

HUNTINGTON MIDDLE SCHOOL BID SET

**Volume 2 of 3
Divisions 02-12**

KELSO SCHOOL DISTRICT

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END OF SECTION

DIVISION 02
EXISTING CONDITIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition of designated equipment and fixtures.
2. Demolition of designated construction and finishes.
3. Removing portions of existing roofing for reroofing.
4. Cutting and alterations for completion of the Work.
5. Protecting items designated to remain.
6. Removing demolished materials.
7. Disconnecting and capping designated utilities.

1.2 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:

1. Indicate demolition and removal sequence.
2. Indicate location and construction of temporary work.

1.3 CLOSEOUT SUBMITTALS

A. Section 017700 - Closeout Procedures: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition and subsurface obstructions.

1.4 QUALITY ASSURANCE

- A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.
- B. Conform to applicable code for procedures when hazardous or contaminated materials are discovered.
- C. Obtain required permits from authorities having jurisdiction.
- D. Perform Work in accordance with local standards.

1.5 PRE-DEMOLITION MEETINGS

A. Section 013119 - Project Meetings: Pre-installation meeting.

- B. Convene minimum one week prior to commencing work of this section.
- C. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

1.6 SCHEDULING

- A. Section 013216 - Construction Progress Schedule: Requirements for scheduling.
- B. Schedule Work to coincide with new construction.
- C. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owners operation and activities in adjoining spaces.
- D. Perform noisy, malodorous, and dusty work in accordance with local jurisdiction requirements.
- E. Coordinate utility and building service interruptions with Owner.
 - 1. Do not disable or disrupt building fire or life safety systems without three days prior written notice to Owner and AHJ.
 - 2. Schedule tie-ins to existing systems to minimize disruption.
 - 3. Coordinate Work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

1.7 LIFE SAFETY PROVISIONS

- A. No enclosure, shield or protective covering shall interfere with the use of an existing emergency exit at any time, unless a temporary exit is substituted and approved by the local Authority Having Jurisdiction (AHJ).
- B. Maintain fully charged, certified (inspected and approved), compliant fire extinguishers and hose racks, as required by the AHJ, readily available during demolition operations.
- C. Post "NO SMOKING" signs and enforce this precaution within the structure and within the AHJ required distance from the structure.
- D. Instruct demolition personnel in fire safety and fire drill policies appropriate for the areas where demolition operations occur.
- E. Deployment, disposition, administration and implementation of any and all safety measures are the sole responsibility of the Contractor.

1.8 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.

- B. Cease operations immediately if structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

PART 2 PRODUCTS - NOT USED.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine existing portions of work indicated to be demolished before demolition.
- B. Determine where removals may result in structural deficiency or unplanned building collapse during demolition. Coordinate demolition sequence and procedures to prevent structures from becoming unstable.
- C. Determine where demolition may affect structural integrity or weather resistance of adjacent buildings.
 - 1. Identify measures required to protect buildings from damage.
 - 2. Identify remedial work including patching, repairing, bracing, and other work required to leave buildings in structurally sound and weathertight and watertight condition.
- D. Verify hazardous material abatement is complete before beginning demolition.

3.2 PREPARATION

- A. Notify affected utility companies before starting work and comply with their requirements.
- B. Mark location and termination of utilities.
- C. Erect, and maintain temporary barriers and security devices, including any warning signs and lights, and similar measures, for protection of the public and Owner existing improvements indicated to remain.
- D. Erect and maintain weatherproof closures for exterior openings.
- E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.
- F. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.
- G. Provide appropriate temporary signage including signage for exit or building egress.
- H. Do not close or obstruct building egress path.
- I. Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to Owner.

3.3 DEMOLITION

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Maintain protected egress from and access to adjacent existing buildings at all times.
- C. Do not close or obstruct roadways or sidewalks without permits.
- D. Cease operations immediately when structure appears to be in danger and notify Architect/Engineer.
- E. Disconnect and remove designated utilities within demolition areas.
- F. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.
- G. Demolish in orderly and careful manner. Protect existing improvements, and supporting structural members.
- H. Carefully remove building components indicated to be reinstalled.
 - 1. Disassemble components as required to permit removal.
 - 2. Package small and loose parts to avoid loss.
 - 3. Mark components and packaged parts to permit reinstallation.
 - 4. Store components, protected from construction operations, until reinstalled.
- I. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- J. The Contractor shall keep work areas cleaned up at all times. Items removed during demolition shall be removed from the site daily. All dirt and debris in the work areas shall be removed daily. Materials that cannot be removed daily shall be stored in areas specified by the Owner's Representative. All dust shall be removed from existing structures, equipment, piping and other items monthly and at the completion of all work. The use of water will not be permitted when it will result in or create a hazardous or objectionable condition such as ice, flooding and pollution. See Section 017419 - Construction Waste Management & Disposal for segregation of materials and recycling requirements. Haul away all remaining materials and dispose of legally. Obtain official receipts of quantities and costs and retain for project records. Upon completion of Work, leave areas in clean condition.
- K. Remove temporary Work.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. General Provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

1.02 SCOPE

- A. This section covers the removal/impact and disposal of asbestos-containing materials (ACMs) from Huntington Middle School as defined by these specifications, hazmat report and drawing sheets H100, H102, H103.
- B. Contractor shall provide all labor, materials, equipment, services, permits and insurance required to complete asbestos abatement procedures as indicated in this Specification.
- C. The methods acceptable for removal and impact of ACMs are described in this Specification.
- D. The Contractor shall refer to the "Good Faith" inspection summary attached to Section 011110, Summary of Hazardous Materials Work, which list suspect materials sampled and analyzed for asbestos content. The Contractor shall ensure that a copy of this letter is made available to and retained on the project site by all subcontractors.

1.03 RELATED WORK

- A. Work performed under this specification section shall be governed by all related specification sections, including, but not limited to, the following:

- Division 0, Contract Requirements;
 - Division 1, General Requirements;
 - Section 011110, Summary of Hazardous Materials Work;
 - Division 2, Existing Conditions:
 - Section 028313, Lead-Hazard Control Activities;
 - Section 028416, PCB-Related Activities.
 - Section 028417, Removal and Disposal of Florescent Lamps;

1.04 DEFINITIONS

- A. Authorized Visitor: The Owner or designated representative, or a representative of any regulatory or other agency having jurisdiction over the project, and having required training, medical, fit test, etc.
- B. Environmental Consultant: Consultant to the Owner specializing in asbestos abatement.
- C. Independent Testing Laboratory: A laboratory financially independent from and hired by the Owner or Contractor which is either AIHA-accredited for asbestos with demonstrated proficiency via the AIHA PAT program, or has analysts proficient in the AIHA AAR program for air sample analysis.
- D. Owner: Representatives designated by the Owner, or designated employees of the Owner.

- E. Work Area: An area where asbestos abatement activities are performed; isolated from non-work areas by negative pressure, containment barriers, decontamination enclosure systems and warning signs.

1.05 DOCUMENTS INCORPORATED BY REFERENCE

- A. The current issue of each document shall govern. Where conflict among requirements or with these Specifications exists, the most stringent requirements shall apply.
 - 1. U.S. Environmental Protection Agency National Emissions Standards for Hazardous Air Pollutants (NESHAPS). (Code of Federal Regulations Title 40, Part 61, Subparts A and B.)
 - 2. U.S. Environmental Protection Agency Office of Toxic Substances Guidance Document, *Guidance for Controlling Friable Asbestos-Containing Materials in Buildings*, EPA Report Number 560/5-85-024 ("Purple Book").
 - 3. U.S. Department of Labor Occupational Safety and Health Administration (OSHA):
 - a. Title 29 Code of Federal Regulations Section 1910.1001--General Industry Standard For Asbestos.
 - b. Title 29 Code of Federal Regulations Section 1910.134--General Industry Standard For Respiratory Protection.
 - c. Title 29 Code of Federal Regulations Section 1910 *et al.*--Occupational Exposure to Asbestos; Final Rule.
 - d. Title 29 Code of Federal Regulations 1926.1101--Construction Standard for Asbestos.
 - e. Title 29 Code of Federal Regulations Section 1910.2--Access to Employee Exposure and Medical Records.
 - f. Title 29 Code of Federal Regulations Section 1910.1200--Hazard Communication.
 - 4. Environmental Protection Agency 40 CFR Part 763, AHERA, Asbestos-Containing Materials in Schools.
 - 5. National Institute for Occupational Safety and Health (NIOSH), 30 CFR, Part II, Respirators.
 - 6. American National Standards Institute (ANSI) NY; ANSI Standard Z 88.2-1980 *American National Standards Practice for Respiratory Protection*, latest edition.
 - 7. CERCLA, Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. 9601 et.seq.)
 - 8. RCRA, Resource Conservation and Recovery Act.
 - 9. Washington State General Occupational Health Standards, WISHA Chapter 296-62 Washington Administrative Code (WAC); Chapter 296-65 WAC Asbestos Removal & Encapsulation; Chapter 296-155 WAC Safety Standards for Construction Work.
 - 10. Washington Industrial Safety and Health Act (WISHA).

11. International Building Code (I.B.C.), latest edition, regulations as applicable.
12. Electrical work shall be performed in accordance with the National Electrical Code.
13. All local ordinances, regulations, or rules pertaining to asbestos, including its storage, transportation, and disposal.

1.06 SUBMITTALS AND NOTICES

- A. Requirements for submittals are described in Section 01 11 10 and these specifications. The requirements in this section pertain to asbestos-containing materials removal.
- B. Initial Submittal: Contractors shall submit the following information 5 days prior to beginning work on the project:
 1. Work Plan: Include a detailed plan including a schedule of the procedures proposed for use in complying with the regulatory requirements.
 2. Notifications and Policies: Submit copy of all required emergency notifications and permits obtained by the contractor (including but not limited to Washington State Department of Labor and Industries and copies of all types of specified bonds and insurance. Submit upon receipt any approved amendments to notifications or re-notifications for multi-phase activities.
- C. Periodic Submittals
 1. Asbestos Training: Upon verbal request, immediately make available to the Environmental Consultant proof of Asbestos Worker Certification or Asbestos Supervisor Certification. Provide copies of worker training certification to the Owner upon request.
 2. Work Plan modification/clarification: In the event that on-site activities will require departure from any and all aspects of the information outlined in the pre-approved Work Plan, submit written clarification/modification of proposed changes to the Owner and Environmental Consultant.
 3. Disposal Manifests: Submit copies of all asbestos waste transportation and disposal manifests including signed receipts from the landfill, and chain-of-custody within 5 working days of removal offsite. Monthly pay application will not be approved unless this documentation has been approved.
- D. Post-Job Submittals shall be delivered to the General Contractor within 15-days of completion of asbestos-related work as specified by these Contract Documents and shall include the following:
 1. Certification: Provide written certification from the Abatement Contractor's Project Manager or Supervisor that Contractor has fully inspected the work area and completed work in strict accordance with the Specifications.
 2. Air Monitoring: Submit documentation of all employee personal air monitoring results relative to OSHA and WISHA respiratory protection level compliance. Include copies of all air monitoring data sheets, chain-of-custody documentation and analysis reports for

sampling conducted at the site.

3. Project Record Documents: Provide project records including documentation of all contract changes, and copies of worksite entry logs, work area entry/exit logs, safety logs, safety meeting sign-in sheets, and supervisor's daily field reports.
4. Disposal Manifests: Submit final copies of all asbestos waste transportation and disposal manifests including signed receipts from the landfill, and chain-of-custody.

1.07 PERSONNEL PROTECTION

A. Training

1. Prior to commencement of work, Contractor shall ensure all workers have been trained as specified in WAC Chapter 296-65.
2. The Contractor shall provide and post decontamination, respirator, and work procedures to be followed by the workers.

B. Personnel Protective Equipment for Asbestos Removal

1. Provide protective clothing and equipment per WAC 296-62.

1.08 AIR MONITORING BY CONTRACTOR

A. Industrial Hygienist: An Independent Testing Laboratory shall be retained by the Contractor for PCM sample analysis. All analysis shall be performed by or supervised by an Industrial Hygienist. The analyst must be experienced and trained in asbestos sampling and analysis. At a minimum, documentation of prior asbestos sampling and analysis experience, plus satisfactory completion of the NIOSH 582 course or equivalent will be required. Air sample collection may be performed by an Industrial Hygienist or the Contractor's foreman at the Contractor's option. The Contractor shall perform sampling and analysis of air samples for asbestos in compliance with WAC Chapter 296-62-07735, Appendix A-WISHA reference method.

B. Contractor's Sampling During Abatement

1. Sample Collection: Air monitoring shall be performed to determine worker exposure during the period of asbestos abatement in each work area. Collect and analyze asbestos air samples prior to abatement, inside the work area, outside the work area, at HEPA exhaust and after visual inspection. Samples are to be taken where Class I or II work is being conducted during each 8-hour work shift until abatement is complete.

1.09 AIR MONITORING BY OWNER

A. The Owner reserves the right to monitor Contractor's performance via air samples periodically throughout the project, including: on abatement workers, inside and outside the work area, at the HEPA exhaust and after visual inspections in addition to the Contractor's air monitoring.

1.10 PERMITS AND NOTIFICATIONS

- A. The Contractor is responsible for obtaining all permits and notifications as required for the completion of the work by the Washington State Department of Labor and Industries, the U.S. E.P.A., the Department of Ecology and any other permitting agency involved with the completion of the work included herein.
- B. The Contractor shall notify the Owner in writing a minimum of 72 hours prior to commencing any hazardous material-related work at the project site.
- C. The contractor shall notify the environmental consultant a minimum of 48 hours prior to visual inspections and clearance testing.

1.11 PERSONNEL TRAINING

- A. All personnel accomplishing removal or impacting asbestos-containing materials shall have received the minimum training as required by the Washington State Department of Labor and Industries for the work to be performed. At a minimum, the supervisor shall be the bearer of a current "Certified Asbestos Supervisor Certificate" issued by the Washington State Department of Labor and Industries.

1.12 LIABILITY

- A. The Contractor is an independent contractor and not an employee of the Owner or Environmental Consultant. The Owner and the Environmental Consultant shall have no liability to the Contractor or any third persons for Contractor's failure to faithfully perform and follow the provisions of these Specifications and the requirements of the governing agencies. Notwithstanding the failure of the Owner or the Environmental Consultant to discover a violation by the Contractor of any of the provisions of these Specifications, or to require the Contractor to fully perform and follow any of them, such failure shall not constitute a waiver of any of the requirements of these Specifications which shall remain fully binding upon the Contractor.

1.13 QUALITY ASSURANCE

A. On-Site Observation

1. Post Removal: Environmental Consultant shall perform visual inspections after the removal of asbestos-containing materials is complete. Visual Inspections shall be performed according to ASTM Standard E 1368, Standard Practice for Visual Inspection of Asbestos Abatement Projects. The Contractor shall assist the environmental consultant with the visual inspection.
2. Observation: Environmental Consultant shall perform periodic onsite observations regarding: integrity of isolation barriers, decontamination facilities, worker protection, Contractor's air monitoring program, performance of abatement operations, and conformance to the Specification, EPA, OSHA, WISHA and Department of Ecology regulations.
3. Stop Work: Environmental Consultant shall notify the Contractor in writing to stop work if the Environmental Consultant determines that work practices are in violation of regulations, these Specifications or work is endangering workers or occupants of the building. The Contractor shall continue work when conditions and actions are corrected and when written authorization is received from the Environmental Consultant.

4. Environmental Consultant shall attend progress meetings as requested the Owner.
- B. Performance: Work shall be performed in a skillful manner representing industry standards. Environmental Consultant shall require Contractor to remove from the work site employees and subcontractors the Environmental Consultant deems incompetent, careless or objectionable.

PART 2 - PRODUCTS

2.01 PROTECTIVE CLOTHING AND EQUIPMENT

- A. Protective Clothing: Provide approved clothing per WAC 296-62 for all workers and all official representatives of the Owner, State or other governmental entity, and the Environmental Consultant who may inspect or visit the project.
- B. Respirators: At a minimum, respiratory protection shall be approved by NIOSH (National Institute for Occupational Safety and Health, in accordance with WAC Chapter 296-62-071. Respiratory protection shall provide workers with a maximum calculated fiber level inside the mask of 0.01 f/cc.
- C. Selection: As part of the Contractor's Respiratory Protection Program, all workers shall be provided with a selection of brands and sizes of respirators to choose from. At a minimum, all workers shall be quantitatively or qualitatively fit-tested at the time of respirator selection per WAC Chapter 296-62-07715.
- D. Contractor shall supply replacement filter cartridges as required. Cartridges, which have become wet or clogged, shall be replaced immediately.
- E. Contractor shall provide personal protective equipment and supplies to the Environmental Consultant and authorized visitors for use on the site.
- F. Air-purifying Equipment: Air-purifying equipment shall consist of High-efficiency Particulate Air (HEPA) filtration systems. No air movement system or air equipment shall discharge asbestos fibers outside the work area. Each unit shall be capable of variable volume from a minimum of 500 CFM to at least 1700 CFM under load and shall have at least 2 stages of pre-filtration ahead of the HEPA final filter. Each unit shall be equipped with an elapsed time indicator (hour meter), static pressure gauge with low flow alarm, and be overload protected. At the Contractor's option, each unit shall be equipped with heat and smoke sensors, which will visually and audibly warn workers and shut unit fan down within 30 seconds. The units shall be: Micro-Trap Portable Air Filtration System manufactured by Asbestos Control Technology, Inc. or approved equal.
- G. Water-purifying Equipment: Capable of removing all fibers longer than 5 microns or as required by local regulations from water used in abatement work and decontamination showers. Control Resource Systems, Inc. "AQUA-HOG" or approved equal.
- H. Vacuum Equipment: all vacuum equipment utilized in the work area shall be High-efficiency Particulate Air (HEPA) equipment, and suitable for wet/dry usage.
- I. Scaffolding: Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations including WAC Chapter 296-155-475 to 48536. Special

scaffolding shall have drawings and calculations stamped and signed by a civil or structural engineer registered in the State of Washington.

- J. Transportation Equipment: Transportation equipment, as required, shall be suitable for loading, temporary storage, transit, and unloading of contaminated waste without exposure to persons or property. Equipment shall have a hard bottom and sides. If equipment is rented, notify rental agency in advance, in writing, of intended use of equipment.
- K. Electrical: Electrical tools, equipment and lighting shall meet all applicable codes and regulations, including WAC Chapter 296-155-426 to 462. Ground fault protection as required by OSHA, shall be in effect at all times. Contractor shall take all additional precautions and measures necessary to ensure a safe working environment during wet removal. Glove Bags: Bags shall be clean poly bags, seamless at the bottom, with pre-printed asbestos warning labels, 6-mil PVC with attached TYVEK arms and latex gloves. Bags shall be "Profo' Bag" manufactured by Asbestos Control Technology, Inc., or "Asbest'O'Saf/SAC" by Control Resource Systems, Inc., or approved equal.
- L. Remote Filter Housing: Stainless steel housing with pre-filters and HEPA filter sealed to cabinet flanges by Century Equipment "Advance Guard II" or approved equal.
- M. Other Tools and Equipment: Provide other suitable tools for the removal, enclosure, encapsulation, patching, and disposal activities including but not limited to: hand-held scrapers, wire brushes, sponges, and rounded-edge shovels.
- N. Lighting: Provide adequate lighting for safe execution of work and for Environmental Consultant to perform visual inspections of work areas.
- O. Pre-manufactured Remote Decontamination Facility: Remote decontamination facilities shall be in compliance with all applicable state, federal and local codes and regulations and function in accordance with these specifications.

2.02 MATERIALS

- A. Encapsulants (Sealants): Encapsulants shall be rated as "Acceptable" using the test method described in the EPA document published as National Technical Information Service report PB 88-113 329/AS [available from NITS, 5825 Port Royal Road, Springfield, VA 22161.] (The report is summarized in EPA publication EPA/600/S-87/091 [available from Center for Environmental Research Information, EPA 26 Martin Luther King, Cincinnati, OH 45268].)
- B. Plastic Sheeting: Plastic sheeting shall be polyethylene material, minimum thickness of 6-mil, sized in lengths and widths to minimize the frequency of joints. Exterior applications require reinforced plastic sheeting.
- C. Plastic Bags: Plastic bags shall be 6-mil polyethylene printed with warning labels with waterproof print and permanent adhesive in accordance with WAC Chapter 296-62-07721, OSHA, DOT and EPA regulations. Permanently mark the label with the date the material was collected for disposal, the name of the waste generator, the name and affiliation of the certified asbestos supervisor, and the location at which the waste was generated.
- D. Tape: Tape shall be capable of sealing joints of adjacent sheets of plastic and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under dry and wet conditions, including use of amended water. Minimum of 2" wide

tape must be used. Do not use polyethylene tape.

- E. Disposal Containers: Disposal containers shall be suitable to receive and retain any asbestos-containing or contaminated materials until disposal at an approved site. The containers shall be labeled with waterproof print and permanent adhesive in accordance with WAC Chapter 296-62-07721, OSHA, DOT and EPA regulations. Permanently mark the label with the date the material was collected for disposal, the name of the waste generator, the name and affiliation of the certified asbestos supervisor, and the location at which the waste was generated. Containers must be both airtight and watertight, and have hardtop, bottom and sides.

- F. Warning Labels: Warning labels on plastic bags and disposal containers shall include the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD
AVOID BREATHING AIRBORNE ASBESTOS FIBERS

- G. Warning Signs: Warning signs shall be provided and displayed at each regulated area in accordance with WAC Chapter 296-62-07721. Warning signs shall include the following information:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

- H. Amended Water: Clean potable water containing a surfactant additive. The surfactant additive shall be 50% polyoxyethylene ether and 50% polyethylene ester, or equivalent, and shall be mixed with water at a concentration of one ounce surfactant to 5 gallons of water, or as recommended by the manufacturer in the case of an equivalent.
- I. Other Materials: Provide materials such as lumber, nails and hardware, which may be required to construct and dismantle the decontamination area and barriers isolating the work area.
- J. Spray Glue: Spray glue shall be a heavy duty adhesive in aerosol can, "CDC Spray Glue" as manufactured by AMREP, Inc., or approved equal.
- K. Chemical mastic removal agents: Chemical removal agents will not be permitted.

PART 3 - EXECUTION

3.01 WORK AREA PREPARATION

A. Worker Decontamination Facilities

1. Worker Decontamination Enclosure System: The Contractor shall construct a personnel decontamination facility immediately outside of isolated work areas consisting of three

chambers and two air locks in compliance with WAC Chapter 296-62-07719.

B. Modified Worker Decontamination Enclosure System

1. At entrances to non-isolated work areas the Contractor shall construct a personnel decontamination enclosure system or area consisting of plastic sheeting barriers with a HEPA vacuum and a water source. The system shall include a decontamination area where workers can remove contaminated protective clothing, decontaminate themselves and change into street clothing.
2. Contractor shall not begin asbestos abatement work unless this system is functional, in good repair, and has been found acceptable for specification compliance by the Environmental Consultant.

C. Access to Work Area by Others

1. Except for emergency personnel, the Contractor shall limit access to the work area to authorized visitors.
2. The Contractor shall provide protective clothing, respirators and equipment for all authorized visitors, as specified.
3. All authorized visitors shall be subject to the personnel protection provisions specified above, and shall sign in and out on the Worksite Entry Logbook.
4. During phases where building occupants have access to adjoining areas, entrances to asbestos abatement work areas shall include a solid lockable door. This door shall be locked when the abatement contractor is not on site.

D. Personnel Protection during Work in Isolated Work Areas

1. Work clothes and respiratory protection as described on page 4.
2. Each worker shall, upon entering the jobsite: Remove street clothes in the clean change room, put on and fit-test his respirator, put on clean protective clothing and sign in on the Worksite Entry Logbook before entering the equipment room or the work area.
3. Workers shall, each time they leave the work area: remove gross contamination from clothing before leaving the work area; proceed to the equipment room and remove and dispose of disposable work clothes; remove and store shoes, boots and other equipment except respirators; still wearing the respirator proceed to the showers; clean the outside of the respirator with soap and water while showering; remove the respirator; thoroughly shampoo and wash themselves; remove filters, dispose of filters in the container provided for the purpose; and wash and rinse the inside of the respirator.
4. Following showering and drying off, each worker shall proceed directly to the clean change room and dress in clean clothes at the end of each day's work, or before eating, smoking, or drinking. Before re-entering the work area from the clean change room, each worker shall put on his respirator with clean filters, dress in clean protective clothing, and sign in on the Worksite Entry Logbook.
5. Contaminated work footwear and other equipment shall be stored in the equipment room

when not in use in the work area. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from work area.

6. Workers shall not eat, drink or chew gum at the worksite except in the established clean room. Smoking or using other tobacco products is prohibited.
7. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos-containing or contaminated material and until final cleanup is completed.
8. Personnel Protection During Work in Non-Isolated Work Areas.
9. Work clothes and respiratory protection as described on page 6.
10. Clothing: Workers shall wear two layers of coveralls after removal of street clothes. Worker decontamination will consist of personal decontamination in a regulated area over drop plastic sheeting with a HEPA vacuum and wet methods. The first layer of coveralls must be removed when exiting the work area.
11. Workers shall not eat, drink or chew gum at the worksite except in the established clean room. Smoking or using other tobacco products is prohibited.
12. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos-containing or contaminated material and until final cleanup is completed.

E. Emergency Precautions

1. Emergency Exits: The Contractor shall establish emergency and fire exits from the work area. Contractor shall ensure these exits are well marked and remain unobstructed.
2. First Aid: The Contractor shall be prepared to administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated without delay for decontamination.
3. Fire Department: Contractor shall notify the local fire department of the asbestos abatement project prior to beginning work area preparation.
4. Contractor shall provide fire extinguishers at all abatement work areas.

F. Building Security and Protection

1. The Contractor shall post adequate warning signs at all potential entrances to work areas.
2. Power Failure: Contractor shall notify Owner immediately when a power failure occurs. Asbestos abatement work will stop and the work area will be misted with water. If power failure exceeds 15 minutes, workers shall use appropriate personnel decontamination procedures and shall seal the work area. Precautions to prevent visible emissions will be performed under the direction of the Environmental Consultant.
3. Contractor shall clean external surfaces of contaminated containers and equipment

thoroughly by wet sponging and HEPA vacuuming.

3.02 REMOVAL OF ASBESTOS-CONTAINING MATERIALS

- A. Perform all asbestos related work and comply with the general safety and health provisions in conformance with 29 CFR 1910.1001 and 29 CFR 1910.20, respectively. Remove and properly dispose of all asbestos-containing materials indicated to be removed in the Contract Documents in accordance with general work practices, and work practices for removal and encapsulation as specified in 40 CFR Part 61, 29 CFR 1926.1101, and other appropriate work procedures approved by the Environmental Protection Agency (EPA), Washington Department of Labor and Industries, and the Department of Ecology.
- B. The Certified Asbestos Supervisor shall conduct a post removal visual inspection to ensure that all ACMs have been removed and properly disposed and the work area is visually clean, prior to notifying the Environmental Consultant. The Owner will be responsible for the cost of the initial post abatement visual inspection by the Environmental Consultant. The cost of all visual re-inspections by the Environmental Consultant will be the responsibility of the Contractor.

3.03 DISPOSAL

- A. Regulations: The Contractor shall determine current waste handling, transportation, and disposal regulations for the work site and for each waste disposal landfill. The Contractor must comply with these regulations and U.S. Department of Transportation and EPA requirements. Double-bagged material in containers shall be delivered to the predesignated disposal site.
- B. Transport: Contractor shall remove decontaminated containers from site within ten calendar days after collection for disposal at a waste disposal site operated in accordance with the provisions of 40 CFR 61.156. Notify disposal site in advance of delivery to ensure immediate disposal. Maintain chain-of-custody until accepted by the landfill.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. General Provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

1.02 SUMMARY OF WORK

- A. General work items include, but are not limited to:
 - 1. Compliance: Activities requiring compliance with this Section include but are not limited to, manual demolition, cutting, sawing, sanding, welding, torch burning, and mechanical demolition of building components with lead-containing paint as defined in these specifications. Based on testing the Owner assumes all painted components to be lead-containing. The Contractor shall perform activities involving lead-containing paint in compliance with WAC 296-155 and this Section.
 - 2. Handling: All activities involving lead-containing paint shall be conducted in accordance with current applicable state and federal regulations including WAC 296-62-07521: "Lead"; WAC 296-155-176: "Occupational Health and Environmental Control"; and 29 CFR 1926.62: "Lead Exposure in Construction- Interim Final Rule".
 - 3. Monitoring: Monitoring of airborne concentrations of lead shall be in accordance with WAC 296-155-176. Exposure monitoring of initial work activities on lead materials will provide information for the Environmental Consultant to determine effectiveness of engineering, work practice and administrative controls. This initial assessment will dictate future lead related activities. The intent of this Section is to reduce and maintain employee exposure to lead at or below the permissible exposure limit.

1.03 RELATED SECTIONS

- A. Work performed under this specification section shall be governed by all related specification sections, including, but not limited to, the following:

- Division 0, Contract Requirements;
 - Division 1, General Requirements;
 - Section 011110, Summary of Hazardous Materials Work;
 - Division 2, Existing Conditions:
 - Section 028213, Asbestos Abatement.;
 - Section 028416, PCB-Related Activities.
 - Section 028417 Removal and Disposal of Florescent Lamps;

1.04 SUBMITTALS

- A. Submit three (3) copies of the following "Pre-Work Submittals" at least 5 working days prior to start of work. The Work may not proceed until complete Pre-Work Submittal package has been reviewed and approved by the Architect's Consultant.

1. Lead Compliance Program and Work Plans: Submit a site-specific lead compliance program in accordance with WAC Chapter 296-155. The plan shall be developed and implemented to provide engineering, work practice and administrative controls to reduce and maintain employee exposure to lead at or below the permissible exposure limit. The plan will include at a minimum a description of air monitoring plan; detailed schedule; work practice program; administrative controls and other relevant information.

B. Final Submittals:

1. Post-Job Submittals submittal shall be delivered to the Environmental Consultant within 15-days of completion of work.
2. Air Monitoring: Submit copies of all air monitoring data collected as part of the initial exposure assessment for workers impacting lead-containing materials. Submit documentation of all employee personal air monitoring results relative to OSHA and WISHA respiratory protection level compliance. Include copies of all air monitoring data and analysis reports conducted at the site.
3. Disposal Manifests: Submit copies of all lead waste disposal transportation and disposal manifests including signed receipts from the disposal facility, and chain-of-custody documentation.
4. Final payment will be issued by the Owner only with written approval, by the Owner's Environmental Consultant, of post-job submittals.

1.05 AIR MONITORING

- A. Testing Laboratory: An Independent Testing Laboratory shall be retained by the Contractor for all lead air *analysis*. All exposure monitoring analysis shall be performed in accordance with 29 CFR Part 1926.62 and WAC Chapter 296-155. The laboratory must participate in the ELPAT Program and be a member of AIHA. Air sample collection may be performed by an Industrial Hygienist or the Contractor's trained supervisor at the Abatement Contractor's option.
- B. Sample Documentation: Documentation shall be kept for each filter sample procured as to worker sampled, social security number, activity, work area location, date and time taken, volume of air drawn through filter, pump identification number and calibration. Documentation shall indicate in what areas tests were taken and shall clearly indicate the specified maximum allowable levels for each area tested. Report and submit all air monitoring data within 48 hours, prepare laboratory chain-of-custody records along with all samples.
- C. Analysis Procedures: The samples shall be collected on 37 mm filters and analyzed within 24 hours using NIOSH Analytical Method No. 7105 or 7082. The containers shall be clearly labeled with project name and Sample Number and shall become property of the Owner at work completion at the Owner's request.
- D. Submittals: The Abatement Contractor's laboratory shall submit sample analysis results, chain-of-custody and equipment calibration records prior to application for payment.

E. Contractor's Sampling During Lead-Related Activities:

1. Initial exposure: Exposure monitoring shall be performed during impact of representative lead-painted building components per WAC 296-155.
2. Most Contaminated Worker: The Contractor shall determine which worker(s) in each work area is probably experiencing the most severe exposure. This is the "Most Contaminated Worker(s)". 8-hour time weighted average samples shall be collected on this worker(s). Worker shall wear a personal sampling pump and the sample shall be drawn from this worker's breathing zone.
3. Number of samples: The number of air samples collected shall be as defined in the approved Lead Compliance Program. Historical measurements may be used to satisfy continuing exposure assessment requirements.

F. Work Area Monitoring

1. Environmental Consultant: The Owner's Environmental Consultant has not collected and analyzed lead waste disposal (TCLP) samples. The Contractor shall test the waste stream prior to disposal.
2. Monitoring: Kelso School District reserves the right to monitor Contractor's performance via air, dust wipe and TCLP samples during lead related activities, in addition to the Contractor's exposure monitoring and testing. Sampling performed by the Environmental Consultant will not be available for use as the Contractor's Initial Exposure Assessment.

1.06 LIABILITY

- A. The General Contractor is an independent contractor and not an employee of the Owner, Architect or Environmental Consultant. The Owner, Architect and the Environmental Consultant shall have no liability to the Contractor or any third persons for Contractor's failure to faithfully perform and follow the provisions of these Specifications and the requirements of the governing agencies. Notwithstanding the failure of the Owner, Architect or the Environmental Consultant to discover a violation by the Contractor of any of the provisions of these Specifications, or to require the Contractor to fully perform and follow any of them, such failure shall not constitute a waiver of any of the requirements of these Specifications which shall remain fully binding upon the Contractor.

PART 2 - PRODUCTS

2.01 PROTECTIVE CLOTHING AND EQUIPMENT

- A. Personnel Protective Equipment for lead related activities shall be provided per WAC 296-155.

PART 3 - EXECUTION

3.01 REMOVAL AND DISPOSAL PROCEDURES

A. Demolition and Component Removal Procedures:

1. Before beginning any lead-related activities the contractor shall provide the environmental consultant with 72 hours prior notice.
2. Set-up Activities: Prior to removal/impact of lead-containing painted components, the Contractor shall cover the ground below the work area with 6-mil plastic sheeting or equivalent. The drop-sheeting shall extend outward a minimum of 6 feet from the location of item(s) being removed/impacted. Any tears that occur in the drop-sheeting shall be immediately repaired with duct tape or other acceptable seal. Debris shall be collected with a wet/dry vacuum to avoid escape from the drop-sheeting. Wash water shall be retained on the drop-sheeting and removed by mops or wet/dry vacuums. The residue/debris and water shall be placed in storage drums for testing prior to disposal. See paragraph 3.1.3 for testing requirements.
3. Perform removal of lead-containing painted components or activities impacting lead-containing painted components in accordance with approved lead work plan. Use procedures and equipment required to limit occupational and environmental exposure to lead when lead-containing paint is impacted. The procedures employed by the Contractor shall not create the potential for contaminating surrounding areas or materials with lead-containing dust. Dust generation shall be minimized at all times.
4. At completion of the above operations, HEPA vacuum drop-sheeting to remove any paint particles or debris. Wet wash plastic sheeting to remove all dust. Request area inspection by the Environmental Consultant.
5. Negative Exposure Assessment: The Contractor may waive the requirement of a negative pressure enclosure when using mechanical methods upon submittal of data to the Environmental Consultant indicating a negative exposure assessment has been completed per WAC 296-155 and paragraph 1.5, Air Monitoring.

B. Housekeeping: Maintain all surfaces as free as practicable of accumulations of lead and perform clean-up of work areas as necessary according to WAC 296-155-17617.

C. Water and Debris Testing

1. It is recommended that the water collected with wet/dry vacuums be HEPA filtered to remove paint and debris chips. The paint and debris chips shall be placed in a separate drum for testing. No rinse water shall be discharged without testing.
2. Debris Testing: Contractor is responsible for TCLP sampling to determine disposal requirements of demolition debris under WAC 173-303, Dangerous Waste.
3. Water Testing: Stir the water in the drum and immediately obtain a 12-liter-size sample from each drum of water to be disposed of. If a laboratory test (EPA Lead 7241) indicates lead levels below 2.0 ppm discharge to the Sanitary Sewer is permitted. When tests show higher levels, dilute the water until tests show levels are acceptable for discharge.

D. Disposal Procedures:

1. The Contractor shall be responsible for disposal of lead-containing debris produced by work impacting lead-containing painted coatings according to applicable local, state and federal regulations.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

1.2 SCOPE

- A. Contractor shall provide all labor, materials, equipment, services, permits and insurance required to complete the removal transport and proper disposal of polychlorinated biphenyl (PCB)-containing light ballasts.

1.3 RELATED WORK

- A. The Contractor shall coordinate with the following related sections:

Division 0, Contract Requirements;

Division 1, General Requirements;

Section 011110, Summary of Hazardous Materials Work;

Division 2, Existing Conditions:

Section 028213, Asbestos Abatement;

Section 028313, Lead-Hazard Control Activities;

Section 028417, Removal and Disposal of Florescent Lamps;

1.4 DEFINITIONS

- A. Authorized Visitor: The Owner or designated representative, or a representative of any regulatory or other agency having jurisdiction over the project, and having required training, medical approval, fit test, etc.
- B. Controlled Area: Area which only qualified and properly protected workers or authorized visitors have access.
- C. Decontamination Area: enclosed area adjacent and connected to controlled/ regulated work area, consisting of an equipment room and clean room, which is used to decontaminate workers, materials, and equipment. Where PCB removal is done in conjunction with asbestos or lead abatement the decontamination area for asbestos or lead may be used for this purpose.
- D. Disposal: Procedures necessary to transport and deposit the PCB materials in an approved waste disposal site in compliance with EPA and other applicable regulations.
- E. Environmental Consultant: Environmental consultant specializing in hazardous materials abatement.
- F. SDS: Safety Data Sheet supplied by manufacturer provides information on a product listed in OSHA 29 CFR 1910.1200(g)(2).

- G. Polychlorinated Biphenyls (PCBs): A class of chlorinated hydrocarbon compounds containing a variable number of chlorine atoms. Commercially available products contain mixtures of as many as 40 to 70 PCB compounds (isomers). A compound containing more than 50 ppm of PCBs is considered to be PCB-containing. PCBs range from oily liquids to white, crystalline solids to hard, non-crystalline resins or waxy solids.
- H. PCB Bulk Product Waste (PCB-BPW): A category of waste defined in 40 CFR 761.3 as non-liquid wastes or debris from the demolition of building and other man-made structures manufactured, coated, or serviced with PCBs, including waste derived from caulk or paint containing PCBs greater than or equal to fifty parts per million
- I. Waste Shipment Records: Form similar to *Uniform Hazardous Waste Manifest*, or an EPA approved state form.

1.5 DOCUMENTS INCORPORATED BY REFERENCE

- A. The current issue of each document shall govern. Where conflict among requirements or with these Specifications exists, the most stringent requirements shall apply.
 - 1. U.S. Environmental Protection Agency Toxic Substance Control Act, TSCA, (Code of Federal Regulations Title 40, Part 761)
 - 2. U.S. Environmental Protection Agency Office of Toxic Substances Guidance Document, *Summary of PCB Regulations*, EPA Document No. 910-S-94-002.
 - 3. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), 40 CFR 1910.120.
 - 4. RCRA, Resource Conservation and Recovery Act, 40 CFR Part 761, Subpart D.
 - 5. Washington State Department of Ecology, Dangerous Waste Regulations, Chapter 173-303 WAC

1.6 SUBMITTALS AND NOTICES

- A. Contractors shall submit the following information 10 days prior to beginning work:
 - 1. WORK PLAN. Submit a written "work plan" satisfactory to the Owner and Environmental Consultant describing the schedule for PCB abatement, methods and work practices and worker protection. The work plan shall also include decontamination procedures and plans for a decontamination area. Also include emergency control and cleanup procedures and emergency phone number(s).
 - 2. DISPOSAL PLAN. Submit written proof that all required arrangements have been made the disposal/recycling facility.
- B. Prior to making final application for payment the Contractor shall submit Waste Shipment Records completely filled out and signed by all handlers.

- C. Refer to EPA, OSHA, and other standards referenced herein for further information and regulatory requirements not included above.

1.7 PERSONNEL PROTECTION

A. Personnel Protective Equipment for PCB Removal

1. Worker personal protective equipment (PPE) shall consist of PCB-resistant gloves and clothing. Eye, hearing, head and fall protection as necessary.
2. Half-face mask, negative-pressure respirator with disposable chemical vapor cartridge. Protection factor: 10. Additional HEPA filter cartridges for particulates including asbestos and lead shall be available for use in areas where these materials are present.
3. Provide additional personnel and respiratory protection to minimize any possible exposure from inhalation.

B. Worker Decontamination Area

1. Where PCB abatement is performed in conjunction with asbestos, lead abatement or other hazardous materials abatement, a multiple use decontamination area shall be established.
2. The Contractor shall provide a decontamination/emergency clean up area consisting of PCB-resistant sheeting (drop cloth) with absorbent material and other necessary equipment. Washing facilities with hot water and cleanser that is capable of removing oily compounds without injury to human skin.

1.8 SAFETY

- A. With regard to the work of this contract, the safety of the Contractor's employees, the Owner's employees, and the public is the sole responsibility of the Contractor.

1.9 LIABILITY

- A. The Contractor is an independent contractor and not an employee of the Owner, Architect or Environmental Consultant. The Owner, Architect and the Environmental Consultant shall have no liability to the Contractor or any third persons for Contractor's failure to faithfully perform and follow the provisions of these Specifications and the requirements of the governing agencies. Notwithstanding the failure of the Owner, Architect or the Environmental Consultant to discover a violation by the Contractor of any of the provisions of these Specifications, or to require the Contractor to fully perform and follow any of them, such failure shall not constitute a waiver of any of the requirements of these Specifications which shall remain fully binding upon the Contractor.

1.10 QUALITY ASSURANCE

- A. Environmental Consultant shall perform periodic inspections to observe work, handling and packaging procedures. Environmental Consultant may perform surface and air testing for PCBs to determine possible contamination and exposure and verify that PCB levels are not exceeded.

- B. Environmental Consultant shall notify the Contractor in writing to stop work if the Environmental Consultant determines that work practices are in violation of the Specifications or work is endangering workers and occupants of the building. The Contractor shall continue work when conditions and actions are corrected and when written authorization is received from the Environmental Consultant.

1.11 LIMITS

- A. The Contractor shall limit PCB levels as follows:
 - 1. Airborne concentrations below $1 \mu\text{g}/\text{m}^3$ (microgram per cubic meter) or pre-abatement background levels, where available.
 - 2. Concentrations below $10 \mu\text{g}/\text{cm}^2$ (microgram per square centimeter) on building surfaces.

PART 2 - PRODUCTS

2.1 PLASTIC SHEET

- A. Plastic sheeting shall be flame-retardant polyethylene material. It shall not dissolve on contact with PCB compounds or any chemicals used by the contractor for abatement/decontamination. The minimum thickness shall be 6-mil.

2.2 STORAGE CONTAINERS

- A. Storage containers shall be suitable to receive and retain any PCB-containing or contaminated materials disposal or incineration at an approved site. They shall comply with container specifications set forth in 49 CFR 178.80, 178.82, 178.102 or 178.116. Containers shall be labeled with waterproof print and permanent adhesive in accordance with WAC, OSHA, DOT and EPA regulations.

2.3 WARNING LABELS

- A. Labels on all disposal containers/drums shall be according to EPA Region 10 Toxic Substances Section, PCB Regulations (M_L).

2.4 WARNING SIGNS

- A. Unless other signs or security access is provided, warning signs shall be provided and displayed at each regulated area to warn of the presence of PCBs.

PART 3 - EXECUTION

3.1 WORK AREA PREPARATION

- A. Where the work area containment requirements are determined by abatement of other hazardous materials, the Contractor shall perform PCB abatement within existing containments.
- B. Where no other hazardous materials abatement is performed in conjunction with the PCB abatement prepare the work area as follows:
 - 1. Contractor shall isolate the work area from unauthorized, unqualified and unprotected persons. At a minimum, warning signs indicating the presence of PCBs and danger tape shall be used. Whenever possible, doors should be closed to further reduce unauthorized access.
 - 2. An approved disposable floor covering (i.e. plastic sheeting) shall be kept beneath the work and in areas of dismantling, consolidation or packaging.
 - 3. An approved worker decontamination area.

3.2 REMOVAL AND DISPOSAL OF PCB-CONTAINING WASTE

- A. Contractor shall isolate work area and perform work at times and in a manner that will not result in the release or discharge of PCBs or the exposure to employees or other building occupants.
- B. Contractor shall carefully handle light ballasts and shall not break, drop, throw or otherwise damage the ballasts. All disposal shall be performed in strict accordance with WAC 173-303 and EPA TSCA.
- C. Where leaking light ballasts are observed, the Contractor shall thoroughly clean the light fixture and building areas where PCB-laden oils spill. The Contractor shall notify the owner of observed leaks.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. General Provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

Division 0: Bidding and Contract Requirements;

Division 1: General Requirements;

Section 011110 Summary of Hazardous Materials Work

Division 2: Existing Conditions:

Section 028213, Asbestos Abatement;

Section 028313, Lead-Hazard Control Activities;

Section 028416, PCB-Related Activities.

1.02 SCOPE

- A. Contractor shall provide all labor, materials, equipment, services, permits and insurance required to complete the removal and proper recycling/disposal of mercury-containing fluorescent lamps.

1.03 DEFINITIONS

- A. Authorized Visitor: The Owner or designated representative, or a representative of any regulatory or other agency having jurisdiction over the project, and having required training, medical approval, fit test, etc.
- B. Controlled Area: Area which only qualified and properly protected workers or authorized visitors have access.
- C. Destination Facility: A facility that treats, disposes of, or recycles universal waste. Facilities treating universal waste as allowed under 40 CFR 273.13, 273.33 or WAC 173-303-573 are not considered to be destination facilities. A facility at which universal waste is only accumulated, is not a destination facility for purposes of managing universal waste.
- D. Electric Lamp: The bulb or tube portion of a lighting device specifically designed to produce radiant energy, most often in the ultraviolet (UV), visible, and infra-red (IR) regions of the electromagnetic spectrum. Examples of common electric lamps include, but not limited to incandescent, fluorescent, high intensity discharge, and neon lamps.
- E. Environmental Consultant: Environmental consultant specializing in hazardous materials abatement.
- F. Mercury-Containing Lamp: An electric lamp in which mercury is purposely introduced by the manufacturer for the operation of the lamp.
- G. Off-site Collection Site: A site that receives and accumulates universal waste from off-site.
- H. Universal Waste: Any waste that is a universal waste listed in 40 CFR 273.1 and subject to

the universal waste requirements of 40 CFR Part 273 and WAC 173-303.

- I. Waste Shipment Records: Form similar to Uniform Hazardous Waste Manifest, or an EPA approved state form

1.04 DOCUMENTS INCORPORATED BY REFERENCE

- A. The current issue of each document shall govern. Where conflict among requirements or with these Specifications exists, the most stringent requirements shall apply.
 - 1. U.S. Environmental Protection Agency Toxic Substance Control Act, TSCA, (Code of Federal Regulations Title 40, Part 761)
 - 2. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), 40 CFR 1910.120.
 - 3. RCRA, Resource Conservation and Recovery Act, 40 CFR Part 761, Subpart D.
 - 4. Washington State Department of Ecology, Dangerous Waste Regulations, Chapter 173-303 WAC

1.05 SUBMITTALS AND NOTICES

- A. Contractors shall submit the following information prior to beginning work:
 - 1. NOTIFICATION. Submit copy of any required notifications including transportation and disposal.
 - 2. WORK PLAN. Submit a written "work plan" satisfactory to the Owner and Environmental Consultant describing the schedule for fluorescent lamp removal, thermostat bulb removal, methods of removal, work practices and worker protection.
- B. Prior to making final application for payment the Contractor shall submit Waste Shipment Records completely filled out and signed by all handlers.
- C. Refer to EPA, OSHA, and other standards referenced herein for further information and regulatory requirements not included above.

1.06 PERSONNEL PROTECTION

- A. Personnel Protective Equipment for Mercury-Containing Lamp Removal
 - 1. Caution should be taken by the Contractor to minimize lamp breakage as escaping vapors from a broken lamp may expose workers to unsafe levels of mercury. Increased personal protective equipment is not required for handling unbroken lamps. If breakage occurs, the Contractor shall not attempt to clean up the resulting debris without wearing the following personal protective equipment:
 - a. Chemical resistant gloves and clothing (compatible with mercury) to minimize dermal contact with debris.
 - b. Chemical cartridge or canister respirator providing protection against mercury vapor

and equipped with an end of service life indicator.

c. Additional respiratory protection shall be as required by governing regulations.

1.07 SAFETY

A. With regard to the work of this contract, the safety of the Contractor's employees, the Owner's employees, and the public is the sole responsibility of the Contractor.

1.08 LIABILITY

A. The Contractor is an independent contractor and not an employee of the Owner, Architect or Environmental Consultant. The Owner, Architect and the Environmental Consultant shall have no liability to the Contractor or any third persons for Contractor's failure to faithfully perform and follow the provisions of these Specifications and the requirements of the governing agencies. Notwithstanding the failure of the Owner, Architect or the Environmental Consultant to discover a violation by the Contractor of any of the provisions of these Specifications, or to require the Contractor to fully perform and follow any of them, such failure shall not constitute a waiver of any of the requirements of these Specifications which shall remain fully binding upon the Contractor.

1.09 QUALITY ASSURANCE

A. Environmental Consultant shall perform periodic inspections to observe work, handling and packaging procedures.

B. Environmental Consultant shall notify the Contractor in writing to stop work if the Environmental Consultant determines that work practices are in violation of the Specifications or work is endangering workers and occupants of the building. The Contractor shall continue work when conditions and actions are corrected and when written authorization is received from the Environmental Consultant.

1.10 LIMITS

A. The Contractor shall limit mercury levels as follows:

1. Airborne concentration below 0.05 mg/M³ (milligram per cubic meter) or pre-abatement background levels, where available.

PART 2 – PRODUCTS

2.01 The following applies to mercury-containing lamp and thermostat bulb removal, and recycling:

A. Storage Containers: A container for lamps must be closed, structurally sound, compatible with the contents of the lamp, and must lack evidence of leakage, spillage or damage that could cause leakage under reasonably foreseeable conditions.

B. Labeling/Marking for mercury-containing products. In addition to the requirements in 40 CFR 273.14 and 40 CFR 273.34, universal waste mercury containing lamps (i.e. each lamp) or a container in which the lamps are contained must be labeled or marked clearly with any one of the following phrases:

**UNIVERSAL WASTE - MERCURY-CONTAINING LAMP(S), or
WASTE MERCURY CONTAINING LAMP(S), or
USED MERCURY CONTAINING LAMP(S).**

PART 3 - EXECUTION

3.01 WORK AREA PREPARATION

- A. Mercury-Containing Lamp Abatement: If the Contractor handles the lamps to minimize any breakage, then no special precautions are necessary other than items listed below:
 - 1. Provide mercury cleanup equipment to immediately transfer any material recovered from a spill or leak to a container that meets the requirements of 40 CFR 262.34.
 - 2. Ensure that the area is well-ventilated and monitored in the event of breakage, to ensure compliance with applicable OSHA exposure levels for mercury.
- B. Mercury-Containing Thermostat Bulb Abatement: If the Contractor removes the thermostat bulbs from the switches in a way the removes the potential for leakage, then no special precautions are necessary other than the items listed below:
 - 1. Provide mercury cleanup equipment to immediately transfer any material recovered from a spill or leak to a container that meets the requirements of 40 CFR 262.34.
 - 2. Place a drop-cloth under the switch during the removal of the bulb in the event of breakage to prevent mercury from becoming lodged in carpet or floor cracks and preventing recovery.
 - 3. Ensure that the area is well-ventilated and monitored in the event of breakage, to ensure compliance with applicable OSHA exposure levels for mercury.

3.02 REMOVAL OF MERCURY-CONTAINING LAMPS

- A. Contractor shall isolate work area and perform work at times and in a manner that will not result in the release or discharge of mercury vapor or the exposure to employees or other building occupants.
- B. Contractor shall carefully handle lamps and shall not break, drop, throw or otherwise damage the lamps.
- C. Should lamp breakage occur, the Contractor shall determine if resulting released material is hazardous waste and if so, the Contractor shall manage it as a hazardous waste.

3.03 DISPOSAL

- A. The fluorescent light tubes shall be packaged and transported to an Owner approved recycling facility. The Contractor shall provide a shipping record to the Owner at the time of shipment. Following completion of processing, Contractor shall provide Owner with a certificate of recycling from the recycling facility indicating exact number of tubes recycled and date of processing.

- B. The Contractor shall determine current waste handling, transportation, and disposal regulations for thermostat bulbs and for each waste disposal landfill. The Contractor must comply with these regulations, U.S. Department of Transportation and EPA requirements. Contractor shall submit disposal receipts (or "letter of acknowledgment") and chain-of-custody for waste as specified.

END OF SECTION

DIVISION 03

CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete reinforcement repair.
2. Concrete surface repair.
3. Concrete crack repair.

B. Related Sections:

1. Section 032000 - Concrete Reinforcing.
2. Section 033000 - Cast-In-Place Concrete.
3. Section 033500 - Concrete Curing and Finishing.

1.2 REFERENCES

A. ASTM International:

1. ASTM C33 - Standard Specification for Concrete Aggregates.
2. ASTM C109 - Standard Test Method for Compressive strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens).
3. ASTM C150 - Standard Specification for Portland Cement.
4. ASTM C293 - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading).
5. ASTM C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
6. ASTM D570 - Standard Test Method for Water Absorption of Plastics
7. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
8. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics.
9. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

B. American Welding Society:

1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.

- B. Product Data: Submit product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material included on project.
- C. Samples: Submit two color samples for patches exposed to view in finished construction and required to match existing.
- D. Manufacturer's Instructions: Submit mixing instructions.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017700 - Closeout Procedures.
- B. Project Record Documents: Accurately record actual locations of structural reinforcement repairs and type of repair.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301
- B. Perform welding work in accordance with AWS D1.4.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Design reinforcement splices under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.
- C. Applicator: Company specializing in concrete repair with minimum 3 years documented experience approved by manufacturer.

1.7 MOCK-UP

- A. Section 014000 - Quality Requirements: Requirements for mockup.
- B. Construct mockup panel illustrating patching method, color and texture of repair surface.
- C. Prepare one mockup of each type of injection and patching procedure.
- D. Locate where directed by Architect/Engineer or indicated on Drawings.
- E. Incorporate accepted mockup as part of Work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Comply with instructions for storage, shelf life limitations and handling.

PART 2 PRODUCTS

2.1 EPOXY MATERIALS

A. Approved Manufacturers:

1. BASF.
2. Dayton Superior Corporation.
3. The Euclid Chemical Company.
4. Sika Construction Products.
5. L&M Construction Chemical.
6. Simpson Strong Tie.
7. Hilti.
8. Substitutions: Section 012500 - Substitution Procedures.

B. Epoxy Adhesive: Two-part epoxy adhesive containing 100 percent solids, 100% reactive compound suitable for use on dry or damp surfaces, meeting the following minimum characteristics:

Characteristic	Test Method	Results
Bond Strength	ASTM C882	2,500 psi
Tensile Strength	ASTM D638	4,400 psi
Elongation	ASTM D638	2 percent at 7 days 70 degrees F
Flexural Strength	ASTM D790	6,700 psi
Compressive Strength	ASTM D695	6,500 psi
Water Absorption	ASTM D570	2% maximum

C. Concrete Repair Epoxy Bonding Resin: Two-part epoxy resin containing 100 percent solids, meeting the following minimum characteristics:

Characteristic	Test Method	Results
Bond Strength	ASTM C882	2,700 psi
Tensile Strength	ASTM D638	5,600 psi
Elongation	ASTM D638	2 percent at 7 days 70 degrees F
Flexural Strength	ASTM D790	8,000 psi
Compressive Strength	ASTM D695	6,500 psi

D. Aggregate: Type recommended by mortar manufacturer.

2.2 CEMENTITIOUS MORTAR MATERIALS

A. Approved Manufacturers:

1. BASF.

2. Dayton Superior Corporation.
 3. The Euclid Chemical Company.
 4. Sika Construction Products.
 5. L&M Construction Chemical.
 6. Simpson Strong Tie.
 7. GCP Applied Technologies.
 8. RAECO.
 9. Substitutions: Section 012500 - Substitution Procedures
- B. Cementitious Mortar: Packaged latex modified silica fume enhanced Portland cement patching mortar with the following properties:
1. Compressive Strength: ASTM C109; minimum 2,000 psi after one day and 4,000 psi after 28 days.
 2. Bond Strength: ASTM C882; minimum 2,200 psi after 28 days.
 3. Flexural Strength; ASTM C293; minimum 1,500 psi after 28 days.
- C. Aggregate: Type recommended by mortar manufacturer.

2.3 RELATED MATERIALS

- A. Bonding Agent for Flooring: As recommended by topping product manufacturer.
- B. Refer to Section 033000 - Cast-in-Place Concrete for additional related materials.
- C. Portland Cement: ASTM C150.
- D. Sand: ASTM C33; uniformly graded, clean.
- E. Water: Clean and potable.
- F. Calcium Chloride: Not permitted.

2.4 REINFORCEMENT MATERIALS

- A. Refer to Section 032000.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.

- B. Verify surfaces are ready to receive work.
- C. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

- A. Clean concrete surfaces of dirt, laitance, corrosion, or other contamination; wire brush using cleaning agent recommended by product manufacturer rinse surface and allow to dry.
- B. Flush out cracks and voids with agent recommended by product manufacturer to remove laitance and dirt. Chemically neutralize by rinsing with water.
- C. For areas repaired using the injection method, provide temporary entry ports spaced to accomplish movement of fluids between ports; no deeper than depth of crack to be filled or port size diameter no greater than thickness of crack. Provide temporary seal at concrete surface to prevent leakage of adhesive.
- D. For areas patched with epoxy mortar, remove broken and soft concrete as recommended by product manufacturer. Remove corrosion from steel. Clean surfaces mechanically; wash with agent recommended by product manufacturer; rinse with water.
- E. Sandblast clean exposed reinforcement steel surfaces. Mechanically cut away damaged portions of bar.

3.3 REPAIR WORK

- A. Repair reinforcement by welding new bar reinforcement to existing reinforcement with sleeve splices. Strength of welded splices and reinforcement to exceed original stress values.
- B. Repair exposed structural, shrinkage, and settlement cracks of concrete by epoxy injection, epoxy application or bonding agent and cementitious paste method.
- C. Repair spalling. Fill voids flush with surface. Apply surface finish.

3.4 MIXING EPOXY MORTAR

- A. Mix epoxy mortars to consistency for purpose intended, as recommended by the manufacturer.
- B. Mix components in clean equipment or containers. Conform to pot life and workability limits.

3.5 MIXING CEMENTITIOUS MORTAR

- A. Mix cementitious mortar to consistency required for purpose intended, as recommended by the manufacturer.
- B. Provide bonding agent as additive to mix as recommended by the mortar manufacturer. Use manufacturers approved bonding agent.

3.6 INJECTION - EPOXY RESIN

- A. Inject epoxy resin adhesive into prepared ports under pressure using equipment appropriate for particular application per manufacturer's written instructions.
- B. Begin injection at lower entry port and continue until adhesive appears in adjacent entry port. Continue from port to port until entire crack is filled.
- C. Remove temporary seal and excess adhesive.
- D. Clean surfaces adjacent to repair and blend finish.

3.7 APPLICATION - EPOXY MORTAR

- A. Apply product per manufacturer's written instructions.
- B. Trowel apply mortar mix to average thickness not to exceed mortar manufacturer's recommendations. Tamp into place filling voids at spalled areas.
- C. For patching honeycomb, trowel mortar onto surface, work mortar into honeycomb to bring surface flush with surrounding area. Finish trowel surface to match surrounding area.
- D. Cover exposed steel reinforcement with epoxy mortar, feather edges to flush surface.

3.8 APPLICATION - CEMENTITIOUS MORTAR

- A. Apply product per manufacturer's written instructions.
- B. Apply coating of bonding agent to concrete surfaces as recommended by manufacturer. Provide full surface coverage.
- C. Apply cementitious mortar by steel trowel to average thickness not to exceed mortar manufacturer's recommendations. Tamp into place filling voids at spalled areas. Work mix into honeycomb.
- D. Damp cure cementitious mortar as recommended by mortar manufacturer.

3.9 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Formwork for cast-in place concrete.
2. Shoring, bracing and anchorage.
3. Form accessories.
4. Form stripping.
5. Waterstops.
6. Bolts and anchors.
7. Light weight fill.

B. Related Sections:

1. Section 032000 - Concrete Reinforcing.
2. Section 033000 - Cast-In-Place Concrete.
3. Section 033500 - Concrete Curing and Finishing.
4. Section 055000 - Metal Fabrications: Product requirements for metal fabrications for placement by this Section.
5. Section 072600 - Vapor Retarders
6. Section 076200 - Sheet Metal Flashing and Trim: Product requirements for flashing reglets for placement by this Section.
7. Section 079200 - Joint Sealants: Sealants used for this section.
8. Division 22- Product requirements for mechanical items for placement by this Section.
9. Division 26- Product requirements for electrical items for placement by this Section.

1.2 REFERENCES

A. American Concrete Institute:

1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 301 - Specifications for Structural Concrete.
3. ACI 318 - Building Code Requirements for Structural Concrete.

- B. American Forest and Paper Association:
 - 1. AF&PA - National Design Specifications for Wood Construction.
- C. The Engineered Wood Association:
 - 1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.
- D. American Society of Mechanical Engineers:
 - 1. ASME A17.1 - Safety Code for Elevators and Escalators.
- E. ASTM International:
 - 1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product data for proprietary materials and items, including forming accessories, waterstops, lightweight fill and other as requested Architect.
- C. Submit ICC reports for each product where ICC approval is required.
- D. Adhesive Anchor Installer certification by the ACI-CRSI Adhesive Anchor Installation Certification Program when installation by certified installer is required, refer to part 3 below.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.
- B. For wood products furnished for work of this Section, comply with AF&PA.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Products storage and handling requirements.
- B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.6 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 PRODUCTS

2.1 PERFORMANCE AND DESIGN CRITERIA

- A. Design, engineer, and construct formwork, shoring, and bracing according to ACI 318 to conform to design and applicable code requirements to achieve concrete shape, line, and dimension as indicated on Drawings.

2.2 FORM MATERIALS

- A. Form Materials for Unexposed Surfaces: At discretion of Contractor. Where waterproofing is required, surface roughness must be compatible with waterproofing manufacture's requirements.
- B. Form Material for Exposed Surfaces: Overlay Plywood.
 - 1. Forms: Conform to PS 1; AC or BB high density overlaid concrete form, Class 1; full size 4 x 8 feet panels; each panel labeled with grade trademark of APA/EWA.
 - 2. Plywood for Surfaces to Receive Membrane Waterproofing: Minimum of 5/8 inch thick; APA/EWA "B-B Plyform Structural I Exterior" grade.
 - 3. Plywood where "Smooth Finish" is required, as indicated on Drawings: APA/EWA "HD Overlay Plyform Structural I Exterior" grade, minimum of 3/4 inch thick
- C. Forms for Cylindrical Columns and Supports: Metal, fiberglass reinforced plastic, or paper or fiber tubes. Construct paper or fiber tubes of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation. Columns exposed to view to have smooth surface, (no barber pole).
- D. Material for formwork and shoring which is to be left in place: Non-organic material only. At the discretion of the Architect. Void cannot be filled.

2.3 PREFABRICATED FORMS

- A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.
- C. Pan Type: Steel or Glass fiber of size and profile required.

- D. Tubular Column Type: Round, surface treated with release agent, non-reusable, sizes as indicated on Drawings Metal, fiberglass reinforced plastic, or paper or fiber tubes. Construct paper or fiber tubes of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation. Columns exposed to view to have smooth surface, (no barber pole).
- E. Steel Forms: Sheet steel, suitably reinforced and designed for particular use indicated on Drawings.
 - 1. Framing, Studding and Bracing: Stud or No. 3 structural light framing grade.

2.4 FORMWORK ACCESSORIES

- A. Form Ties:
 - 1. Carbon steel wire snap-off type, adjustable length, 1" x 1" plastic cone type, 1" break back dimension, free of defects that could leave holes larger than 1 1/4" in concrete surface.
 - 2. Substitutions: Section 012500 - Substitution Procedures.
- B. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.
- C. Form Anchors and Hangers:
 - 1. Do not use anchors and hangers exposed concrete leaving exposed metal at concrete surface.
 - 2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member.
 - 3. Penetration of structural steel members is not permitted.
- D. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture or impair natural bonding or color characteristics of coating intended for use on concrete.
- E. Corners: Chamfer as 3/4" x 3/4" unless noted otherwise; maximum possible lengths.
- F. Flashing Reglets: Galvanized steel, 22 gage thick, longest possible lengths, with alignment splines for joints, release tape sealed slots, anchors for securing to concrete formwork. Surface applied reglets are not allowed.
 - 1. Acceptable Manufacturers:
 - a. Fry Reglet "CO" concrete reglet, 26 gauge galvanized steel.
 - b. Substitutions: Section 012500 - Substitution Procedures.

- G. Vapor Retarder: Refer to Section 072600.
- H. Bituminous Joint Filler: ASTM D1751.
- I. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.
- J. Keyways shall be formed using wood or removable plastic or metal preformed units to sizes indicated.

2.5 CONCRETE ACCESSORIES

- A. Water Stops:
 - 1. Type 1: Self expanding waterstop embedded in concrete and spanning control, expansion, and/or construction joints with sealant recommended by waterstop manufacturer.
 - a. Sika Greenstreak; Hydrotite CJ.
 - b. GCP Applied Technologies; Adcor ES
 - c. Substitutions under provisions of Section 012500 - Substitution Procedures.
 - 2. Type 2: Self expanding waterstop used in non moving joints with sealant recommended by waterstop manufacturer.
 - a. Sika Greenstreak Swellstop.
 - b. Cetco; Waterstop - RX.
 - c. Substitutions under provisions of Section 012500 - Substitution Procedures.
- B. Grout Anchor Sleeves: Galvanized P.T. duct with .05" wall thickness to sizes indicated.
- C. Bearing Pads: Reinforced rubber elastomer pad per:
 - 1. JVI, Inc.; Masticord
 - 2. Fabreeka Product Co.; Fabreeka Bearings
 - 3. Substitutions under provisions of Section 012500 - Substitution Procedures.
- D. Sliding Bearing Pads: Assembly consisting of upper and lower sliding element of PTFE bonded to steel plates. Lower element to be bonded to reinforced rubber elastomer pad.
 - 1. JVI, Inc.; Dynalon.
 - 2. Fabreeka Product Co.; Fabreeka Bearings
 - 3. Substitutions under provisions of Section 012500 - Substitution Procedures.

- E. Adhesive Anchor: Two-part, self-mixing, cartridge type epoxy adhesive for anchoring thread rebar and all thread rod. For applications in temperatures below what is set by the Manufacturer use Cold Weather Adhesive Anchor per manufacturers requirements. Use subject to approval by ICC.
 - 1. Acceptable Manufacturers:
 - a. Hilti; "Hit-RE 500--V3"
 - b. Substitutions under provisions of Section 012500 - Substitution Procedures.
- F. Cold Weather Adhesive Anchor. Use subject to approval by ICC.
 - 1. Acceptable Manufacturers:
 - a. Hilti; Hit-Ice.
 - b. Simpson; "AT-XP"
 - c. DeWalt; AC100+Gold (CMU)
 - d. DeWalt "AC200+"
 - e. Substitutions under provisions of Section 012500 - Substitution Procedures.
- G. Expansion Bolts. Use subject to approval by ICC.
 - 1. Acceptable Manufacturers:
 - a. Simpson Strong Tie Co.; Strong-Bolt 2
 - b. DeWalt - Power-Stud + SD2
 - c. Hilti; Kwik Bolts T-Z.
 - d. Substitutions under provisions of Section 012500 - Substitution Procedures.
- H. Screw Anchors (1 piece carbon steel threaded bolt for concrete):
 - 1. Simpson Strong Tie-Co.; Titan HD
 - 2. DeWalt Screw Bolt+
 - 3. DeWalt, Snake+
 - 4. Hilti, Inc.; HUS-HR
 - 5. Substitutions under provisions of Section 012500 - Substitution Procedures.

2.6 LIGHT WEIGHT FILL

- A. Acceptable Manufacturers:

1. Geofoam.
2. Substitutions under provisions of Section 012500.
- B. Minimum compressive resistance at 1% deformation to be 2.2. psi.
- C. Comply with requirements of ASTM D6817.
 1. Density, min, kg/m³: 11.2.
 2. Compressive Resistance, min., kPa at 1%: 15.
 3. Compressive Resistance, min., kPa at 5%: 35.
 4. Compressive Resistance, min., kPa at 10%: 40.
 5. Flexural Strength, min., kPa: 69.
 6. Oxygen index, min., volume %: 24.0.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 013100 - Project Management and Coordination. Ensure that dimensions agree with drawings.
- B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.
- C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

3.2 INSTALLATION

- A. Earth Forms:
 1. Earth forms are permitted at bottom of sloped footings at change of level only and only if soil on sides is firm.
 2. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.
 3. Verify locations with Structural Engineer and Geotechnical Engineer.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Do not reuse formwork that will perform less well than new. Do not patch formwork.
- D. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

- E. Align joints and make watertight. Keep form joints to a minimum.
- F. Obtain approval from Architect before framing openings in structural members which are not indicated on Drawings.
- G. Provide chamfer strips on external corners of all exposed to view concrete.
- H. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- I. Formwork - General:
 - 1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
 - 2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
 - 3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
 - 4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
 - 5. Complete wedging and bracing before placing concrete.
- J. Forms for Smooth Finish Concrete:
 - 1. Use steel, plywood or lined board forms.
 - 2. Use clean and smooth plywood and form liners, uniform in size and free from surface and edge damage capable of affecting resulting concrete finish.
 - 3. Install form lining with close-fitting square joints between separate sheets without springing into place.
 - 4. Use full size sheets of form lines and plywood wherever possible.
 - 5. Tape joints to prevent protrusions in concrete.
 - 6. Use care in forming and stripping wood forms to protect corners and edges.
 - 7. Level and continue horizontal joints.
 - 8. Keep wood forms wet until stripped.
- K. Forms for Surfaces to Receive Membrane Waterproofing: Use plywood or steel forms. After erection of forms, tape form joints to prevent protrusions in concrete.

- L. Framing, Studding and Bracing:
 - 1. Size framing, bracing, centering, and supporting members with sufficient strength to maintain shape and position under imposed loads from construction operations.
 - 2. Distribute bracing loads over base area on which bracing is erected.
 - 3. When placed on ground, protect against undermining, settlement or accidental impact.
- M. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- N. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

3.3 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices and embedded items.
- C. Do not apply form release agent to formwork which is to be left in place or where concrete surfaces are indicated to receive special finishes or applied coverings that could be affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
- D. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION - ACCESSORIES, INSERTS, EMBEDDED PARTS AND OPENINGS

- A. Provide formed openings where required for items to be embedded in or passing through concrete work. Provide temporary access pockets for vibrating concrete at wide opening sills.
- B. Locate and set in place items required to be cast directly into concrete. Use templates to hold anchor rods in place during concrete placement.
- C. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, bolts, anchors, other inserts and components of other Work.
- D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install water stops continuous per manufacturer's requirements and as shown without displacing reinforcement. Seal joints watertight to waterstop manufacturer's recommendations.

- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
- H. Form Ties:
 - 1. Use sufficient strength and sufficient quantity to prevent spreading of forms.
 - 2. Place ties at least 1 inch away from finished surface of concrete unless noted otherwise.
 - 3. Leave inner rods in concrete when forms are stripped.
 - 4. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.
 - 5. When architecturally exposed ties are used, assure the pattern and style are as detailed on the drawings.
- I. Construction Joints:
 - 1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
 - 2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
 - 3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
 - 4. Arrange joints in continuous line straight, true and sharp.
- J. Embedded Items:
 - 1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
 - 2. Do not embed wood or uncoated aluminum in concrete. Obtain installation and setting information for embedded items furnished under other Specification sections.
 - 3. Securely anchor embedded items in correct location and alignment prior to placing concrete.
 - 4. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.
- K. Screeds:
 - 1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.

2. Slope slabs to drain where required or as shown on Drawings.
 3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.
- L. Screed Supports:
1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which shall not puncture the membrane.
 2. Staking through membrane is not permitted.
- M. Cleanouts and Access Panels:
1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
 2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.
- N. Install dowels, rebar, threaded or smooth steel dowels and all thread rebar, size and spacing to match reinforcing in adhesive anchor per manufacturers requirements, and as shown on drawings. Holes must be blown out with air gun or vacuumed out per manufacturer's requirements. Special inspection is required. Refer to general notes and special inspection drawing. Refer to Section 032000.
- O. Adhesive anchors shall be installed by an Adhesive Anchor Installer certified by the ACI-CRSI Adhesive Anchor Installation Certification Program where installed in a horizontal or upwardly inclined position and where indicated in the plans as an "adhesive tension anchor."
- P. Unless indicated, separate exterior slabs on grade from vertical surfaces with 3/8 inch thick, joint filler indicated in Section 033000. Extend joint filler from bottom of slab to within 1/4 inch of finished slab surface. Use joint sealer 3/8" wide by 1/4" deep to seal joint. Refer to section 079200.
- Q. Install joint devices in accordance with manufacturer's instructions. See section 033000.
- R. Install joint covers in one piece longest practical length, when adjacent construction activity is complete.
- S. Floor control joint device (e.g. zip strip) or Speed-E-Joint by W.R. Meadows, used as a floor crack inducer shall be used only in areas covered by finished flooring materials and shall not be used in areas either indoor or outdoor where exposed to view. See section 033000.
- T. Install bearing pads per manufacturer's recommendations. Where steel plates are welded to imbeds, use the smallest diameter weld rod to minimize heat build-up so that PTFE bond will not be subject to more than 300°F. See section 055000.

3.5 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6

FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and after flatness/levelness has been approved.
- B. Loosen forms carefully. Do not wedge pry bars, hammers or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- D. Under ordinary conditions, formwork and supports shall remain in place for not less than the periods of time under schedule - Form Removal. These periods represent cumulative number of days or hours, not necessarily consecutive, during which the temperature of the air surrounding the concrete is above 50°F. If high-early-strength concrete is used, these periods may be reduced as approved by the Architect. Conversely, if ambient temperatures remain below 50°F or if retarding agents are used, then these periods shall be increased at the discretion of the Architect.
- E. Forms and shoring in the formwork used to support the weight of concrete in beams, slabs and other structural members shall remain in place until the formwork for the supported member is allowed to be removed.
- F. Before shore removal the strength to be attained by members carrying their own dead load shall be no less than 75% of the specified strength, f_c . Restrict construction live loading to 50% of the design live load.

3.7 CONCRETE CURING AND FINISHING

- A. Cure concrete floors as specified in Section 033500 - Concrete Curing and Finishing.
- B. For general concrete curing refer to ACI 308.1.

3.8 ERECTION TOLERANCES

- A. Tolerances: Construct formwork to produce completed concrete surfaces within construction tolerances specified in ACI 117, except as otherwise indicated.
- B. Camber slabs and beams as indicated on drawings.

3.9 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspecting, testing, adjusting and balancing.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- C. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.
- D. Schedule concrete placement to permit formwork inspection before placing concrete.

3.10 SCHEDULES - FORM REMOVAL

- A. The following times represent a cumulative amount of time during which the temperature of the air surrounding the concrete is above 50° F;
 - 1. Walls and column encasement 12
hours
 - 2. Columns 12 hours
 - 3. Sides of beams 12
hours
 - 4. Beam soffits: Under 10 feet clear span between structural supports 7 days
 - 5. Beam soffits: Over 10 feet clear span between structural supports 14 days

3.11 SCHEDULE - TESTING BY OWNER-FURNISHED TESTING LAB

- A. Refer to Special Inspecting and Testing on Structural Drawings

3.12 SCHEDULES

- A. Provide concrete as indicated and detailed on drawings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Reinforcing bars.
2. Welded wire fabric.
3. Reinforcement accessories.

B. Related Sections:

1. Section 031000 - Concrete Forming and Accessories.
2. Section 033000 - Cast-In-Place Concrete.
3. Section 033500 - Concrete Curing and Finishing
4. Division 26 - Electrical: Grounding concrete reinforcement.
5. Division 31 - Earthwork.

1.2 REFERENCES

A. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI SP-66 - ACI Detailing Manual.

B. ASTM International:

1. ASTM A615 - Standard Specification for Deformed and Plain Carbon -Steel Bars for Concrete Reinforcement.
2. ASTM A706 - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
3. ASTM A767 - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
4. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
5. ASTM A1064- Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

C. American Welding Society:

1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

D. Concrete Reinforcing Steel Institute:

1. CRSI - Manual of Standard Practice.
2. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Shop Drawings:

1. Indicate bar sizes, spacing, locations, and quantities of reinforcing steel bending and cutting schedules and supporting and spacing devices for reinforcement and accessories in 1/4 inch minimum scale elevations and plans.
2. General Contractor and Subcontractor to review shop drawings and add all proposed openings to drawings before submitting to Architect.

C. Certificates: Submit AWS qualification certificate for welders employed on the Work.

D. Submit ICC reports for each product where ICC approval is required.

E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

F. Submit request to use splices not shown on the project drawings.

G. Submit request to use mechanical splices not shown on the project drawings.

H. Submit request for placement of column dowels without the use of templates.

I. Submit request and procedure to field bend or straighten partially embedded reinforcement.

J. Submit description of reinforcement weld locations, weld procedures, and welder qualifications.

K. Submit proposed supports for coated reinforcement and uncoated reinforcement when it is necessary to move reinforcement beyond the specified placing tolerances to avoid interference with other reinforcement, conduits, or embedded items. Provide a submittal showing the resulting arrangement of reinforcement.

L. Submit request to heat and bend reinforcement when required.

M. Submit certified copies of mill test report of reinforcement materials analysis.

1.4 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

A. Deliver, store, protect and handle products to site under provisions of Section 016000 - Product Requirements.

- B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with CRSI - Manual of Standard Practice and ACI 301.
- B. Prepare shop drawings in accordance with ACI SP-66.

1.6 QUALIFICATIONS

- A. Welders: AWS qualified within previous 6 months.

1.7 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Coordinate with placement of formwork, formed openings and other Work.
- C. All trades with openings in concrete or masonry are to show size and location of proposed openings on shop drawings before submitting drawings to Architect for approval.
- D. Location of reinforcement takes precedence over that of work by other trades.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: As noted on the Structural Drawings.
- B. Deformed Reinforcement: ASTM A615, 60 ksi yield grade, steel bars, unfinished.
- C. Deformed and Plain Reinforcement: ASTM A706; 60 ksi yield strength, steel bars, unfinished where weldable rebar is required.
- D. Plain Wire: ASTM A1064; galvanized finish.
- E. Welded Deformed Wire Fabric: ASTM A1064; in flat sheets; unfinished.
- F. Welded Plain Wire Fabric: ASTM A1064; in flat sheets; unfinished.
- G. All Thread Rebar: "Williams" Grade 75 meets or exceeds physical properties of ASTM A615.

2.2 ACCESSORY MATERIALS

- A. Tie Wire: As noted on the Structural Drawings, or patented system as approved.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions. Provide "SBU" Type chairs or load bearing pads over vapor retarder to prevent puncture.

- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic-coated steel, Plastic tipped steel or Stainless steel type; size and shape and spacing to maintain bars in required position.
- D. Precast concrete block chairs to be made from 4000 psi concrete and have (2) 16 ga. tie wires cast in center.
- E. Flanged Rebar Couplers (FRC): Williams Form Engineering Corp. C2D rebar flange coupler, Dayton-Superior D340 Taper Lock Flange Coupler, or approved equivalent. Provide in size to meet or exceed rebar capacity. System may be used as substitutions for dowel bars.
- F. All Thread Rebar Couplers: Williams Form Engineering., Portland, OR (503) 285-4548.
- G. Ferrule Loop Insert - "F-42" by Dayton Superior, size as indicated. Substitutions per specification Section 012500 - Substitution Procedures.
- H. Bar Couplers:
 - 1. Acceptable Manufacturers: Provide ICC ES Report or IAMPO Report.
 - a. HRC Xtender Splicing System.
 - b. Dayton Superior Bar Lock Couplers System.
 - 2. Sizes as required.
 - 3. Substitutions per specification Section 012500 - Substitution Procedures.
- I. Expansion Bolts: Refer to Section 031000 - Concrete Forming and Accessories.
- J. Adhesive Anchors: Refer to Section 031000 - Concrete Forming and Accessories.
- K. Screw Anchors: Refer to Section 031000 - Concrete Forming and Accessories.
- L. Provide templates for placing column, footing anchor rods.
- M. Welding electrodes of type complying with AWS Code as required for welding ASTM A706, grade 60 steel as applicable.
- N. Threaded Dowels: Fabricate from ASTM A615 Grade 60 reinforcement steel threaded to fit expansion anchor furnished. Dowel to be one diameter size larger than continuous reinforcement size shown.

2.3 FABRICATION

- A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice and ACI 318.
- B. Form standard hooks for: 180 degree bends, 90 degree bend, stirrup and tie hooks, and seismic hooks as indicated on Drawings.

- C. Form reinforcement bends with minimum diameters in accordance with ACI 318.
- D. Weld reinforcement in accordance with AWS D1.4.
- E. Locate reinforcement splices not indicated on Drawings, at point of minimum stress. Review location of splices with Engineer.

2.4 SHOP FINISHING

- A. Galvanized Finish for Steel Bars: ASTM A767, Class I, hot dip galvanized after fabrication.

2.5 SOURCE QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Make completed reinforcement available for inspection at manufacturer's factory prior to packaging for shipment. Notify Architect/Engineer at least seven days before inspection is allowed.

PART 3 EXECUTION

3.1 PLACEMENT

- A. See applicable Division 3 and 4 sections.
- B. Place, support and secure reinforcement against displacement. Provide carrier bars as required to maintain position of bars. Do not deviate from required position beyond specified tolerance.
 - 1. Do not weld crossing reinforcement bars for assembly.
- C. Do not displace or damage vapor retarder.
- D. Accommodate placement of formed openings.
- E. Space reinforcement bars with minimum clear spacing in accordance with ACI 318
 - 1. Where bars are indicated in multiple layers, place upper bars directly above lower bars, unless noted otherwise.
- F. Maintain concrete cover around reinforcement in accordance with ACI 318 and as noted on the drawings.
- G. Call for special inspection. Concrete is not to be ordered for delivery until after formwork and reinforcement has been approved by the Special Inspector.
- H. Splice reinforcing where indicated on Drawings in accordance with splicing device manufacturer's instructions.
- I. Galvanized rebar that are field bent, welded, or damaged in the field shall be touched up with 2 brush coats of organic, zinc rich paint, passing ASTM A780.

- J. Bond and ground reinforcement in accordance with requirements of Division 26.

3.2 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Install reinforcement within the tolerances specified in ACI 301.

3.3 FIELD QUALITY CONTROL

- A. See applicable Division 3 and 4 sections.
- B. Section 014000 - Quality Requirements and 017000 - Execution: Field inspecting, testing, adjusting and balancing.
- C. Field inspection and testing will be performed by Owner's testing laboratory in accordance with applicable code.
- D. Provide free access to Work and cooperate with appointed firm. Refer to Structural drawings.
- E. Reinforcement Inspection: Refer to Structural General Notes.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete for the following:
 - 1. Building frame members.
 - 2. Elevator shaft walls.
 - 3. Foundation walls.
 - 4. Topping Slabs.
 - 5. Slabs on grade.
 - 6. Joint devices: control, expansion and contraction.
 - 7. Stair pans.
 - 8. Equipment pads.
 - 9. Light pole bases.
 - 10. Flagpole bases.
 - 11. Fence footers.
 - 12. Concrete Mix/Materials.
 - 13. Admixtures.
 - 14. Controlled Low Strength Material (CLSM, CDF and lean concrete)
- B. Related Sections:
 - 1. Section 030100 - Concrete Repair.
 - a. Concrete reinforcement repair.
 - b. Concrete surface repair.
 - c. Concrete crack repair.
 - 2. Section 031000 - Concrete Forming and Accessories.
 - a. Formwork for cast-in place concrete.
 - b. Shoring, bracing and anchorage.
 - c. Form accessories.
 - d. Form stripping.

- e. Waterstops.
- f. Bolts and Anchors.
- 3. Section 032000 - Concrete Reinforcing.
 - a. Reinforcing bars.
 - b. Welded wire fabric.
 - c. Reinforcement accessories.
- 4. Section 033500 - Concrete Curing and Finishing.
 - a. Initial and final curing of horizontal and vertical concrete surfaces.
 - b. Finishing concrete floors.
 - c. Floor surface treatment.
 - d. Tolerances.
- 5. Section 033543 - Polished Concrete: Finish for special areas as scheduled.
- 6. Section 036000 - Grouting.
 - a. Portland cement grout.
 - b. Rapid curing epoxy grout.
 - c. Non-shrink cementitious grout.
- 7. Section 053113 - Steel Floor Decking.
- 8. Section 053123 - Steel Roof Decking.
- 9. Section 055000 - Metal Fabrications: Supply of metal fabrications for placement by this Section.
- 10. Division 07 - Preparing concrete surfaces to receive dampproofing and/or waterproofing.
- 11. Section 072600 - Vapor Retarders: Provide vapor retarders for placement by this Section.
- 12. Section 076200 - Sheet Metal Flashing and Trim: Supply of flashing reglets for placement by this Section.
- 13. Section 079200 - Joint Sealants.
- 14. Section 079500 - Expansion Control.
- 15. Section 107500 - Flagpoles: Concrete Base.

16. Division 22 - Plumbing: Mechanical items for casting into concrete.
17. Division 26 - Electrical: Electrical items for casting into concrete.
18. Division 31 - Earthwork: Fill.
19. Division 32 - Exterior Improvements: Sidewalks, curbs and gutters.

1.2 REFERENCES

A. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 305.1 - Specification for Hot Weather Concreting.
3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
4. ACI 308.1 - Standard Specification for Curing Concrete.
5. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:

1. ASTM C33 - Standard Specification for Concrete Aggregates.
2. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
3. ASTM C150 - Standard Specification for Portland Cement.
4. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
5. ASTM C494- Standard Specification for Chemical Admixtures for Concrete.
6. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
7. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
8. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
9. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
10. ASTM C1602 - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
11. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Product Data for proprietary materials and items including admixtures, joint systems, finishing materials, and other as requested by Architect.
- D. Design Data: Prior to placing any concrete and within 20 days of award of contract, submit for Architect's review the following per the Structural General Notes - Defred Submittals;
 - 1. Submit to Architect and inspecting and testing firm for review prior to commencement of work, identifying each class of concrete with letters corresponding to those indicated in the Concrete Mix Design Table in the Structural General Notes. Minimum acceptable evidence shall be laboratory trial mix data or field test data (30 or more tests or mixes, identical to proposed mix, made during the past 12 months) with the appropriate standard deviation analysis, all in accordance with ACI 301.
 - 2. Identify mix ingredients and proportions, including admixtures.
- E. Building Product Disclosure Requirements: Provide Building Product Disclosure documentation. Any requests for substitution must include this documentation.
 - 1. Environmental Product Declaration: Submit product-specific Environmental Product Declarations (EPDs) for each product (mix design) proposed on the project.
- F. Materials certificates shall be signed by manufacturers and contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- G. Submit control joint and pour stop layout to Engineer ten (10) days prior to installation.
- H. Proof of Concrete Finishers Certification for Slab on Grade.
- I. Quality Control Plan: Contractor to submit a quality control plan outlining activities and procedures that minimize potential issues at concrete exposed to view.
- J. Prior to placement in 95 degree Fahrenheit or warmer weather, for concrete exposed to view, submit a thermal control plan.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017700 - Closeout Procedures.
- B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.

- B. Conform to ACI 305.1 when concreting during hot weather.
- C. Conform to ACI 306.1 when concreting during cold weather.
- D. Acquire cement and aggregate from one source for Work.
- E. Pre-Installation Meeting:
 - 1. Section 013119 - Project Meetings: Pre-Installation meeting.
 - 2. Convene minimum one week prior to commencing work of this section. Parties in attendance to be General Contractor, Owners Representative, Architect, Flooring Installer, Mechanical Engineer, Electrical Engineer, Structural Engineer, Independent Inspector, Concrete Foreman, Concrete Supplier, Pumping Contractor and Concrete Finisher. Agenda to include coordinating embed items and openings, mix design and additives, testing and inspection, form tolerances and stripping, curing methods, finishes and control joint locations.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.
- B. Maintain concrete temperature after installation per ACI 301.

1.7 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 PERFORMANCE AND DESIGN CRITERIA

- A. Vapor Retarder Permeance: Refer to Section 072600.

2.2 CONCRETE MATERIALS

- A. Cement: ASTM C595, Type IL (15)
- B. Supplementary Cementitious Materials (SCMs) - Provide minimum cementitious replacement by weight as noted below:
 - 1. Fly Ash: ASTM C618 Class F. 15% minimum replacement.
 - 2. Slag: ASTM C989. 30% minimum replacement.
- C. Fine and Coarse Aggregates: ASTM C33. No iron aggregates allowed in concrete.

- D. Water: Comply with ASTM C1602.
- E. Controlled Density Fill (CDF, CLSM and lean concrete): Designed and proportioned specifically for this project, obtained by a predetermined combination of water-reducing/set controlling/ plastic flow producing admixtures conforming to ASTM C494 types A through G as an Admixture System.

2.3 ADMIXTURES

- A. All admixtures shall be from the same manufacturer to ensure compatibility.
 - 1. Acceptable Manufacturers:
 - a. Master Builders Solutions.
 - b. The Euclid Company.
 - c. GCP Applied Technologies.
 - d. Sika Chemical Co.
 - e. Substitutions under provisions of Section 012500 - Substitution Procedures.
 - 2. Prohibited Admixtures: Calcium chloride, thiocyanate or admixtures containing more than 0.05% chloride ions are not permitted.
- B. Shrinkage-Reducing Admixture: Conforming to ASTM C494, Type S.
- C. Air Entrainment: Conforming to ASTM C260. Certified by manufacturer to be compatible with other admixtures.
- D. Water Reducing Admixture: Conforming to ASTM C494, Type A shall contain no chlorides (not more than 0.05 percent). The amount of admixture added to the concrete shall be in accordance with the manufacturer's recommendations to obtain between 5% and 10% water reduction.
- E. Water Reducing, Retarding Admixture: Conforming to ASTM C494, Type D and not containing more chloride ions than are present in municipal drinking water.
- F. High Range Water Reducing Admixture (Superplasticizer): Conforming to ASTM C494 type F or G. The admixture shall be free of chlorides and alkalis. Use a third generation superplasticizer which shall be job site added in measured container, extended plastic-flow time, maintain setting characteristics similar to normal concrete throughout its recommended dosage range at varying concrete temperatures, reduce water 30 to 40 percent, give high early and ultimate strengths.
- G. Non-Corrosive, Non-Chloride Accelerator: Conforming to ASTM C494, Type C or E shall be non-chloride and shall not promote corrosion of reinforcing steel in concrete.
- H. Corrosion Inhibitor: Calcium nitrite (if called for on the drawings). Per manufacturers' recommendation, to be added to specified concrete.

- I. Microsilica (Silica Fume) Admixture shall be dry densified or slurry formed. Microsilica shall come from the same source throughout the project. If a single source cannot be maintained, laboratory testing of each new source shall be required before acceptance by the Engineer at no cost to the Owner. Must comply with ASTM C1240.
- J. Polyfiber Reinforcement (Micro): Conforming to STM C1116. Fibers of collated fibrillated polypropylene containing no pre-processed Olefin materials to reduce plastic and hardened concrete shrinkage, improve impact strength, increase fatigue resistance and for secondary reinforcing of concrete slabs and members. Medium-duty fiber to increase bonding power, long-term concrete durability, and secondary/temperature control. Nylon fibers not allowed. The product shall have a UL rating. Apply at rate per the recommendation of the manufacturer to achieve the optimal performance.
- K. Polyfiber Reinforcement (Macro): Fibers of collated fibrillated polypropylene/polyethylene or a blend of cold drawn steel wire fiber and 100% polypropylene fibers containing no pre-processed Olefin materials to reduce plastic and hardened concrete shrinkage, improve impact strength, increase fatigue resistance and for secondary reinforcing of concrete slabs and members. Heavy-duty fiber to increase bonding power, long-term concrete durability, and secondary/temperature control. Nylon fibers not allowed. The product shall have a UL rating. ASTM C1116, minimum of 2 inches long, and aspect ratio of 50 to 90. Fiber manufacturer shall provide data to satisfy engineering requirements. Fiber manufacturer shall provide 2 hour fire resistance certification from UL when used in lieu of WWF in composite metal decks. Macro fibers shall be used and dosed in strict accordance with the manufacturer's maximum recommendations unless noted otherwise on the drawings. Apply at rate per the recommendation of the manufacturer to achieve the optimal performance.
- L. Admixtures not listed above are to be approved by the EOR before use. These include, but are not limited to: pigments, pumping aides, anti-freeze, etc.

2.4 ACCESSORIES

- A. Bonding Agent for Concrete to Concrete:
 - 1. W.R. Meadows: Intralok or Acry-lok Bonding Agent.
 - 2. Euclid Chemical Co. Product: SBR Latex.
 - 3. BASF Master Builders.
 - 4. Larsen Product Co.: Weldcrete.
 - 5. L&M Construction Materials Product: Everbond.
 - 6. Substitutions: Under provision of Section 012500.
- B. Vapor Retarder: Refer to Section 072600.
- C. Non-Shrink Grout: Refer to Section 036000.
- D. Metal stair nosings and abrasive strips: Refer to Section 055000 - Metal Fabrications.

- E. Additional accessories refer to Section 031000.

2.5 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Sealants: Refer to Section 079200 - Joint Sealants.
- B. Recessed Preformed Joint Fillers:
 - 1. Asphalt Impregnated Joint Filler: Conforming to ASTM D1751. W.R. Meadows, Fibre Expansion Joint No. 320-F, specified for type and quality.
 - 2. Rigid Foam Joint Fillers: W.R. Meadows Deck-0-Foam with removable pre-scored strip for installation of elastomeric joint sealants and backer rods, specified for type and quality.
- C. Interior Semi-Rigid Joint Sealer/Filler: Industrial quality, two component, semi-rigid epoxy or polyurea, USDA approved, ASTM D2240, minimum Shore A 75-85, matching approximate color of natural concrete finish. Specified for type and quality
 - 1. Epoxy Semi-Rigid Joint Sealer / Joint Filler:
 - a. BASF; MasterSeal CR 190.
 - b. Dayton Superior; Poxylon Fil (J-52).
 - c. Edoco Burke; Reflex Joint Filler.
 - d. Euclid; EUCO 700 or EUCO 800
 - e. US MIX; US SPEC, SR 50 EBF.
 - f. Vexcon; Power Coat Epoxy Flexible Joint Sealant.
 - g. W.R. Meadows; Rezi-Weld Flex.
 - 2. Polyurea Semi-Rigid Joint Sealer:
 - a. BASF; MasterSeal CR 100.
 - b. Edoco Burke; JointFill.
 - c. Euclid; EUCO QWIKjoint 200.
 - d. L&M Construction Chemicals; Joint Tite 750.
 - e. VersaFlex; SL/75.

2.6 CONTROL JOINT DEVICES

- A. Wall (below grade): Marflex Control Joint System (joint form, elastomeric sealant and fiberglass fabric reinforcement); (800-498-1411).

- B. Wall (above grade): Provide form material as required to produce control joints and rustication joints as shown on the drawings.
- C. Elevated Slab Control Joints (seismic joints): As detailed or approved by Engineer.
- D. Sealant and Primer: Type, as specified in Section 079200.

2.7 CONCRETE MIX

- A. Provide concrete to meet all of the requirements shown on the drawings. The contractor is responsible for the preparation of design mixtures for each class of concrete used in construction.
- B. Select proportions for normal weight concrete in accordance with ACI 301 using the method of trial mixes.
- C. Calcium chloride is not allowed in the concrete.
- D. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94.
- E. For exposed slab-on-grade, the mix design shall conform to ASTM C157, and submit data showing length change shall not exceed 0.05%.

PART 3 EXECUTION

3.1 GENERAL

- A. This section shall conform to requirements of ACI 301 specifications for Structural Concrete for buildings, except as modified by the supplemental requirements below.

3.2 EXAMINATION

- A. Verify site conditions under provisions of Section 013100 - Project Management and Coordination: Ensure that dimensions agree with drawings.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely and will not interfere with placing concrete.

3.3 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.
- B. Remove debris and ice from formwork, reinforcement and concrete substrates.
- C. Remove water from areas receiving concrete before concrete is placed.

3.4 PLACING CONCRETE

- A. Do not place concrete until installation of embedded electrical conduit is verified to conform to IBC requirements and notes on structural drawings.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchors, seats, plates, conduit, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- D. Clean formed cavities of debris prior to placing concrete.
- E. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- F. During cold weather, remove all ice, frost and snow from within forms and reinforcing. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.
- G. Do not cast concrete against frozen surfaces. Refer to ACI-306.1 "Cold Weather Concrete" preparation before placing concrete.
- H. Maintain freshly placed concrete temperature at 50° minimum for 7 days minimum.
- I. Place concrete in accordance with ACI 301, ACI 305.1 - Hot Weather Concreting, and ACI 306.1 - Cold Weather Concreting. Record daily High-Low temperatures at the site.
- J. Notify Architect and Special Inspector minimum 24 hours prior to commencement of operations.
- K. Ensure reinforcement, anchor rods, trench drains, inserts, embedded parts, formed joint fillers and utilities are not disturbed during concrete placement.
- L. Do not drop concrete freely more than 10 feet for concrete containing high-range water-reducing admixture (superplasticizer) or 5 feet for conventional concrete. Where greater drops are required, use a tremie or flexible spout (canvas elephant trunk), attached to a suitable hopper.
- M. Continuously place concrete until an entire unit between construction joints is placed. Rate and method of placing concrete shall be such that no concrete between construction joints will be deposited upon or against partly set concrete, after its initial set has taken place, or after 45 minutes of elapsed time during concrete placement.
- N. Concrete on Metal Deck: Class and minimum thickness shown. Provide uniform thickness of concrete as directed in the structural drawings, regardless of the deflection of the steel beams and the metal deck under the weight of wet concrete.
 - 1. Provide depressed slabs in locations indicated.

2. Shores for metal deck shall be supported by the beams which support that deck element, and as directed by the Shoring Engineer.
- O. Consolidation: Conform to ACI 309R. Immediately after depositing, spade concrete next to forms, work around reinforcement and into angles of forms, tamp lightly by hand, and compact with mechanical vibrator applied directly into concrete at approximately 1½ foot intervals. Mechanical vibrator shall be power driven, hand operated type with minimum frequency of 5,000 cycles per minute having an intensity sufficient to cause flow or settlement of concrete into place. Vibrator head to meet D.O.T. non-metal head specifications when using with epoxy coated rebar. Vibrate concrete to produce thorough compaction, complete embedment of reinforcement and concrete of uniform and maximum density without segregation of mix. Do not transport concrete in forms by vibration.
1. Use of form vibration shall be approved only when concrete sections are too thin or too inaccessible for use of internal vibration.
 2. Carry on vibration continuously with placing of concrete. Do not insert vibrator into concrete that has begun to set.
- P. Maintain records of concrete placement. Record date, location, quantity, wind speed, rain, high and low air temperature, and test samples taken.
- Q. Place concrete continuously between predetermined joints.
- R. Do not interrupt successive placement; do not permit cold joints to occur.

3.5 PLACING CONCRETE SLABS

- A. Verify that base course has been prepared per Division 31 - Earth Moving.
- B. Monitoring and Adjustment: Provide continuous cycle of placement, measurement, evaluation and adjustment of procedures to produce slabs within specified tolerances. Monitor elevations of structural steel in key locations before and after concrete placement to establish typical deflection patterns for the structural steel.
- C. Set perimeter screed using either optical or laser instruments. Use rigid screed guides to control strikeoff elevation for all types of elevated slabs. Divide bays into halves or thirds by hard screeds. Adjust as necessary where monitoring of previous placements indicates unshored structural steel deflections to other than a level profile.
- D. Place slabs monolithically. Once slab placement commences, complete finishing operations within same day. Slope finished slab to floor drains where they occur, whether shown or not.
- E. Use straight edges specifically made for screeding, such as hollow magnesium straightedges or power strikeoffs. Do not use pieces of dimensioned lumber. Strike off and screed slab to a true surface at required elevations. Use optical or laser instruments to check concrete finished surface grade after strikeoff. Repeat strikeoff as necessary. Complete screeding before any excess moisture or bleeding water is present on surface. Do not sprinkle dry cement on the surface.

- F. Immediately following screeding, and before any bleed water appears, use a 10-foot wide highway straightedge in a cutting and filling operation to achieve surface flatness. Do not use bull floats or darbys, except that darbying may be allowed for narrow slabs and restricted spaces.
- G. If saw cuts are used as an alternative to preformed slab joint, cut joints within 4 to 12 hours after placing, 4 hours in hot weather and 12 hours in cold. Using 3/16 inch thick blade, cut into 1/4 depth of slab thickness. Saw cuts must be in a straight line, with no deviation.
- H. Soff Cut or early entry saw-cutting equivalent may be used within 1 to 4 hours after placing as an alternate, provided manufacturer's recommendations are followed, 1 hour in hot weather and 4 hours in cold weather.
- I. Screed floors and slabs on grade level, maintaining surface flatness tolerances. (Refer to Schedule Flatwork Tolerances below.)
- J. Install joint fillers, primer and sealant in accordance with manufacturer's instructions.

3.6 CONCRETE FINISHING

- A. Finish concrete floor surfaces to requirements of Section 033500 - Concrete Curing and Finishing.

3.7 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Cure concrete floor surfaces as specified in Section 033500 - Concrete Curing and Finishing. For general concrete curing refer to ACI 308.1.

3.8 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Field inspection and testing will be performed by Owner furnished testing laboratory as scheduled in the drawings.
- C. Provide inspection of concrete batch plant in accordance with ACI 301, Chapter 1 and schedule listed therein.
- D. For number and frequency of tests refer to Schedule - Testing.
- E. Provide free access to Work and cooperate with testing and special inspection firm.
- F. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.

- G. Tolerances not scheduled shall be in accordance with ACI 301, Chapter 1 and ACI-117.
- H. Evaluation and acceptance of concrete strength shall be in accordance with ACI 301.
- I. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

3.9 PATCHING

- A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.
- C. Patch imperfections to match original design intent. Use materials specified in Section 030100 - Concrete Repair.

3.10 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances, surface finish or specified requirements.
- B. Repair or replacement of defective concrete will be determined by Architect/Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.
- D. Refer to Specification Section 030100 - Concrete Repair, for repair instructions, and as directed by the Architect.

3.11 SCHEDULE - CONCRETE TYPES AND FINISHES

- A. Refer to Concrete Mix Design Table in the drawings, Sections 033500 and 033543, and finish schedule.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Initial and final curing of horizontal and vertical concrete surfaces.
2. Finishing concrete floors.
3. Floor surface treatment.
4. Tolerances.

B. Related Sections:

1. Section 030100 - Concrete Repair.
2. Section 031000 - Concrete Forming and Accessories.
3. Section 033000 - Cast-In-Place Concrete.
4. Section 033543 - Polished Concrete.
5. Section 072600 - Vapor Retarders.
6. Section 079200 - Joint Sealants.
7. Section 079500 - Expansion Control.

1.2 REFERENCES

A. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 302.1R - Guide for Concrete Floor and Slab Construction.
3. ACI 308.1 - Standard Specification for Curing Concrete.

B. ASTM International:

1. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
2. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
3. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
4. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting.

5. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and of FL Floor Levelness Numbers.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on concrete: hardener, sealer, curing compounds, curing sheets including slip resistant treatment; compatibilities and limitations.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017700 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit data on maintenance renewal of applied coatings.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301 and ACI 302.1R.
- B. Mock up:
 1. Apply CONC-5 to vertical concrete wall surface to illustrate surface finish.
 2. Locate where directed by Architect unless location is indicated on the Drawings.
 3. Incorporate accepted mockup as part of Work unless noted otherwise.
- C. Qualifications
 1. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
 2. Applicator/Installer: Company specializing in performing work of this section with minimum 3 years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Deliver materials in manufacturer's packaging including application instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.
- B. Temporary Lighting: Minimum 200 W light source, placed 8 feet above floor surface, for each 425 sq ft of floor being finished.
- C. Temporary Heat: Ambient temperature of 50 degrees F minimum.

- D. Ventilation: Sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

1.8 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Coordinate the Work with concrete floor placement and concrete floor curing.

PART 2 PRODUCTS

2.1 CURING MATERIALS

- A. Compatibility: Determine compatibility of curing compounds with applied finishes and adhesives before starting work. Do not use incompatible products or when prohibited by resilient flooring or adhesive manufacturer. Provide curing/sealing products coordinated with the final approved flooring finishes selected.
- B. Curing Compound: ASTM C309 Type 1-D, clear or translucent with fugitive dye, waterborne, membrane forming, and curing compound. Comply with Federal Air Quality Regulations 40 CFR 52.254 and with VOC requirements for project.
 - 1. W.R. Meadows; 1100 Clear (Exterior use only).
 - 2. Dayton Superior Corporation; Clear Resin Cure J11W.
 - 3. Substitutions Section 012500 - Substitution Procedures.
- C. Curing Compound: ASTM C309, Type 1, Class B, clear or translucent resin-based, water-based curing compound. Comply with VOC requirements for project.
 - 1. US Spec; Maxcure Resin Clear HS (Exterior use only)
 - 2. L&M Chemicals; L&M Cure "R". US Spec; CS-25-1315.
 - 3. Dayton Superior Corporation; Clear Cure VOC J7WB.
 - 4. The Euclid Chemical Company; Kurez DR VOX.
 - 5. WR Meadows; CC-309-1WS.
 - 6. Substitutions Section 012500 - Substitution Procedures.
- D. Sealing Compound: Hardener and dustproofers. Comply with VOC requirements for project. (CONC-1)
 - 1. US Spec; Permasil.
 - 2. The Euclid Chemical Company; Eucosil.
 - 3. W.R. Meadows; Med-Cure. L&M Chemicals; L&M Seal Hard.

4. Substitutions Section 012500 - Substitution Procedures.
- E. Acrylic Curing and Sealing Compound: High solids, water-based, modified acrylic curing, sealing and dustproofing compound. ASTM C1315, Type 1, Class B. Comply with VOC requirements for project. (CONC-5)
 1. BASF MasterKure CC1315WB.
 2. Substitutions Section 012500 - Substitution Procedures.
- F. Evaporation Retarder: Waterborne, monomolecular, film forming for application to fresh concrete.
 1. Dayton Superior Corporation; Aqua Film J74/J74 RTU.
 2. US Spec; Monofilm ER.
 3. The Euclid Chemical Company; Eucobar.
 4. W.R. Meadows; EVAPRE - RTU.
 5. L&M Chemicals; E-CON. Substitutions Section 012500 - Substitution Procedures.
- G. Cleaner: The Euclid Chemical Company; Kurez RC-off.
- H. Absorptive Mats: ASTM C171, cotton fabric or burlap-polyethylene, minimum 9 oz/sq yd bonded to prevent separation during handling and placing.
- I. Waterproof Paper: ASTM C171, curing paper treated to prevent separation during handling and placing, regular color.
- J. Polyethylene Film: ASTM C171, ASTM D2103, 6 mil, clear.
- K. Curing Covers:
 1. McTech Group, Inc.; Ultra Cure "NCF" or Ultra Cure "SUN".
 2. PNA Construction Technologies; S16 Hydracure Covers for single-use or M5 for multi-use.
 3. Substitutions Section 012500 - Substitution Procedures.
- L. Water: Potable, not detrimental to concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify surfaces are acceptable to receive the Work of this section.

3.2 CURING - HORIZONTAL SURFACES

- A. Cure concrete in accordance with ACI 308.1 using one of the following methods:
 - 1. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
 - 2. Spraying: Spray water (fog) over floor slab areas and maintain wet for 7 days.
 - 3. Absorptive Mat: Spread approved mat over floor slab areas. Spray with water until mats are saturated, and maintain in saturated condition for 7 days.
 - 4. Absorptive Mat: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.
 - 5. Membrane Curing Compound: Apply curing compound in compliance with manufacturer's written recommendations.
 - 6. Non-Membrane Forming Curing Compound: Apply curing compound in one coat. Maintain surface wet with curing compound, without ponding for time recommended by manufacturer.
 - 7. Polyethylene Film: Spread over floor slab areas, lap edges and sides, seal with pressure sensitive tape; maintain in place for 7 days.

3.3 CURING - VERTICAL SURFACES

- A. Cure concrete in accordance with ACI 308.1 using one of the following methods:
 - 1. Spraying: Spray water over surfaces and maintain wet for 7 days.
 - 2. Membrane Curing Compound: Apply compound in compliance with manufacturer's written recommendations.
 - 3. Non-Membrane Forming Curing Compound: Apply curing compound in one coat. Maintain surface wet with curing compound for time recommended by manufacturer.

3.4 FLOOR SURFACE TREATMENT

- A. Apply sealer as scheduled on floor surfaces.

3.5 PROTECTION OF FINISHED WORK

- A. Section 017700 - Closeout Requirements: Protecting Installed Construction.
- B. Do not permit traffic over exposed concrete floor surface or stair treads and landings.

3.6 SCHEDULE - CONCRETE FINISHES

- A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1.

- B. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains at 2 percent slope or as indicated on Drawings.
- C. Foundation Walls: Form finish with honeycomb and tie holes filled and fins removed unless noted otherwise.
- D. Underside of Supported Floors and Structure not Exposed to View: Form finish with holes and honey combs filled and surface finished unless noted otherwise.
- E. Underside of Supported Floors and Structure Exposed to View: Sack rubbed finish unless noted otherwise.
- F. Floor Surfaces to Receive Ceramic Tile or Quarry Tile: Wood Float unless noted otherwise.
- G. General Exposed Concrete Floor Surfaces and Surfaces to Receive Carpet or Resilient Flooring: Steel trowel unless noted otherwise.
- H. Special Exposed Concrete Floor Surfaces, see finish schedule and Section 033543 - Polished Concrete.
- I. Exterior Flatwork: Light Broom Finish unless noted otherwise.
- J. Interior Exposed Vertical Concrete: Smooth formed finish unless noted otherwise. Patch tie holes and defects. Remove fins exceeding 1/8 inch in height. Seal with CONC-5.
- K. Exterior Exposed Vertical Concrete Unless Noted Otherwise: Smooth formed finish unless noted otherwise.
- L. Interior Stair Treads: Steel trowel finish unless noted otherwise. Acid wash and seal with CONC-2.
- M. For a blast finish, the degree of blasting is to be based on the following:
 - 1. Brush: Sufficient to dull surface sheen but not to have any reveal.
 - 2. Light: Maximum 1/16 inch aggregate exposure.

3.7 SCHEDULE - FLATWORK TOLERANCE

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Measure for FF and FL tolerances for floors in accordance with ASTM E1155, within 72 hours after slab installation.
- C. Finished slab flatness (FF) and levelness (FL) values comply with the following minimum requirements:
 - 1. Slab-on grade areas covered with carpeting, or not specified otherwise in 2. below:
 - a. Specified overall value FF 25/FL 20

- b. Minimum local value FF 17/FL 15
 - c. Level tolerance such that 80 percent of all points fall within a 3/4 inch envelope (+3/8 inch, -3/8 inch) from the design elevation.
- 2. Slab-on grade areas that will be exposed, receive thin-set tile or resilient flooring:
 - a. Specified overall value FF 30/FL 20
 - b. Minimum local value FF 24/FL 15
 - c. Level tolerance such that 80 percent of all points fall within a 3/4 inch envelope (+3/8 inch, -3/8 inch) from the design elevation.
- 3. Framed elevated floor areas covered with carpeting, or not specified otherwise in 4. below:
 - a. Specified overall value FF 25
 - b. Minimum local value FF 17
 - c. Level tolerance such that 80 percent of all points fall within a 3/4 inch envelope (+3/8 inch, -3/8 inch) from the design elevation.
- 4. Framed elevated floor areas that will be exposed, receive thin-set tile or resilient flooring:
 - a. Specified overall value FF 30
 - b. Minimum local value FF 24
 - c. Level tolerance such that 80 percent of all points fall within a 3/4 inch envelope (+3/8 inch, -3/8 inch) from the design elevation.
- 5. Areas with polished slabs:
 - a. Specified overall value FF 50/FL 35
 - b. Minimum local value FF 35/FL 24
- 6. Main Gymnasium (1502) and Aux Gymnasium (1524):
 - a. Specified overall value FF 50/FL 20
 - b. Minimum local value FF 30/FL 15
 - c. Very Flat Finish (1/8 inch in 10 foot)
- 7. Specified overall value is based on the composite of all measured values in a placement derived in accordance with ASTM E1155.

- D. Measurements: Owner approved testing laboratory will take measurements to verify compliance with FF, FL, and other finish requirements. Measurements will occur within 72 hours after completion of concrete placement (weekends and holidays included). Make measurements before shores or forms are removed to insure the “as-built” levelness is accurately assessed. Profile data for above characteristics may be collected using a laser level or any Type II apparatus (ASTM E1155, “profileograph” or “dipstick”). Contractor’s surveyor shall establish reference elevations to be used by testing laboratory.
- E. Contractor not experienced in using FF and FL criteria is encouraged to retain the services of a floor consultant to assist with recommendations concerning adjustments to slab thicknesses and procedures on measurements of the finish as it progresses in order to achieve the specific flatness and levelness numbers.
- F. Unacceptable Work: Individual slab section measuring less than either of specified minimum local FF/FL numbers, that section shall be rejected and remedial measures shall be required. Sectional boundaries may be set at construction and contraction (control) joints, and not smaller than one-half bay. If composite value of entire slab installation, combination of all local results, measures less than either of specified overall FF/FL numbers, then whole slab shall be rejected and remedial measures shall be required.
- G. Remedial Measures for Rejected Slabs: Correct rejected slab areas by grinding. Patching of low spots is not permitted. Repair or removal and replacement of entire rejected slab areas, as directed by Architect, until a slab finish constructed within specified tolerances is accepted. Grinding shall be done as soon as possible, preferably within three days, but not until concrete is sufficiently strong to prevent dislodging of coarse aggregate particles.
- H. Correct defects in defined traffic floor by grinding or removal and replacement of defective Work. Areas requiring corrective Work will be identified. Re-measure corrected areas by same process.

3.8 SCHEDULE - CURING AND SEALING

- A. In general cure concrete surfaces in accordance with ACI 301 (Refer to Schedule Curing). Apply compounds in accordance with manufacturer's instructions. Check for compatibility with finishes.
- B. Interior Flatwork:
 - 1. Typical:
 - a. Curing Compound without sealer.
 - b. Absorptive mats and polyethylene Film with sealing compound.
 - c. Curing Covers with sealing compound.
 - 2. Below grout set flooring:
 - a. Curing Compound or Mats or Film without sealer.

3. Below adhesive applied flooring:
 - a. Absorptive mats and polyethylene Film or Curing covers without sealer.
 - b. Arrange Schedule for flatwork requiring adhesive applied flooring so that concrete will dry to meet the installation requirements of Sections 096816 and 096500.
4. At polished concrete:
 - a. Absorptive mats or curing covers without sealer.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Liquid-applied cementitious self-leveling floor underlayment.

1.2 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens) 2020b.
- B. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.
- C. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars 2020.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Cementitious Underlayment: (CEM-1)
 - 1. ARDEX Engineered Cements; ARDEX V 1200 with ARDEX P51 Primer: www.ardexamericas.com/#sle.
 - 2. Custom Building Products; CL-150 Self-Leveling Underlayment: www.custombuildingproducts.com/#sle.
 - 3. LATICRETE International, Inc; LATICRETE NXT Level Plus with NXT Primer: www.laticrete.com/#sle.
 - 4. SILPRO Corporation; SilFlo 220: www.silpro.com/#sle.
 - 5. USG; Durock® Quik-Top Self-Leveling Underlayment: www.usg.com/#sle.
 - 6. Substitutions under provisions of Section 012500.

2.2 MATERIALS

- A. Cast Underlayments, General:
 - 1. Comply with applicable code for combustibility or flame spread requirements.
- B. Cementitious Underlayment: Blended cement mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:

1. Compressive Strength: Minimum [] pounds per square inch after 28 days, tested per ASTM C109/C109M.
 2. Flexural Strength: Minimum 1000 psi after 28 days, tested per ASTM C348.
 3. Density: 125 pounds per cubic foot, nominal.
 4. Final Set Time: 1-1/2 to 2 hours, maximum.
 5. Thickness: Capable of thicknesses from feather edge to maximum 3-1/2 inch.
 6. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.
- C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to underlayment mix materials.
- D. Primer: Manufacturer's recommended type.
- E. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.

2.3 MIXING

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Mix to self-leveling consistency without over-watering.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

3.2 PREPARATION

- A. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.
- B. Vacuum clean surfaces.
- C. Prime substrate in accordance with manufacturer's instructions. Allow to dry.
- D. Close floor openings.

3.3 APPLICATION

- A. Install underlayment in accordance with manufacturer's instructions.
- B. Place to indicated thickness, with top surface level to 1/8 inch in 10 ft.

3.4 CURING

- A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.
- B. Air cure in accordance with manufacturer's instructions.

3.5 PROTECTION

- A. Protect against direct sunlight, heat, and wind; prevent rapid drying to avoid shrinkage and cracking.
- B. Do not permit traffic over unprotected floor underlayment surfaces.

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes Grout for structural steel members, metal fabrications, and as indicated.
Types of grout are as follows:
 - 1. Type C - Portland cement, sand and gravel.
 - 2. Type F - Portland cement and sand.
 - 3. Type N - Non-shrink, proprietary.
- B. Related Sections:
 - 1. Section 051200 - Structural Steel Framing.
 - 2. Section 055000 - Metal Fabrications.
 - 3. Section 081213 - Hollow Metal Frames.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
- B. ASTM International:
 - 1. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 2. ASTM C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.
 - 3. ASTM C150 - Standard Specification for Portland Cement.

1.3 SUBMITTALS

- A. Submit product data under provisions of Section 013300.
- B. Submit product data indicating product standards, physical and chemical characteristics, technical specifications, limitations, and general recommendations regarding each manufactured product specified.
- C. Submit manufacturer's installation instructions under provisions of Section 013300.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 016000.
- B. Store and protect products under provisions of Section 016000.

- C. Comply with instructions for storage, shelf life limitations and handling.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Type N Grout, Non-Shrink:
 - 1. Laticrete: L&M Crystex or Duragrout.
 - 2. W.R. Meadows: 588 Precision Grout or Pac-It.
 - 3. Euclid Chemical Co.: NS Grout.
 - 4. BASF Master Builders Solutions: Masterflow 713 Grout or Masterflow 555 or Masterflow 928.
 - 5. Five Star Products, Inc.: Five Star Grout.
 - 6. Substitutions: Under provision of Section 012500.
- B. Bonding Agent: Refer to Section 033000.

2.2 GROUT MATERIALS

- A. Portland Cement: ASTM C150, Type I or II; color as selected.
- B. Water: Potable; containing no impurities, suspended particles, algae or dissolved natural salts in quantities capable of causing:
 - 1. Corrosion of steel.
 - 2. Volume change increasing shrinkage cracking.
 - 3. Efflorescence.
 - 4. Excess air entraining.
- C. Fine Aggregate:
 - 1. Washed natural sand.
 - 2. Gradation in accordance with ASTM C33 and represented by smooth granulometric curve within required limits.
 - 3. Free from injurious amounts of organic impurities as determined by ASTM C40.
- D. Mix: Portland cement, sand and water. Do not use ferrous aggregate or staining ingredients in grout mixes.
- E. Gravel: Clean, washed, 3/8" minus.

2.3 MIXING CEMENTITIOUS (TYPE C & F) GROUT

- A. Type C Grout: Portland cement, 3/8" minus gravel and clean sand. Mix to a consistency to suit the application and meet the design requirements.
- B. Type F Grout: Portland cement and clean sand. Mix to a consistency to suit the application and meet the design requirements.
- C. Include bonding agent as additive to grout mix intended for exterior locations. Comply with additive manufacturer's mixing and application instructions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.

3.2 PREPARATION - CONCRETE

- A. Clean surfaces of dirt, laitance, corrosion, or other contamination; wire brush using water. Rinse surface and allow to dry.
- B. Where Type C and F Grouts are used, roughen surface before wire brushing then saturate surface with water for 24 hours prior to applying bonding compound or installing grout containing bonding additive.

3.3 APPLICATION - GENERAL

- A. Fill space to be grouted full. Finish exposed surfaces smooth and even.
- B. Seal spaces at penetrations of floors and walls so as to provide a fire resistive rating equal or greater than the construction penetrated.
- C. Maintain grout and surfaces in contact with grout at min. 45° for 3 days.

3.4 APPLICATION - CEMENTITIOUS (TYPE C AND F) GROUT

- A. For application of grouts containing no bonding additive, apply coating of bonding agent to damp concrete surfaces. Pre wet surface for 24 hours.
- B. Place grout after bonding compound has dried. Rod grout until it rings when struck. Cover fresh grout with wet burlap for four days. Apply curing compound upon removing burlap.

3.5 APPLICATION - TYPE N

- A. Apply and cure proprietary grouts according to manufacturer's printed instructions.

3.6 FIELD QUALITY CONTROL

- A. Field inspection and testing of Type F and Type C grout will be performed under provisions of Section 014000 and ACI 301.

3.7 SCHEDULE

A. Provide grout types as follows unless noted otherwise.

B.

Type F Grout: (4,000 psi unless noted otherwise)

1. Concrete wall and floor penetrations, i.e. pipe and duct.
2. Steel door and window frames in concrete construction (2,000 psi).
3. Division 5 product bearing plates not indicated as Type N Grout.

C. Type C Grout: Voids 3" or greater where Type F grout is scheduled or indicated.

D. Type N Grout: (Strength per manufacturer)

1. Below structural steel column bearing plates.
2. Below steel beam and girder bearing surfaces.
3. Filling of holes for rods, bolts and handrail posts anchored in concrete.
4. Machinery Bases.

END OF SECTION

DIVISION 04

MASONRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes mortar and grout for masonry.
- B. Related Sections:
 - 1. Section 042113 - Veneer Brick Masonry: Installation of mortar and grout.
 - 2. Section 081213 - Hollow Metal Frames: Grouting steel door frames.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 530 - Building Code Requirements for Masonry Structures.
 - 2. ACI 530.1 - Specifications for Masonry Structures.
- B. ASTM International:
 - 1. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
 - 2. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
 - 3. ASTM C150 - Standard Specification for Portland Cement.
 - 4. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
 - 5. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
 - 6. ASTM C387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar for Concrete and High Strength Mortar.
 - 7. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
 - 8. ASTM C476 - Standard Specification for Grout for Masonry.
 - 9. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
 - 10. ASTM C1019 - Standard Test Method for Sampling and Testing Grout.
 - 11. ASTM C1072 - Standard Test Method for Measuring of Masonry Flexural Bond Strength.
 - 12. ASTM C1142 - Standard Specification for Extended Life Mortar for Unit Masonry.
 - 13. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
 - 14. ASTM C1384 - Standard Specification for Admixtures for Masonry Mortars

15. ASTM E96- Standard Test Methods for Water Vapor Transmission of Materials.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal requirements.
- B. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- C. Design Data: Submit design mix when Property specification of ASTM C270 is to be used, required environmental conditions, and admixture limitations.
- D. Test Reports:
 - 1. Submit reports on mortar indicating conformance of component mortar materials to requirements of ASTM C270 and test and evaluation reports to ASTM C780 for aggregate ratio and water content, air content, consistency and compressive strength.
 - 2. Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476 and test and evaluation reports to ASTM C1019.
- E. Manufacturer's Installation Instructions: Submit premix mortar manufacturer's installation instructions.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 530 and ACI 530.1.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.
- B. Section 016000 - Product Requirements.
- C. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- D. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Mutual Materials. <https://www.mutualmaterials.com/>
- B. Spec Mix. <http://www.specmix.com/>
- C. Quikrete. <https://www.quikrete.com/>

- D. Cemex. <https://www.cemexusa.com>
- E. Basalite. <https://www.basalite.com/>
- F. Amerimix. <http://www.amerimix.com/>
- G. Substitutions: Section 012500 - Substitution Procedures.

2.2 COMPONENTS

- A. Portland Cement: ASTM C595, Type IL (15), color to be selected.
- B. Extended Life Mortar: ASTM C1142, Types S, using color cement.
- C. Premix Mortar: ASTM C387, Type S and N, using white color cement.
- D. Mortar Aggregate: ASTM C144, standard masonry type.
- E. Hydrated Lime: ASTM C207, Type S or N.
- F. Grout Aggregate: ASTM C404, fine and coarse.
- G. Water: Clean and potable.
- H. Mortar Color: Standard gray.
- I. Water Repellent: Required in Mortar for all exterior building walls. Manufacture Mortar with:
 - 1. GCP Applied Technologies, Dry Block.
 - 2. Euclid Chemicals, BlockTite.
 - 3. Master Builders, MasterPel 240.
 - 4. ACM Chemistries, Rainbloc.
 - 5. Substitutions under provision of Section 012500 - Substitution Procedures.
 - a. Meet ASTM E514 for wind-driven rain resistance.
 - b. Meet ASTM C1072 for bond strength to mortar.
 - c. Meet ASTM E96 for reduction of water vapor transmission.
 - d. Meet ASTM C1384 Standard Specification for Admixtures for Masonry Mortar.
- J. Accelerator: Non-Corrosive type; Accel Guard 80 manufactured by Euclid Chemical Co.
- K. Retardant: Non Chloride type; Hydra Set-Free manufactured by W.R. Meadows.
- L. Bonding Agent: Latex type, approved by mortar manufacturer.

- M. Pumping Aid: Liquid type; approved by mortar manufacturer.
- N. Expansive Agent: Liquid type; approved by mortar manufacturer.
- O. Calcium chloride is not permitted.

2.3 MIXES

A. Mortar Mixes:

- 1. Mortar For Structural Masonry: ASTM C270, Type S using Property specification.
- 2. Mortar For Non-Structural Masonry: ASTM C270, Type S using Property specification.
- 3. Pointing Mortar: ASTM C270, Type N using Property specification.

B. Grout Mixes:

- 1. Grout for Non-Structural Masonry: 2,000 psi strength at 28 days; 8-11 inches slump; mixed in accordance with ASTM C476
- 2. Grout for Structural Masonry: 2,000 psi strength at 28 days; 8-11 inches slump; mixed in accordance with ASTM C476
- 3. Application:
 - a. Coarse Grout: For grouting spaces with minimum 4 inches dimension in every direction.
 - b. Fine Grout: For grouting other spaces.

2.4 ADMIXTURES

- A. Air Entrainment: ASTM C260. Certified by manufacturer to be compatible with other admixtures. Refer to Section 033000.
- B. Water Reducing Admixture: Conforming to ASTM C494, Type A shall contain no chlorides (not more than 0.05 percent). The amount of admixture added to the concrete shall be in accordance with the manufacturer's recommendations to obtain between 5% and 10% water reduction.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Request inspection of spaces to be grouted.

3.2 PREPARATION

- A. Apply bonding agent to existing concrete surfaces.
- B. Mortar Mixing:
 - 1. Thoroughly mix mortar ingredients according to ASTM C270 in quantities needed for immediate use.
 - 2. Achieve uniformly damp sand immediately before mixing process.
 - 3. Add mortar color and admixtures to achieve uniform mix and coloration.
 - 4. Retemper only within two hours of mixing.
- C. Grout Mixing:
 - 1. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476.
 - 2. Add admixtures; mix uniformly.

3.3 INSTALLATION

- A. Install mortar and grout in accordance with ACI 530.1 Specifications for Masonry Structures.

3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Establishing Mortar Mix: In accordance with ASTM C270.
- C. Testing of Mortar Mix: In accordance with ASTM C780 for aggregate ratio and water content, air content, consistency, and compressive strength.
- D. Testing of Grout Mix: In accordance with ASTM C1019 for compressive strength, and in accordance with ASTM C143 for slump.
- E. Test flexural bond strength of mortar and masonry units to ASTM C1072; test in conjunction with masonry unit sections specified.
- F. Test compressive strength of mortar and masonry to ASTM C1314; test in accordance with masonry unit sections specified.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes CMU with:

1. Reinforcement.
2. Anchorage.
3. Accessories.
4. Installation of grout.

B. Related Sections:

1. Section 040514 - Masonry Mortaring and Grouting: Mortar and grout.
2. Section 042113 - Masonry Veneer.
3. Section 051200 - Structural Steel Framing: Product requirements for steel anchors for placement by this section.
4. Section 055000 - Metal Fabrications: Product requirements for loose steel lintels, fabricated steel items, and for placement by this section.
5. Section 071910 - Water Repellents Anti Graffiti Coatings: Coordinate mockup with this section.
6. Section 079200 - Joint Sealants: Rod and sealant at control and expansion joints.

1.2 REFERENCES

A. American Concrete Institute:

1. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 530 - Building Code Requirements for Masonry Structures.

B. ASTM International:

1. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
2. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI
3. ASTM A951 - Standard Specification for Steel Wire for Masonry Joint Reinforcement.
4. ASTM A1064- Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

5. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
6. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
7. ASTM E514 - Standard Test Method for Water Penetration and Leakage Through Masonry.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings:
 1. Show reinforcing sizes, spacings, locations, reinforcement quantities, supporting and spacing devices for reinforcement and accessories in 1/4 inch minimum scale elevation, drawn on a minimum size 24 x 36 inch drawing.
 2. Submit bending and cutting schedules.
 3. General Contractor and Subcontractor to review shop drawings and add all proposed openings to drawings before submitting to Architect.
- C. Product Data: Submit data for masonry units, fabricated wire reinforcement, wall ties, anchors and other accessories.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements, and conform to ICC code and standards.
- E. Section 017700 - Closeout Procedures.
- F. Manual for Materials and Finishes: Indicate surface cleaning and frequency of sealing instructions.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 117, 530, and 530.1.
- B. Testing and inspection per Section 014000 - Quality Requirements.
- C. Qualifications:
 1. Installer: Company specializing in performing Work of this section with minimum four years documented experience. Certified member in good standing with the Washington State Conference of Mason Contractors (WSCMC) or accepted by architect prior to bid date. Other installers who meet or exceed quality assurance and qualifications criteria of WSCMC may submit bid upon acceptance by Architect.
- D. Regulatory Requirements:

1. Conform to IBC Sections 2102, 2103, 2104 and 2105 requirements for masonry construction.
- E. Pre-Installation Meeting:
 1. Section 013119 - Project Meetings: Pre-installation meeting.
 2. Convene minimum one week prior to commencing work of this section.
- 1.5 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver, store, protect and handle products to site under provisions of Section 016000.
 - B. Accept units on site. Inspect for damage.
- 1.6 ENVIRONMENTAL REQUIREMENTS
 - A. Section 016000 - Product Requirements.
 - B. Hot and Cold Weather Requirements: ACI 530 & 530.1
- 1.7 COORDINATION
 - A. Section 013100 - Project Management and Coordination: Coordination and project conditions.

PART 2 PRODUCTS

- 2.1 ACCEPTABLE MANUFACTURERS
 - A. Basis of Design: Mutual Materials, <http://www.mutualmaterials.com>.
 - B. Basalite, <http://www.basalite.com> .
 - C. Substitutions under provisions of Section 012500.
- 2.2 CONCRETE MASONRY UNITS
 - A. Hollow Load Bearing Block Units (CMU): ASTM C90, weight 115 lbs. per cu. ft. unless indicated on drawings.
 1. Size:
 - a. 8 x 8 x 16 and 12 x 8 x16 (W x H x L)
 2. Finish/color:
 - a. CMU-1: Mutual Materials, Winter Sky, Ground face
 - b. CMU-2: Mutual Materials, Sable, Ground face

2.3 MASONRY FLASHING

- A. Install masonry through wall flashing to divert water from inside wall cavity to the exterior at all locations where downward flow of water will be interrupted, including at bottom of wall.
- B. Refer to Section 042113.

2.4 ACCESSORIES

- A. Single Wythe Joint Reinforcement: ASTM A951; truss or ladder type; 0.188 inch diameter side rods with 0.148 inch diameter cross ties; hot dip galvanized.
- B. Reinforcing Steel: as specified in Section 032000; uncoated finish.
- C. Masonry Reinforcement Bar Positioners required shall be saddle type only.
 - 1. General: Provide prefabricated positioners manufactured to hold vertical and horizontal reinforcing bar in place during grouting and mortaring procedures.
 - 2. Material: #9 gage or more 80,000 psi brite basic wire meeting ASTM A1064 specifications for cold drawn wire; G90 finish.
 - 3. Fabrication: Furnish in sizes appropriate to masonry unit installed. Positioners shall be electric welded.
 - 4. Acceptable Manufacturers:
 - a. Cradle positioners by W.C.R. Fabricators, 146 Calle De Los Molinos, San Clement, CA 92672; (714) 492-2370.
 - b. Hohmann & Barnard RB Rebar Positioner, AA Wire Products Co. Architect238.
 - c. Substitutions: Section 012500 - Substitution Procedures.
- D. Anchor Rods: ASTM A307; Grade C; headed bolt with washer or all thread rod; complete with washers and heavy hex nuts; sized for minimum 12 inch embedment; galvanized finish.
 - 1. Hot-Dipped Galvanizing: ASTM A153 or
 - 2. Mechanical Galvanizing: ASTM B695; Class 55.
- E. Mortar and Grout: As specified in Section 040514.
- F. Joint Filler:
 - 1. Description: Closed-cell PE, oversized 50 percent to joint width.
 - 2. Type: Self-expanding.
 - 3. Size: maximum lengths.

- G. Grout Screen: Monofilament screen to be added to bond beams as required.
- H. Cleaning Solution: As recommended by block supplier.
 - 1. Acceptable manufacturers: Prosoco and Fabrikem.
 - 2. Do not use muriatic acid.
- I. Integral Water Repellent: Required in CMU for all exterior building walls.
 - 1. Acceptable Manufacturers:
 - a. GCP Technologies.
 - b. Euclid Chemicals.
 - c. Master Builders Solutions.
 - d. ACM Chemistries.
 - 2. Tested to ASTM E514.
 - 3. Meet ASTM C1072 for bond strength to mortar.
- J. Adhesive Anchor: two-part, self mixing epoxy adhesive for anchoring rebar, threaded or smooth steel dowels, and all thread rebar. Acceptable Manufacturers:
 - 1. Hilti, Hit 270 (ESR-4143)
 - 2. Substitutions: Section 012500 - Substitution Procedures.
- K. Masonry Sealer
 - 1. Refer to Section 071910.

2.5 SOURCE QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive work.
- C. Verify items provided by other sections of work are properly sized and located.
- D. Verify built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied to other Sections.
- B. Provide and install temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent support.

3.3 INSTALLATION

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform thickness.
- C. Coursing of Concrete Masonry Units:
 - 1. Bond: Running, unless indicated.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave, unless indicated otherwise.
- D. Placing And Bonding:
 - 1. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
 - 2. Lay hollow masonry units with face shell bedding on head and bed joints. Where walls are grouted solid, units to have full bed and head joints.
 - 3. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
 - 4. Remove excess mortar as Work progresses.
 - 5. Interlock intersections and external corners.
 - 6. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar and replace.
 - 7. Perform job site cutting of masonry units with proper tools to assure straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
 - 8. Cut mortar joints flush where wall tile is scheduled, cement parging is required, resilient base is scheduled, or bitumen dampproofing is applied.
 - 9. Isolate masonry from vertical structural framing members with movement joint or as indicated on Drawings.
 - 10. Isolate top of masonry from horizontal structural framing members and slabs or decks with compressible joint filler, or as indicated.
- E. Joint Reinforcement and Anchorage: Refer to Structural notes and details.

F. Masonry Flashings:

1. Extend flashings horizontally under parapet caps, and turn down on outside face to form drip.
2. Lap end joints minimum 6 inches and seal watertight.
3. Turn flashing, fold, and seal at corners, bends, and interruptions.

G. Lintels:

1. Do not splice reinforcing bars.
2. Allow masonry lintels to attain specified strength before removing temporary supports.
3. Maintain minimum 8 inch bearing on each side of opening or as indicated on drawings.

H. Grouting:

1. Lay masonry units with cells vertically aligned and clear of mortar and unobstructed.
2. Place reinforcing, reinforcement bars, and grout as indicated on Drawings.
3. Splice reinforcement in accordance with Section 032000 and as shown on drawings.
4. Support and secure reinforcement from displacement.
5. Dampen masonry unit surfaces in contact with grout just prior to grout placement, depending on moisture content, rate of absorption and weather conditions.
6. Place and consolidate grout fill without displacing reinforcing - use mechanical vibrator or rebar vibrator.
7. Grout spaces less than 2 inches in width with Fine grout. Grout spaces 2 inches or greater in width with Coarse grout.
8. When grouting is stopped for more than one hour, terminate grout 1-1/2 inch below top of upper masonry unit to form a positive key for subsequent grout placement. Reinforcing to have a minimum of 3/4 inch of grout cover over horizontal bars.
9. Low Lift Grouting: Place first lift of grout to a height of 8 inches and rod or mechanically vibrate for grout consolidation. Place subsequent lifts in 48 inch increments and mechanically vibrate for grout consolidation. Re-vibrate 5 to 15 minutes after initial vibration.
10. Place grout in accordance with TMS MSJC Specification (alternate grout placement method not allowed).

I. Control And Expansion Joints:

1. Install control and expansion joints at the following maximum spacings, unless otherwise indicated on Drawings:
 - a. Exterior Walls: 20 feet on center and within 24 inches on one side of each interior and exterior corner.
 - b. Interior Walls: 30 feet on center.
 - c. At changes in wall height.
 2. Do not continue horizontal reinforcement through expansion joints.
 3. Install control joint in continuous lengths as shown on drawings. Seal butt and corner joints.
 4. Refer to Section 079200 for sealant materials.
 5. Form expansion joint by omitting mortar and move unit to form open space. Fill open space with expansion joint per Section 079500.
- J. Built-In Work:
1. As work progresses, install built-in fabricated metal frames, window frames, anchor bolts, plates, and other items to be built-in the work and furnished by other sections.
 2. Install built-in items plumb and level.
 3. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout or mortar. Fill adjacent masonry cores with grout minimum 16 inches from framed openings.
 4. Do not build in organic materials subject to deterioration.
- K. Cutting And Fitting:
1. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location. (Refer to Structural General Notes Drawing.)
 2. Obtain Architect/Engineer's approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.4 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation From Alignment of Columns Pilasters: 1/4 inch.
- C. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.

- D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft, 3/8 inch in 20 ft, and 1/2 inch maximum or more.
- E. Maximum Variation from Plumb: 1/4 inch in 10 feet, 3/8" in 20 feet, 1/2" maximum.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- G. Maximum Variation of Joint Thickness: Bed Joint $\pm 1/8$ inch, Head Joint -1/4 inch, +3/8 inch.
- H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.
- I. Maximum Variation for Steel Reinforcement:
 - 1. Plus or minus 1/2 inch when distance from centerline of steel to opposite face of masonry is 8 inches or less.
 - 2. Plus or minus 1 inch when distance is between 8 and 12 inches.
 - 3. Plus or minus 2 inches from location along face of wall.

3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements and 017700 - Closeout Procedures: Field inspecting, testing, adjusting, and balancing.
- B. Concrete Masonry Units: Test each type in accordance with requirements of special inspection notes in Structural Drawings.

3.6 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Remove excess mortar and mortar smears as work progresses.
- C. Replace defective mortar. Match adjacent work.
- D. Clean soiled surfaces with cleaning solution.
- E. Use non-metallic tools in cleaning operations.

3.7 SEALING

- A. Apply masonry water repellent according to manufacturer's instructions and Section 071910.

3.8 PROTECTION OF FINISHED WORK

- A. Section 017000 - Execution: Requirements for protecting installed construction.
- B. Protect exposed external corners subject to damage.

- C. Protect base of walls from mud and mortar splatter.
- D. Protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.
- E. Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. CMU veneer.
2. Reinforcement, anchorage and accessories.

B. Related Sections:

1. Section 040514 - Masonry Mortaring and Grouting: Product Requirements for Mortar.
2. Section 054000 - Cold-Formed Metal Framing: Structural wall backing.
3. Section 055000 - Metal Fabrications: Execution requirements for loose steel lintels, fabricated steel items and miscellaneous metal items for placement by this section.
4. Section 072113 - Board Insulation.
5. Section 071910 - Water Repellant and Anti-Graffiti coatings.
6. Section 072700 - Air Barriers: Air barrier placed as detailed.
7. Section 076200 - Sheet Metal Flashing and Trim: Product requirements for reglets for flashings for placement by this section.
8. Section 079200 - Joint Sealants: Rod and sealant at control and expansion joints.
9. Section 104400 - Fire Protection Specialties: Masonry blockouts for key lock boxes.
10. Division 22 - Plumbing.
11. Division 23 - Mechanical.
12. Division 26 - Electrical.

1.2 REFERENCES

A. American Concrete Institute:

1. ACI 530 - Building Code Requirements for Masonry Structures.
2. ACI 530.1 - Specifications for Masonry Structures.

B. ASTM International:

1. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
2. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).

C. International Energy Conservation Code (IECC)

1. C104.2.1.1 Wall Insulation Inspection

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Product Data:

1. Submit data for each product specified.
2. Indicate initial rate of absorption for clay and shale brick.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 and ACI 530.1.

B. Qualifications

1. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

C. Pre-installation meetings

1. Section 013119 - Project Meetings: Pre-installation meeting.
2. Convene minimum one week prior to commencing work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Accept units on site. Inspect for damage.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 016000 - Product Requirements.

B. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.

C. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F) or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

1.7 COORDINATION

A. Section 013100 - Project Management and Coordination: Coordination and project conditions.

- B. Coordinate masonry work with adjacent construction.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Mutual Materials.
 - 1. Local Rep: Rick Crooks, 253.872.5364.
- B. Interstate Brick.
 - 1. Local Rep: Mona Syrovatka, 254.405.6544.
- C. Substitutions: As allowed in Section 012500 - Substitution Procedures.

2.2 COMPONENTS

- A. CMU Veneer (MV-1):
 - 1. Nominal Size: 4x4x16. Furnish other special units as detailed.
 - 2. Color/Finish: Sable, Ground face.

2.3 MASONRY FLASHING

- A. Stainless Steel: Fabric Flashing:
 - 1. Acceptable manufacturers:
 - a. York Mfg. Co, .
 - b. Prosoco R Guard, SS Thru Wall.
 - c. Hohmann & Barnard, Mighty-Flash Stainless Steel Fabric Flashing.
 - d. Product substitutions under provisions of Section 012500.
 - 2. Stainless steel core with polymer fabric laminated to bottom stainless steel face with non-asphalt adhesive. Type 304 stainless steel.
 - 3. Provide prefabricated stainless steel end dams, prefabricated stainless steel inside corners, and prefabricated stainless steel outside corners where these conditions exist.
 - a. Gauge: 26 ga.
 - b. Material: 304 stainless steel.
 - 4. Sealant: Recommended by flashing manufacturer.
- B. Stainless steel termination bar.
- C. Stainless steel drip edge.

- D. Cavity Drain Material: Fabric mesh shaped to ensure moisture drainage to cavity weeps and break up mortar droppings.

1. Manufacturers:

- a. Hohmann & Barnard, Mortar Trap.
- b. York Manufacturing, Weep-Armor.
- c. Substitutions: Section 012500 - Substitution Procedures.

E. Weeps/Vents:

1. Acceptable manufacturers:

- a. York Mfg. Co, Stainless steel weep vent.
- b. Hohmann & Barnard, Quadro-Vent.
- c. Substitutions under provisions of Section 012500 - Substitution Procedures.

2. Color to be selected by Architect.

2.4 MORTAR AND GROUT:

- A. As specified in Section 040514.

2.5 INSULATION

- A. As specified in Section 072113.

2.6 ACCESSORIES

- A. Reinforcing Steel: type, specified in Section 032000. As indicated on drawings.
- B. Lap Sealant: Butyl type as specified in Section 079200.
- C. Wall Ties with 9 gage continuous hot dipped wire conforming to ASTM A153 - Masonry Veneer or CMU veneer to Gypsum Sheathing, Steel stud framing or Structural steel. All material to be Hot Dip Galvanized:
 - 1. Hohmann & Barnard HB-213 w/-2 x Hook, (2) H&B self-drilling / self-tapping screws (per connection), X-Seal® Tape.
 - 2. Wire-Bond #2401 RJ-711, 12 ga. w/ 3/16 inch diameter #2402 hook., (2) #10-16 x 1 1/2" minimum. Stalgard screws per connection, Anchorseal Tape.
- D. Wall Ties with 9 gage continuous hot dipped wire conforming to ASTM A153 - Masonry Veneer to Concrete or CMU:
 - 1. Heckman Post-I-Tie with 3/16" dia Triangle Wire Tie, hot-dip galv finish.

2. Wirebond, Tapcon Sure-Tie with 3/16" dia Sure-Tie Triangle, hot dip galv finish.
 3. Hohmann & Barnard Concrete Seal Tie with 3/16" dia 2-seal Byna-lok tie, hot dip galv finish.
- E. Joint Filler/Control Joint: Closed cell neoprene; oversized 50 percent to joint width; self-expanding; by maximum lengths. Backer rod as needed.
- F. Cleaning Solution: As recommended by block supplier.
1. Acceptable manufacturers: Prosoco and Fabrikem.
 2. Do not use muriatic acid.
- G. Steel Lintels: Refer to Section 055000, size as indicated on Drawings.
- H. Water Repellents/Anti-Graffiti Coating: Refer to Section 071910 - Water Repellents Anti-Graffiti Coatings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive work.
- C. Verify items provided by other sections of work are properly sized and located.
- D. Verify built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied to other sections.
- B. Furnish temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent support.

3.3 INSTALLATION

- A. Install masonry through-wall flashing to divert water from inside wall cavity to the exterior at all locations where downward flow of water will be interrupted, including at bottom of wall.
- B. Establish lines, levels, and coursing indicated. Protect from displacement.
- C. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform thickness.
- D. Coursing of CMU units:

1. Bond: Running.
 2. Two units and one mortar joint to equal 8 inches.
 3. Mortar joints: Concave.
- E. Placing And Bonding:
1. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
 2. Remove excess mortar as work progresses.
 3. Interlock intersections and external corners.
 4. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar and replace.
 5. Perform job site cutting of masonry units with proper tools to assure straight, clean, un-chipped edges. Prevent broken masonry unit corners or edges.
 6. IECC C104.2.1.1 Wall Insulation Inspection: To be made after all wall insulation and air vapor retarder sheet or film materials are in place, but before any wall covering is placed.
 7. Isolate masonry from vertical structural framing members with movement joint as indicated on Drawings.
 8. Isolate top of masonry from horizontal structural framing members and slabs or decks with compressible joint filler.
- F. Weeps and Vents: Furnish weeps and vents in outer wythe at 24 inches oc horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls, and vents as indicated.
- G. Insulation: Apply board as recommended by insulation manufacturer. Apply in parallel courses with joints breaking midway over course below. Place boards in moderate contact with adjoining insulation without forcing and without gaps. Seal around cutouts with sealant.
- H. Cavity Wall: Do not permit mortar to drop or accumulate into cavity air space or to plug weeps.
1. Install cavity drain material continuously at bottom of each cavity above through wall flashing.
- I. Reinforcement and Anchorage: Refer to structural notes.
- J. Veneer tie spacing: Refer to structural notes.
- K. Masonry Flashings:

1. Extend flashings horizontally through outer wythe at foundation walls, above ledge or shelf angles and lintels, under parapet caps and at bottom of walls and turn down on outside face to form drip.
2. Turn flashing up minimum 8 inches and seal to substrate.
3. Lap end joints minimum 6 inches and seal watertight.
4. Turn flashing, fold, and seal at corners, bends and interruptions.

L. Lintels:

1. Install lintels over openings.
2. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled or indicated.
3. Maintain minimum 4 inch bearing on each side of opening.

M. Control And Expansion Joints:

1. Install control and expansion joints at the following maximum spacing, unless otherwise indicated on Drawings:
 - a. Exterior Walls: 20 feet on center and within 24 inches on one side of each interior and exterior corner.
 - b. Interior Walls: 30 feet on center.
 - c. At changes in wall height.
2. Do not continue horizontal joint reinforcement through control and expansion joints.
3. Install preformed control joint device in continuous lengths. Seal butt and corner joints.
4. Size control joint in accordance with Section 079200 for sealant performance.
5. Form expansion joint by omitting mortar and cutting unit to form open space or as detailed.

N. Cutting And Fitting:

1. Cut and fit for penetrations and built-in items. Coordinate with other sections of work to provide correct size, shape, and location.
2. Obtain Architect/Engineer's approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

O. Install Work in accordance with applicable codes.

3.4 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation from Alignment of Columns and Pilasters: ¼ inch.
- C. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.
- D. Maximum Variation from Plane of Wall: ¼ inch in 10 ft and ½ inch in 20 ft or more.
- E. Maximum Variation from Plumb: ¼ inch per story non-cumulative; ½ inch in two stories or more.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and ¼ inch in 10 ft; ½ inch in 30 ft.
- G. Maximum Variation of Joint Thickness: 1/8 inch.
- H. Maximum Variation from Cross Sectional Thickness of Walls: ¼ inch.
- I. Maximum Variation for Steel Reinforcement:
 - 1. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.
 - 2. Plus or minus ½ inch when distance from centerline of steel to opposite face of masonry is 8 inches or less.
 - 3. Plus or minus 1 inch when distance is between 8 and 24 inches.
 - 4. Plus or minus 1-1/4 inch when distance is greater than 24 inches.
 - 5. Plus or minus 2 inches from location along face of wall.

3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements; Section 017000 - Execution: Field inspecting, testing, adjusting, and balancing.

3.6 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Remove excess mortar and mortar smears as work progresses.
- C. Replace defective mortar. Match adjacent work.
- D. Clean soiled surfaces with cleaning solution.
- E. Use non-metallic tools in cleaning operations.

3.7 PROTECTION OF FINISHED WORK

- A. Section 017000 - Execution: Requirements for protecting finished Work.
- B. Protect exposed external corners subject to damage.
- C. Protect base of walls from mud and mortar splatter.
- D. Protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.
- E. Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather, when work is not in progress, to prevent water from entering air space.

END OF SECTION

DIVISION 05

METALS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel framing members.
2. Base plates and other structural plates.
3. Grouting under base plates.
4. Anchor Rods for embedding into concrete and masonry.
5. Fasteners, connectors and anchors.

B. Related Sections:

1. Section 033000 - Cast-In-Place Concrete: Supply of anchors for casting into concrete.
2. Section 036000 - Grouting: Grout for setting base plates.
3. Section 052100 - Steel Joist Framing.
4. Section 053113 - Steel Floor Decking: Support framing for small openings in floor deck.
5. Section 053123 - Steel Roof Decking: Support framing for small openings in roof deck.
6. Section 055000 - Metal Fabrications: Steel fabrications affecting structural steel work.
7. Section 099000 - Painting and Coating: Finish painting.
8. Section 116600 - Athletic Equipment: Support for mat mover.

1.2 REFERENCES

A. American Institute of Steel Construction:

1. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.
2. AISC 360 - Specification for Structural Steel Buildings.
3. AISC 341 - Seismic Provisions for Structural Steel Buildings.

B. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.

3. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.
 4. ASTM A123 - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
 5. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
 6. ASTM A500 - Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 7. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 8. ASTM A572 - Standard Specification for High Strength Low Alloy Columbium Vanadium Structural Steel.
 9. ASTM A588- Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi Minimum Yield Point, with Atmospheric Corrosion Resistance.
 10. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 11. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 12. ASTM A786 Standard Specification for Hot-Rolled Carbon,
 - a. Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
 13. ASTM A992 - Standard Specification for Structural Steel Shapes.
 14. ASTM A1064 - Standard Specification for Carbon-Steel wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 15. ASTM F436 - Standard Specification for Hardened Steel Washers.
 16. ASTM F959 - Standard Specification for Compressible Washer Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric.
 17. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
 18. ASTM F3125 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Heat Treated, 120 and 105ksi Minimum Tensile Strength, Inch and Metric Dimensions.
- C. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

2. AWS D1.1 - Structural Welding Code - Steel.
 3. AWS D1.3 - Structural Welding Code - Sheet Steel.
 4. AWS D1.8 - Structural Welding Code - Seismic Supplement.
- D. Research Council on Structural Connections:
1. RCSC - Specification for Structural Joints Using ASTM F3125 Bolts.
- E. SSPC: The Society for Protective Coatings:
1. SSPC - Painting Manual.
 2. SSPC Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
 3. SSPC SP 1 - Solvent Cleaning.
 4. SSPC SP 2 - Hand Tool Cleaning.
 5. SSPC SP 3 - Power Tool Cleaning.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
1. Indicate profiles, sizes, spacing and locations of structural members, openings, attachments and fasteners. Include erection drawings, elevations and details where applicable, showing shipping piece marks. Reference pieces on drawings to applicable design details. Drawings to be on a 24" x 36" minimum sheet size.
 2. Connections.
 3. Cambers.
 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Manufacturer's Mill Certificate: Certify that Products meet or exceed specified requirements.
- D. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.
- E. Shop Certificate: Submit a copy of a certificate indicating that the fabrication shop complies with "Approved Fabricator" requirements of the Building Official to the Architect.
- F. Building Product Disclosure Requirements: Provide Building Product Disclosure documentation. Any requests for substitution must include this documentation.

1. Environmental Product Declaration for fabricated hot rolled structural sections, fabricated steel plate and fabricated hollow structural sections.
- G. Non-Approved Fabricator: Submit copies of special inspection reports to the Architect.
- H. Welders Certificates:
1. Job Site: Certify welders employed on the Work before work commences. Verify WABO qualification within the previous 6 months. Submit certificates to Welding Special Inspector and Architect for approval. Welders added after job in progress must also be approved by Special Inspector prior to admittance on job site.
 2. Fabricators: Welders employed shall be WABO/AWS certified. Verify qualifications within the previous 6 months. Submit certificates to Welding Special Inspector and Architect for approval.

1.4 QUALITY ASSURANCE

- A. Shop must be AISC and WABO certified.
- B. Fabricate structural steel members in accordance with AISC Code of Standard Practice. Shop must be AISC and WABO certified or meet Non-certified conditions below.
- C. AISC and WABO Certified Fabricator: Special Inspection per IBC Section 1704 shall not be required when the work is done on the premises of an AISC and WABO certified fabricator, when the shop has approved NDT testing procedures in place. When a shop does not have NDT testing procedures in place, then Special Inspection for those welds are required by Section 1704. An AISC and WABO certified fabricator shall either be registered and approved by the Building Official to perform such work without Special Inspection, and have a current certification to the AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures. Fabricators meeting these requirements are still required to pass an initial shop audit by the special inspector.
- D. Non-AISC Certified Fabricator: Special inspection per IBC Section 1704 shall be required when work is completed on the premises of a non-AISC or non-WABO certified fabricator. Special inspector shall meet qualifications per IBC Section 1704.2.1 and be approved by local jurisdiction. Cost of special inspections required due to non-AISC or non-WABO certification shall be borne by the contractor.
- E. Erector: Company specializing in performing the work of this section with minimum five years experience.
- F. Visual special inspection of welds shall be done by an I.B.C. / W.A.B.O. certified welding inspector. Non-destructive weld testing (N.D.T.) shall be done by a Level III certified individual.

- G. Non-Destructive testing and continuous visual special inspection to be done on all special moment resisting and full penetration welds as noted on drawings. Cost to be by the Owner. Non-destructive testing type to be magnetic particle (MT) or ultrasonic testing (UT). Testing to be done per A.W.S. code. Extent to be as indicated on the drawings. Acceptance criteria to be per AWS D1.1 and D1.8 (latest version). Costs for re-testing of welds to be deducted from contract payment to Contractor.
- H. Pre-Installation Meeting:
 - 1. Contractor to convene a preconstruction meeting 1 week prior to erection of structural steel, in accordance with Section 013113 - Project Meetings. Parties in attendance to be the General Contractor, Architect, Engineer, Fabricator, Erector and Special Inspector.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements shown on Drawings, shop drawings and manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide as noted on the Structural Drawings and specified herein.
- B. Structural Steel Members: For wide flange shapes: ASTM A572 or A992, $F_y = 50$ ksi. For other structural shapes: ASTM A36, $F_y = 36$ ksi.
- C. Structural T-Shapes: Cut from structural W-shapes, M-shapes or S-shapes.
- D. Channels and Angles: ASTM A36; Grade 50.
- E. Weathering Steel: ASTM A588 where indicated on Drawings.
- F. Hollow Structural Shapes:
 - 1. Rectangular or Square: ASTM A500, Grade C, $F_y = 50$ ksi.
 - 2. Round: ASTM A500, Grade C, $F_y = 46$ ksi.
- G. Pipe: ASTM A53, Grade B, $F_y = 35$ ksi.
- H. Shear Stud Connectors (Weld Studs): ASTM A-108, Grade C1010 through 1020, forged steel, headed, uncoated. Lengths as indicated.
 - 1. Nelson Stud Welding, 253.874.3524, www.nelsonstud.com.
 - 2. Tru-Weld Stud Welding. 800.321.5588, www.truweldstudwelding.com.
 - 3. Stud Welding Products, Inc. 800.252.1919, www.studweldprod.com.

4. Substitutions under provisions of Section 012500 - Substitution Procedures.
- I. Erection Bolts: ASTM A307, Grade B.
- J. Structural Bolts: ASTM F3125. Load indicator bolts required
 1. Lejeune Bolt Company
 2. Nucor Fastener Division.
 3. St. Louis Screw and Bolt Co.
 4. Substitutions under provisions of Section 012500.
- K. Heavy Hex Nuts for F3125 Bolts: ASTM A563, Grades C3, D, H, DH3.
- L. Hardened Steel Washers: ASTM F436.
- M. Direct Tension Indicator Washers: ASTM F959.
- N. Anchor Rods: ASTM F1554, Grade 55, Supplementary Requirement S1, (Weldable).
- O. Welding Materials: E70XX type or as otherwise required for materials being welded.
- P. Slide Bearing Plates: Teflon (PTFE) coated.
- Q. Floor Plates: ASTM A786; raised pattern.
 1. Floor plate patterns depend on manufacturer. Verify available patterns for visual appearance.
- R. Suspension Cable: wire rope.
- S. Structural Bearing Pads: Reinforced Teflon (PTFE) bearing elements; type as indicated, complying with AASHTO Specification 2.10.3(M).
 1. Fabreeka International, Structural Expansion Bearings
 2. Fluorocarbon, 'Fluoroglide' Slide Bearings;
 3. JVI, Inc Masticord (Random Oriented Fiber pad not PTFE)
 4. Con-Slide by Con-Serv, Inc.
 5. Substitutions under provisions of Section 012500.
- T. Threaded Rod Ties: ASTM F1554 type, 36,000 psi yield strength. Provide with turnbuckles, clevis, clevis pins and other related accessories, and as shown.
- U. Expansion Bolts: Bolts, nuts and washers shall be in lengths as noted on drawings:
 1. Refer to Section 031000 - Concrete Forming and Accessories.

- V. Screw Anchors (1 piece carbon steel threaded bolt for concrete or masonry):
 - 1. Refer to Section 031000 - Concrete Forming and Accessories.
- W. Deformed Bar Anchors (DBA): Nelson Stud Welding, or Stud Welding Products "fluxed" deformed bar anchor studs; conforming to ASTM A1064 , sizes, shapes, lengths as indicated. Substitutions under provisions of Section 012500 - Substitution Procedures.
- X. Weld Studs: Provide headed studs made from material conforming to ASTM A108, size and length as indicated. Manufactured by TRW Nelson, Stud Welding Products Co., or approved equal. Substitutions under provisions of Section 012500 - Substitution Procedures.
- Y. Welded Reinforcement Anchors: ASTM A706.
- Z. Adhesive Anchor: Refer to Section 031000 - Concrete Forming and Accessories.
 - 1. Cold Weather Adhesive Anchor: Refer to Section 031000.
- AA. Grout: Non-shrink (Type N), pre-mixed compound specified in Section 036000 - Grout.
- BB. Standard Shop and Touch-Up Primer: SSPC Paint 15, Type 1. Refer to paragraph 2.3.
- CC. Coal Tar Epoxy: Two component cold applied bituminous mastic compound applied 15 mils thick. Sherwin Williams product TarGuard Coal Tar Epoxy C-200 or Simco Product Simtar-200 Coal Tar Epoxy.

2.2 FABRICATION

- A. General:
 - 1. Fabricate items in accord with AISC Specifications and as indicated on final shop drawings; provide camber in structural members where indicated. Camber to have tolerance of minus zero plus one-eighth inch for each 10 feet of member length. Place natural camber for beams up.
 - 2. The ends of all steel columns shall be plain and cut square with all burrs removed.
 - 3. Properly mark, match-mark materials for field assembly; fabricate for delivery sequence which will expedite erection, minimize field handling.
 - 4. Furnish templates, other devices as necessary for presetting bolts and other anchors to accurate locations.
 - 5. There shall be no square cut reentrant corners. All reentrant corners to have a minimum 1 inch radius.
 - 6. Furnish threaded studs, nuts, bolts, bent plates, and other specialty items welded to framing members as required for securing other work to members.

7. Where exposed to view, continuously seal between intermittent welds with plastic filler. If material is to be hot dip galvanized, use 3/16" continuous fillet weld instead of plastic filler.
8. Use A307 bolts for erection purposes only (listed as "MB" on drawings), or where hot dip galvanized.

B. Welding (Refer to PART 3 - EXECUTION):

1. For welded construction, comply with the AWS Code for procedures, pre-qualifications, quality of welds, and for methods used in correcting welding work. Grind exposed welds smooth.
2. Weld per AWS D1.1, D1.3 and D1.8 cold weather technique when ambient air temperature is less than 40°F.
3. Welding processes other than shielded metal arc and submerged may be used provided procedure pre-qualification tests in accordance with the American Welding Society are made for the intended application of any such process.
4. Welds not specified shall be continuous fillet welds, using not less than the minimum fillet as specified by AISC, for 3/16" plates or thicker.
5. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

C. Weld Studs, Deformed Bar Anchors and Welded Deformed Reinforcement:

1. All welds and welders are to be pre-qualified.
2. The area where welded studs are to be attached must be free of all foreign material, such as rust, oil, grease, paint, etc. Remove mill scale by grinding or sandblasting if sufficiently thick to cause difficulty in obtaining proper welds.
3. Space weld studs and deformed bar anchors as shown. Shop installation of studs on top of beams is prohibited. Install with Manufacturer's Gun using certified installer.
4. Fillet welding of weld studs or welded deformed bar anchors is not permitted unless inspected by a certified inspector at no cost to the Owner.
5. Use ASTM 706 bars for welded reinforcement. Use of welded ASTM 615 rebar will not be allowed.

D. Holes:

1. Provide holes for work as required for securing other work to framing members and for passage of other work through framing members.
2. Holes as required, shall be drilled or punched and reamed; burning of holes or use of drift pins not permitted. Do not heat members for bending.

- E. Unless otherwise indicated, continuously seal joined members by continuous welds. Grind exposed welds smooth.
- F. Where a connection is noted as slip critical, facing surfaces shall be prepared per RCSC Specification, for Structural Joints using ASTM F3125 bolts, Section 3.2.2. Unless noted otherwise, prep for Class A.

2.3 FINISH

- A. Special Finishes: Provide bolts, nuts and washers with cadmium plated or hot dipped galvanized finish where connection is likely to be exposed to weather or moisture. Coating type to match material fastened.
- B. Shop prime with inorganic zinc rich primer, structural steel surfaces at interior of buildings and at exterior non galvanized ferrous metal to be finish painted. Surfaces to be field welded, paint free and 2" back from weld areas. Primer to be compatible with finish paint. Refer to Section 099000 - Painting and Coating.
- C. Enclosed structural steel does not need primer, unless it is to be finish painted. Use surface prep SSPC 1 and 3 at areas to be welded.
- D. Prepare structural component surfaces needing primer in accordance with SSPC SP-1, 2 and 3.
- E. Do not prime surfaces in contact with concrete. Do not prime surfaces that will be spray fireproofed. Prepare surfaces to be spray fireproofed per SSPC 1 and 2.
- F. Apply coal tar epoxy to all structural steel surfaces, including anchor bolts, exposed to soil in the finished condition. Prepare steel per epoxy manufacturer recommendations.
- G. Galvanize all steel members exposed to weather as indicated after fabrication to ASTM A123. Provide galvanized coating thickness per ASTM A123. Do not "quench" the galvanized coating where painting the steel is specified. Section 099000 - Painting and Coating for cleaning and painting of exterior galvanized steel.
 - 1. Plug exposed to view or moisture holes using tapered zinc filler plugs.

2.4 SOURCE QUALITY CONTROL AND TESTS

- A. Testing and analysis of components will be performed under provisions of Section 014000 - Quality Requirements and the General Notes and Special Inspection Drawings.
- B. Hot Dip Galvanized members to meet ASTM Material Fabrication Tolerances, and AISC Code of Standard Practice Tolerances for straightness before shipping to erection site.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

- B. Beginning of installation means erector accepts existing conditions.

3.2 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- B. Install thread rods in adhesive anchor and expansion bolts per manufacturer's requirements. Size and location per drawings. Holes must be blown out with compressed air or vacuumed out. Special inspection is required per general notes drawing.
- C. Coordinate placement of cast-in-place embeds and anchor rods. Set anchor rods with a wood or steel template, securely attached to form work or reinforcing. Also, securely attach embed items. Verify accuracy of position before placing concrete.
- D. Install Columns; set leveling nuts, and plumb with plastic (not steel) shims or leveling nuts. Tighten anchor rods after supported members have been positioned, plumbed. Nick anchor rod threads or apply Lock Tite to prevent loosening.
- E. Grout under base plates and where indicated, in accordance with Section 036000 - Grouting. Complete grouting before pouring concrete on floors above.
- F. Unless noted, use load indicator high strength bolts and F-436 washers for all connections. Tighten bolts in accordance with AISC and manufacturer's recommendations. Where conditions do not allow load indicator bolts, use A325 bolts with load indicator washers and heavy hex nuts.
- G. Install bolts in concrete or CMU per manufacturer's requirements (expansion bolt, wedge bolt or epoxy anchored type).
- H. Welding:
 - 1. For welded construction, comply with AWS Code for procedures, pre-qualifications, quality of welds, and for methods used in correcting welding work. Grind exposed welds smooth.
 - 2. Weld filler metal to conform to AWS D1.1 and D1.8 for demand critical welds.
 - 3. Weld per AWS D1.1, D1.3 and D1.8 cold weather technique when ambient air temperature is less than 40°F.
 - 4. Welding processes other than shielded metal arc and submerged may be used provided procedure pre-qualification tests in accordance with the American Welding Society are made for the intended application of any such process.
 - 5. Welds not specified shall be continuous fillet welds, using not less than the minimum fillet as specified by AISC, for 3/16" plates or thicker.

6. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.
 7. Weave welds are to be pre-qualified.
 8. Field weld components indicated on Drawings. Minimum length of field fillet weld: 4 inches and minimum size of weld per AISC or as noted on drawing. All welds are to be thoroughly defluxed by the welder. Wipe weld clean, wash with mild acid solution and rinse with clean water within 48 hours of completing weld. Call for special inspection after welds are washed. Prime paint field welds within 24 hours of approved inspection.
- I. Do not field cut or alter structural members (Field Bending) without approval of Architect/Engineer.
 - J. Splice members only where indicated and accepted on shop and construction drawings.
 - K. Field weld shear studs (weld studs) using "TRW Nelson," "Stud Welding Products Co.," or approved equipment. Operator to have current certificate to use equipment. Manual welding with fillet welds to be inspected by Certified Inspector at Owner's expense.
 - L. Carry framing up true and plumb accurately assembled to lines and elevations indicated. Align and adjust members forming a complete frame or structure before securely fastening.
 - M. Fasten splices in compression members after abutting surfaces have been brought completely into contact. Clean bearing surfaces before assembling.
 - N. Touch up or repair dings, dents or other damage which occurs during the erection process, apply primer with a brush. Refer to Section 099000.
 - O. Galvanizing Touch Up: For galvanized materials that have been damaged, or where galvanizing has been removed for erection procedures, follow ASTM A780 guidelines. Apply 2 brush coats of organic zinc cold galvanizing compound, 12 hours apart minimum. Dry coat thickness to be 1.5 mils min., verified by Special Inspector.
 - P. All O.S.H.A. safety regulations must be adhered to.
- 3.3 ERECTION TOLERANCES
- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
 - B. Maximum Offset From True Alignment: 1/4 inch.
- 3.4 FIELD QUALITY CONTROL
- A. Field inspection will be performed under provisions of Section 014000 - Quality Requirements and special inspection requirements on Structural General Notes and Special Inspection sheet.
 - B. Scope of field inspection and tests as indicated on Drawings and as required by code.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Open web steel joists and girders, with bridging, attached seats and anchors.
2. Loose bearing plates and anchor bolts for site placement.

B. Related Sections:

1. Section 033000 - Cast-In-Place Concrete: Placement of anchors for casting into concrete.
2. Section 036000 - Grouting: Grouting base plates and bearing plates (Type N).
3. Section 051200 - Structural Steel Framing: Superstructure framing.
4. Section 053113 - Steel Floor Decking.
5. Section 053123 - Steel Roof Decking.
6. Section 055000 - Metal Fabrications: Non-framing steel fabrications attached to joists.

1.2 REFERENCES

A. American Institute of Steel Construction:

1. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.
2. AISC 360 - Specification for Structural Steel Buildings.
3. AISC 341 - Seismic Provisions for Structural Steel Buildings.

B. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A123 - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
4. ASTM F436 - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions.
5. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength.

C. American Welding Society:

1. AWS D1.1 - Structural Welding Code - Steel.
 2. AWS D1.3 - Structural Welding Code - Sheet Steel.
- D. Steel Joist Institute:
1. Standard Specifications, Load tables, and Weight Tables for Steel Joists and Joist Girders.
- E. Society of Protective Coatings:
1. SSPC - Painting Manual.
 2. SSPC Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
 3. SSPC SP 2 -Hand Tool Cleaning.
- F. Underwriters Laboratories:
1. Fire Resistance Directory.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
- B. Shop Drawings:
1. Indicate standard designations, configuration, sizes, spacing, locations of joists, joist chord extensions.
 2. Joist coding, bridging, connections, attachments, and cambers.
 3. Connection details.
- C. Design Calculations: Refer to General Notes in Structural Drawings.
- D. Welders' Certificates: Submit copies of certificates of certified welders employed on the Work, verifying WABO qualification within the previous 6 months. Submit certificates to welding Special Inspector and Architect for approval prior to admittance on job site.
- E. Statement from SJI that manufacturer is a current member.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
1. S.J.I., Load Tables, and Weight Tables, including headers and other supplementary framing. Design Joists and Joist Girders for the gravity loads, uplift, axial loads and moments as indicated on the drawings.
 2. AISC 341 Seismic Provisions for Structural Steel Buildings.

- B. Fabricator: Company specializing in performing the work of this section with minimum 5 years documented experience. Must be current member of S.J.I. and must have current I.C.C. certification.
- C. Erector: Company specializing in performing the work of this section with minimum 5 years documented experience.
- D. Design connections not detailed on the Drawings. Connections shall be designed under direct supervision of a Professional Engineer experienced in design of this work and licensed in the state where the Project is located.
- E. Regulatory Requirements:
 - 1. Conform to UL for fire rated assembly and S.J.I. for design strength requirements.

1.5 DELIVERY, STORAGE, AND PROTECTION

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Open Web Joists and Girder Members: SJI Under Sling, Parallel Chord type as indicated on drawings (unless noted otherwise).
- B. Bolts: ASTM A325; Type 1, hot dipped galvanized, or Type 3, plain; heavy hex, structural type.
- C. Bridging and X-Bracing, as required by SJI Specifications. Provide supplemental bridging as required for net uplift condition.
- D. Headed Anchor Rods: ASTM F1554, Grade 55.
- E. Nuts: ASTM A563, Grades C3, D, H or DH3, Heavy Hex Type.
 - 1. Finish: Hot dipped galvanized.
- F. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A36.
- G. Hardened Steel Washers: ASTM F436; Type 1, circular. Furnish clipped washers where space limitations apply.
- H. Welding Materials: AWS D1.1 and D1.3; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC- Paint 15, Type 1.

2.2 FABRICATION

- A. Fabricate members per SJI Specifications.

- B. Provide bottom and top chord extensions as indicated on drawings.
- C. Design and fabricate to achieve end bearing as shown on drawings.
- D. Drill holes in chords necessary for attachment of wood nailers.
- E. Frame special sized openings in joist web framing as detailed.

2.3 FINISH

- A. Shop prime joists and supplementary framing. Do not prime surfaces that will be fireproofed, field welded, or in contact with concrete.
- B. Galvanizing: ASTM A123; hot dip galvanize after fabrication.

2.4 SOURCE QUALITY CONTROL AND TESTS

- A. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Furnish shop testing and analysis of steel sections.
- C. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
 - 1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution: Requirements for installation examination.
- B. Verify bearing plates are set to required location and elevation.
- C. Verify bearing surfaces are ready to receive joists.

3.2 ERECTION

- A. Erect and bear joists on supports.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- C. Coordinate placement of anchors in concrete and/or masonry construction for securing bearing plates.
- D. After joist installation and alignment, field weld joist seat to bearing plates.
- E. Position and field weld joist chord extensions and wall attachments as detailed.

- F. Frame floor and roof openings greater than 18 inches with supplementary framing as shown on Structural Drawings.
- G. Do not permit erection of decking until joists are braced/bridged, and secured.
- H. Do not field cut or alter structural members without approval of joist manufacturer.
- I. After erection, prime welds, abrasions, and surfaces not shop primed except surfaces to be in contact with concrete.

3.3 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

- A. Section 017000 - Execution: Requirements for testing, adjusting, and balancing.
- B. Field inspect members, connections, welds, and tightening of high strength bolts in slip-critical connections.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel roof deck and accessories.
2. Formed steel cant strips, eave strips, ridge and valley strips.
3. Framing for openings up to and including 18 inches.
4. Bearing plates and angles.
5. Acoustical metal deck.

B. Related Sections:

1. Section 033000 - Cast-In-Place Concrete: Placement of anchors for bearing plates and angles cast in concrete. Concrete topping over metal roof deck.
2. Section 051200 - Structural Steel Framing: Support framing for deck openings.
3. Section 052100 - Steel Joist Framing: Support framing for deck openings.
4. Section 053113 - Steel Floor Decking.
5. Section 095123 - Acoustical Tile Ceilings. Installing hanger accessories, e.g., piercing hanger tabs and rolled-in hanger tabs for attaching suspension systems to steel decks.
6. Division 22 - Plumbing Specialties: reinforcement pans with roof drain hub assemblies.

1.2 REFERENCES

A. ASTM International:

1. ASTM A653 - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
2. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic Coated by the Hot Dip Process.

B. American Welding Society:

1. AWS D1.1 - Structural Welding Code - Steel.
2. AWS D1.3 - Structural Welding Code - Sheet Steel.

C. Steel Deck Institute:

1. SDI 29 - Design Manual for Composite Decks, Form Decks and Roof Decks.

D. SSPC: The Society for Protective Coatings:

1. SSPC Paint 15 - Steel Joist Shop Paint.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, type and location of welds, pertinent details, and accessories.
- C. Product Data: Provide deck profile characteristics and dimensions, structural properties and finishes.
- D. Certificates: Certify that products meet or exceed specified requirements.
- E. Submit manufacturer's installation instructions.
- F. Welders' Certificates: Submit copies of certificates of certified welders employed on the Work, verifying WABO qualification within the previous 6 months. Submit certificates to welding Special Inspector and Architect for approval prior to admittance on job site.

1.4 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this Section with minimum 5 years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Acceptable Manufacturers:
 1. Vercor, ER-0217 - IAPMO ES Evaluation Report.
 2. Substitutions under provision of Section 012500 - Substitution Procedures.
- B. Sheet Steel: ASTM A653 and ASTM A924, minimum yield 38 ksi, Minimum Grade C, D or E Structural Quality; with "G60" or "G90" galvanized coating. Refer to Schedule at end of section.
- C. Welding Materials: AWS D1.1 and AWS D1.3.
- D. Touch-Up Primer for Galvanized Surfaces: organic zinc rich, cold galvanizing type.

- E. Powder Driven Fasteners: Hilti Type ENP2, ENPH2, ENP2K, X-EDN19 HSN or X-EDN22 HSN. Use for purpose recommended by manufacturer.
- F. Fasteners: For exposed deck, stainless steel #10, self-tapping, screws painted to match deck finish.

2.2 ACOUSTICAL DECKING

- A. Basis of Design: Verco, N32 Acoustic Deck. Substitutions under provisions of Section 012500.
- B. 18 gage, 1- 1/2 inch deep.
- C. Refer to Drawings for locations.

2.3 ACCESSORIES

- A. Flute Closures: Neoprene closure, 1 inch thick; profiled to fit tight to the deck. 20 ga. vertical metal closure, profiled to fit tight to the underside of deck profile.
 - 1. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.
- B. Sump Pans, Sump Plates, Valley Strips and Eave Strips: Fabricated of metal of same type and finish as deck.
- C. Related Deck Accessories: Metal closure strips, cover plates, cant strips, 20 gage minimum thickness galvanized sheet steel; of profile and size as indicated.

2.4 FABRICATION

- A. Deck configuration, size, thickness and finish as indicated on drawings and schedule.
- B. Roof Sump Pan and Plates: Fabricate of 14 gage sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.
- C. Cant Strips: Formed sheet steel, 20 gage thick, 45 degree slope, 4 inch nominal width and height, flange for attachment.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Verify conditions and supporting members are correct prior to beginning work.
- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Erect steel deck in accordance with approved shop drawings and manufacturer's instructions.
- B. Bear deck on steel supports with 2 inch minimum bearing. Lap end joints 2 inch minimum where bearing on bar joists. Align and level.
- C. Fasten deck to steel support members at ends, sides and intermediate supports per structural drawings.
- D. Weld in accordance with AWS D1.1 and AWS D1.3.
- E. Unless noted on the drawings, mechanically clinch male/female side laps at spacing per Structural Drawings. Clinches to be made with interlocking punch which pierces the metal. Acceptable method is "Punch-Lok II" by Verco. No substitutions. Clinches to be inspected by Special Inspector.
- F. Reinforce steel deck openings from 6 to 18 inches in size with 2 x 2 x 1/4 inch steel angles. Place framing angles perpendicular to flutes on top of deck; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute, each side.
- G. Install sheet steel closures, supports, and angle flashings to close openings between deck and walls, at exterior walls, add expanding foam insulation between exterior closure and interior continuous foam cell closure.
- H. Position roof sump pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- I. Place metal cant strips in position and fusion weld at 12" o.c. max.
- J. Immediately after welding deck and other metal components in position, wash welds with mild acid solution. When material has dried, coat welds, burned areas and damaged surface coatings with touch-up primer.
- K. Where shown on drawings, fasten sidelaps using an interlocking punch machine, such as Verco "PunchLok II" to provide shear capacities indicated.

3.3 STEEL ROOF DECK - PRIMER SCHEDULE

- A. All decks to be galvanized (Interior G60, exterior G90).

Location	Primer	Finish
Non-visible	none	Galvanized
Visible	Factory gray (bottom)	Refer to Section 099000

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Load bearing formed steel stud wall framing.
2. Formed-steel joist, purlin, slotted-channel, framing and bridging.

B. Related Sections:

1. Section 031000 - Concrete Forming and Accessories.
2. Section 051200 - Structural Steel Framing: Structural building framing.
3. Section 053113 - Steel Floor Decking: Metal floor decking supported by wall stud metal framing.
4. Section 053123 - Steel Roof Decking: Metal roof decking supported by wall stud metal framing.
5. Section 061000 - Rough Carpentry.
6. Section 072116 - Blanket Insulation: Insulation within framing members.
7. Section 072600 - Vapor Retarders.
8. Section 072700 - Air Barriers.
9. Section 092216 - Non-Structural Metal Framing: Light weight, non-load bearing metal stud framing.

1.2 REFERENCES

A. American Iron and Steel Institute:

1. AISI S100 NAS - North American Specification for the Design of Cold Formed Steel Structural Members.
2. AISI S213: North American Standard for Cold-Formed Steel Framing - Lateral Design.
3. AISI S214: North American Standard for Cold-Formed Steel Framing - Truss Design.
4. AISI S240 - North American Standard for Cold Formed Steel Structural Framing.

B. ASTM International:

1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

2. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Stud from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 3. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members.
 4. ASTM C1513 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing connections.
- C. American Society of Civil Engineers (ASCE) 7- Minimum Design Loads for Buildings and Other Structures.
- D. American Welding Society:
1. AWS D1.1 - Structural Welding Code - Steel.
 2. AWS D1.3 - Structural Welding Code - Sheet Steel.
- E. SSPC: The Society for Protective Coatings:
1. SSPC Paint 20 - Zinc-Rich Coating (Type II - Organic).
- F. Steel Stud Manufacturers Association:
1. SSMA - Product Technical Guide.

1.3 COORDINATION

- A. Section 013100 - Project Management and Coordination: Requirements for coordination.

1.4 SUBMITTALS

- A. Submit shop drawings, product data and manufacturer's installation instructions under provisions of Section 013300 - Submittal Procedures.
- B. Indicate on shop drawings, component details, framed openings, bearing, anchorage, loading, welds, type and location of fasteners and accessories or items required of other related work.
- C. Building Product Disclosure Requirements: Provide Building Product Disclosure documentation. Any requests for substitution must include this documentation.
1. Environmental Product Declaration for steel framing studs and tracks.
- D. Design Calculations: Refer to General Notes in Structural Drawings.
- E. Describe method for securing studs to tracks and for bolted and welded framing connections.
- F. Provide product data on standard framing members. Describe materials, finish, and product criteria.

- G. Welders' Certificates: Submit copies of certificates of certified welders employed on the Work, verifying WABO qualification within the previous 6 months. Submit certificates to welding Special Inspector and Architect for approval prior to admittance on job site.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in structural framing components and be current members of the Steel Stud Manufacturers Association (SSMA) or the Steel Framing Industry Association (SFIA).
- B. Calculate structural properties of framing members in accordance with AISI NAS requirements.
- C. Perform Work according to following:
 - 1. Framing: AISI General and AISI NAS.
 - 2. Headers: AISI Header.
 - 3. Trusses: AISI S214.
 - 4. Wall Studs: AISI WSD.
 - 5. Lateral Design: AISI S213.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Size components as noted on Structural Drawings.
- B. Maximum Allowable Deflection: 1/360 span.
- C. Wall and support system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
- D. System to accommodate construction tolerances, deflection of building structural members and clearances of intended openings.

2.2 ACCEPTABLE MANUFACTURERS

- A. Cemco, 263 South Covina Lane, City of Industry, CA 91744. (ICC ES ESR - 3016)
- B. Clark Dietrich Building Systems, Sacramento, CA. (ICC-ES ESR 1166P)
- C. Scafco Corporation, 6212 East Main Avenue, PO Box 11215, Spokane, WA 99211-1215. (ICC -ES ESR-2507)
- D. Steeler, Inc., 10023 Martin Luther King Way South, Seattle, WA 98178. (ECC-ES ESR-2054)

- E. Substitutions under provisions of Section 012500.

2.3 FRAMING MATERIALS

- A. Studs: ASTM A653, galvanized, Grade D for 75 and 60 mils (14 and 16 gage metal,) Grade A for 48 and 36 mils (18 and 20 gage) metal sheet steel, formed to channel shape, punched web. Gages and sizes as shown on Structural Drawings.
- B. Joists and Purlins: ASTM A653, galvanized, Grade D for 75 and 60 mils (14 and 16 gage metal,) Grade A for 48 and 36 mils (18 and 20 gage) metal sheet steel, formed to channel shape, solid web. Gages and sizes as shown on Structural Drawings.
- C. Track: Formed sheet steel; galvanized, channel shaped; same width as studs, tight fit; solid web (un-punched). Gage and sizes as shown on Structural Drawings.
- D. Deflection Track Systems
 - 1. Slip Track: "SLP-TRK" by Sliptrack Systems, Inc. - (888) 475-7875. ICC ESR-1042.
 - 2. SCAFCO Slotted track IAPMO UES-0283

2.4 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members.
- B. Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members. Slide clips to be as shown on drawings. Manufacturers: Priceless, Clark Dietrich and The Steel Network or approved equal.
- C. Touch up Paint: SSPC Paint 20, Type I or II
- D. Welding Electrodes: AWS D1.3/D1.3M; type required for materials being welded

2.5 FASTENERS

- A. Self-drilling, Self-tapping Screws: Non-corrosive, ASTM C954, ASTM C1513.
- B. Powder driven fasteners: Lengths and sizes as required.
- C. Welding: In conformance with AWS D1.3.
- D. Expansion Bolts: Provide as specified in Section 051200 - Structural Steel Framing.
- E. Washers: FS FF-W-92 carbon steel type, non-corrosive.
- F. Adhesive Anchor: Provide as specified in Section 031000.
- G. Anchor Rods: Provide as specified in Section 031000.
- H. Screw Anchors: Provide as specified in Section 031000.

2.6 FABRICATION

- A. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.
- B. Fit and assemble in largest practical sections for delivery to site, ready for installation.
- C. Fabrication Tolerances: In accordance with AISI S240.

2.7 FINISHES

- A. Galvanizing: ASTM A653, G60 coating class.
- B. Primer: Zinc rich type, touch-up for galvanized surfaces.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that substrate surfaces and building framing components are ready to receive work.
- B. Beginning of installation means acceptance of existing conditions.

3.2 ERECTION OF STUDDING

- A. Install components in accordance with manufacturer's instructions.
- B. All exterior studs and studs backing veneer are to be 6" x 48 mil (18 gage) galvanized minimum unless noted otherwise on drawings.
- C. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners or by welding at maximum 18 inches oc.
- D. Place studs at spacing shown and not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener or welding method, unless indicated otherwise.
- E. Construct corners using minimum three studs. Double stud wall openings, door jambs and window jambs.
- F. Erect load bearing studs one piece full length. Splicing of studs is not permitted.
- G. Erect load bearing studs, brace, and reinforce to develop full strength, to achieve design requirements.
- H. Fully seat axial loaded studs in receiving tracks maximum 1/16 inch gap between stud and track web.
- I. Refer to Drawings for locations of partitions extending to ceiling only, and partitions extending through ceiling to structure above.
- J. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

- K. Install intermediate studs above and below openings to align with wall stud spacing.
- L. Install studs with deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing. For rated walls use "SLP-TRK" or approved equal.
- M. Attach cross studs or furring channels to studs for attachment of fixtures anchored to walls.
- N. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- O. Touch-up field welds and damaged galvanized primed surfaces with organic zinc rich primer to match shop coating.
- P. Complete framing ready to receive finish and sheathing.

3.3 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances
- B. Maximum Variation from True Position: ½ inch, non-cumulative.
- C. Maximum Variation of any Member from Plane: 1/4 inch, non-cumulative.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Shop-fabricated metal items.
2. Shop fabricated ferrous metal items, galvanized and prime painted, not covered in Section 051200 but required to complete the work.
3. Custom Metal Stairs and Railings.
4. Metal items such as bearing plates and embedments furnished under this section but installed under other sections.
5. Loose steel lintels.
6. Ledge and shelf angles.
7. Channel door frames.
8. Ladders.
9. Locker trim.
10. Structural supports for miscellaneous attachments.
11. Fabricated architectural details.
12. Ladder fall arrest system.

B. Related Requirements:

1. Section 031000 - Concrete Forming and Accessories: Execution requirements for embedded anchors and attachments for metal fabrications specified by this Section in concrete.
2. Section 042113 - Veneer Brick Masonry: Execution requirements for embedded anchors and attachments for metal fabrications specified by this Section in masonry.
3. Section 051200 - Structural Steel Framing: Structural steel anchor bolts.
4. Section 052100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.
5. Section 053123 - Steel Roof Decking: Bearing for metal deck bearing, including anchorage.
6. Section 062100 - Finish Carpentry: Wood cap at stairs.
7. Section 084113 - Aluminum Framed Entrances and Storefronts.

8. Section 099000 - Painting and Coating: Field applied paint finish.

1.2 REFERENCE STANDARDS

A. Aluminum Association:

1. AA DAF-45 - Designation System for Aluminum Finishes.

B. American Architectural Manufacturers Association:

1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.

C. American National Standards Institute:

1. ANSI A14.3 - Ladders - Fixed - Safety Requirements

D. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A53- Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
6. ASTM A194 - Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts and Bolts for High Pressure or High Temperature Service, or Both.
7. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
8. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
9. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
10. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
11. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
12. ASTM A572 - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

13. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 14. ASTM A992 - Standard Specification for Structural Steel Shapes.
 15. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 16. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 17. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
 18. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
 19. ASTM F436 - Standard Specification for Hardened Steel Washers.
 20. ASTM F3125 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Heat Treated, 120 and 105ksi Minimum Tensile Strength, Inch and Metric Dimensions.
- E. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
 2. AWS D1.1 - Structural Welding Code - Steel.
 3. AWS D1.6 - Structural Welding Code - Stainless Steel.
- F. Builders Hardware Manufacturers Association (BHMA):
1. ANSI/BHMA A156.20 - American National Standard for Strap and Tee Hinges and Hasps.
- G. National Ornamental & Miscellaneous Metals Association:
1. NOMMA Guideline 1 - Joint Finishes.
- H. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
 2. SSPC SP 1 - Solvent Cleaning.
 3. SSPC SP 10 - Near-White Blast Cleaning.
 4. SSPC Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
 5. SSPC Paint 20 - Zinc-Rich Coating (Type I - Inorganic and Type II - Organic).

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, location of custom corner guards, size and type of fasteners and accessories. Include erection drawings, elevations and details where applicable. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Pre-engineered pre-fabricated stair
 - 1. Design Data: As required by Authorities Having Jurisdiction.
 - 2. Provide calculations for bolts/fasteners attachment and for stair stringers.
- D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.
- E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.4 QUALIFICATIONS

- A. Licensed Professional: Professional engineer experienced in design of specified Work and licensed at Project location.
- B. Qualification of Welders: Refer to Section 051200.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept metal fabrications on-Site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather or by ground contact.

1.6 EXISTING CONDITIONS

- A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 CUSTOM METAL RAILINGS

- A. Refer to Structural and Architectural details and fabricate from materials in this section.
- B. Railing assembly, wall rails and attachments to resist lateral force of 200 lbs. at any point without damage or permanent set. Test in accordance with ASTM E935.
- C. Comply with IBC 1607.8 Loads on handrails, guards, grab bars, seats and vehicle barriers.

- D. Stainless Steel Pipe Handrail: ASTM A312, Grade TP304 (Type 304), Schedule 40; 1-1/2 inch; 1.9 inch OD. #4 finish. (interior)
- E. Galvanized Steel Pipe Handrail: ASTM A53, Grade B, Schedule 40. (exterior)
- F. Plate, Square and Flat Bar Railing Posts and Sections: Steel ASTM A572, thickness and fabricated as detailed on Drawings.
 - 1. Galvanize per ASTM A123, 2.0 ounce per square foot.
 - 2. Finish: Refer to Section 099000.
- G. Fabricated handrail mounting bracket to match handrail. Refer to Section 051200 for welding requirements.
- H. Guardrail: As detailed.
- I. Fittings: Elbows, T-shapes, wall brackets, sleeves; machined steel. Elbows and rail caps stainless steel as required to match railing.

2.2 LINTELS

- A. Steel sections, size, bearing lengths and configuration as indicated on Drawings.
 - 1. Exterior Locations: Galvanized.
 - 2. Interior Locations: Prime paint, one coat (Section 099000).

2.3 LEDGE AND SHELF ANGLES

- A. Ledge and Shelf Angles, Channels and Plates Not Attached to Structural Framing: For support of metal decking, joists or masonry; galvanized.

2.4 DOOR FRAMES

- A. Door Frames: Steel sections, size indicated on Drawings, with jamb anchors suitable for attachment to structure, minimum 4 anchors per jamb; galvanized.

2.5 LADDERS

- A. Aluminum heavy duty fixed ladder, ANSI A14.3 and OSHA 1920.27.
 - 1. Acceptable Manufacturers:
 - a. O'Keeffe's Inc.
 - b. Precision Ladders.
 - c. Substitutions under provisions of Section 012500.
 - 2. Aluminum: ASTM B209, 6063 alloy, T5 or T-6 temper, mill finish.

3. Treads: 2 ¼ inch by ¾ inch by ¼ inch extruded 6005-T5 aluminum with deeply serrated top surface. 1,000 lb design load capacity.
 4. Side Rails: 2-1/2 inch by 1 inch by 1/8 (0.125) inch thick aluminum channel.
 5. Wall Brackets: 3 inch by 3/16 inch aluminum flat bar, depth per architectural drawings. Locate maximum 4 feet on center and as instructed by manufacturer.
 6. Crossover Platform with roof return: Guardrail and decks of serrated aluminum treads.
 - a. Mounting Brackets: 4 inch by 4 inch by ¼ inch aluminum.
 - b. Side Rails: 42 inch side rail extension for through ladder exits.
 - c. Provide walk-thru where shown on drawings.
 7. Fasteners: Stainless steel, screws, bolts and anchors as suitable for installation and as instructed by manufacturer.
 8. Length: Extend to heights as detailed at parapet conditions, except not less than required to meet WISHA and OSHA Standards.
- B. Ladder Rigid Track Fall Arrest System: Basis of Design, CAI Safety Systems.
1. Aluminum climbing rails (with complete mounting hardware included)
 2. Aluminum climbing trolley for straight aluminum vertical climbing rail.
 3. Aluminum removable extension, 54 inch.
- C. Ship's Ladder:
1. Acceptable Manufacturers:
 - a. O'Keeffe's Inc.
 - b. Precision Ladders.
 - c. Substitutions under provisions of Section 012500.
 2. Performance Requirements:
 - a. Design for 60 degree to 75 degree slope as shown on Drawings.
 - b. Design and certify to meet WISHA and OSHA/ANSI A14.3 Standards and IBC ship's ladder requirements.
 - c. Aluminum: ASTM B209, 6063 alloy, T5 or T-6 temper, mill finish.
 - d. Hand Rails: 1-1/4 inch diameter, Schedule 40 aluminum pipe.

- e. Wall Brackets: Manufacturer's standard to suit installation.
- f. Tread: Serrated, aluminum plate.
- g. Stringers: Aluminum channel.
- h. Fasteners: Stainless steel, screws, bolts and anchors as instructed by manufacturer.
- i. Length: Extend to fullest possible height to suit installation.

D. Folding Access Ladder

- 1. Acceptable Manufacturers:
 - a. Basis of Design: Precision Simplex S1000.
 - b. O'Keeffe's Inc.
 - c. Substitutions under provisions of Section 012500.
- 2. Aluminum manual disappearing stairways.
 - a. Comply with ANSI A14.9 Commercial Type.
 - b. Stairway Stringer: 6005-T5 Extruded aluminum channel 5" x 1" x 1/8"; tri-fold design; steel blade type hinges; adjustable feet with plastic Mar-guard. 63 degree Pitch.
 - c. Stairway Tread: 6005-T5 extruded aluminum channel 5 - 3/16 inches by 1- 1/4 inches by 1/8 inch. 5- 3/16 inches depth. Deeply serrated top surface. Riser Height: 9-1/2 inches. Clear Tread Width for Standard Width: 18 inches.
 - d. Railing: Aluminum bar handrail riveted to stringers, upper section only.
 - e. Frame: 1/8 inch steel formed channel, box.
 - f. If ceiling to floor (or roof deck) above is under 12', frame shall be 1/8" steel formed channel, box.
 - g. Door Panel: 1/8 inch aluminum sheet attached to stairway frame with a steel piano hinge. Door overlaps bottom flange of frame. Eye bolt accommodates pole for opening and closing door.
 - h. Hardware:
 - 1) Steel blade type hinge connecting stringer sections. Zinc plated and chromate sealed.
 - 2) Steel operating arms, both sides. Zinc coat with clear trivalent chromate.
 - 3) Double acting steel springs and cable, both sides.

- 4) Rivets rated at 1100 lb shear strength each.
- 5) Steel section alignment clips at stringer section joints.
- 6) Molded rubber guards at corners of aluminum door panel.
- 7) Keyed lock. Key to district standard.

i. Finishes: Mill finish on aluminum stairway components. Prime coat on frame.

2.6 STRUCTURAL SUPPORTS

- A. Other Structural Supports: Steel sections, shape and size as indicated on Drawings or required to support applied loads with maximum deflection of 1/240 of the span; Interior: prime paint, one coat; exterior: galvanized (and paint if exposed 099000).

2.7 FABRICATED ARCHITECTURAL TRIM

- A. Steel and aluminum sections, size and configuration as indicated on Drawings.
- B. Exterior Locations: Finish as indicated in 099000.
- C. Locker trim: 16 gage painted steel.

2.8 ANCHORS

- A. Refer to Section 031000 - Concrete Forming and Accessories.

2.9 MATERIALS

A. Steel:

1. Structural W-Shapes: ASTM A992.
2. Channels and Angles: ASTM A36.
3. Steel Plate: ASTM A572; Grade 50.
4. Steel Pipe: ASTM A53, Grade B, Schedule 40 or as indicated.
5. Sheet Steel: ASTM A653, Grade 33 Structural Quality. Diamond plate where noted.
6. Bolts: ASTM A307; Grade A or B F3125; Type 1.
7. Nuts: ASTM A563 heavy hex type.
8. Washers: ASTM F436; Type 1.
9. Welding Materials: AWS D1.1; type required for materials being welded.

B. Stainless Steel:

1. Pipe: ASTM A312, seamless; Type 304.

2. Plate, Sheet, and Strip: ASTM A240; Type 304.
 - a. SS-1: 22 gage, bevelled 1/4 radius corners.
 3. Bolts, Nuts, and Washers: ASTM A354.
 4. Welding Materials: AWS D1.6; type required for materials being welded.
- C. Aluminum:
1. Extruded Aluminum: ASTM B221 Alloy 6063, Temper T5.
 2. Sheet Aluminum: ASTM B209 Alloy.
 3. Bolts, Nuts, and Washers: Stainless steel.
 4. Welding Materials: AWS D1.1; type required for materials being welded.
- D. Bolts, Nuts, and Washers for Equipment and Piping:
1. Carbon Steel:
 - a. Structural Connections: ASTM A307, Grade A or B, hot-dip galvanized.
 - b. Anchor Bolts: ASTM A36, hot-dip galvanized.
 - c. Pipe and Equipment Flange Bolts: ASTM A193, Grade B-7.
 2. Stainless Steel: Type 316 stainless steel, class 2; ASTM A193 for bolts; ASTM A194 for nuts.

2.10 FABRICATION

- A. Fit and shop assemble items in largest practical sections for delivery to Site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush and hairline. Ease exposed edges to small, uniform radius.
- D. Exposed Welded Joints: NOMMA Guideline 1 Joint Finish 2, Completely sanded joint.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- G. Fabrication Tolerances:
 1. Squareness: 1/8 in maximum difference in diagonal measurements.

2. Maximum Offset between Faces: 1/16 in.
3. Maximum Misalignment of Adjacent Members: 1/16 in.
4. Maximum Bow: 1/8 inch in 48 in.
5. Maximum Deviation from Plane: 1/16 inch in 48.

2.11 FINISHES

A. Steel:

1. Clean surfaces of rust, scale, grease and foreign matter prior to finishing.
2. Do not prime surfaces in direct contact with concrete or where field welding is required.
3. Prime paint items with one coat except where galvanizing is specified.
4. Structural Steel Members: Refer to Section 051200.
5. Galvanizing: ASTM A123; hot-dip galvanize after fabrication.
6. Galvanizing for Fasteners, Connectors, and Anchors:
 - a. Hot-Dip Galvanizing: ASTM A153.
 - b. Mechanical Galvanizing: ASTM B695; Class 50 minimum.
7. Sheet Steel: Galvanized with G90 coating class.
8. Bolts: Hot-dip galvanized.
9. Nuts: Hot-dip galvanized.
10. Washers: Hot-dip galvanized.
11. Shop Primer: SSPC Paint 15, Type 1, red oxide.
12. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic or Type II Organic.
13. Powder coated:
 - a. Exterior: Thermosetting Ultra Polyester TGIC; 2.0-3.0 mil.
 - b. Interior: Thermosetting Polyester TGIC; 1.8-3.0 mil.

B. Stainless Steel:

1. Satin-Polished Finish: Number 4, satin directional polish parallel with long dimension of finished face.

C. Aluminum:

1. Finish coatings to conform to AAMA 611. Comply with AA DAF-45.
2. Exterior Aluminum Surfaces:
 - a. Exterior anodized to clear color, to 0.0007 in thickness.
3. Interior Aluminum Surfaces:
 - a. Interior anodized to clear color, to 0.0007 in thickness.
4. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution: Requirements for installation examination.
- B. Verify field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

- A. Section 017000 - Execution: Requirements for installation preparation.
- B. Clean and strip primed steel items to bare metal and aluminum where field welding is required.
- C. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted and free from distortion or defects.
- B. Make provisions for erection stresses. Install temporary bracing to maintain alignment until permanent bracing and attachments are installed.
- C. Field weld components indicated on Drawings.
- D. Perform field welding according to AWS D1.1.
- E. Obtain approval of Architect/Engineer prior to Site cutting or making adjustments not scheduled.

3.4 TOLERANCES

- A. Section 014000 - Quality Requirements: Requirements for tolerances.

- B. Maximum Variation from Plumb: 1/4 in per story or for every 12 ft in height, whichever is greater, non-cumulative.
- C. Maximum Variation from Level: 1/16 inch in 3 ft and 1/4 inch in 10 ft.
- D. Maximum Offset from Alignment: 1/4 in.
- E. Maximum Out-of-Position: 1/4 in.

3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.
- B. Section 017000 - Execution: Requirements for testing, adjusting, and balancing.
- C. Welding: Inspect welds according to AWS D1.1.
- D. Replace damaged or improperly functioning hardware.
- E. After erection, touch up welds, abrasions and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.
- F. Touch up factory-applied finishes according to manufacturer-recommended procedures.

3.6 ADJUSTING

- A. Section 017000 - Execution: Requirements for adjusting.
- B. Adjust operating hardware and lubricate as necessary for smooth operation.

END OF SECTION

DIVISION 06
WOOD, PLASTICS, AND COMPOSITES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Preservative treatment of wood.
2. Fire retardant treatment of wood.
3. Miscellaneous framing and sheathing.
4. Wood Panel Products.
5. Concealed wood blocking.
6. Anchors to substrate.

B. Related Sections:

1. Section 055000 - Metal Fabrications: Prefabricated steel structural supports.
2. Section 054000 - Cold-Formed Metal Framing: Openings to receive wood blocking.
3. Section 062000 - Finish Carpentry.
4. Section 064100 - Architectural Casework.
5. Section 099000 - Painting and Coating.
6. Section 105110 - Lockers.
7. Section 116600 - Athletic Equipment: Location of wall pads.

1.2 REFERENCES

A. American Wood Protection Association:

1. AWWPA M4 - Standard for the Care of Preservative-Treated Wood Products.
2. AWWPA U1 - Use Category System: User Specification for Treated Wood.

B. APA - The Engineered Wood Association:

1. APA - Plywood Design Specification, including supplements.
2. APA PS 1 - Voluntary Product Standard - Structural Plywood

C. ASTM International:

1. ASTM A153 - Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.

2. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 4. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 5. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- D. U.S. Department of Commerce - National Institute of Standards and Technology:
1. DOC PS 1 - Structural Plywood.
 2. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
 3. DOC PS 20 - American Softwood Lumber Standard.

1.3 COORDINATION

- A. Section 013100 - Project Management and Coordination: Requirements for coordination.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit technical data on wood preservative materials and application instructions.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
1. Lumber Grading Agency: Certified by DOC PS 20.
 2. Wood Structural Panel Grading Agency: Certified by APA - The Engineered Wood Association.
- B. Fire Rated Wall Construction: Rating as indicated on Drawings.
1. Tested Rating: Determined in accordance with ASTM E119.
- C. Surface Burning Characteristics:
1. Fire Retardant Treated Materials: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- D. Apply label from agency approved by authority having jurisdiction to identify each fire retardant treated material.

- E. Perform Work in accordance with IBC standards.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Maintain storage space relative humidity within ranges indicated in NAAWS Section 2.
- C. Acclimatize delivered woodwork to the job site for a minimum of 72 hours before installation.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

- A. Lumber Grading Rules: DOC PS20.
- B. Non-structural Light Framing: Douglas Fir/Larch, No 2 and better, 19 percent maximum moisture content.
- C. Studding: Douglas Fir/Larch, No 2 and better, 19 percent maximum moisture content.
- D. Miscellaneous Framing: Douglas Fir/Larch, No 2 and better, 19 percent maximum moisture content, pressure preservative treat.

2.2 WOOD PANEL PRODUCTS

- A. APA Grade Stamp each panel. Conform to DOC PS 1 and DOC PS 2 for cross-laminated veneer panel.
 - 1. APA PS 1, A-C Group 1, Exposure 1: Face exposed one side.
- B. Roof Sheathing: Oriented strand board wood structural panel; PS 2.
 - 1. Grade: Structural 1 Sheathing.
 - 2. Bond Classification: Exposure 1.
 - 3. Edges: Square.
 - 4. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
- C. (PLYWD-1): Communications and Electrical Room Panel Boards, Gym Storage; 3/4" Plywood,
 - 1. At Communication and Electrical Room Panel Boards, paint with fire retardant coating per Specification Section 099000.

2.3 ACCESSORIES

- A. Fasteners and Anchors:

1. Fasteners: ASTM A153, hot dipped galvanized or ASTM B695, Class 55 mechanically galvanized, for high humidity locations, #304 stainless steel for treated wood locations and unfinished steel elsewhere.
 2. Nails : ASTM F1667.
 3. Anchors: Adhesive anchor with screen type for anchorage to hollow masonry. Expansion bolt and screw anchor type for anchorage to solid masonry or concrete. A307 Bolt, Self Drilling Screw or ballistic fastener for anchorages to steel. All material to be zinc coated or stainless steel.
- B. Polymeric Membrane: Self adhering underlayment. GCP Applied Technologies, Grace Ice and Water Shield or approved equivalent. Provide as a barrier between pressure treated lumber and steel deck products, metal panels and accessory metal materials.

2.4 FACTORY WOOD TREATMENT

- A. Wood Preservative - Pressure Treatment (PT): AWWA Treatment U1 using water borne preservative with 0.25percent retainage.
1. Treat with wood preservative any wood to come in contact with concrete.
- B. Fire Retardant Treatment: Chemically treated and pressure impregnated, having flame spread of 25 or less when tested in accordance with ASTM E84 and showing no evidence of significant progressive combustion when test is continued for an additional 20 minute period, Interior Type.
- C. Moisture Content after Treatment: Kiln dried (KDAT).
1. Lumber: Maximum 19 percent.
 2. Structural Panels: Maximum 15 percent.

PART 3 EXECUTION

3.1 FRAMING

- A. Set structural members level and plumb, in correct position.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- C. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

3.2 ACCESSORIES

- A. Install polymeric membrane material as a barrier between copper containing preservative treated lumber and steel deck products, metal panels and accessory metal materials.

3.3 WOOD PANEL PRODUCTS

- A. Install telephone and electrical panel back boards with wood structural panel where required. Size back boards 48" x 96" at electrical panel location, unless noted otherwise.
- B. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 - 1. At long edges use sheathing clips where joints occur between roof framing members.
 - 2. At long edges provide solid edge blocking where joints occur between roof framing members.
 - 3. Nail panels to framing; staples are not permitted.

3.4 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment.
- B. Brush apply one coat of preservative treatment on wood in contact with cementitious materials; roofing and related metal flashings. Treat site-sawn cuts.
- C. Allow preservative to dry prior to erecting members.

3.5 TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Framing Members: 1/4 inch from indicated position, maximum.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior gypsum wall sheathing board to patch existing walls.

B. Related Sections:

1. Section 054000 - Cold Formed Metal Framing.
2. Section 072700 - Air Barriers.

1.2 REFERENCES

A. ASTM International:

1. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
2. ASTM C473 - Standard Test Methods for Physical Testing of Gypsum Panel Products.
3. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033in. (0.84mm) to 0.112 in in Thickness.
4. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
5. ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
7. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
8. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

B. Gypsum Association:

1. GA-253 - Recommended Specifications for Application of Gypsum Sheathing.

1.3 SUBMITTALS

- A. Submit in accordance with the requirements of Sections 013300 - Submittal Procedures.
- B. Product Data: Manufacturer's descriptive literature indicating material composition, thickness, sizes, and fire resistance.

- C. Sample Warranty: Meet or exceed provisions specified by this Section.
- D. Building Product Disclosure Requirements: Provide Building Product Disclosure documentation. Any requests for substitution must include this documentation.
 - 1. Environmental Product Declaration for glass mat gypsum panels.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Conform to provisions of Section 016000 - Product Requirements.
- B. Deliver to jobsite in manufacturer's original, clearly labeled protective packaging. Immediately upon delivery to job site, place materials in area protected from weather.
- C. Stack flat above ground on framework or blocking and cover with protective waterproof covering under cover, protected from moisture and weather conditions.
- D. Handle to prevent breaking of gypsum panels and edges.

1.5 COORDINATION

- A. Conform to Section 013100 - Project Management and Coordination, for coordination with work of related Sections for installation of gypsum sheathing work of this Section.
- B. Section 054000 for coordination of framing members for support of gypsum sheathing.

1.6 WARRANTY

- A. Conform to Warranty provisions specified Section 017700 - Closeout Procedures.
- B. Manufacturer's standard minimum 12 month Warranty against damage due to weather exposure.
- C. Manufacturer's standard minimum 5 year Warranty against manufacturing defects.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire Resistance:
 - 1. Noncombustible, ASTM E136.
 - 2. Flame Spread and Smoke Developed: 0, as tested to ASTM E84.
- B. Humidified deflection (Sag): Maximum 2/8 inch, ASTM C473.
- C. Permeance: Maximum 29 perms; ASTM E96.
- D. Mold Resistant: High resistance to mold and mildew and scores a 10 when tested in accordance with ASTM D3273.

- E. Conform to requirements of Section 014000 - Quality Requirements.
- F. Conform to IBC for fire rated assemblies.

2.2 GYPSUM WALL SHEATHING

- A. USG, Securock Glass-Mat Sheathing, ½ inch thick, meeting or exceeding ASTM C1177.
 - 1. Core: Silicone treated water-resistant gypsum.
 - 2. Facing: Inorganic glass mat both sides.
 - 3. Coating: Green colored, alkali resistant on outside face of panel.
- B. GP Dens-Glass Fireguard Sheathing, ½ inch thick, meeting or exceeding ASTM C1177.
 - 1. Core: Silicone treated water-resistant gypsum.
 - 2. Facing: Inorganic glass mat both sides.
 - 3. Coating: Yellow colored, alkali resistant on outside face of panel.
 - 4. UL Classified as to fire resistance, surface-burning characteristics and core combustibility.
 - 5. ICC ES Evaluation Report ESR 3044.
- C. CertainTeed, GlasRoc Sheathing, ½ thick, meeting or exceeding ASTM C1177.
 - 1. Core: Silicone treated water-resistant gypsum.
 - 2. Facing: Polymer modified gypsum surface with fully embedded both sides with inorganic glass reinforcing mats.
 - 3. Coating: Protective acrylic coating on exterior face.
- D. Substitutions under provisions of Section 012500.

2.3 FASTENERS

- A. Steel Drill Screws: ASTM C1002, self-drilling, minimum 1-1/4 inch long, bugle head, corrosion-resistant polymer coating, conforming to ASTM B117.
 - 1. ASTM C954 when fastening to framing ranging from .033 in. to .112 in. in thickness.
- B. Screws at Steel Framing: Type S, in lengths required to penetrate 3/8 inches beyond steel stud framing.
- C. Pneumatic Fasteners: ET & F Fastening Systems, Inc. Pneumatically driven knurled shank hardened steel pins designed for attaching plywood, OBS, exterior gypsum sheathing and fiber cement boards to steel framing 68 mil (14 gage) and lighter.

1. Minimum 0.100 inch diameter.
2. Length to penetrate minimum 1/4 inch beyond steel stud framing.
3. Aerisote 1000 corrosion-resistant coating.

2.4 GYPSUM WALL SHEATHING ACCESSORIES

- A. Self-Adhering Membrane Flashing: As specified by Section 072700 - Air Barriers.
- B. Air Barrier: As specified by Section 072700 - Air Barriers.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify installation conditions as satisfactory to receive work of this Section before beginning.

3.2 GYPSUM SHEATHING INSTALLATION

- A. Conform to GA-253, manufacturer's instructions, and provisions of Contract Documents.
- B. Provide roof cover board at inside of parapets where adhered roofing installed.
 1. Densdeck Prime or approved equivalent. Refer to Section 075400.
- C. Install with long dimensions horizontal. Abut ends of sheathing at center of supports. Stagger end joints.
- D. Fasten gypsum sheathing board with screws or pneumatic pin fasteners. Space at 8 inch or 6 inch on center at panel perimeters and panel field, conforming to manufacturer's instructions. Set heads flush with sheathing board into solid bearing spaced at maximum 24 inch on center.
- E. Drive fasteners to bear tightly against and flush with panel surface. Do not countersink.
- F. Do not locate perimeter fasteners closer than 3/8 inch from panel edges and ends.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Parallam Beam, columns and posts for roof and floor framing.
2. Laminated Veneer Lumber (LVL) beams.
3. Laminated Strand Lumber (LSL).
4. Rim Boards.
5. Bridging, bracing and anchorage.
6. Framing for openings.

B. Related Sections:

1. Section 033000 - Cast-In-Place Concrete: Setting anchors in concrete.
2. Section 042016 - Concrete Unit Masonry: Setting anchors in masonry.
3. Section 061000 - Rough Carpentry: Framing and Sheathing.

1.2 REFERENCES

A. ASTM International:

1. ASTM A123 - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
2. ASTM A653 - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
3. ASTM D2559 - Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions.
4. ASTM D5055 - Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I Joists.
5. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate sizes and spacing of studs, beams, loads, framed openings and beam camber. Submit design calculations.

- C. Product Data: Submit Beam and Stud configurations, bearing and anchor details, bridging, bracing and installation instructions
- D. ICC report.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following agencies:
 - 1. Lumber Grading Agency: Certified by ALSC.
 - 2. Plywood Grading Agency: Certified by APA.
- B. Joists detailed and installed in accordance with current National Evaluation Report or ICC, Engineering Service Report.
- C. Design and manufacture products to be custom fit to dimensions and loads indicated on drawings in accordance with ASTM D5055.
 - 1. Tested Rating: Determined in accordance with ASTM E119.
- D. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
 - 2. Design joists and associated components under direct supervision of Professional Engineer experienced in design of this Work and licensed in State where Project is located.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Protect structural components from warping or other distortion by stacking in vertical position, braced to resist movement. Protect from weather.

1.6 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Laminated Veneer Lumber (LVL):
 - 1. Acceptable Manufacturers:
 - a. Boise Cascade Corp. - Versa-Lam.
 - b. RedBuilt - Redlam.

- c. Murphy - LVL Structural Lumber.
 - d. Substitutions under provisions of Section 012500.
- 2. Product made from Douglas Fir or Southern Pine veneers with all grain parallel to the member, laminated with adhesives which comply with ASTM D2559. The glue line is parallel to the wide face of the member.
- 3. Minimum Allowable Stresses (unless noted on drawings):
 - a. Flexural stress in bending $F_b = 2,900$ psi.
 - b. Compression perpendicular to grain $F_{c1} = 750$ psi.
 - c. Horizontal shear $F_v = 285$ psi.
 - d. Modulus of elasticity $E = 1,900,000$ psi.
- B. Laminated Strand Lumber (LSL):
 - 1. To be used only where specifically designated on the structural drawings.
 - 2. Acceptable Manufacturers:
 - a. Timberstrand Weyerhaeuser.
 - b. Substitutions under provisions of Section 012500.
 - 3. Product is made from oriented strand board ANSI A208.1; wood flakes set with waterproof resin binder; unsanded faces meeting requirements of PSI-83, Structural 1.
 - a. Minimum Allowable Stresses (unless noted on the drawings):
 - 1) Shear modulus of elasticity $G = 81,250$ psi.
 - 2) Modulus of elasticity $E = 1.3 \times 10^6$ psi.
 - 3) Flexural stress in bending $F_b = 1,700$ psi.
 - 4) Compression perpendicular to grain parallel to wide face of strands $F_{c1} = 680$ psi.
 - 5) Compression parallel to grain $F_{c11} = 1,400$ psi.
 - 6) Horizontal shear perpendicular to wide face of strands $F_v = 400$ psi.
- C. Parallel Strand Lumber (PSL):
 - 1. Acceptable Manufacturers:
 - a. Weyerhaeuser, Paralam.
 - b. Manufacturer approved by ICC-ES.

- 1) Submit current ICC-ES Evaluation Report.
 2. Product is made from oriented strands in longitudinal direction of member, and complies with ICC ES ESR-1387.
 3. Minimum Allowable Beam Stresses:
 - a. Shear Modulus of Elasticity - $G = 137,500$ psi.
 - b. Modulus of Elasticity - $E = 2.2 \times 10^6$ psi.
 - c. Flexural Stress - $F_b = 2,900$ psi. (For member depths of 12 inch or less. Depths greater than 12 inch per latest National Design Specification for Wood Construction.)
 - d. Compression Perpendicular to Grain - $F_{c\perp} = 750$ psi. (May not be increased for duration of load.)
 - e. Compression Parallel to Grain - $F_{c\parallel} = 2,900$ psi.
 - f. Horizontal Shear Parallel to Grain - $F_v = 290$ psi.
 - g. Equivalent Specific Gravity - $SG = 0.50$ (For lateral connection design only.)
 - h. Density = 45lbs/ft³.
 4. Minimum Allowable Column and Post Stresses:
 - a. Modulus of Elasticity - $E = 1.8 \times 10^6$ psi.
 - b. Flexural Stress - $F_b = 2,400$ psi.
 - c. Compression Parallel to Grain - $F_{c\parallel} = 2,500$ psi.
 - d. Equivalent Specific Gravity - $SG = 0.50$. (For lateral connection design only.)
 - e. Density = 45lbs/ft³.
 - D. Joist Bridging and Bracing: Design and supply by joist manufacturer.
- 2.2 ACCESSORIES
- A. Adhesive: ASTM D2559; for wet condition of service.
 - B. Wood Blocking, Plating, Framing for Openings: In accordance with Section 061000 - Rough Carpentry.
 - C. Fasteners: All hardware in contact with treated wood shall be galvanized G185 (1.85 oz. of zinc per square foot of surface area) per ASTM A653. All fasteners in contact with treated wood shall be hot-dipped galvanized per ASTM A123.
 - D. Hangars, blocking plates and web stiffeners to suit application.

2.3 FABRICATION

- A. Fabricate members to achieve structural requirements specified.
- B. Do not proceed with fabrication until shop drawings and calculations have been reviewed by the Architect.

2.4 FACTORY WOOD TREATMENT

- A. Refer to Section 061000.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify supports are ready to receive members.

3.2 PREPARATION

- A. Coordinate placement of bearing items.
- B. Do not allow notches or holes to be cut in members unless detailed on the drawings.

3.3 ERECTION

- A. Install members in accordance with manufacturer's instructions.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in alignment until completion of erection and installation of permanent bracing.
- C. Place headers and supports to frame openings.
- D. Frame openings between members with lumber in accordance with Section 061000.
- E. Coordinate placement of sheathing with Work of this section.

3.4 SITE APPLIED WOOD TREATMENT

- A. Brush apply two coats of preservative treatment on wood in contact with cementitious materials and roofing and related metal flashings. Treat site-sawn cuts.
- B. Allow preservative to dry prior to erecting members.

3.5 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Framing Members: 1/2 inch maximum, from indicated position.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glue laminated wood beams and purlins.
- B. Preservative treatment of wood.
- C. Steel hardware and attachment brackets.

1.2 RELATED REQUIREMENTS

- A. Section 061000 - Rough Carpentry.
- B. Section 099000 - Painting and Coating.

1.3 REFERENCE STANDARDS

- A. AITC A190.1 - American National Standard for Wood Products - Structural Glued Laminated Timber 2007.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- E. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2015.
- F. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric) 2007 (Reapproved 2013).
- G. ASTM D2559 - Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions 2012a (Reapproved 2018).
- H. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2019, with Editorial Revision (2020).
- I. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.
- J. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber 2019.

1.4 SUBMITTALS

- A. See Section 013300 - Submittal Procedures.
- B. Shop Drawings: Indicate framing system, sizes and spacing of members, loads and cambers, bearing and anchor details, bridging and bracing, and framed openings.

1. Submit design calculations signed and sealed by Professional Engineer licensed in the State in which the Project is located.

1.5 QUALITY ASSURANCE

- A. Manufacturer/Fabricator Qualifications: Company specializing in manufacture of glue laminated structural units with three years of documented experience, and certified by AITC in accordance with AITC A190.1.
- B. Erector Qualifications: Company specializing in erection of products of the type specified with three years documented experience, and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect members to AITC requirements for not wrapped.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Boise Cascade.
- B. Red Built.
- C. Substitutions under provisions of Section 012500.

2.2 GLUED-LAMINATED UNITS

1. Verify dimensions and site conditions prior to fabrication.
 2. Cut and fit members accurately to length to achieve tight joint fit.
 3. Fabricate member with camber built in.
 4. Do not splice or join members in locations other than those indicated without permission.
 5. Fabricate steel hardware and connections with joints neatly fitted, welded, and ground smooth.
 6. Welding: Perform welding in accordance with AWS D1.1/D1.1M.
 7. After end trimming, seal with penetrating sealer in accordance with AITC requirements.
- B. Performance Criteria:
1. Comply with applicable code for loads, seismic zoning, and other load criteria.

2.3 MATERIALS

- A. Lumber: Softwood lumber complying with RIS (GR) grading rules with 12 percent maximum moisture content before fabrication.
 - 1. Lumber fabricated from old growth timber is not permitted.
- B. Steel Connections and Brackets: ASTM A36/A36M weldable quality, galvanize per ASTM A123/A123M.
- C. Anchor Bolts: ASTM F3125/F3125M, Type 1 heavy hex high strength bolts and ASTM A563 (ASTM A563M) nuts; hot-dip galvanized to meet requirements of ASTM A153/A153M, matching washers.
- D. Laminating Adhesive: Tested for wet/exterior service in accordance with ASTM D2559.
- E. Bearing Plate Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete.

2.4 WOOD TREATMENT

- A. Fire Retardant Treatment: Refer to Section 061000.
- B. Preservative Pressure Treatment: Refer to Section 061000.
- C. Surface-Applied Wood Preservative: Clear.
- D. Moisture Content: Refer to Section 061000.

2.5 FABRICATION

- A. Fabricate glued-laminated structural members according to ANSI/AITC A190.1.
 - 1. Stamp members with AITC Quality Mark in a location which will be concealed from view in its as-built condition.
 - 2. For conditions where quality mark stamp cannot be concealed, accompany member with an AITC Certificate of Conformance.
- B. Grade: Refer to General Notes on Structural Plans.
- C. Layup:
 - 1. Apply TOP stamp
 - a. On the top of the member.
 - b. At both ends.
 - c. Spaced at a maximum of 8 feet.
 - d. In letters at least 2 inch in height.

- D. Verify dimensions and site conditions prior to fabrication.
- E. Cut and fit members accurately to length to achieve tight joint fit.
- F. Camber: 200 foot radius unless noted otherwise.
- G. Do not splice or join members in locations other than those indicated without permission.
- H. Fabricate steel hardware and connections with joints neatly fitted, welded, and ground smooth.
- I. After end trimming, seal with penetrating sealer in accordance with AITC requirements.

2.6 FINISHES

- A. Field Finish of Members: As specified in Section 099000 - Painting and Coating.

2.7 SOURCE QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.
- B. Inspection: Inspect Work performed at manufacturer's/fabricator's facility to verify conformance to Contract Documents.
- C. Certificate of Compliance:
 - 1. If manufacturer/fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's/fabricator's facility conforms to Contract Documents.
 - 2. Specified shop tests are not required for Work performed by approved manufacturer/fabricator.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that supports are ready to receive units.
- B. Verify sufficient end bearing area.

3.2 PREPARATION

- A. Coordinate placement of bearing items.

3.3 ERECTION

- A. Lift members using protective straps to prevent visible damage.
- B. Set structural members level and plumb, in correct positions or sloped where indicated.

- C. Provide temporary bracing and anchorage to hold members in place until permanently secured.
- D. Fit members together accurately without trimming, cutting, splicing, or other unauthorized modification.
- E. Swab and seal the interior wood surfaces of field drilled holes in members with primer.

3.4 TOLERANCES

- A. Framing Members: 1/2 inch maximum from true position.

3.5 PROTECTION

- A. Section 017000 - Execution: Requirements for protecting finished Work.
- B. Do not remove factory protective wrapping until after installation of roof deck and water-resistant membrane.

3.6 SCHEDULE - FINISH

- A. Non-Exposed to View Members: Industrial Appearance Grade per AITC 110-2001.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stair caps.
2. MDF.
3. PLAM window sills.

B. Related Sections:

1. Section 055000 - Metal Fabrications.
2. Section 061000 - Rough Carpentry.
3. Section 064100 - Architectural Casework: Custom casework.
4. Section 092116 - Gypsum Board Assemblies.
5. Section 099000 - Painting and Coating.
6. Section 099613 - Abrasion Resistant Coatings.

1.2 REFERENCES

A. American National Standards Institute:

1. ANSI A135.4/Voluntary Product Standard PS 58-73- Basic Hardboard.

B. ASTM International:

1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. Architectural Woodwork Manufacturers Association of Canada/Woodwork Institute:

1. North American Architectural Woodwork Standards, Version 3.1. (NAAWS)

D. Federal Specification Unit:

1. FS A-A-1936 - Adhesive, Contact, Neoprene Rubber.

E. Green Seal:

1. GS-36 - Aerosol Adhesives.

F. National Electrical Manufacturer's Association:

1. NEMA LD 3- High Pressure Decorative Laminates.

G. South Coast Air Quality Management District:

1. SCAQMD Rule 1113 - Architectural Coatings. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

H. U.S. Department of Commerce National Institute of Standards and Technology:

1. DOC PS 20 - American Softwood Lumber Standard.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details and accessories, to a minimum scale of 1½ inch to 1 ft.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with NAAWS Custom Grade.
- B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Refer to Section 014000 - Quality Requirements.
- D. Qualifications:
 1. Fabricator: Company specializing in fabricating the products specified in this section with minimum three years documented experience.
- E. Mockup:
 1. Provide alcove mock-up under provisions of Section 014000 - Quality Requirements.
 2. When accepted, mock-up will demonstrate minimum standard for the Work. Mock-up will remain as part of the Work.
 3. Work of this section shall not proceed until approval of the mock-up.
- F. Pre-Installation Meetings:
 1. Section 013119 - Project Meetings: Pre-installation meeting.
 2. Convene one week prior to commencing work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Protect work from moisture damage.
- C. Maintain storage space relative humidity within ranges indicated in NAAWS Section 2.

- D. Store wood in a dry environment to meet maximum moisture content requirements. Do not store wood outside.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. During and after installation of Work of this section, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.
 - 1. Maintain relative humidity within ranges indicated in NAAWS Section 2.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.8 SEQUENCING

- A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.9 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.

PART 2 PRODUCTS

2.1 COMPONENTS

- A. Softwood Lumber, concealed: DOC PS20 grade in accordance with requirements of NAAWS; maximum moisture content 6% for interior work.
- B. Typical Solid Hardwood Lumber: NAAWS Grade Custom Grade; maximum moisture content of 6-8 percent; and the following:
 - 1. Species of Wood: Hard white maple.
 - 2. Cut or Slicing of Wood: Plain sliced.
- C. Medium Density Fiberboard Panel (MDF-1) (MDF-2)
 - 1. ANSI A208.2 Grade 130.
 - 2. Moisture Content: 6 percent to 8 percent.
 - 3. Formaldehyde Content: Manufactured with formaldehyde free binders. Labeled by manufacturer as containing less than 0.005 parts per million found occurring naturally in wood.
 - 4. Flame Spread Rating Class C (3).

5. Density: 48 lb/ft³.
 6. Internal Bond: 115 lb/in².
 7. Modulus of Hardness 1000 lbs.
 8. Screw Holding, Face: 225 lbs.
 9. Screw Holding, Edge: 180 lbs.
 10. Thickness: ½ inch.
 11. Acceptable Manufacturers:
 - a. Rosenberg, Arreis.
 - b. West Fraser, EcoGold.
 - c. Plum Creek, GlacierGreen.
- D. Plastic Laminate for Window Sills:
1. NEMA LD3, 1/16 inch General Purpose type
- E. Substrate - Non-Added Urea Formaldehyde Particle Board (NAUF PB)
1. Meeting ANSI A208.1 requirements.
 2. Formaldehyde Content: Third Party Certified (TPC-1) to meet the requirement of EPA Formaldehyde Emission Regulation, TSCA Title VI, Standards Council of Canada Formaldehyde Emission Standard for Composite Wood Products - CAN/CSA 0160-16, California Air Resources Board (CARB) ATCM 93120.
 3. Density: 47 lb/ft³.
 4. Internal Bond: 80 psi.
 5. Modulus of Rupture/MOR: 2100 psi.
 6. Modulus of Elasticity/MOE: 400,000 psi.
 7. Screw Holding, Face: 250 lbs.
 8. Screw Holding, Edge: 200 lbs.
 9. Linear Expansion: 0.40%.
 10. Flame Spread Rating Class C (3).
- F. Stair Cap: (WD-1) 1-1/4 solid maple.

2.2 ACCESSORIES

- A. Fasteners: to meet NAAWS standards, of size and type to suit application or as indicated.
 - 1. Exposed fasteners for MDF panel attachments. Zinc tamper resistant screws with nickel beauty washers.
- B. Adhesive for High Pressure Decorative Laminates: Type recommended by laminate manufacturer to suit application.
 - 1. Adhesives: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
 - 2. Aerosol Adhesives: Maximum volatile organic compound content in accordance with GS-36.
- C. Lumber for Shimming and Blocking: Softwood lumber.
- D. Wood Filler: Oil base, tinted to match surface finish color.

2.3 FABRICATION

- A. Fabricate finish carpentry to NAAWS Section 6 Custom Grade.
- B. Shop assemble work for delivery to site, permitting passage through building openings.
- C. Shop prepare and identify components for book match grain matching during site erection.
- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.4 FINISHING

- A. Prepare cut edges to receive paint.
- B. Sand work smooth and set exposed nails and screws.
- C. Apply wood filler in exposed nail and screw indentations.
- D. On items to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.
- E. Seal internal surfaces and semi-concealed surfaces. Brush apply only.
- F. Seal surfaces in contact with cementitious materials.
- G. The following items are to be factory finished in accordance with NAAWS Section 5; Custom Grade; Clear Transparent; System 5, Conversion varnish.
 - 1. WD-1.
 - 2. PLWD-1.

3. Miscellaneous trims.

H. (MDF-1)(MDF-2): Refer to Section 099613.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

- A. Install work in accordance with NAAWS Section 6 and Custom Grade and manufacturer's instructions.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install wood components with nails.

3.3 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation from True Position: 1/16 inch.
- C. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. General

1. This section includes casework specified to the Architectural Woodwork Standards (NAAWS) Casework Design Series (CDS) system. All casework numbering on the documents will reference Appendix A, located in the NAAWS standards. Refer to the NAAWS legend in the drawings or NAAWS manual for casework tag interpretation.
2. This section also includes custom casework as detailed. Custom build casework, which has a detail number in lieu of an NAAWS number, with materials and construction similar to the adjacent NAAWS casework.

B. Section Includes:

1. Plastic laminate faced casework:
 - a. Type A, Flush Overlay at Concealed Hinges.
 - b. Type A, Reveal Overlay at Five Knuckle Hinges.
2. Counter tops including plastic laminate.
3. Custom Interior display cases.
4. Custom Casework, as detailed.
5. Library Casework, as detailed.
6. At existing library bookcases, reface vertical edges and top and bottom frame.
7. Cabinet hardware.
8. Under Stage Storage Doors.
9. Installation.
10. Preparation for installing utilities.

C. Related Sections:

1. Section 061000 - Rough Carpentry: Grounds and support framing.
2. Section 062000 - Finish Carpentry: Related wood and trim not specified in this section.
3. Division 22 - Plumbing: Components for plumbing connections.
4. Division 26 - Electrical: Components for power connections.

5. Division 27 - Communications: Components for power connections.

1.2 REFERENCES

- A. American National Standards Institute:
 1. ANSI A135.4 - Basic Hardboard.
 2. ANSI A156.9 - Cabinet Hardware.
 3. ANSI A208.2 - Medium Density Fiberboard.
- B. Architectural Woodwork Manufacturers Association of Canada/Woodwork Institute:
 1. North American Architectural Woodwork Standards, Version 3.1. (NAAWS)
 2. CONTRACTOR TO PROVIDE A COPY ON SITE
- C. IBC seismic requirements for cabinet restraint.
- D. ASTM International:
 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. Green Seal:
 1. GS-36 - Aerosol Adhesives.
- F. National Electric Manufacturers Association:
 1. LD3 - High Pressure Decorative Laminates.
- G. South Coast Air Quality Management District:
 1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.
- H. U.S. Department of Commerce National Institute of Standards and Technology:
 1. DOC PS 20 - American Softwood Lumber Standard.

1.3 SUBMITTALS

- A. Submit under provisions of Section 013300 - Submittal Procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Certification: Submit documentation confirming Project complies with requirements of Quality Control paragraph below.
- D. Samples:

1. Submit two, 6x6 inch size samples, illustrating cabinet finish.
2. Submit two 4x4 inch size samples, illustrating counter top finish.
3. Submit two samples of drawer and door pulls and hinges illustrating hardware finish.

E. Section 017700 -Closeout Procedures: Manual for Materials and Finishes.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with NAAWS, Section 10 and Section 11; Custom grade.
- B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Provide plastic laminate in accordance with NEMA LD3.
- D. Definitions: Refer to the North American Architectural Woodwork Standards.
- E. Qualifications:
1. An AWI member or a Woodwork Institute Accredited Millwork Company in good standing.
 2. Single Source responsibility: A single manufacturer shall provide and install the work described in this section.
- F. Mockup:
1. Provide mockup of full size base cabinet and upper cabinet under provisions of Section 014000 - Quality Requirements.
 2. Provide units with specified counter top; with hardware installed.
 3. Units will be examined to ascertain quality and conformity to specification requirements.
 4. Approved mockup may remain as part of the Work.
- G. Pre-Installation Meetings:
1. Convene one week prior to commencing work of this section, under provisions of Section 013119 - Project Meetings.

1.5 QUALITY CONTROL

- A. Contractor shall make the following items part of the Contractor's Quality Control Plan:
1. Certified Compliance Program: Before delivery to the job site, provide a Woodwork Institute Certified Compliance Certificate indicating the millwork products being supplied and Certifying that these products fully meet the requirements of the Grade or Grades specified.

- a. Each elevation of casework, each laminated plastic top, and each solid surface top shall bear a Woodwork Institute Certified Compliance Label.
 - b. At completion of installation, the woodwork installer shall provide a Woodwork Institute Certified Compliance Certificate indicating the products installed, and certifying that the installation of these products fully meets the requirements of the Grade or Grades specified.
 - c. All fees charged by the Woodwork Institute for its Certified Compliance Program are the responsibility of the millwork manufacturer and/or installer and shall be included in their bid.
2. Contractor shall verify that all shop drawings, samples, and other submittals are complete and have been reviewed by the Architect prior to beginning installation of custom casework.
 3. Conduct a Pre-Installation Conference sufficiently early in the Project to communicate the requirements for work of this Section. As a minimum, the Project Superintendent and foreman from the framing, painting, plumbing, electrical and other related trades shall be present. Coordination requirements of the various trades shall be discussed.
 4. Prior to start of work, Contractor shall inspect preparatory work and ensure that it is acceptable for subsequent installation.
 5. Contractor shall inspect installation daily to ensure compliance with project requirements.
 6. Contractor shall perform a final inspection of all installations, make all necessary corrections and ensure completion prior to contacting the Owner for finish inspection.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products to site under provisions of Section 016000 - Product Requirements.
- B. Protect units from moisture and other damage.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. During and after installation of Work of this section, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.
 1. Maintain relative humidity within ranges indicated in NAAWS Section 2.

1.8 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated and instructed by the manufacturer.

1.9 COORDINATION

- A. Coordinate work under provisions of Section 013100 - Project Management and Coordination. Coordinate the work with electrical and plumbing rough-ins.

PART 2 PRODUCTS

2.1 ACCEPTABLE FABRICATORS

- A. Genothern, Tumwater, WA (360) 352-3636.
- B. ISEC, Bothell, WA (425) 488-1333/TMI Systems Design Corp, Dickinson, ND (800) 456.6716.
- C. Advanced Custom Cabinets, Hayden ID (208) 772-2377.
- D. Pacific Cabinets, Inc., Ferdinand, ID (208) 962-5546.
- E. Custom Source Woodworking, Inc. Olympia, wa (360) 918-6205.
- F. Frontier Central Cabinet System, Tacoma WA (253) 531-3470.
- G. Substitutions under provisions of Section 012500.

2.2 REGULATORY REQUIREMENTS

- A. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated according to IBC and ASCE 7.
- B. Accessibility: Conform to IBC Chapter 11 and ICC/ANSI 117.1 Accessible and Usable Buildings and Facilities.

2.3 WOOD MATERIALS

- A. Per NAAWS Section 3.

2.4 SHEET MATERIALS

- A. Per NAAWS Section 4.
- B. Wood Veneer:
 - 1. Birch veneer core panel (PLYWD-2): Veneer core panel constructed from uniform laminations of solid grade 1/16 inch birch.
 - a. Basis of Design: States Industries, ApplePly. Substitutions under provision of Section 012500.
 - b. Maple face and back.
 - c. Thickness: 1-1/4 inch and 5/8 inch .

d. Finishing/Execution: Refer to 062000 - Finish Carpentry.

C. Glazing: as indicated in the drawings and specified in Section 088000 - Glazing.

2.5 REFURBISH UNDER STAGE STORAGE CARTS

A. Sand and paint existing storage carts. Color P-2.

B. Replace Existing 3 1/2" Diameter Casters - (2) swivel at front and (2) rigid at back, non-marking wheels, 8 and 9 Series by Industrial Caster & Wheel or approved equal.

C. Repair existing wood bumpers under stage.

2.6 COUNTERTOPS AND FACING MATERIALS

A. Per NAAWS Sections 10 and 11.

B. Per NAAWS Section 11 for sink countertops and splashes: Comply with ANSI A208.2-2016 section 3.6, moisture resistant criteria necessary to obtain an MR50 board designation.

1. Acceptable Manufacturers:

a. GP Ultrastock MR MDF.

b. Roseburg, Medite.

c. Substitutions under provisions of Section 012500.

2. Physical Properties

a. MOR - Modulus of Rupture: 4000 psi.

b. MOE - Modulus of Elasticity: 405 kpsi.

c. Internal Bond: Minimum 110 psi.

d. Screw Holding - Face: Minimum 250 lbs.

e. Screw Holding - Edge: Minimum 200 lbs.

f. Thickness Swell: 5.5% or less.

g. Linear Expansion: .30%.

h. Moisture Content: 4-6%.

i. Flame Spread Rating: Class C (3).

C. Plastic Laminate: Manufacturers and Colors - Refer to Finish and Color Schedule.
Substitutions: Under provisions of Section 012500.

1. Plastic Laminate: NEMA LD3.

- a. Vertical Casework: 0.028 inch nominal.
- b. Horizontal Casework: 0.048 inch nominal.
- c. Whiteboard Laminate: 0.38 inch. With iron foil incorporated under surface decor. (PLAM-4)
- d. Chemical Resistant PLAM: Post forming Type 390 (HGP). A special resin formulation is applied over the decorative surface paper to achieve chemical resistance. (PLAM-7)

2.7 ACCESSORIES

- A. Adhesive for High Pressure Decorative Laminates: Type recommended by laminate manufacturer to suit application.
 1. Interior Adhesives: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
 2. Interior Aerosol Adhesives: Maximum volatile organic compound content in accordance with GS-36.
 3. Contact adhesives not permitted.
- B. Veneer Edge Band: 3 mm PVC by Doelken-Woodtape. Color to match casework. 0.02 inch thick acceptable at bottom and top edge of casework.
- C. Fasteners and Anchors: Per NAAWS.
- D. Mirrors at Wardrobe Cabinets: Per NAAWS.
- E. Provide locks and cores. Cores to be Schlage FSIC.

2.8 HARDWARE

- A. Hardware: ANSI A156.9.
- B. Drawer and Door Pulls: Wire Pull Liberty 96 mm P604D6-SC-C, 4" solid brass with US26D finish, wire pulls.
- C. Countertop Support Bracket:
 1. 6063-T6 extruded aluminum, minimum 450 lb bracket, cut and sanded extrusions drilled with four 5/16" holes. <http://rakks.com/products/counter-support-brackets.php>
 2. Surface Mount (EH Series): 2"x 12" x depth" L-shaped Rakks Bracket in clear anodized aluminum finish.
 3. Inside Wall Mount (EH Series): Left sided, made to order. Clear anodized aluminum finish. Flush mounted installation. Display case shelving as noted in drawings.

- D. Cabinet Locks: Olympus 777ICP-DR door lock and 888ICP-DW drawer lock, keyed to Owner's master key system. Provide locks and install at the following door and drawer locations:
1. Workroom 203 (NAAWS 401 only)
 2. Gym 145 Storage Cabinets
 3. Main Office 138 Cabinets
 4. Health Room 135 Cabinets
 5. Conference 132 Cabinets
 6. All Classrooms
 7. Special Ed Life Skills 123
 8. Counseling 124 Cabinets
 9. Library 229 Casework
 10. Vestibule 224
 11. FSC 114 (NAAWS 402 only)
 12. Under Stage Storage Doors.
- E. Fixed glass track assemblies: Extruded aluminum, channel type, sized for glass thickness, clear anodized finish.
- F. In Rooms Storage 010 and Storage 047, 454 NAAWS: add pole per NAAWS Standard. Provide proved hasp for padlock.
- G. Door Catches: EPCO 591aluminum. Provide at all cabinet doors without self closing hinges.
- H. Drawer Slides: KV 6505 or equivalent zinc-plated cold rolled steel, ball bearing rollers, 125 lbs. capacity.
- I. Paper Storage Extra Heavy Duty drawer slides: K&V 8800 or equivalent zinc-plated cold rolled steel, full extension, ball bearing rollers with 200 lbs. capacity. Length to suit application.
- J. Shelf Clips: Nylon, double 5 mm pegs, seismic shelf securing clips designed to lock shelf in place, suitable for 3/4 inch and 1 inch thick shelves, min. 500 lb. load capacity per shelf. Engstrom #11 Earthquake Proof Shelf Clip.
- K. Shelf Support Brackets: Rakks, Eclipse EC-0808, 125 lbs weight capacity for shelves, clear anodized finish.

- L. Hinges: Exceed ANSI/BHMA 156.9 Grade 1 requirements, five knuckle, 2 ¾ inch, 270 degree swing hospital type, one pair per door except two pairs required on doors over 48 inches high. US 26D finish. For student locations.
- M. Concealed Hinges: Blum #73T5550; clip top Blumotion 120° opening, self-closing, for office locations.
- N. Coat Hooks: Stanley 1430 Satin Chrome finished double hook.
- O. Coat Rod and Shelf Brackets: KV #770-5 chrome rod with #766CHR end supports.
- P. Elbow Catch: (for inactive leaf of locking cabinets) Ives 2A92, cast aluminum spring loaded, provide two per inactive leaf.
- Q. Grommets: Round metal brush desk grommet. 2- 3/8 inch, matte chrome. Mocket, MBG1/A. Provide 1 grommet at each knee space 4 feet wide or less and additional grommets for each knee space over 4 feet wide at maximum 48" on center. Coordinate exact locations with the Owner.

2.9 FINISHING MATERIALS

- A. Cabinets:
 - 1. High pressure laminated plastic to NAAWS Section 11 requirements.
- B. Other standard accessories and equipment: As required for units as indicated; manufacturer's standard stock as approved.

2.10 FABRICATION

- A. General:
 - 1. Fabricate casework to NAAWS Section 10 Custom Grade.
 - 2. Fabricate counter tops to NAAWS Section 11 Custom Grade.
 - 3. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
 - 4. Provide cutouts for plumbing fixtures, inserts, outlet boxes, fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surfaces of cut edges.
- B. Cabinet Panels and Shelves: To NAAWS requirements.
 - 1. Provide 3/4" finished backs on movable units.
 - 2. At spans over 36 inch, provide 1 inch core.
- C. Cabinet Bodies:

1. Fabricate, assemble and finish each cabinet to NAAWS requirements.
 2. Provide HPDL at exposed interior surfaces.
 3. Unless otherwise shown, provide toe-space on floor-mounted units.
 4. Toe Base Finish: See finish schedule.
 5. Adjustable Shelving: Support each shelf with four shelf clips permitting adjustment on 1-inch centers.
- D. Doors and Drawers: To NAAWS standards.
1. Door and Drawer Fronts; 3/4 inch thick.
- E. Counter Tops and Splash: To NAAWS Section 11 standards. Self edged with coved splash.
- F. Toe Kicks: Cross banded plywood or lumber.
- G. Scribes and Fillers: Required at all surfaces adjoining walls of adjacent construction and equipment including bottoms of wall mounted uppers.
- H. Special Lock Requirement: Where locks are indicated, provide casework drawers and doors with locks; lock cylinders shall be master keyed in one or more systems and in addition, further keyed alike, keyed differently or separately as directed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Install casework in accordance with NAAWS Section 10 Custom Grade.
- B. Install countertops in accordance with NAAWS Section 11 Custom Grade.
- C. Install, plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where casework abuts other finished work, scribe and apply filler strips for accurate fit with fasteners concealed where practicable. Include horizontal closure panels at tops and bottoms of wall cabinets where cabinets meet at room corners.
- D. Existing library bookcases: Apply PLAM-6 at vertical edges and top and bottom frame.

3.3 TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances per NAAWS standards.

3.4 ADJUSTING

- A. Adjust work under provisions of Section 017700 - Closeout Procedures.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.5 PROTECTION, CLEANING/REPAIRING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Repair or remove and replace defective work.
- C. Clean shop finished casework, touch up as required, remove and refinish damaged or soiled areas.
- D. Cover casework for protection against soiling and deterioration during remainder of construction period.
- E. Clean counter tops with diluted dishwashing liquid and water leaving tops free of all grease and streaks. Use no wax or oils.
- F. Casework shall be protected before, during and after installation. Damaged materials due to improper protection shall be cause for rejection. Remove protection at substantial completion.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fiberglass reinforced plastic panels (FRP).

B. Related Sections:

1. Section 079200 - Joint Sealants: Panel joint filler.
2. Section 092116 - Gypsum Board Assemblies: Wall substrate.

1.2 REFERENCES

A. ASTM International:

1. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
2. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
3. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
4. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degree C and 30 degree C with a Vitreous Silica Dilatometer.
5. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
6. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
7. ASTM E84 - Standard Test Method for Surface Burning Characteristic of Building Materials.

1.3 SUBMITTALS

- A. Submit shop drawings indicating panel layout and installation instructions.
- B. Submit product data and samples in accordance with Section 013300.
- C. Section 017700 - Closeout Procedures: Manual for Materials and Finishes.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 016000.
- B. Accept panels on site in manufacturer's packaging. Inspect for damage.

1.5 PROJECT CONDITIONS

- A. Do not begin installation until building is enclosed, permanent heating equipment is in operation and residual moisture from concrete work has dissipated.
- B. During installation, and within 48 hours prior to installation, maintain ambient temperature and relative humidity within limits required by type of panel adhesive used and recommendation of panel adhesive manufacturer.

1.6 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings and instructed by the manufacturer.

1.7 COORDINATION

- A. Coordinate work under provisions of Section 013100 - Project Management and Coordination.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design:
 - 1. Crane Composites.
- B. Substitutions accepted under provisions of Section 012500.

2.2 FIBERGLASS REINFORCED PLASTIC PANELS

- A. Color and Finish: Refer to Finish and Color Schedule. (FRP-1)
- B. Size: Refer to drawings.
- C. ASTM E84 Class C fire rated.
- D. Thickness: .09 inch.
- E. Composition:
 - 1. Reinforcement: Random chopped fiberglass.
 - 2. Resin Mix: Polyester/styrene copolymer, inorganic fillers, and pigments.
- F. Properties:
 - 1. Barcol Hardness: 40, ASTM D2583.
 - 2. Izod Impact 4.0 ft-lbs/in notched, ASTM D256.
 - 3. Flexural Strength: 14 x 1000 psi, ASTM D790.

4. Flexural Modulus: 4 x 1,000,000 psi, ASTM D790.
5. Tensile Strength: 7.0 x 1000 psi, ASTM D638.
6. Tensile Modulus: 7 x 1,000,000 psi, ASTM D638.
7. Coefficient of Linear Thermal Expansion: 2.0×10^{-5} in/in/°F, ASTM D696.
8. Water Absorption: 0.16%/24 hrs @ 77°F, ASTM D570.
9. Surface Burning Characteristics: Class C.

2.3 ACCESSORIES

- A. Clear extruded aluminum trim recommended by panel manufacturer.
- B. Adhesive: Recommended by manufacturer.
- C. Sealant: Recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions under provisions of Section 013100 - Project Management and Coordination.
- B. Verify that joint preparation and affected dimensions are acceptable.

3.2 PREPARATION

- A. Clean substrates to remove substances that could impair bond of adhesive, including oil, grease, dirt, dust or other contamination.
- B. Condition panels by unpacking and placing in installation space no less than 24 hours before installation.
- C. Lay out paneling before beginning installation. Locate panel joints to provide equal panel widths at ends of walls and so that trimmed panels at corners are not less than 12 inches wide.

3.3 INSTALLATION

- A. Install components in accordance with manufacturer's written instructions.
- B. Align work plumb and level.
- C. Rigidly anchor to substrate to prevent misalignment.
- D. Butt joints and fill joints with silicone sealant.

3.4 TOLERANCES

- A. Maximum Variation From True Dimension: 1/8 inch.
- B. Maximum Offset From True Position: 1/8 inch.

3.5 CLEANING

- A. Clean work under provisions of 017700 - Closeout Procedures.
- B. Clean surfaces in accordance with manufacturer's instructions.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect installed construction under provisions of Section 017000 - Execution.
- B. Do not permit construction near unprotected surfaces.

END OF SECTION

DIVISION 07

THERMAL AND MOISTURE PROTECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes: Below grade dampproofing for concrete walls and footings.
- B. Related Sections:
 - 1. Section 033000 - Cast-in-Place Concrete.
 - 2. Division 31 - Earthwork: Fill.

1.2 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit properties of dampproofing and accessories.
- C. Manufacturer's Installation Instructions: Submit special procedures and perimeter conditions requiring special attention.

1.3 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Do not apply at temperatures below 45 degree F or when temperatures are expected to fall to 40 degree F in the next 24 hours.
- C. Protect from rain or moisture until coating has cured.

PART 2 PRODUCTS

2.1 DAMPPROOFING

- A. General: Provide dampproofing materials designed for below grade application.
- B. Acceptable Manufacturers:
 - 1. BASF; MasterSeal 615 Waterborne Emulsified-asphalt Dampproofing.
 - a. Waterborne Emulsified-asphalt Dampproofing for use on "green" or slightly damp surfaces.
 - 2. Deco Products, Inc.; Deco 20 Dampproof.
 - a. Acrylic resin designed as an alternative material to replace bituminous products and is approved for masonry block, pre-cast and poured concrete foundation walls.
 - 3. Henry; HE789

- a. Fibered Asphalt Emulsion Dampproofing for dampproofing the exterior side of below grade foundation walls.

4. Substitutions: Section 012500 - Substitution Procedures.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- C. Verify items penetrating surfaces to receive dampproofing are securely installed.

3.2 PREPARATION

- A. Protect adjacent surfaces not designated to receive dampproofing.
- B. Clean and prepare surfaces to receive dampproofing.
- C. Do not apply dampproofing to surfaces unacceptable to manufacturer.
- D. Seal penetrations, small cracks, or minor honeycomb in substrate with material or method approved by dampproofing manufacturer to provide clean surface without depressions or projections.

3.3 INSTALLATION

- A. Install dampproofing per manufacturer's written instructions.
- B. Apply two coats, continuous and uniform.
- C. Apply from 2 inches below finish grade elevation to bottom edge of footings, unless noted otherwise.
- D. Seal items projecting through dampproofing surface with material approved by dampproofing manufacturer. Seal watertight.

3.4 SCHEDULE

- A. Exterior surfaces below grade foundation walls, typ.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes water repellent/anti-graffiti coating applied full height to:
 - 1. All exterior brick veneer, concrete and concrete masonry units.
 - 2. Interior concrete and concrete masonry walls.
- B. Related Sections:
 - 1. Section 033000 - Cast-In-Place Concrete: Concrete Surfaces.
 - 2. Section 042016 - Concrete Unit Masonry.
 - 3. Section 042113 - Masonry Veneer: Masonry surfaces.
 - 4. Section 079200 - Joint Sealants.

1.2 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Product Data: Submit details of product description, tests performed, limitations to coating, and chemical properties including percentage of solids.
- C. Manufacturer's Installation Instructions: Submit special procedures and conditions requiring special attention, and cautionary procedures required during application.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- E. Closeout Submittals
 - 1. Section 017700 - Closeout Procedures.
 - 2. Manual for Materials and Finishes: Indicate frequency of recoating.

1.3 QUALITY ASSURANCE

- A. Supply products from single manufacturer or under responsibility and Warranty of single manufacturer.
- B. Qualifications
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
 - 2. Applicator: Company specializing in performing Work of this section with minimum three years documented experience approved by manufacturer.
- C. Mock-Up

1. Prepare a minimum 4 foot by 4 foot in size area for each exterior wall substrate and each proposed product to be tested. Let test area protective treatment cure before inspection.
2. Test patch to determine consumption, check compatibility with substrate and avoid unwanted color change of substrate.
3. Remove graffiti, applied by Owner to determine graffiti removal methods and performance.
4. Final acceptance of product is based on successful removal of graffiti from mock up.

D. Pre-Installation Meetings

1. Section 013119 -Project Meetings: Pre-installation meeting.
2. Convene minimum one week prior to commencing work of this section.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Protect coating liquid from freezing.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply coating when ambient temperature is lower than 50 degrees or higher than 100 degrees F.
- B. Do not apply coating when wind velocity exceeds manufacturer recommendations.

1.6 WARRANTY

- A. Section 017700 - Closeout Procedures: Warranties.
- B. Furnish minimum five year manufacturer warranty that graffiti and other paint can be removed without harm to masonry and concrete substrates when following manufacturer's graffiti removal instructions.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Anti graffiti system will prevent penetration of unwanted markings into masonry and facilitate their removal.
 1. Allow for vapor transmission.
 2. UV resistant.
 3. Prevent water penetration.

4. Sacrificial graffiti coatings are not accepted. Coating system must maintain an acceptable final appearance after each graffiti removal procedure.
5. Ease of removal: Non abrasive chemical or detergent cleaning methods using low pressure rinsing that will not harm substrate.
6. Leave no visible residue, surface film, color change, darkening, or sheen on treated surfaces.
7. Meet Federal VOC standards for Architectural and Industrial Maintenance Coatings.

2.2 ACCEPTABLE MANUFACTURERS

- A. Evonik Industries, Protectosil Antigraffiti: Clear, penetrating, breathable water repellent.
 1. Local Representative: Bob Sallee, Salleeeco, Inc. 253.841.2849.
 2. Website: www.salleeeco.com
- B. Professional Products of Kansas, Inc. Professional Water Sealant, Super Strength: Clear silicone rubber based formulation; penetrates and fills pores to prevent water intrusion and paint adhesion.
 1. Local representative: Mike Peters, 425.351.5468. msrpsales@gmail.com
 2. <http://www.watersealant.com/>
- C. Prosoco, Inc. Blok-Guard Graffiti Control Ultra: Clear drying, water-based silicone emulsion.
 1. Local Representative: Parker Sloan, 206.240.9139, parker.sloan@prosoco.com
 2. Website: <http://www.prosoco.com/>
- D. Substitutions under provisions of Section 012500.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify joint sealants are installed and cured.
- C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of coating.

3.2 PREPARATION

- A. Delay Work until masonry mortar, and concrete substrate is cured minimum of 60 days.

- B. Remove loose particles and foreign matter.
- C. Remove oil or foreign substance with chemical solvent which will not effect coating.
- D. Scrub and rinse surfaces with water and let dry.
- E. Notify Manufacturer's representative at least 48 hours before application. Do not begin application until manufacturer's representative has approved proposed application conditions and equipment.

3.3 APPLICATION

- A. Apply coating in accordance with manufacturer's instructions.
- B. Apply full height in two continuous, uniform coats, unless otherwise recommended by manufacturer.

3.4 ADJUSTING

- A. Reapply additional coatings where testing, logs or invoices indicate insufficient coverage.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution: Protecting installed construction.
- B. Protect adjacent surfaces not scheduled to receive coating.
- C. Protect landscaping, property, and vehicles.
- D. When applied to unscheduled surfaces, remove immediately by methods as instructed by coating manufacturer.

3.6 SCHEDULE

- A. Masonry veneer.
- B. Exposed Concrete Walls.
- C. Exposed Concrete Masonry Units.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes rigid board insulation at:
 - 1. Foundation walls.
 - 2. Masonry cavity walls.
 - 3. Continuous insulation for the building envelope.
 - 4. Roofing assemblies.
- B. Related Sections:
 - 1. Section 042113 - Veneer Brick Masonry: Installation by the masonry contractor of wall insulation specified in this Section 072113.
 - 2. Section 072116 - Blanket Insulation.
 - 3. Section 072600 - Vapor Retarders: Vapor retarder materials to adjacent insulation.
 - 4. Section 075400 - Thermoplastic Membrane Roofing.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C165 - Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
 - 2. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
 - 3. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
 - 4. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.
 - 5. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics.
 - 6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. International Energy Conservation Code (IECC)
 - 1. C104.2.1.1 Wall Insulation Inspection
 - 2. C104.2.1.4 Slab/Floor Insulation Inspection

- C. Non-Residential Washington State Energy Code (current addition at time of bid).

1.3 SUBMITTALS

- A. Submit under provisions of Section 013300 - Submittal Procedures.
- B. Product Data: Provide data on product characteristics, performance criteria and limitations.
- C. Provide certification listing the type, manufacturer and R-value of insulation installed in each element of the building thermal envelope.
- D. Manufacturer's Installation Instructions: Indicate special environmental conditions required for installation techniques.
- E. Building Product Disclosure Requirements: Provide Building Product Disclosure documentation. Any requests for substitution must include this documentation.
 - 1. Environmental Product Declaration for insulation (Polyiso, XPS and mineral wool).

1.4 QUALITY ASSURANCE

- A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
 - 1. Foam Plastic Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
 - 2. Other Insulation: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Insulation Installed in Exposed Locations Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store according to manufacturer instructions.
- D. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Remove insulation that becomes wet or damp.
 - 3. Provide additional protection according to manufacturer instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.7 SEQUENCING

- A. Sequence work to ensure fireproofing materials are in place before beginning the Work of this section.

PART 2 PRODUCTS

2.1 EXTRUDED POLYSTYRENE INSULATION (XPS)

A. Manufacturers:

1. The Dow Chemical Company; (<http://building.dow.com/na/en/>)
2. Owens Corning; (<http://commercial.owenscorning.com/foam/>)
3. Greenguard, (<http://greenguard.pactiv.com>)
4. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

B. Extruded Polystyrene Insulation in Vertical Applications: ASTM C578, Type IV 1.35 lbs./s.f. min. density; extruded cellular type, conforming to the following:

1. Thermal Resistance: R of 5.0 for 1 inch thickness.
2. Thickness: As required to achieve the total R-Value as shown on drawings.
3. Compressive Strength: Minimum 25 psi by ASTM D1621.
4. Water Absorption: Comply with ASTM D2842. Maximum: 0.7 percent by volume.
5. Edges: Square.
6. Comply with requirements of WA State HB 1112. If manufactured after January 1, 2021, product must not contain HFC 134a.

C. Refer to Schedule at end of section for locations.

2.2 POLYISOCYANURATE INSULATION MATERIALS

A. Manufacturers:

1. Atlas Roofing Corporation; (www.atlasroofing.com).
2. Dow, (<http://building.dow.com>).
3. Firestone Building Products. (www.firestonebpco.com)
4. Hunter, (www.hpanels.com).

5. Johns Manville Corp.; (www.jm.com).
 6. Substitutions: Under provisions of Section 012500 - Substitution Procedures.
- B. Polyisocyanurate Insulation: ASTM C1289, Closed-cell polyisocyanurate foam core bonded to non-asphaltic fiberglass facers for under metal roofing system.
1. Thermal Resistance: Aged R of 5.7 for 1 inch thickness based on Advanced Method for Determining Long-Term Thermal Resistance (LTTR).
 2. Thickness: As required to meet requirements of Washington State Energy Code.
 3. Compressive Strength: Minimum 20 psi ASTM C165.
 4. Water Absorption: Less than 1.5% per ASTM D2842.
 5. Edges: Square.
 6. U.L. Fire Resistance: Flame spread - 35 (for 1 inch thick board). Smoke Developed - 175.
- C. Refer to Schedule at end of section for locations.
- D. Tapered Insulation: Provide in 1/4inch or 1/2 inch per foot taper to meet to meet requirements of installation. Maintain average thickness not less than one-half inch thickness to achieve stabilized R-Value, except as otherwise accepted by Architect.

2.3 MINERAL WOOL INSULATION

- A. Acceptable Manufacturers:
1. Owens Corning Thermafiber Rainbarrier 45.
 2. Rockwool CavityRock.
- B. Description: Mineral fiber rigid board.
1. Comply with ASTM C612, Type IA, IB, IVA.
 2. ASTM C665 - Non corrosive.
 3. ASTM C795 - Pass.
 4. ASTM E136 - Rated Non-combustible per NFPA Standard 220.
 5. ASTM E96 - Unfaced, 50 perms as tested.
 6. ASTM E84 - Flame spread 0; Smoke developed 0.
 7. ASTM C1104 - Absorbs 0.03% by volume.
 8. ASTM C356 - Linear Shrinkage <2% 1200 degrees F.

- C. Thermal Resistance: 4.2 per inch of thickness.
- D. Density: 4.5 pcf.
- E. Board Edges: Square.
- F. Refer to Drawings for locations.

2.4 ACCESSORIES

- A. Adhesive: Type recommended by insulation manufacturer for application.
- B. Tape: Type recommended by insulation manufacturer for application.
 - 1. Type: Self-adhering, mesh reinforced.
 - 2. Width: 2 inches.
- C. Spray Foam Sealant: Spray polyurethane foam sealant in a canister to fill gaps 1/8 inch or greater.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions.
- B. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.
- C. Verify substrate surface is flat, free of honeycomb, fins, irregularities, and materials or substances that may impede adhesive bond.
- D. Verify that firestopping, and air barrier materials are in place.

3.2 INSTALLATION - FOUNDATION PERIMETER

- A. Apply adhesive to substrate in three continuous beads per board length, unless otherwise recommended by manufacturer.
- B. Adhere boards to foundation wall perimeter on side shown on the drawings. Place boards in a method to maximize contact bedding. Stagger side and end joints. Butt edges and ends tight to adjacent board and to protrusions.
- C. Extend boards over control joints, unbonded 12 inches on one side of joint.
- D. IECC C104.2.1.4 Slab/Floor Insulation Inspection: To be made after the installation of the slab/floor insulation, but before concealment.

3.3 INSTALLATION - MASONRY CAVITY WALL

- A. Install under Section 042113 - Veneer Unit Masonry.

- B. Wall Insulation Inspection: To be made after the installation of the wall insulation, but before concealment per requirements of Washington State Energy Code, C104.2.1.1.

3.4 INSTALLATION - ROOFING ASSEMBLIES

- A. Install under related roofing sections.
- B. Exterior Roofing Insulation Inspection: To be made after the installation of the roof insulation, but before concealment per requirements of Washington State Energy Code, C104.2.1.3.

3.5 INSTALLATION - CONTINUOUS INSTALLATION

- A. Place boards in method to maximize contact bedding. Stagger end joints. Butt edges and ends tight to adjacent board and to protrusions.
- B. Cut and fit insulation tight to protrusions or interruptions to insulation plane.
- C. Wall Insulation Inspection: To be made after the installation of the wall insulation, but before concealment per requirements of Washington State Energy Code, C10.2.1.1.

3.6 PROTECTION OF FINISHED WORK

- A. Do not permit work to be damaged prior to covering insulation.

3.7 SCHEDULE

- A. Perimeter insulation: Extruded polystyrene, bead adhesive application.
- B. Masonry cavity wall insulation: Mineral wool.
- C. Roof Insulation: Polyisocyanurate with glass facers.
- D. Continuous Insulation at Exterior Walls: Mineral wool.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Batt insulation in exterior and interior wall, ceiling and roof construction.
2. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior walls and roofs.
3. Sound attenuation blanket insulation for acoustical walls and construction.

B. Related Requirements:

1. Section 072113 - Board Insulation: Boards of: polystyrene, polyurethane, or polyisocyanurate foam, cellular glass, rigid or semi-rigid glass fiber.
2. Section 072600 - Vapor Retarders: Vapor retarder materials adjacent to insulation.
3. Section 072700 - Air Barriers: Air barrier materials adjacent to insulation.
4. Section 078400 - Firestopping: Products for closing openings in and penetrations through fire-rated construction.
5. Section 092116 - Gypsum Board Assemblies: Acoustic insulation installation.

1.2 REFERENCE STANDARDS

A. Non-Residential Washington State Energy Code (current edition at time of bid).

B. ASTM International:

1. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
2. ASTM C1320 - Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. International Energy Conservation Code (IECC)

1. C104.2.1.1 Wall Insulation Inspection

1.3 COORDINATION

- #### A.
- Coordinate Work of this Section with Section 072600 - Vapor Retarders for installation of vapor retarder and Section 072700 - Air Barriers for air seal materials.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer data on product characteristics, performance criteria and limitations.
- C. Provide certification listing the type, manufacturer and R-value of insulation installed in each element of the building thermal envelope.
- D. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
- E. Building Product Disclosure Requirements: Provide Building Product Disclosure documentation. Any requests for substitution must include this documentation.
 - 1. Environmental Product Declaration for insulation.

1.5 QUALITY ASSURANCE

- A. Surface Burning Characteristics of Insulation Installed in Concealed Locations:
 - 1. Batt Insulation: Maximum 25/450 flame-spread/smoke-developed index when tested according to ASTM E84.
- B. Surface Burning Characteristics of Insulation Installed in Exposed Locations:
 - 1. Maximum 25/450 flame-spread/smoke-developed index when tested according to ASTM E84.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store according to manufacturer instructions.
- D. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Remove insulation that becomes wet or damp.

3. Provide additional protection according to manufacturer instructions.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Conform to Washington State Energy Code.

2.2 SYSTEM DESCRIPTION

- A. Thermal Protection of Vapor Retarder in Conjunction with Vapor Retarder Materials: As specified in Section 072600 - Vapor Retarders.
- B. Thermal Protection of Air Seal Materials at Building Enclosure Elements: In conjunction with air barrier materials as specified in Section 072700 - Air Barriers.

2.3 ACCEPTABLE MANUFACTURERS

- A. CertainTeed Insulation, www.certainteed.com.
- B. Johns Manville, www.jm.com.
- C. Owens Corning Fiberglass, www.owenscorning.com.
- D. Knauf Insulation, www.knaufinsulation.us
- E. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.4 MATERIALS

- A. Unfaced Batt Insulation: ASTM C665, Type 1 and ASTM E136; glass fiber blanket; friction fit, conforming to the following:
 1. Thermal Resistance: R value minimum 3.0 per inch.
 2. Blanket Size: Width to suit stud or joist spacing.
 3. Facing: Unfaced.
 4. Flame Spread/Smoke Developed: 25/50 or less when tested in accordance with ASTM E84.
- B. Glass Fiber Sound Attenuation Blankets (use in sound rated partitions, except where mineral fiber is required to meet fire ratings): Unfaced type conforming to ASTM C665, Type 1, and ASTM E136; provide 3.5 inch thick insulation batts, except where stud depths are less than 3.5 inches in which case provide insulation of thickness to fill entire stud cavity; widths as required for friction fit.
 1. Flame spread rating of 10 or less with a smoke developed of 10 when tested per ASTM E84.
 2. Owens-Corning "Sound Attenuation Batt Insulation", or approved equal.

- C. Mineral Wool Insulation (use in fire rated partitions and where noted on drawings): ASTM C665, Type I mineral wool batts, non-combustible (ASTM E136), 0 flame spread and smoke developed (ASTM E84); moisture-resistant, non-corrosive and mildew-proof; 3 inches thick x stud spacing; nominal density 2.5 pounds per cubic foot; NRC of 1.05; unfaced; Thermafiber® SAFB™, Rockwool AFB or approved equal.
- D. Sheet Vapor Retarder: As specified in Section 072600 - Vapor Retarders.
- E. Staples:
 - 1. Material: Steel wire, electroplated or galvanized.
 - 2. Type and Size: To suit application.
- F. Tape:
 - 1. Material: Bright aluminum, Polyethylene or Polyester.
 - 2. Type: Self-adhering, mesh reinforced.
 - 3. Width: 2 inches.
- G. Attachment: Provide materials required for a complete and proper installation of the work of this section.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

- A. Comply with manufacturer's printed instructions and ASTM C1320.
 - 1. Install in exterior wall, roof and ceiling spaces without gaps or voids.
 - 2. Do not compress insulation.
 - 3. Trim insulation neatly to fit spaces.
 - 4. Insulate miscellaneous gaps and voids.
 - 5. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.
- B. Metal Framing:
 - 1. Place vapor retarder on warm side of insulation.
 - 2. Lap and seal sheet retarder joints over member face.

C. Attachment:

1. Place insulation fasteners at maximum 8 inches o.c.
2. Tape-seal tears or cuts in vapor retarder.

D. Refer to Section 072600 - Vapor Retarders for Installation at penetrations/openings.

E. C104.2.1.1 Wall Insulation Inspection: To be made after all building envelope insulation and air vapor retarder sheet or film materials are in place, but before any wall covering is placed.

3.3 SCHEDULE

A. Refer to plans and details for R value required for this project.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes closed cell spray foam insulation.
- B. Related Sections:
 - 1. Section 072700 - Air and Moisture Barriers: Materials continuing air barrier seal.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.
 - 2. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - 3. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
 - 4. ASTM D2482 - Standard Test Method for Surface Strength of Paper (Wax Pick Method).
 - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 6. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- B. International Energy Conservation Code (IECC)/Washington State Energy Code:
 - 1. C104.2.1.1 Wall Insulation Inspection.
- C. Green Seal:
 - 1. GS-11 - Product Specific Environmental Requirements.

1.3 SUBMITTALS

- A. Section 013000 - Submittal procedures.
- B. Product Data: Submit product description, insulation properties, preparation requirements, and overcoat properties.
- C. Manufacturer's Installation Instructions: Submit special procedures and perimeter conditions requiring special attention.
- D. Provide certification indicating installed thickness of the areas covered and R-value of the installed thickness. Sign, date and post certification in a conspicuous location on the job site per requirements of Washington State Energy Code.

- E. Submit ICC reports to verify insulation thickness prescribed for the project meets requirements of AHJ.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
 - 1. Foam Plastic Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Apply label from agency approved by authority having jurisdiction to identify each foam plastic component.
- C. Qualifications
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
 - 2. Installer: Company specializing in performing Work of this section with minimum three years experience approved by manufacturer.
- D. Mock up: Provide mock-up at area designated by Architect of insulation installation for evaluation of application workmanship; thickness; preparation of substrate cavity; installation techniques and follow-up. Do not proceed with remaining work until workmanship is approved by Architect. Accepted mock-up may remain as part of finished work.
- E. Pre-Installation Meetings
 - 1. Convene minimum one week prior to commencing work of this section.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Storage: Store materials in dry locations with adequate ventilation, protected from freezing rain, direct sunlight and excess heat and in such a manner to permit easy access for inspection and handling. Store at temperature within limits recommended by manufacturer for optimum results.

1.6 COORDINATION

- A. Coordinate with appropriate trades installation of insulation at perimeter and penetrations of building envelope assemblies without affecting or causing assembly warranties changes from occurring.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Install insulation when ambient temperature is acceptable to Manufacturer. Maintain temperature, ventilation and humidity through-out installation period.
- C. Do not begin work until space is watertight and no weather is allowed to enter the cavity being insulated. Surfaces must be dry prior to application of spray foam. Excess humidity may cause poor adhesion, and result in product failure.
- D. To avoid overspray, product should not be applied when conditions are windy.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Carlisle, Closed Cell Foam, SealTite Pro One Zero.
- B. Icynene ProSeal HFO. www.icynene.com
- C. Henry Permax 3.0 HFO [Http://us.henry.com](http://us.henry.com)
- D. Substitutions: Under provisions of Section 012500.

2.2 PERFORMANCE REQUIREMENTS

- A. Conform to applicable code for flame and smoke, concealment, and over coat requirements.
- B. Conform to Washington State Energy Code.

2.3 COMPONENTS

- A. Insulation: Spray applied two component, medium density, closed cell polyurethane thermoset rigid foam. ASTM C1029, Type II, polyurethane.
 - 1. Physical and Mechanical Properties:
 - a. Core Density: Minimum 2.0 pcf when tested in accordance with ASTM D1622.
 - b. Thermal Resistance (aged 90 days at 140 deg F): R-value per inch is min 6.0 when tested in accordance with ASTM C518 at 75 degrees F, (h-ft² degrees F)/Btu-in.
 - c. Compressive Strength (psi): 25minimum when tested in accordance with ASTM D1621.
 - d. Closed Cell Content: 88-98 percent when tested in accordance with ASTM D2842.
 - e. Water Vapor Transmission - Permeance: less than 1 perm when tested in accordance with ASTM E96.

- f. Water Vapor Transmission - Permeability (perm-inch): 2.2 maximum when tested in accordance with ASTM E96.
 - g. Water Absorption (vol %): 1.2 maximum when tested in accordance with ASTM D2482.
- 2. Fire Performance at thickness indicated in drawings:
 - a. Flame Spread: Less than 25 when tested in accordance with ASTM E84.
 - b. Smoke: Less than 450 when tested in accordance with ASTM E84.
 - c. Potential Heat: Shall comply with NFPA 259.
 - d. Flammability: Shall comply with NFPA 285.
- 3. Maximum GWP: 1.
- 4. Use slow rising foam at boxed framing.

2.4 ACCESSORIES

- A. Primer: As required by insulation manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination.
- B. Verify Work within construction spaces is complete prior to insulation application.
- C. Verify surfaces are clean, dry, and free of matter capable of inhibiting insulation adhesion.
- D. Verify that mechanical and electrical services in ceilings, walls and floors have been installed and tested and, if appropriate, verify that adjacent materials are dry and ready to receive insulation.

3.2 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving the best result for the substrate under the project conditions.
- B. Mask and protect adjacent surfaces from over spray or dusting.
- C. Apply any required primers for special conditions as recommended by manufacturer.
- D. Post all required warning signs.

3.3 INSTALLATION

- A. Install in accordance with ASTM C1029 and manufacturer's instructions. Product must be installed according to local code and must be applied by a qualified applicator.
- B. Apply insulation by spray method, to uniform monolithic density without voids. Apply product in overlapping layers. Allow full curing of each layer and test prior to continuing the final installation layer.
- C. Determine with insulation manufacturer when surface sealer or spray overcoat is required to ensure that air movement in return air plenum space does not erode insulation surface, or to ensure required fire rating.
- D. Apply to minimum cured thickness of as indicated on drawings.
- E. Patch damaged areas.
- F. Wall Insulation Inspection: To be made after the installation of the wall insulation, but before concealment per requirements of Washington State Energy Code, C10.2.1.1.

3.4 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 014000 - Quality Requirements.
- B. Inspection will include verification of insulation thickness and density.

3.5 TOLERANCES

- A. Maximum variation in applied thickness: minus 1/4 inch, plus 5/8 inch.

3.6 CLEANING

- A. Remove overspray from non-prescribed surfaces without causing damage to surfaces.
- B. Remove protective covers from adjacent surfaces.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Do not permit subsequent construction Work to disturb applied insulation.
- B. Touch-up, repair or replace damaged products before Substantial completion.
- C. Any open flame or welding shall not be in contact with spray polyurethane foam.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes above and below grade sheet materials for controlling vapor diffusion.
- B. Related Sections:
 - 1. Section 033000 - Cast-In-Place Concrete.
 - 2. Section 072113 - Board Insulation.
 - 3. Section 072116 - Blanket Insulation.
 - 4. Section 072700 - Air Barriers.

1.2 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 302.2 R-06 - Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
- B. ASTM International:
 - 1. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
 - 2. ASTM E1643 - Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
 - 3. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data indicating material characteristics, performance criteria, and limitations.
- C. Manufacturer's Installation Instructions: Submit preparation and installation requirements, techniques.

1.4 SEQUENCING

- A. Sequence Work to permit installation of materials in conjunction with insulation installation in Section 072116 - Blanket Insulation.
- B. Do not install vapor retarder until items that penetrate the vapor retarder are in place.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Above Grade Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96, Procedure A.
- B. Below Grade Vapor Retarder Thickness: Minimum 15 mils thick.
- C. Air Barrier Testing Procedures: Refer to Section 014100 for requirements.

2.2 ABOVE GRADE VAPOR RETARDERS

- A. Acceptable Manufacturers:
 - 1. MemBrain by CertainTeed.
 - 2. Substitutions under provision of Section 012500.
- B. Provide a 2 mil thick film of polyamide (nylon). Permeability changes with ambient humidity conditions.
- C. Properties:
 - 1. Water Vapor Transmission Rating (WVTR):
 - a. Less than 1.0 perms by ASTM E 96, Desiccant method.
 - b. More than 10 perms by ASTM E 96, Water method.
 - 2. Surface Burning Characteristics:
 - a. Maximum Flame Spread Index: 20.
 - b. Max Smoke Developed Index: 55.
 - 3. Fungi Resistance: No growth; ASTM C1338.
 - 4. Corrosivity: No unusual aspect of corrosion such as pitting, cracking and adhesive cure inhibition; ASTM C665.
- D. Adhesives
 - 1. Spray Adhesive: 3M Spray 90 or equal. Water-based adhesives are not acceptable.
 - 2. Double-Sided Adhesive Tape: Asphaltic mastic strips compatible with sheet barrier and substrate, with factory applied release paper. Use for bonding adjacent sheets of retarder to each other at seams.
 - 3. Sealant/Mastic: Per Manufacturer.

2.3 BELOW GRADE (UNDER SLAB) VAPOR RETARDERS

A. Vapor Retarder:

1. Under slab Vapor Retarder: Minimum 15 mil thick Polyolefin geo membrane manufactured from prime, virgin resins. Water vapor retarder ASTM E1745, meets or exceeds Class A. Water transmission rate ASTM E96, 0.006 gr./ft²/hr. or lower permeance rating, ASTM E96, 0.01 perm or lower use manufacturers tapes, mastic and pipe boots.
2. Typical Vapor Retarder
 - a. Stego Wrap, 15 mil, by Stego Industries, LLC (877-464-7834).
 - b. Perminator, 15 mil, by W.R. Meadows (847-214-2100).
 - c. "Vapor Block 15" by Raven Industries (800-635-3456).
3. Vapor Retarder Tape: High density polyethylene tape with pressure sensitive adhesive, by manufacturer of vapor barrier, 3.75 inches minimum width. Pipe Boots: Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instruction.
4. Vapor Proofing Mastic: Water transmission rate ASTM E96, 0.3 perms or lower. Stego Mastic by Stego Industries or equal.
5. Double Sided Adhesive Strip: Synthetic Rubber blend, 0.03 perms. Stegotack Tape or equal.
6. Plastic Termination Bar. Stego Term Bar or equal.
7. Multi-layered tape: 0.03 perms. Stego Crete Claw Tape or equal.
8. Substitutions: Section 012500 Substitution Procedures.

2.4 ADHESIVES

- A. Tapes and Adhesives: Per Vapor Retarder Manufacturer's recommendations.

PART 3 EXECUTION

3.1 PREPARATION

- A. Remove loose or foreign matter capable of impairing adhesion.
- B. Clean and prime substrate surfaces to receive adhesive and sealants.
- C. Below Grade (Under Slab):
1. Ensure that base material is approved by A/E.
 2. Verify that base material is level and compacted.

3.2 INSTALLATION

- A. Vapor Retarder For Stud Framed Walls: Secure sheet retarder to stud faces on room side of insulation at exterior walls with adhesive.
 - 1. Conform to manufacturer's instructions for spray adhesives.
- B. Perimeter Wall Openings: Seal Air Barrier (Section 072700) to Vapor Retarder with tape, providing a minimum 3 inches overlap.
- C. Tape to seal butt ends, lapped flanges, tears, perimeter edges, and other openings in membrane.
- D. Below Grade (Under Slab) Vapor Retarder: Install Vapor Retarder in accordance with manufacturer's instructions and ASTM E1643.
 - 1. Unroll vapor retarder with the longest dimension parallel with the direction of the concrete placement.
 - 2. Lap vapor retarder over footings and seal to foundation walls.
 - 3. Overlap joints 6 inches and seal with manufacturer's tape.
 - 4. Seal all penetrations (including pipes) per manufacturer's instructions.
 - 5. No penetration of the vapor retarder is allowed except for columns, walls, reinforcing steel and permanent utilities.
 - 6. Repair damaged areas by cutting patches of vapor retarder, overlapping, damaged area 6 inches and sealing with tape.
 - 7. Small punctures may be repaired by retarder tape.
 - 8. The use of a skid steer on vapor retarder or curing layer is not allowed.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Self adhered weather resistant air and moisture barriers. (WRB)
2. Air leakage criteria for primary air seal building enclosure materials and assemblies in areas.
3. Air seal materials to connect and seal openings, joints and junctions between other air seal materials and assemblies.
4. Requirements for Building Envelope Air Leakage Test required by Washington State Energy Code.

B. Related Sections:

1. Section 072526 -Fluid Applied Air Barriers.
2. Section 079200 - Joint Sealants: Sealant materials and installation techniques.

1.2 REFERENCES

A. American Society of Civil Engineers:

1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

B. ASTM International:

1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E96 - Standard Test Method for Water Vapor Transmission of Materials.
3. ASTM E779 - Standard Method for Determining Air Leakage Rate by Fan Pressurization.
4. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
5. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

C. American Association of Textile Chemists and Colorists:

1. AATCC 127 - Hydrostatic Pressure Test.

D. International Energy Conservation Code (IECC)

1. C104.2.1.1 Wall Insulation Inspection

2. C104.2.1.2 Glazing Inspection.
3. C105.2.1.3 Exterior Roofing Insulation

1.3 DEFINITIONS

- A. Air Barrier: A continuous network of materials and joints providing air tightness, with adequate strength and stiffness to not deflect excessively under air pressure differences, to which it will be subjected in service. It can be comprised of a single material or a combination of materials to achieve the performance requirements.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on material characteristics, performance criteria, and limitations.
- C. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, product storage and handling criteria.

1.5 QUALITY ASSURANCE

- A. Pre-Installation Meetings:
 1. Section 013119 - Project Meetings: Preinstallation meeting.
 2. Convene minimum one week prior to commencing Work of this section.
- B. Furnish transition and flashing membrane and weather barrier membrane system from a single source manufacturer. Do not combine products from multiple manufacturers into a single system, except under a single source responsibility.
- C. Regulatory Requirements
 1. Conform to requirements of regulatory authorities.
 - a. IBC Chapter 14, including Section 1404 and 2510.6.
 - b. ICC ES AC38 Acceptance Criteria for Water-Resistive Barriers.
 2. Fire Performance Characteristics:
 - a. Surface Burning Characteristics: ASTM E84.
 - 1) Flame spread index: 25 or less.
 - 2) Smoke developed index: 450 or less.
 3. Building Envelope Air Leakage Test:
 - a. Conform to Washington State Energy Code C402.5.1.2 Building Test for description and C406.11.1 for air leakage rate.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.
- C. Field Conditions: Do not install air and moisture barrier in snow, rain, fog, or mist without temporary protection and supplemental heat as required. Do not install air and moisture barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer. Apply membrane to a surface dry substrate, or in accordance with manufacturer's recommendations.
- D. Exposure limitations: Schedule work to ensure that weather-resistive barrier system is covered and protected from UV exposure within 180 days of installation. If weather-resistive barrier membrane system cannot be covered within 180 days after installation, apply temporary UV protection as recommended by membrane manufacturer. Do not expose air barrier materials to sunlight longer than as recommended by the primary material manufacturer.

1.7 SEQUENCING

- A. Sequence Work to permit installation of materials in conjunction with related materials and seals.

1.8 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Coordinate the Work of this section with all sections referencing this section.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Connections to Adjacent Materials: Provide connections to prevent air leakage and vapor migrations at the following locations.
 - 1. Foundation and walls, including penetrations, ties and anchors.
 - 2. Walls, windows, curtain walls, storefronts, louvers or doors.
 - 3. Different wall assemblies and fixed openings within those assemblies.
 - 4. Wall and roof connections.
 - 5. Walls, floor and roof across construction, control and expansion joints.
 - 6. Walls, floors and roof to utility, pipe and duct penetrations.

7. Seismic and expansion joints.
 8. All other leakage pathways in the building envelope.
- B. Performance Criteria:
1. Material: Comply with requirements of Washington State Energy Code.
 2. Assembly: Comply with requirements of Washington State Energy Code.
 - a. The air barrier assembly shall be capable of withstanding combined design wind, fan and stack pressures, both positive and negative on the envelope without damage or displacement, and shall transfer the load to the structure.
 - b. Materials of the air barrier assembly shall not displace adjacent materials in the assembly under full load.
 - c. The air barrier assembly shall be joined in an airtight and flexible manner to the air barrier materials of adjacent assemblies, allowing for the relative movement of assemblies due to thermal and moisture variations, creep, and anticipated seismic movement.
- C. Perform design work in accordance with ASCE 7.

2.2 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Vapro-Shield.
- B. Henry.
- C. Soprema.
- D. GCP Applied Technologies
- E. Substitutions under provisions of Section 012500.

2.3 COMPONENTS

- A. Vapro-Shield; Wrap Shield SA.
 1. Performance Characteristics:
 - a. Thickness: 23 mils.
 - b. Width: 59 inches.
 - c. Weight: 7.36 oz per sq.yd.
 - d. Surface Burning Characteristics, ASTM E84; Flamespread index 5; Smoke developed index, 15.
 - e. Moisture Vapor Transmission Rate: 50 perms, tested to ASTM E96 Method B.

- f. Water Resistance: tested to AATCC 127, 550 mm hydrostatic head for 5 hours: No leakage.
 - g. Air Leakage: < 0.00002 cfm/sq.ft. @ 1.57 psf when tested in accordance with ASTM E2178 and <.002 cfm/sq.ft. @1.57 psf when tested in accordance with ASTM E2357.
 - h. Breaking Strength/Elongation tested to ASTM D5034: 88 lbf/inch, machine direction; 83 lbf/inch, cross machine direction.
- B. Blueskin VP 160 SA, Henry Corp.
 - 1. Performance Characteristics:
 - a. Thickness: 23 mils.
 - b. Surface Burning Characteristics, ASTM E84; Flamespread index 0; Smoke developed index, 105.
 - c. Moisture Vapor Transmission Rate: 29 perms, tested to ASTM E96 Method A.
 - d. Water Resistance: tested to AATCC 127, 550 mm hydrostatic head for 5 hours: No leakage.
 - e. Air Leakage: < 0.003 cfm/sq.ft. @ 75Pa when tested in accordance with ASTM E2178.
 - f. Average Breaking Force, dry tested to ASTM D5034: 127 lbf/inch, machine direction; 91 lbf/inch, cross machine direction.
- C. Sopraseal Stick VP, Soprema.
 - 1. Performance Characteristics:
 - a. Thickness: 24 mils.
 - b. Moisture Vapor Transmission Rate: 17 perms, tested to ASTM E96 Method B.
 - c. Water Resistance: tested to AATCC 127, 550 mm hydrostatic head for 5 hours: No leakage.
 - d. Air Leakage: < 0.0025 cfm/sq.ft. @ 75 Pa when tested in accordance with ASTM E2178 and <.002 cfm/sq.ft. @1.57 psf when tested in accordance with ASTM E2357.
 - e. Tear resistance tested to ASTM D5034: 64 lbf/inch, machine direction; 54 lbf/inch, cross machine direction.
- D. Perm-A-Barrier VPS, GCP Applied Technologies.
 - 1. Performance Characteristics:

- a. Thickness: 21 mils.
- b. Air Permeance, ASTM E2178: Not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water. (1.57 psf)
- c. Assembly Air Permeance, ASTM E2357: Not to exceed 0.04 cfm/sq.ft. under a pressure differential of 0.3 in. water (1.57 psf)
- d. Water Vapor Permeance, ASTM E96: Not less than 10 perms.
- e. Water Resistance, ICC AC 38: Pass.
- f. Breaking Force, ASTM D5034: >40 lbf MD, and >35 lbf CD.
- g. Pull Adhesion, ASTM D4541: min. 15 psi to primed glass faced gypsum sheathing, min. 12 psi to primed CMU.
- h. Peel Adhesion at min. temperature: ASTM D903: min. 5 pli to primed glass faced gypsum sheathing, min. 4 pli to PERM-A-BARRIER® VPS, min. 2.5 pli to primed CMU.
- i. UV Exposure Limit: Not more than 150 calendar days.
- j. Water Penetration Resistance Around Nails, ASTM D1970 Modified: Pass
- k. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

E. Substitutions: Section 012500 - Substitution Procedures.

2.4 ACCESSORIES

- A. Primer: As required by air and moisture barrier manufacturer to comply with warranty requirements.
- B. Transition and Flashing Membrane: Self adhered. As required by air and moisture barrier manufacturer to comply with warranty requirements. (SAF)
- C. Sealant: As required by air and moisture barrier manufacturer to comply with warranty requirements. Refer to Section 079200.
- D. Adhesives: As required by air and moisture barrier manufacturer to comply with warranty requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify conditions ready to receive work of this Section before beginning.

- B. All substrates must be dry, sound, clean and free of oil, grease, dirt or other contaminants detrimental to the adhesion of the water resistive air barrier flashings. Fill voids, gaps in substrate to provide an even surface.
- C. Verify sealants are compatible with flexible sheet air barrier proposed for use.

3.2 INSTALLATION

- A. Install in accordance with Manufacturer's written instructions over exterior sheathing. Seal joints and penetrations through weather-resistive barrier with specified tape and fasteners prior to installation of finish material. Air infiltration barrier shall be air tight and free from holes, tears and punctures. All window and door penetrations are to be flashed and sealed per manufacturer's instructions.
- B. Seal WRB to associated materials at building envelope penetrations as detailed.

3.3 FIELD QUALITY CONTROL

- A. Building Envelope Air Leakage Test: Refer to G022 for extent of test area.
 - 1. Conduct testing at mutually agreeable point of construction as determined by Owner and Contractor.
 - 2. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to Owner and Code Official.
 - 3. If the tested rate exceeds the allowable amount, comply with requirements of WA State Building Code.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution: Protecting installed construction.
- B. Do not permit adjacent work to damage work of this section.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes.
 - 1. Fluid applied WRB.
 - 2. Air leakage criteria for primary air seal building enclosure materials and assemblies in areas of CMU wall types.
 - 3. Air seal materials to connect and seal openings, joints and junctions between other air seal materials and assemblies.
 - 4. Requirements for Building Envelope Air Leakage Test required by Washington State Energy Code.
- B. Related Sections:
 - 1. Section 042016 - Concrete Unit Masonry: Seal over masonry tie penetrations.
 - 2. Section 079200 - Joint Sealants: Sealant materials and installation techniques.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D412 - Standard Test Method for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
 - 2. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
 - 3. ASTM E96 - Standard Test Method for Water Vapor Transmission of Materials.
 - 4. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
 - 5. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Product Data: Submit data on material characteristics and performance criteria and manufacturer's printed instruction for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties.
 - 1. Include statement that materials are compatible with adjacent materials proposed for use.

2. Submit reports indicating that field peel-adhesion test on all materials to which sealants are adhered have been performed and the changes made, if required, to other approved materials, in order to achieve successful adhesion.
- C. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, product storage and handling criteria.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Obtain primary materials from a single manufacturer regularly engaged in manufacturing air and vapor barrier membranes. Obtain secondary materials from a source acceptable to the primary materials manufacturer.
- B. Pre-Installation Meeting
 1. Section 0131113 - Project Meetings: Pre-installation meeting.
 2. Convene minimum one week prior to commencing Work of this section.
- C. Regulatory Requirements
 1. Conform to requirements of regulatory authorities.
 - a. IBC Chapter 14, including Section 1404 and 2510.6.
 - b. ICC ES AC38 Acceptance Criteria for Water-Resistive Barriers.
 2. Fire Performance Characteristics:
 - a. Surface Burning Characteristics: ASTM E84.
 - 1) Flame spread index: 25 or less.
 - 2) Smoke developed index: 450 or less.
 3. Building Envelope Air Leakage Test:
 - a. Conform to Washington State Energy Code C402.5.1.2 Building Test for description and C406.11.1 for air leakage rate.
- D. Connections to Adjacent Materials: Provide connections to prevent air leakage and vapor migration at the following locations:
 1. Foundation and walls, including penetrations, ties and anchors.
 2. Walls, windows, curtain walls, storefronts, louvers or doors.
 3. Different wall assemblies, and fixed openings within those assemblies.
 4. Wall and roof connections and penetrations.
 5. Floors over unconditioned space.

6. Walls, floor and roof across construction, control and expansion joints.
7. Walls, floors and roof to utility, pipe and duct penetrations.
8. Seismic and expansion joints.
9. All other leakage pathways in the building envelope.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacture, and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air and vapor barrier membrane manufacturer. Protect stored materials from direct sunlight.
- C. Handle materials in accordance with manufacturer's recommendations.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Temperature: Install air and vapor barrier within range of ambient and substrate temperatures recommended by air and vapor barrier manufacturer.
- B. Field Conditions: Do not install air and vapor barrier in snow, rain, fog, or mist without temporary protection and supplemental heat as required. Do not install air and vapor barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer. Apply membrane to a surface dry substrate, or in accordance with manufacturer's recommendations.

1.7 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Coordinate the Work of this section with all sections referencing this section.

1.8 WARRANTY

- A. Material Warranty: Provide manufacturer's standard product warranty, for a minimum 3 years.
- B. Installation Warranty: Provide air barrier subcontractor's 2 year warranty including all components of the air and vapor barrier assembly, against failures including loss of air tight seal, loss of watertight seal, loss of adhesion, loss of cohesion, failure to cure properly.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Prosoco, R-Guard Spray Wrap, <https://prosoco.com/>.

- B. GCP Applied Technologies, Perm-A-Barrier VP, <http://www.na.graceconstruction.com>.
- C. Henry, Air Bloc 31 MR, <http://us.henry.com>.
- D. Tremco, ExoAir 230, <http://www.tremcosealants.com>.
- E. Soprema, Sopraseal LM 202 VP, <https://soprema.us/>.
- F. Substitutions: Section 012500 - Substitution Procedures.

2.2 FLUID APPLIED AMB

- A. Use regular or low-temperature formulation depending on site conditions, within temperature ranges specified by manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. Air Permeance (Material): Comply with Washington State Energy Code.
- B. Air Permeance (Assembly): Comply with Washington State Energy Code.
 - 1. Assembly shall be capable of withstanding combined positive and negative design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure.
 - 2. Assembly shall not displace adjacent materials under full load.
 - 3. Assembly shall be joined in an airtight and flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of assemblies due to thermal and moisture variations and creep, and anticipated seismic movement.
- C. VOC Content: Less than 35 g/L.
- D. Solids Content: Minimum 53%.
- E. Water Vapor Transmission: Max 25 perms at 10 mils, ASTM E96, Method B.
- F. Water Penetration: No visible water penetration; ASTM E331.
- G. UV Exposure Limit: 6 months; ASTM D 412.
- H. Verify compatibility with all components of Exterior Gypsum Sheathing with Integral WRB system.

2.4 SELF ADHERING MEMBRANE FLASHING

- A. Self adhering SBS rubberized asphalt laminated to a cross-laminated, high density, polyethylene film with a siliconized release liner compatible with fluid applied air barrier membrane and fluid applied flashing. Recommended and compatible with manufacturer.(SAF)

2.5 ACCESSORIES

- A. Mastics, flashings, primers, sealants and surface conditioners as recommended by the manufacturer.
- B. Transition membrane between air and vapor barrier membrane and roofing and other adjacent materials: Comply with both air and vapor barrier manufacturers.
- C. Airless spray equipment: As instructed by manufacturer.
- D. Polyurethane Foam Sealant: Approved manufacturer for compatibility with fluid applied air and moisture barrier.
- E. Substrate Joint Treatment: Reinforced non woven polyester fabric recommended by manufacturer to meet requirements of warranty.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which air and vapor barrier assemblies will be applied, with Installer present, for compliance with requirements.
- B. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Ensure that the following conditions are met:
 - a. Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants.
 - b. Masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.
 - c. Verify substrate is surface dry. Test for capillary moisture by plastic sheet method according to ASTM D 4263 and take suitable measures until substrate passes moisture test. Surface dry is an acceptable substrate condition if acceptable to the manufacturer.
 - d. Verify sealants used in sheathing are compatible with membrane proposed for use. Perform field peel-adhesion test on materials to which sealants are adhered.
- C. Notify Architect in writing of anticipated problems using air and vapor barrier over substrate prior to proceeding.

3.2 INSTALLATION

- A. Install in accordance with Manufacturer's instructions.

- B. Inspect membrane before covering. Repair any punctures or damaged areas by applying additional membrane. Overlap repairs, penetration treatments, transitions, rigid flashing and other air barrier components to ensure positive drainage and continuity of the air and water-resistive barrier.

3.3 FIELD QUALITY CONTROL

- A. Building Envelope Air Leakage Test: Refer go G022 for extent of test area.
 - 1. Conduct testing at mutually agreeable point of construction as determined by Owner and Contractor.
 - 2. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to Owner and Code Official.
 - 3. If the tested rate exceeds the allowable amount, comply with requirements of WA State Energy Code.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution: Protecting installed construction.
- B. Coordinate with installation of materials which cover air and vapor membrane, to ensure exposure period does not exceed that recommended by the air and vapor barrier manufacturer.
- C. Do not permit adjacent work to damage work of this section.
- D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction and acceptable to the primary material manufacturer.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preformed metal siding systems for exterior walls and soffits, with related flashings and accessory components.

B. Related Sections:

1. Section 072113 - Board Insulation.
2. Section 076200 - Sheet Metal Flashing and Trim.
3. Section 084113 - Aluminum Framed Storefronts.

1.2 REFERENCES

A. ASTM International:

1. ASTM A755 - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil Coating Process for Exterior Exposed Building Products.
2. ASTM A792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by Hot Dip Process.
3. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
4. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
5. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Shop Drawings: Indicate dimensions, layout, joints, construction details and methods of anchorage.
- C. Samples: Submit two samples of each of siding, 12 x 12 inch in size illustrating finish color, sheen, and texture. Submit two samples of each type of trim piece, including coping, 12 inches long illustrating gage and shape. Submit two samples of typical bayonet type trim seams.
- D. Section 017700 - Closeout Procedures: Manual for Materials and Finishes.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.
- C. Provide resume of foreman and project manager indicating work experience.

1.5 DELIVERY, STORAGE, AND PROTECTION

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Store prefinished material off ground protected from weather, to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- D. Prevent contact with materials which may cause discoloration or staining.

1.6 COORDINATION

- A. Coordinate work under provisions of Section 013100 - Project Management and Coordination.
- B. Coordinate the Work for installation of vapor retarders and air barriers.
- C. Coordinate the Work with installation of windows, louvers and doors components or materials.

1.7 WARRANTY

- A. Section 017700 - Closeout Procedures: Warranties and Bonds.
- B. Correct defective Work within a two year period after Substantial Completion water tightness, integrity of seals, and degradation of panel finish including color fading caused by exposure to weather.
- C. Provide manufacturer's 25 year warranty including:
 - 1. Paint on the product will not crack, flake or peel to an extent that is apparent on ordinary outdoor visual observation.
 - 2. Paint on the product will not change color more than 5 Hunter delta-E units as determined by ASTM method D2244-02.
 - 3. Paint on the product will not chalk in excess of ASTM D4214-98 method A D659 number 8 when properly maintained.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Components: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with applicable code and to a design pressure of 15 lb/sq ft.
- B. Maximum Allowable Deflection of Panel: 1/180 of span.
- C. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.

2.2 ACCEPTABLE MANUFACTURERS

- A. Metal Sales, <http://www.metalsales.us.com/>.
 - 1. Ben O'Harra, boharra@metalsales.us.com, 253.777.6488.
- B. Northclad, <http://northclad.com>
 - 1. David Killian, dkillian@northclad.com, 425.740.3702.
- C. AEPSpan, <http://aepspan.com>
 - 1. Jim Moreland, jmoreland@aepspan.com, 253.922.4948.
- D. Substitutions: Under Section 012500 - Substitution Procedures.

2.3 COMPONENTS

- A. Basis of Design.
 - 1. (MP-1): AEPSpan, Flush Panel.
 - a. 22 gage; ASTM A792, min yield 50,000 psi.
 - b. Protective Coating: Conform to ASTM A792, AZ50 (Zincalume/Galvalume).
 - c. 12 inch coverage. 1 inch depth.
 - 2. (MP-2): AEPSpan, Nu-Wave.
 - a. 24 gage; ASTM A792, min yield 50,000 psi.
 - b. Protective Coating: Conform to ASTM A792, AZ50 (Zincalume/Galvalume).
 - c. 34- 2/3 inch panel coverage. 7/8 inch depth corrugated profile.

- B. Metal Panel Siding Subframing: Spacing as shown on drawings and as required by manufacturer for attaching metal siding to substrate.
 - 1. Z Clips. Fasten directly to wall framing. 16 gage verify with manufacturer's requirements for design loads.
 - 2. Metal Channels: 16 gage galvanized. Attach to each zee clip.
- C. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system as shown; shop cut and factory mitered to required angles. Mitered internal corners to be back braced with 24 gage thick precoated sheet stock to maintain continuity of profile.
- D. Expansion Joints: Same material, thickness and finish as exterior sheets; 24 gage thick; of profile to suit system as shown.
- E. Trim, Metal Panel Copping, Closure Pieces, Caps, Flashings, Fascias and Infills: Same material, thickness and finish as exterior sheets, brake formed to required profiles and as shown.
 - 1. Provide custom metal flashing shapes to suit conditions for watertight installation.
 - 2. Panel and flashing closures: Waterproof, semi-rigid polyethylene closed cell foam, or solid rubber in size and shape to tightly fit panel configuration.
 - 3. Provide standing seam coping.
- F. Anchors: Galvanized steel.
- G. Cleats: Refer to Section 076200.

2.4 ACCESSORIES

- A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant; color as selected.
 - 1. Neoprene end closure gaskets: Formed to siding profile.
- B. Sealants: Specified in Section 079200 - Joint Sealants, Manufacturer's standard type suitable for use with installation of system; non-staining, non-skinning, non-shrinking and non-sagging; ultra-violet and ozone resistant; color as selected.
- C. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Exposed fasteners same finish as panel system.
- D. Field Touch-up Paint: As recommended by panel manufacturer.
- E. Bituminous Paint: Asphalt base.
- F. Perforated Aluminum Closures: Refer to Section 076200.

2.5 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.
- C. Fabricate trim to sections shown.
- D. Fabricate corners in one continuous piece with minimum 18 inch returns.
- E. Provide bayonet-type interlocking joints for continuous runs of trim.

2.6 FINISH

- A. Premium fluoropolymer (PVDF) coating system with 70 percent Kynar 500 or Hylar 5000 resin content, conforming to AAMA 621, over aluminum-zinc alloy finished sheet steel.
 - 1. Primer: UV resistant, .20 mil corrosion resistance.
 - 2. Color Coat: 70-.80 mil baked on finish coat.
 - 3. Color:
 - a. MP-1: Cool Slate Gray.
 - b. MP-2: Cool Slate Gray.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate framing under provisions of Section 013100 - Project Management and Coordination.
- B. Verify that building framing members are ready to receive panel system.

3.2 INSTALLATION

- A. Install metal siding system on walls in accordance with manufacturer's written instructions.
- B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.
- C. Fasten siding to structural supports; aligned, level, and plumb.
- D. Install exterior panels full length between vertical reveal joints as recommended by manufacturer.
- E. Provide expansion or control joints within panel system where required.
- F. Use fasteners approved by manufacturer and spaced as directed by manufacturer.

- G. Seal and place formed neoprene end gaskets to prevent weather penetration, set in mastic tape. Maintain neat appearance.
- H. Provide recesses for mechanical and electrical devices, as shown.

3.3 TOLERANCES

- A. Maximum Offset from True Alignment between Adjacent Members Butting or In Line: 1/16 inch.
- B. Maximum Variation from Plane: 1/8 inch.

3.4 CLEANING

- A. Clean work under provisions of Section 017000 - Closeout Procedures.
- B. Remove site cuttings from finish surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.
- D. Panels with severe paint and/or substrate damage shall be replaced as directed.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanically or induction fastened, and fully adhered single ply polyvinyl chloride membrane roofing system with hot air welded seams.
2. Cover board, rigid insulation, tapered rigid insulation, air and vapor barrier, and substrate.
3. Membrane flashings, clad metal flashing, pedestrian traffic membrane, fastenings, precast concrete splash blocks and adhesives.

B. Related Sections:

1. Section 061000 - Rough Carpentry.
2. Section 061643 - Gypsum Sheathing Board: Vertical wall surfaces areas to receive roofing.
3. Section 072113 - Board Insulation.
4. Section 076200 - Sheet Metal Flashing and Trim.
5. Section 079200 - Joint Sealants.
6. Section 079500 - Expansion Control.
7. Section 112429 - Fall Protection System.
8. Division 23 - HVAC.

1.2 REFERENCES

A. American Society of Civil Engineers (ASCE):

1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

B. ASTM International (ASTM):

1. ASTM D6754 - Standard Specification for Ketone Ethylene Ester Based Sheet Roofing.

C. Single Ply Roofing Industry (SPRI):

1. ANSI/SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.
2. SPRI - Wind Load Design Guide For Low Sloped Flexible Membrane Roofing Systems.

- D. Underwriters Laboratories, Inc. (UL):
 - 1. UL 790 -Tests for Fire Resistance of Roof Covering.

1.3 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Shop Drawings: Dimensioned drawings showing roof outlines, profile details of flashing methods for penetrations and terminations, and technical acceptance from manufacturer. Show locations of traffic pads and splash blocks.
- C. Product Data: Manufacturer's current product literature, include manufacturer's guide specifications, installation requirements, special procedures, and conditions requiring special attention.
- D. Samples: Minimum 8 inch by 10 inch sample of membrane, membrane coated metal flashing, fasteners, and system components showing conformance to specifications.
- E. Qualified Installer Certification: Manufacturer's written statement, signed by manufacturer's authorized representative, certifying roofing installer as trained and certified by manufacturer to perform work for this Project.
- F. Product Certification: Manufacturer's written statement, signed by manufacturer's executive officer, certifying conformance to provisions of Contract Documents including referenced ASTM, and UL Standards.
- G. Manufacturer's Instructions: Include manufacturer's guide specifications, installation requirements, special procedures, and conditions requiring special attention.
- H. Sample Warranty: Meet or exceed provisions specified by this Section.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility:
 - 1. Provide system and components under responsibility of single roofing manufacturer.
 - 2. Perform roofing and related flashing and sheet metal work by or under supervision of single installer.
- B. Polyisocyanurate Insulation Board: Supply in thickness to produce overall R-Value as shown on Drawings.
- C. Manufacturer Qualifications: Company specializing in work of this Section.
 - 1. Responsible for manufacture of roofing membrane.
- D. Installer Qualifications:
 - 1. Trained and certified by manufacturer as authorized installer for work of this Project.

2. 5 years documented experience installing single ply roofing of comparable scope and type.
 3. Roofing Foreman: Minimum 2 projects installing manufacturer's system.
 4. Roofing Foreman: On site for full duration of the roofing portions of the Project.
- E. Preinstallation Meetings:
1. Attendance: Contractor, installer, Owner, Architect, Owner's Roofing Consultant, manufacturer, and as requested to attend.
 2. Arrange conference and job walk-through, minimum 2 weeks prior to completion of roofing substrate and beginning roofing work of this Section.
- F. Mock-Up: Provide under provisions of Section 014000.
1. Locate complete system as directed by Architect.
 2. Provide as required to illustrate system.
 3. Verify mock-up as conforming to manufacturer's instructions and provisions of Contract Documents. Make adjustments as needed for accepted system.
 4. Do not begin work of this Section until after inspection by Owner's roofing inspector and manufacturer's representative is complete and system is acceptance by Architect.
 5. Protect and maintain accepted mock-up as standard of quality for work of this Section.
 6. Incorporate accepted mock-up into work of this Section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Conform to provisions of Section 016000.
- B. Deliver to site in manufacturer's original unbroken, labeled containers or packaging.
- C. Store rolls lying down on pallets, cover, and protect from moisture.
- D. Store bonding adhesives at temperatures above 40 degrees F.
- E. Store flammable materials in cool dry place away from sparks and flame.

1.6 FIELD CONDITIONS

- A. Weather Conditions:
 1. Conform to manufacturer's instructions for extremes of temperature, humidity.
 2. Do not install when inclement weather is forecast or expected.
 3. Do not install over wet or moist substrates.

4. Remove components that become wet or otherwise damaged.

1.7 COORDINATION

- A. Coordinate with related work of other Sections in accordance with Section 013100.
- B. Arrange work sequence to prevent foot traffic, rolling loads, movement of equipment, and storage of materials, on unprotected roofing membrane.
- C. Division 23 for roof penetrations and roof drains.

1.8 WARRANTY

- A. Manufacturer: Standard 20 year non-prorated, No Dollar Limit, labor and materials watertightness System Warranty for complete roofing system. Warranty exclusions for conditions leading to standing water and insufficient roof slope are not accepted.
- B. Contractor: 2 year workmanship warranty guaranteeing watertightness for system including at flashing, terminations, and penetrations.

PART 2 PRODUCTS

2.1 ROOFING SYSTEMS

- A. R1: Roofing System Over Sloped Metal Deck: Mechanically attached or Induction fastened.
 1. Mechanically attached PVC membrane roofing.
 - a. Mechanically attached coverboard over rigid insulation.
 - b. Rigid insulation and tapered rigid insulation.
 - c. Air and vapor barrier over mechanically attached substrate board.
 - d. Steel decking installed under work of Section 053123.
 2. Induction fastened PVC membrane roofing.
 - a. Cover Board over rigid board insulation.
 - b. Rigid insulation and tapered rigid nsulation.
 - c. Air and vapor barrier over substrate board.
 - d. Steel decking installed under work of Section 053123.
- B. R2: Roofing System Over Insulated Flat Metal Deck: Mechanically attached or Induction fastened.
 1. Mechanically attached PVC membrane roofing.

- a. Mechanically attached cover board.
 - b. Tapered rigid insulation over substrate board.
 - c. Air and vapor barrier over mechanically attached substrate board.
 - d. Steel decking installed under work of Section 053123.
- 2. Induction fastened PVC membrane roofing.
 - a. Cover Board.
 - b. Tapered rigid board insulation over substrate board.
 - c. Air and vapor barrier over substrate board.
 - d. Steel decking installed under work of Section 053123.
- C. R3: Roofing System Over Sloped Metal Deck: Mechanically attached or Induction fastened.
 - 1. Mechanically attached PVC membrane roofing.
 - a. Mechanically attached coverboard.
 - b. Steel decking installed under work of Section 053123.
 - 2. Induction fastened PVC membrane roofing.
 - a. Cover board.
 - b. Steel decking installed under work of Section 053123.
- D. R4: Roofing System at Existing Sloped Concrete Roof:
 - 1. Fully adhered thermoplastic membrane roofing.
 - 2. Adhered coverboard over rigid insulation.
 - 3. Rigid insulation and tapered rigid insulation.
 - 4. Air and vapor barrier over existing concrete roof slab.
- E. R5: Roofing System at Existing Flat Concrete Roof:
 - 1. Fully adhered thermoplastic membrane roofing.
 - 2. Adhered coverboard over rigid insulation.
 - 3. Rigid insulation and tapered rigid insulation.
 - 4. Air and vapor barrier over existing concrete roof slab.

- F. R6: Roofing System at Existing Concrete Roof:
 - 1. Fully adhered thermoplastic membrane roofing.
 - 2. Adhered coverboard over existing concrete canopy.
- G. Accessories: Flashings and traffic membranes as required to complete system for manufacturer's single source warranty.
- H. Assume 20 penetrations at random vertical and horizontal locations above and beyond what is shown on drawings.

2.2 ACCEPTABLE MANUFACTURERS

- A. Sika/Sarnafil, Inc, Sarnafil S327 Roof Membrane.
 - 1. Web Site <http://www.sarnafilus.com> .
- B. Versico.
- C. Carlisle.
- D. Durolast.
- E. Soprema, Sentinel.
- F. Substitution Requests: Submit for approval under provisions of Section 012500.

2.3 PERFORMANCE / DESIGN CRITERIA

- A. IBC Chapter 15 and Chapter 16, including IBC Section 1504 and Section 1609, based on ASCE 7 Section 6 or corresponding SPRI Wind Load Design tables.
- B. Safety Factor Calculate of 2 times Field Design Pressure, Perimeter Design Pressure, and Corner Design Pressure.
- C. Edge Metal Securement: Conform to IBC Section 1504 including ANSI/SPRI ES-1.
- D. Fire Hazard Classification: Underwriters Laboratories UL 790 Tests for Fire Resistance of Roof Covering Materials, Class C.
- E. Washington State Energy Code: Conform to SRI (minimum 78) and R value insulation requirements.
- F. Air and Moisture Barrier Testing Procedures: Refer to Section 014100 for requirements.

2.4 ROOFING MATERIALS

- A. PVC Membrane: Polyester fabric reinforced polyvinyl chloride (PVC) thermoplastic membrane. ASTM Type III.
 - 1. Overall Thickness: Minimum 60 mils (0.060 inch) thick.

2. Thickness Above Scrim: 27 mil.
3. Breaking Strength (M.D.), ASTM D751: 305 lbf/in.
4. Elongation at Break, ASTM D751
 - a. Machine Direction %: 28.5.
 - b. Cross Direction %: 29.5.
5. Seam Strength; (% of original) ASTM D751: Pass.
6. Retention of Properties After Heat Aging; ASTM D3045
 - a. Tensile Strength, min., (% of original): Pass.
 - b. Elongation, min., (% of original): Pass.
7. Tearing Strength (C.D.), min; ASTM D1004: 48 lbf.
8. Low Temperature Bend, -40 degrees F; ASTM D2136: Pass.
9. Accelerated Weathering Test (Florescent Light, UV exposure): ASTM G154: 10,000 hours.
 - a. Cracking (7x magnification): None.
 - b. Discoloration (by observation): Negligible.
 - c. Crazing (7x magnification): None.
10. Linear Dimensional Change (C.D.); ASTM D1204: -0.12 %.
11. Weight Change After Immersion in Water; ASTM D570: 2 %.
12. Static Puncture Resistance, 33 lbf; ASTM D5602: Pass.
13. Dynamic Puncture Resistance, 14.7 ft-lbf; ASTM D5635: Pass.
- B. Durolast 60-Mil Membrane, ASTM D4434, Type III internally reinforced sheet.
 1. Overall Thickness: Minimum 60 mils (0.060 inch) thick.
 2. Thickness Above Scrim: 28 mil.
 3. Breaking Strength, ASTM D751 Grab Method: 438 x 390 lbf/in.
 4. Elongation, ASTM D751 Grab Method: 31% x 31%.
 5. Seam Strength; (% of original) ASTM D751 Grab Method: 431 lbf.
 6. Low Temp. Bend, ASTM D2136: Pass.

7. Heat Aging; ASTM D3045: Pass.
 8. Accelerated Aging; ASTM G154: Pass.
 9. Dimensional Stability; ASTM D1204: --0.45% x 0.02%.
 10. Water Absorption; ASTM D570: 2.6 %.
 11. Static Puncture Resistance, ASTM 5602: 56 lbf, Pass.
 12. Dynamic Puncture Resistance, ASTM D5635: 14.7 ft-lbf; Pass.
- C. Carlisle, Sure-Flex PVC Membrane, ASTM D4434, Type III or Type IV.
1. Overall Thickness: Minimum 60 mils (0.060 inch) thick.
 2. Thickness Above Scrim: 25 mil.
 3. Weight: 40 lbs/ft².
 4. Breaking Strength, ASTM D751 Grab Method: 330 x 300 lbf/in.
 5. Elongation, ASTM D751 Grab Method: 30 x 30%.
 6. Seam Strength; (% of original) ASTM D751 Grab Method: Pass.
 7. Tearing Strength, ASTM D751 proc. B: 100 x 130.
 8. Low Temp. Bend, ASTM D2136: Pass.
 9. Dimensional Stability; ASTM D1204: --.4%.
 10. Ozone Resistance, no cracks 7x ASTM D1149: Pass.
 11. Water Absorption; ASTM D570: 2 %.
 12. Static Puncture Resistance, ASTM 5602: 56 lbf, Pass.
 13. Dynamic Puncture Resistance, ASTM D5635: 14.7 ft-lbf; Pass.
 14. Water Vapor Permeance, perms ASTM E96 proc. B: 10 max, .05 typ.
- D. Soprema, Sentinel, P150.
1. Overall Thickness: Minimum 60 mils (0.060 inch) thick.
 2. Breaking Strength, ASTM D751: 430 x 305 lbf/in.
 3. Elongation at break, ASTM D751: 25% x 25%.
 4. Seam Strength; (min 75% of breaking strength) ASTM D751: Pass.
 5. Low Temp. Bend, ASTM D2136: Pass.

6. Linear Dimensional Change; ASTM D1204: <0.1 %.
 7. Static Puncture Resistance, ASTM 5602: Pass.
 8. Dynamic Puncture Resistance, ASTM D5635: Pass.
- E. Prefabricated Roof Membrane Flashing:
1. Manufacturer's standard manufactured configurations for flashing pipe penetrations, fall protection anchors, inside and outside corners, and other conditions. Match color and thickness of roofing membrane.
 2. Membrane clad metal flashing where recommended by manufacturer. 24 gage hot dipped G-90 Steel.
 3. Membrane Clad Gravel Stop Edge Flashing: Conforming to manufacturer's instructions. 24 gage hot dipped G-90 Steel.
 4. Membrane Clad Gutter: Refer to Section 076200.
- F. Termination Bars: Extruded aluminum with slotted holes for fasteners, integral caulk edge, and as instructed by manufacturer to make watertight roofing terminations.
- G. Walkway Pads: Manufacturer's, same thickness as membrane, non-skid thermoplastic membrane for heat welding to roof membrane.

2.5 ADHESIVES

- A. Conform to manufacturer's instructions for single source system.

2.6 FASTENERS AND PLATES

- A. Corrosion resistant screws and plates, as instructed by manufacturer.
- B. Insulation Fasteners: Self tapping, corrosion resistant.
- C. Induction fasteners: Polymer coated with adhesive formulated for PVC membrane roofing plates and fasteners for attaching insulation and cover board: Corrosion resistant, 3 inch round, 0.028 inch thick metal plates. 22 gage.

2.7 COVER BOARD AND SUBSTRATE BOARD

- A. Acceptable Manufacturers:
1. Georgia Pacific Corp
 - a. Contacts:
 - 1) Kelly Bryant, kelly.bryant@gapac.com
 - 2) Web Site <http://www.densdeck.com> / <http://www.gp.com/gypsum>

2. National Gypsum
 - a. Contacts: <http://www.nationalgypsum.com>
 3. Substitutions: Under provisions of Section 012500.
- B. Georgia Pacific, Dens-Deck, 1/2 inch thick.
1. Properties:
 - a. Material: ASTM C 1177 Composition: Non-structural glass mat faced, silicone-treated gypsum core panel.
 - b. Non-Combustible: As tested ASTM E 136 and required to meet requirements for thermal barrier board at roofing assembly.
 - c. Surface Burning Characteristics: Tested to ASTM E 84
 - 1) Flamespread: 0.
 - 2) Smoke Developed: 0.
- C. DEXcell Glass Mat Roof Board, 1/2 inch thick
1. Properties:
 - a. Material: ASTM C 1177 Composition: Non-structural coated glass mat faced, silicone-treated gypsum core panel.
 - b. Non-Combustible: As tested ASTM E 136 and required to meet requirements for thermal barrier board at roofing assembly.
 - c. Surface Burning Characteristics: Tested to ASTM E 84
 - 1) Flamespread: 0.
 - 2) Smoke Developed: 0.

2.8 RIGID INSULATION

- A. Polyisocyanurate Insulation Board: Tapered and untapered, as specified Section 072113 and recommended in writing by roofing manufacturer and as required to comply with warranty requirements.

2.9 AIR AND VAPOR BARRIER

- A. Self - adhered vapor barrier membrane composed of SBS-modified bitumen adhesive on the bottom surface and a tri-laminated woven polyethylene on the top surface.
1. Thickness: 31 mils, ASTM D5147.
 2. Water Absorption: 0.1%, ASTM D5147.

2.10 ACCESSORIES

- A. Solvent Cleaner: As instructed by manufacturer for removal of adhesive and contaminants from membrane.
- B. Hot Air Welder: As instructed by manufacturer for membrane joint seaming.
- C. Expansion Joints: Prefabricated expansion joint covers with nailing flanges, welding tabs, and as instructed by manufacturer for expansion control of roofing areas. Refer to Section 079500.
- D. Mastic: As instructed by manufacturer.
- E. Roof Equipment: Coordinate with Division 23.
- F. Precast Concrete Splash Blocks: 1'-0" x 2' - 6" size as manufactured by Modern Pre-Cast, 866.466.1374 or equal. Color: Concrete Gray.
- G. Caution Tape- heat weldable, safety yellow caution tape.
- H. Other Accessories: In accordance with manufacturer's instructions.

2.11 FINISH

- A. Membrane Roofing Color: Gray.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify conditions as satisfactory to receive work of this Section.

3.2 PREPARATION

- A. Work of Other Sections: Verify that metal flashings, crickets, roof penetrations, and other preliminary related work are in place.
- B. Roof Decks: Sweep and vacuum surfaces clean prior to roofing application.
 - 1. Surface: Free of protruding fasteners, depressions, fins, raised edges.
 - 2. Condition: Structurally sound, dry, free of contamination.
 - 3. Weather: Moisture, temperature conditions in accordance with roofing manufacturer's instructions.
- C. Complete all through roof penetrations including vents, roof accessories, and equipment specified in Division 23 prior to commencement of roof installation.
- D. Cricket: Provide for positive drainage and for watertight installation as instructed by manufacturer.

- E. Conform to manufacturer's instructions and provisions of Contract Documents.

3.3 SUBSTRATE INSTALLATION

- A. Install as required to meet required UL Fire Hazard Classification for roofing assembly.

3.4 AIR AND VAPOR BARRIER

- A. Install per manufacturer's instructions. Extend above height of insulation at perimeters and roof curbs, seal at penetrations and drains.

3.5 INDUCTION FASTENED

- A. Install gypsum roof sheathing, rigid and tapered insulation and roof cover board with specially designed polymer coated plates and manufacturer's fasteners, as instructed by manufacturer.
- B. Place plates in grid pattern on roof insulation. Increase fasteners at corners and perimeters to meet specified wind uplift requirements. Adjust plates to hit top flutes of roof deck. Install plates and fasteners tight and flat to roof insulation with no dimpling of insulation board or cover board surface.

3.6 MECHANICAL FASTENED

- A. Install substrate, rigid and tapered insulation and roof cover board with fasteners, as instructed by manufacturer.
- B. Mechanically fasten into steel decking through top flange of steel deck. At metal decking fasteners to be in the upper flutes of the decking and shall not penetrate more than $\frac{3}{4}$ inch where decking is exposed to view.
- C. Temporarily hold insulation board in place with construction adhesive or other means acceptable to manufacturer prior to through fastening into place.

3.7 RIGID INSULATION INSTALLATION

- A. Install tapered rigid insulation board in thickness to achieve R-Value per inch as specified Section 072113 and as shown on Drawings.
- B. Cut and tightly fit rigid insulation to penetrations, projections, and other construction.
 - 1. Leave between $\frac{1}{8}$ inch to $\frac{1}{4}$ inch wide gap at adjacent board and construction.
 - 2. Fill gaps larger than $\frac{1}{4}$ inch with rigid insulation cut to fit.
- C. Install rigid insulation where possible in not less than 2 layers deep. Stagger joints of insulation layers with layer below to reduce thermal drift.
- D. Install tapered or feathered insulation to form crickets, slopes to roof drains, and sumps around roof drains.

- E. Slope and align edges and meeting joints to make smooth transitions and tight meeting joints. Install to prevent telegraphing of joints through membrane.
- F. Install no more rigid insulation than can be covered by completed membrane roofing during single day and before onset of inclement weather.
- G. Mechanically fastened: Install each layer of insulation and secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter and field of roof.
 - 2. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.8 MEMBRANE ROOFING AND MEMBRANE FLASHING INSTALLATION

- A. Mechanically Fastened Membrane Roofing: Mechanically fasten with specified fasteners in accordance with manufacturer's Guide Specifications.
 - 1. Hold disks 1 inch minimum back from edge of membrane.
 - 2. Install in approved pattern with 6 inch minimum overlaps, shingled where possible to direct the flow of water.
- B. Induction fastened Membrane Roofing: Secure PVC roofing membrane using RhinoBond Induction Welder to RhinoBond Plates fastened with applicable fasteners and hot-air weld lapping seams with single nozzle welder.
- C. Membrane Flashing: Adhere with contact adhesive and hot air welded seams. Tie into manufacturer's termination bars and clad metal flashing systems as necessary to make watertight system.
- D. Parapets: Adhere up parapet wall and over top of parapet. Cover with sheet metal coping under work of Section 076200. At inside of parapet walls with membrane roofing, provide roof coverboard substrate to maintain manufacturer's warranty. Interface membrane with WRB.
- E. Fall Protection, Vent Stacks and Pipe Penetrations: Flash with manufacturer's standard one-piece manufactured thermoplastic membrane flashing.

3.9 METAL FLASHINGS AND MEMBRANE CLAD METAL FLASHINGS

- A. Install metal flashings as instructed by manufacturer and as required to make watertight.
- B. Install membrane clad metal flashings for watertight seamless heat welded transitions from membrane roofing to metal flashing at scuppers and terminations.

- C. Tie into continuous metal gutters, downspouts and sheet metal flashing and trim specified Section 076200.

3.10 ROOFING ACCESSORIES

- A. Roof Drains and Overflow Drains: Sump roof drain with clamping ring. Coordinate with Division 23 for tie into interior storm water lines.
- B. Expansion Joints: Install in accordance with manufacturer's instructions at perimeter and membrane roofing areas where expansion control is required to relieve stress on membrane roofing. Refer to Section 079500.
- C. Roof Equipment Curbs: Install membrane flashing fully adhered up and over curb.
- D. Walkway Pads: Hot air weld to membrane roofing with secure, continuous welds.
 - 1. Minimum 24 inch wide at roof areas subject to foot traffic around mechanical equipment on roofing.
 - 2. Minimum 24 inch by 24 inch membrane centered under downspouts which empty on to roofing.
 - 3. Do not extend walk pad over membrane laps.
- E. Provide extra layer of roofing membrane under splash blocks slightly larger than size of block.

3.11 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services:
 - 1. Perform inspections by manufacturer's authorized technical representative during interim and completion of roofing work of this Section.
 - 2. Note deficiencies and promptly make oral and written report to Contractor and Architect.
- B. Field Inspections and Testing: In accordance with Owner's roofing inspection services.
- C. Test welds:
 - 1. Membrane laps 2x a day minimum per machine welder.
 - 2. Induction welder test welds 2x a day per induction welder.

3.12 ADJUSTING AND CLEANING

- A. Correct identified defects and irregularities. Make adjustments as required for watertight installation.
- B. Replace or repair damaged roofing and roofing system work prior to Owner occupancy.

- C. Leave installations clean and premises free from residue and debris from work of this Section.

3.13 PROTECTION

- A. Protect roofing system from traffic, storage of materials, and other potentially damaging conditions.
- B. Provide layer of 10 mil visqueen, 2 layers insulation and plywood where work is conducted over roofing membrane. No work may be performed over the roof without this protection. Remove protection system daily to check for and remove all fasteners and sharps. Identify and repair holes.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof flashings.
2. Counterflashings over roofing base flashings.
3. Installation of metal copings specified in other sections.
4. Gutters and downspouts.
5. Chimney flue caps.
6. Roof penetration caps.

B. Related Sections:

1. Section 031000 - Concrete Forming and Accessories: Placement of recessed flashing reglets and accessories.
2. Section 033000 - Cast-In-Place Concrete: Installing reglets.
3. Section 074213 - Metal Wall Panels: Sheet metal flashing and trim.
4. Section 076200 - Thermoplastic Membrane Roofing.
5. Section 077233 - Roof Hatches.
6. Section 079200 - Joint Sealants: Field-applied sheet metal flashing and trim sealants.
7. Section 079500 - Expansion Control.
8. Section 089100 - Wall Louvers.
9. Division 23 - HVAC: Roof curbs for mechanical equipment.
10. Division 26 - Electrical: Roof curbs for electrical equipment.

1.2 REFERENCES

A. ASTM International:

1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
3. ASTM B32 - Standard Specification for Solder Metal.

4. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.

B. Sheet Metal and Air Conditioning Contractors:

1. SMACNA - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Product Data: Submit data on manufactured components metal types, finishes, and characteristics.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Fabricator and Installer: Company specializing in sheet metal work with minimum three years documented experience.

B. Mock up:

1. Provide sheet metal flashing portion of multi-component exterior wall stand alone mock-up under provisions of Section 014000 - Quality Requirements.

2. When accepted, mock-up will demonstrate minimum standard for the Work.

3. Work of this section shall not proceed until approval of the mock-up.

C. Pre-Installation Meeting:

1. Section 013119 - Project Meetings: Pre-installation meeting.

2. Convene minimum one week prior to commencing work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials causing discoloration or staining.

1.6 COORDINATION

A. Section 013100 - Project Management and Coordination: Coordination and project conditions.

- B. Coordinate with Work of Section 031000 and Section 042000 for installing recessed flashing reglets.

1.7 WARRANTY

- A. Pre-Finished Steel Sheet and Coil Coating Warranty: Manufacturer's 20 year Warranty against fading, color change, chalking, peeling, cracking, or delaminating.
- B. Contractor: Provide 2 year material and labor weathertightness Warranty for work of this Section subject to conditions of ordinary wear and usage.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Sheet Metal Flashings: Conform to the relevant criteria in the SMACNA "Architectural Sheet Metal Manual."
- B. Gutter and Downspout Components: Conform to SMACNA Manual for sizing components for rainfall intensity determined by storm occurrence of 1 in 10 years.

2.2 SHEET METAL FLASHING AND TRIM

- A. Reglets: Surface mounted or recessed type as indicated, prefinished galvanized steel.
- B. Stainless Steel: ASTM A240; ASTM A276; Type 304, dead soft fully annealed, smooth surface.
- C. Galvanized Steel: ASTM A653; structural steel sheet, G90 zinc coating.
- D. Prefinished Galvanized Steel Sheet: ASTM A924, Grade A, or ASTM A653, G90 (Z275) zinc coating; gage as scheduled; shop pre-coated with PVDF (polyvinylidene fluoride) coating.
- E. Aluminum Sheet: ASTM B209; 3003 alloy, H14temper.
- F. Prefinished Metal Sheet: Gage as scheduled; shop pre-coated with PVDF (polyvinylidene fluoride) coating.
- G. PVC Clad Metal: Refer to Section 075400.

2.3 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Underlayment: Self adhered high temperature underlayment.
- C. Slip Sheet: Rosin sized building paper.
- D. Primer: Zinc molybdate type.
- E. Sealant: Butyl sealant specified in Section 079200 - Joint Sealants.

- F. Plastic Cement: ASTM D4586, Type I.
- G. Solder: ASTM B32; type suitable for application and material being soldered.
- H. Self-adhered underlayment. 40 mil rubberized asphalt adhesive backed by a layer of high density cross laminated polyethylene.
 - 1. Acceptable Manufacturer: GCP Applied Technologies, Grace Ice & Water Shield.
 - 2. Substitutions under provisions of Section 012500.

2.4 FABRICATION

- A. Form sections shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet metal, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.
- I. Fabricate gutters to profile and size indicated on the Drawings.
- J. Fabricate downspouts to profile and size indicated on Drawings.
- K. Fabricate accessories in profile and size to suit gutters and downspouts.
 - 1. Anchorage Devices: In accordance with SMACNA requirements.
- L. Seal metal joints.

2.5 FINISH

- A. Color:
 - 1. PRFN-1: To match P-1. Refer to Room Finish & Color Schedule Sheet A400.
 - 2. PRFN-2: To match MP-1. Refer to Section 074213.
 - 3. PRFN-3: To match Storefront. Refer to Section 084113.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, blocking and nailing strips located.
- C. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install reglets to lines and levels indicated on Drawings.
- C. Paint concealed metal surfaces with protective backing paint to minimum dry film thickness of 15 mils.

3.3 INSTALLATION

- A. Refer to Section 031000 and Section 042000 for installation of masonry reglets.
- B. Secure counterflashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- C. Apply plastic cement compound between metal flashings and felt flashings.
- D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- E. Seal metal joints watertight.
- F. Secure gutters in place using fasteners.
- G. Secure downspouts in place using bracket and strap with fasteners.
- H. Slope gutters to drain minimum 1/4 inch per foot.
- I. Connect downspouts to downspout boots. Seal connection watertight.

3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements and Section 017000 - Execution: Field inspecting, testing, adjusting, and balancing.
- B. Inspection will involve surveillance of Work during installation to ascertain compliance with specified requirements.

3.5 SCHEDULE

- A. Thickness as noted below, unless otherwise noted on Drawings.
- B. Copings:
 - 1. Material: Pre-Finished Galvanized Steel Sheet.
 - 2. Thickness: 22 gage. .0336 inch nominal thickness. For coping over 18 inches, use 20 gage, .0396 nominal thickness.
 - 3. Detail: As shown.
 - 4. Standing seam.
- C. Continuous Gutter:
 - 1. Material: Galvanized Steel Sheet.
 - 2. Thickness: 22 gage, .031 inch nominal thickness.
 - 3. Detail: As shown.
- D. Membrane Clad Gutter:
 - 1. Material: Membrane clad metal.
 - 2. Thickness: .020 inch film over 24 gage hot dipped G-90 Steel.
 - 3. Detail: As shown.
 - 4. Color: To match roof membrane.
- E. Gutter Fascia:
 - 1. Material: Pre-Finished Galvanized Steel Sheet.
 - 2. Thickness: 22 gage.
 - 3. Detail: As shown.
 - 4. Color: Per detail.
- F. Cleat:
 - 1. Material, color and thickness: Same material as sheet metal interlocking with sheet.
 - 2. Detail: As shown.
- G. Downspouts:
 - 1. Material: Schedule 10 galvanized steel pipe.

2. Size: 4 inch, typ. 3 inch at canopy.
 3. Downspout Detail: As indicated.
 4. Provide stainless steel wire strainer at each downspout.
- H. Conductor Heads:
1. Material: Galvanized Steel.
 2. Thickness: 22 gage, .031 inch nominal thickness.
 3. Detail: As indicated.
- I. Scuppers:
1. Material: Stainless Steel. Where thermoplastic membrane roofing interfaces with through wall scuppers, use PVC coated metal to form the through wall scupper.
 2. Thickness: 24 gage.
 3. Detail: As indicated.
 4. Finish: #4.
- J. Flashings at Sill:
1. Material: Prefinished metal sheet at storefront and curtainwall.
 2. Fabrication to include seal-welded joints for leak-free assembly.
 3. Thickness: 24 gage.
 4. Color: Per detail.
- K. Aluminum Head Flashing:
1. Material: Aluminum.
 2. Fabrication to include seal-welded joints for leak-free assembly.
 3. Thickness: 24 gage.
- L. Counterflashings at roof to wall transitions:
1. Material: Pre-Finished Galvanized Steel Sheet.
 2. Thickness: 24 gage.
 3. Detail: As indicated.
- M. Wall to Wall Saddle Flashing:

1. Material: Stainless steel.
 2. Thickness: 22 gage, .031 inch nominal thickness.
 3. Detail: As indicated.
 4. Finish: #4
- N. Parapet Saddle Flashing:
1. Material: Stainless Steel.
 2. Thickness: 24 gage.
 3. Detail: As indicated.
 4. Finish: #4.
- O. Miscellaneous trims and flashing:
1. Material: Pre-Finished Galvanized Steel Sheet.
 2. Thickness: 24 gage.
 3. Detail: As indicated.
- P. Continuous Perforated Aluminum Closure:
1. Material: 032 inch extruded aluminum, prefinished.
 2. Perforation: Minimum 30% open area.
 3. Color: Black. AAMA 2604.
- Q. Membrane-clad flashing:
1. Material: Membrane clad metal.
 2. Thickness: .020 inch film over 24 gage hot dipped G-90 Steel.
 3. Detail: As shown.
 4. Color: To match roof membrane.
- R. Brake Metal:
1. Material Aluminum.
 2. Thickness 18 GA.
 3. Detail: as indicated.
- S. Metal Fascia:

1. Material: Pre-finished galvanized steel sheet .
 2. Thickness: 18 GA.
 3. Detail: as indicated.
- T. Chimney Flue Caps:
1. Refer to Drawings.
- U. Roof Penetration Caps:
1. Refer to Drawings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes prefabricated roof hatches, with integral insulated support curbs, operable hardware, and counterflashings, with release mechanism.
- B. Related Sections:
 - 1. Section 061000 - Rough Carpentry: Wood framing for rough opening.
 - 2. Section 075400 - Thermoplastic Membrane Roofing: Roof system.
 - 3. Section 076200 - Sheet Metal Flashing and Trim: Flashing to roof system.
 - 4. Section 099000 - Painting and Coating: Field painting.

1.2 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on unit construction, sizes, configuration, jointing methods and locations when applicable, and attachment method.
- C. Manufacturer's Installation Instructions: Indicate special installation criteria and interface with adjacent components.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Hatches to withstand 40 psf external live load and negative (uplift) design pressure of 20 to 50 psf.

2.2 ROOF HATCHES

- A. Manufacturers:
 - 1. Babcock-Davis Hatchways.
 - 2. The Bilco Company.
 - 3. Dur Red Products.
 - 4. J.L. Industries.
 - 5. Nystrom.
 - 6. Precision.
 - 7. Substitutions: Section 012500 - Substitution Procedures.

- B. Product Description: Manufacturer's standard zinc-coated steel, with nominal 12 inch high integral curb, double-wall insulated type.

2.3 COMPONENTS

- A. Integral Steel Curb: Minimum 14 gage galvanized, prime painted steel with nominal 1 inch rigid glass fiber or foam insulation; integral cap flashing to receive roof flashing; extended flange for mounting.
- B. Flush Steel Cover: Minimum 14 gage galvanized, prime painted steel; nominal 1 inch glass fiber or foam insulation; minimum 22 gage steel interior liner; continuous neoprene or vinyl gasket to provide weatherproof seal.
- C. Hardware: Manufacturer's standard finish:
 - 1. Compression spring operator and shock absorbers;
 - 2. Steel manual pull handle for interior and exterior operation;
 - 3. Steel hold open arm with vinyl covered grip handle for easy release,
 - 4. Padlock hasp.
 - 5. Hinges: Manufacturer's recommended type for specific type of roof hatch.

2.4 ACCESSORIES

- A. Anchorage Devices: Type recommended by manufacturer.
- B. Counterflashings: Integral at curb.
- C. Protective Coating: Red oxide prime paint or manufacturer's standard corrosion resistant finish.
- D. Sealant: Manufacturer's recommended sealants integral with roof hatch installation, non-hardening, non-skinning, non-drying, non-migrating butyl based sealants.
- E. Ladder Safety Post: Telescoping, tubular steel with locking mechanism in full upright position; Model LU-1 Ladder Up® by Bilco, Model LP-4® by J.L. Industries, or approved equal.

2.5 FABRICATION

- A. Fabricate components free of visual distortion and free of defects. Weld corners and joints.
- B. Provide for condensation occurring within components and within assembly to drain to exterior above roofing.
- C. Fit components for weather tight assembly.
- D. Sloped Roofs: Fabricate roof hatch curbs tapered to maintain hatch top level.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify openings and substrate conditions are ready to receive Work of this section.

3.2 INSTALLATION

- A. Install curb assembly, fastening securely to roof decking. Flash curb assembly into roofing system.
- B. Place roof hatch and secure to curb assembly. Install integral setting sealant and counterflashing as required.
- C. Final installation to be watertight assembly.
- D. Coordinate with installation of roofing system and related flashings for weather tight installation.
- E. Lubricate hinges for smooth operation. Adjust cover to open and close properly.

3.3 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Wash down exposed surfaces; wipe surfaces clean.
- C. Remove excess sealant.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Firestopping and through-penetration protection system materials and accessories.
2. Firestopping tops of fire rated walls.

B. Related Sections:

1. Section 072600 - Vapor Retarders: Vapor retarder materials to adjacent insulation.
2. Section 078400 - Firestopping.
3. Section 092116- Gypsum Board Assemblies: Gypsum board fireproofing.

1.2 REFERENCES

A. American Society for Testing and Materials:

1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.

B. Intertek Testing Services (Warnock Hersey Listed):

1. WH - Certification Listings.

C. National Fire Protection Association:

1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

D. Underwriters Laboratories Inc.:

1. ANSI/UL 723 - Tests for Surface Burning Characteristics of Building Materials.
2. ANSI/UL 1479 - Fire Tests of Through-Penetration Firestops.
3. ANSI/UL 2079 - Tests for Fire Resistance of Building Joint Systems.

1.3 DEFINITIONS

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Product Data: Submit data on product characteristics, performance and limitation criteria.
- C. Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Manufacturer's Installation Instructions: Submit preparation and installation instructions.
- E. Engineering Judgments: For conditions not covered by UL or WH listed designs, submit judgments by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements. Engineering judgment documents must follow requirements set forth by the International Firestop Council.
- F. Sustainability Submittal Requirements: Refer to Section 018113 - Sustainable Project Requirements for submittals required by this Section to meet the sustainability goals for this Project.

1.5 QUALITY ASSURANCE

- A. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings as indicated on Drawings, but not less than 1-hour.
 - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
 - 2. Floor and Roof Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - 3. Floor Penetrations within Wall Cavities: T-Rating is not required.
- B. Through Penetration Firestopping of Non-Fire Rated Floor and Roof Assemblies: Materials to resist free passage of flame and products of combustion.
 - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
 - 2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.

- C. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
- D. Fire Resistant Joints between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- E. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84, NFPA 255, or UL 723.
- F. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
 - 2. Applicator: Company specializing in performing Work of this section with minimum five years documented experience, and approved by manufacturer.
- G. Mockup:
 - 1. Section 014500 - Quality Control: Requirements for mockup.
 - 2. Apply 3 linear ft of each type of linear firestopping material to representative substrate surface.
 - 3. Apply one of each unit type of firestopping material, such as penetrations through fire rated partition, to representative application.
 - 4. Locate where directed by Architect/Engineer.
 - 5. Incorporate accepted mockup as part of Work.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.
- C. Maintain this minimum temperature before, during, and for minimum 3 days after installation of materials.
- D. Provide ventilation in areas to receive solvent cured materials.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. The materials to be provided are to meet the guidelines for selection as available and as part of the total package developed, as defined in Section 018113 - Sustainable Project Requirements.
- B. Conform to applicable code UL and WH for fire resistance ratings and surface burning characteristics.
- C. Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

2.2 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Hilti, Inc.
- B. A/D Fire Protection Systems.
- C. Nelson Firestop Products.
- D. Specified Technologies, Inc. (STI), SpecSeal Firestop Products.
- E. 3M Fire Protection Products.
- F. Tremco Tremstop.
- G. Substitutions: Section 012500 - Substitution Procedures..

2.3 DESCRIPTION

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Use only firestop products that have been UL 1479, ASTM E814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- D. Product Description:
 - 1. Silicone Firestopping Elastomeric Firestopping: Single component silicone elastomeric compound.

2. Elastomeric Joint Sealant: Single component silicone free elastomeric compound.
 3. Foam Firestopping Compounds: Two component foam compound.
 4. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
 5. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.
 6. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
 7. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
 8. Firestop Bricks: Formed mineral fiber bricks.
- E. Color: As selected from manufacturer's full range of colors.

2.4 MATERIALS

- A. Intumescent Firestop Sealants and Caulks:
1. Hilti FS-ONE MAX.
- B. Latex Firestop Sealant:
1. Hilti CP 606.
- C. Silicone Firestop Sealants and Caulks:
1. Hilti CFS-S SIL GG
- D. Firestop Putty:
1. Hilti Putty Pad CP 617
 2. Hilti Putty Pad CFS-P PA
 3. Hilti Putty Stick CP 618
 4. Hilti Cable Disk CFS-D
 5. Hilti Putty Roll CP 619T.
 6. Hilti Box Insert.
- E. Firestop Collars:
1. Hilti CP 643N/ CP 644.

- F. Firestop Cable Collar
 - 1. Hilti CFS-CC.
- G. Wrap Strips:
 - 1. Hilti CP648-S / CP 648-E.
- H. 2-Part Silicone Firestop Foam:
 - 1. Hilti CP 620.
- I. Firestop Mortar:
 - 1. Hilti CP 637.
- J. Composite Board:
 - 1. Hilti FS 675.
 - 2. Hilti CFS-COS.
- K. Firestop Pillows:
 - 1. Nelson PLW Firestop Pillow.
 - 2. STI "SpecSeal" Firestop Pillows.
- L. Firestop Blocks & Plugs:
 - 1. Hilti CFS-BL
 - 2. Hilti CFS-PL
- M. Firestop Joint Sealants:
 - 1. Hilti CFS-SP WB
 - 2. Hilti CP 672 FC
 - 3. Hilti CFS-S SIL SL
 - 4. Hilti CFS-SP SIL
- N. Pre-Formed Firestop Devices
 - 1. Hilti Speed Sleeve CP 653.
 - 2. Hilti Sleeve Kit CFS-SL SK.
 - 3. Hilti Retrofit Sleeve Kit CFS-SL RK.
 - 4. Hilti Gangplate CFS-SL GP.

5. Hilti Cast-in-Place CP 680.
 6. Hilti Cast-in Place metal Deck CP 680 MD.
 7. Hilti Tub Box Kit CP 681.
 8. Hilti Drop-in Device CFS-DID.
 9. Hilti QuickSeal CFS-EOS QS.
- O. Prefabricated Joints
1. Hilti Top Track Seal CFS-TTS.
 2. Hilti Top Track Seal Metal Deck CFS-TTS MD.
- P. Other applications:
1. Specialty products, approved by the Architect, for atypical penetration conditions.
- Q. Color: As selected from manufacturer's full range of colors.

2.5 ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.
- B. Fire Resistant Seal Compound: Fire resistant sealing compound which is listed as part of the fire and smoke system used at top of rated partitions. In all cases, sealing compound must be UL listed and approved by local governing authorities. Coordinate with Section 092116 - Gypsum Board Assemblies.
1. USG Interiors, Inc. "Firecode Compound"
- C. Dam Material: Permanent:
1. Mineral fiberboard.
 2. Mineral fiber matting.
- D. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

2.6 TELECOMMUNICATIONS FIRESTOPPING

- A. Firestopping material: Conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire test in a configuration that is representative of the actual field conditions.
- Manufactured by:
1. Hilti, Inc.

2. Specified Tech. Inc.
- B. Fire-Rated Cable Pathways: Device modules shall be comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill:
 1. Hilti, Inc. CP 653 Firestop Speed Sleeve.
 2. Specified Technologies Inc. (STI) EZ-PATH Fire Rated Pathway
- C. Firestop Pillows or Blocks: Preformed firestop blocks for sealing penetrations with cables:
 1. Pillows: Re-enterable, non-curing, mineral fiber core encapsulated on six sides with intumescent coating contained in a flame retardant poly bag.
 2. Specified Technologies Inc. (STI) SpecSeal® Series SSB PillowsBlocks.
 3. Hilti CFS-BL Firestop Block.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify openings are ready to receive firestopping.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- B. Remove incompatible materials affecting bond.
- C. Install backing or damming materials to arrest liquid material leakage.

3.3 APPLICATION

- A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.
- D. Compress fibered material to maximum 40 percent of its uncompressed size.

3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

- B. Inspect installed firestopping for compliance with specifications and submitted schedule.

3.5 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Clean adjacent surfaces of firestopping materials.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 016000 - Product Requirements: Protecting installed construction.
- B. Protect adjacent surfaces from damage by material installation.

3.7 TELECOMMUNICATIONS FIRESTOPPING

- A. Only employees trained/certified by the firestopping manufacturer shall apply firestopping materials.
- B. Maintain fire rating of penetrated fire barriers. Fire stop and seal penetrations made during construction.
 - 1. Provide firestopping material for through and membrane penetrations of fire-rated barriers.
 - 2. Install firestops in strict accordance with manufacturer's detailed installation procedures.
 - 3. Install firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, local fire and building authorities, and applicable codes and standards referenced in Section 270500 - "Common Works Results for Communications" PART 1 - STANDARDS AND CODES. Apply of sealing material in a manner acceptable to the local fire and building authorities.
 - 4. For demolition work, apply firestopping to open penetrations in fire rated barriers where cable is removed. Apply firestopping regardless of whether or not the penetrations are used for new cable or left empty after construction is complete.
 - 5. Firestopping material used to seal open penetrations through which cable passes shall be re-usable/re-enterable.
- C. Fire and smoke stopping cable pathway devices shall be provided for all sleeve penetrations through fire-rated walls and wherever cables (not in conduit) pass through fire-rated walls. Devices shall be arranged singly or in gangs, and installed in strict accordance with the manufacturer's recommendations. Apply the factory supplied gasketing material prior to the installation of the wall plates. Secure wall plates to devices per the equipment manufacturer's recommendations.
 - 1. Putty-type firestopping products are not acceptable.

- D. Fire and smoke stopping cable pathway devices shall be provided for all floor-to-floor firestopping applications.
- E. Firestopping putty and firestopping pillow products shall not be used for vertically oriented applications.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Sealants and backer rods.
 - 2. Accessories.
- B. Related Sections:
 - 1. Section 042113 - Masonry Veneer.
 - 2. Section 072600 - Vapor Retarders: Sealants required in conjunction with vapor retarders.
 - 3. Section 072700 - Air Barriers: Sealants required in conjunction with air barriers.
 - 4. Section 078400 - Firestopping: Firestopping sealants.
 - 5. Section 088000 - Glazing: Glazing sealants and accessories.
 - 6. Section 092116 - Gypsum Board Assemblies: Acoustic sealant.
 - 7. Section 093000 - Tiling: Sealant used as tile grout.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C834 - Standard Specification for Latex Sealants.
 - 2. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
 - 3. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 - 4. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- B. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples: Submit two samples, 2 x 1/4 inch in size illustrating sealant colors for each product selection.

- D. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- E. Warranty: Include coverage for installed sealants and accessories failing to achieve airtight or watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.
- F. Section 017700 - Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Qualifications

- 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
- 2. Applicator: Company specializing in performing Work of this section with minimum three years documented experience, and approved by manufacturer.

B. Mockup

- 1. Section 014000 - Quality Requirements: Requirements for mockup.
- 2. Construct mockup of sealant joints in conjunction with multi-component exterior wall stand alone corner mock up specified in Section 014000 and mockups specified in other sections.
- 3. Construct mockup with specified sealant types and with other components noted.
 - a. Determine preparation and priming requirements based on manufacturers recommendations; take action necessary for correction of failure of sealant tests on mock-up.
 - b. Verify sealants, primers, and other components do not stain adjacent materials.
- 4. Locate where directed by Architect/Engineer unless location is indicated on the Drawings.
- 5. Incorporate accepted mockup as part of Work unless noted otherwise.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.6 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.

- B. Coordinate Work with sections referencing this section.

PART 2 PRODUCTS

2.1 JOINT SEALERS

- A. Acceptable Manufacturers:

1. Dowsil Corp.
2. GE Silicones
3. Hilti.
4. 3M.
5. Pecora Corp.
6. Sika Corp.
7. Tremco Sealants & Waterproofing
8. Bostik.
9. Master Builders Solutions, BASF.
10. US Gypsum.
11. Substitutions: Section 012500 - Substitution Procedures

- B. Products Description:

1. Type A (Acoustical) Acoustical Sealant: Non-hardening, non-bleeding, non-drying resilient caulk.
 - a. Hilti.
 - b. 3M.
 - c. Dowsil.
 - d. USG Sheetrock Brand Acoustical Sealant.
 - e. Tremco Acoustical Sealant.
 - f. Applications: Refer to Section 092116 - Gypsum Board Assemblies.
2. Type B (Butyl) Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, non-drying, non-skinning, non-curing.
 - a. Tremco, Butyl Sealant.

- b. Applications: Use for concealed sealant bead in sheet metal work and concealed sealant bead in siding overlaps.
- 3. Type G (Gasket) Exterior Compressible Gasket Expansion Joint Sealer Pre-compressed Joint sealant. Silicone coated polyurethane foam.
 - a. Construction Specialties, Type: VF.
 - b. Color: As selected from manufacturer's standard colors.
 - c. Size and Shape: As indicated on Drawings.
 - d. Applications: Use for exterior wall expansion joints.
- 4. Type GI (General Interior) General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.
 - a. Pecora, AC-20 + Silicone.
 - b. Tremco, Tremflex 834.
 - c. Color: Colors as selected.
 - d. Applications: Use for interior wall and ceiling control joints, joints between door and window frames and wall surfaces, and other interior joints for which no other type of sealant is indicated.
 - e. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
- 5. Type GP (General Polyurethane) General purpose Polyurethane sealant: one component, nonpriming, elastomeric, gun-grade; ASTM C920, Type S, Grade NS, Class 35; Uses T, NT, M, A, and O.
 - a. MasterSeal NP1
 - b. Tremco, Dymonic FC.
 - c. Sika, Sikaflex-15 LM.
 - d. Exterior Applications: expansion joints, precast units, aluminum curtain walls, roofing, fascia, parapets, and structural components.
 - e. Color as selected from manufacturer's full line.
- 6. Type GS (General Silicone) High Performance General Purpose Exterior (Non-traffic) Sealant Silicone; ASTM C920, Grade NS, Type S, Class 100/50, Uses M, G, and A; single component.
 - a. Dowsil 790, 791 and 795.

- b. Pecora 890FTS.
 - c. Tremco Spectrem 1.
 - d. Sika, Sikasil WS-290.
 - e. Color: Colors as selected from manufacturer's full line.
 - f. Applications: Use for:
 - 1) Control, expansion, and soft joints in masonry.
 - 2) Joints between concrete and other materials.
 - 3) Joints between metal frames and other materials.
 - 4) Other exterior non-traffic joints for which no other sealant is indicated.
7. Type WB (Weather Barrier Sealant) Compatible with Air and Moisture Barrier. Single Component Silyl-Terminated-Poly-Ether or one part, neutral cure silicone sealant.
- a. Dow Corning 758 Silicone Weather Barrier Sealant.
 - b. Prosoco R-Guard AirDam.
 - c. Color: Colors as selected from manufacturer's full line.
 - d. Applications: Use at windows, louvers and doors.
8. Type T (Traffic) General Purpose Traffic Bearing Sealant: Polyurethane; ASTM C920, Grade P, Class 25, Use T.
- a. Pecora, Urexpan NR-200.
 - b. BASF MasterSeal SL2.
 - c. Tremco, Vulkem 45 SSL.
 - d. Color: Colors as selected from manufacturer's full line.
 - e. Applications: Use for exterior pedestrian and vehicular traffic and interior pedestrian traffic bearing joints.
 - f. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
9. Type W (Wet) Bathtub/Tile Sealant: White silicone; ASTM C920, Type S, Grade NS, Class 50/25, Uses NT, G, O and A; single component, mildew resistant.
- a. Dowsil 786 Silicone sealant.

- b. Pecora 898.
- c. Tremco Tremsil 200.
- d. Applications: Use for joints between plumbing fixtures and floor and wall surfaces, and joints between kitchen and toilet room counter tops and wall surfaces.
- e. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.

2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
 - 1. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant;
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- E. Sand: Provide sand finish at Concrete and Masonry Joints and at Exterior tile: Apply sand of color, appearance, and texture matching mortar. Completely cover joint sealant.

2.3 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Unless otherwise specified, match color of adjacent material occurring in same plane. Where joints occur adjacent to two or more material colors in same plane, match color of lighter adjacent material, unless otherwise directed. Custom colors for exposed sealants may be required if standard colors are not acceptable to the Architect.
- C. Sealant for Face Brick: Sealant must have been tested by the manufacturer for staining of face brick, resulting in no discoloration or change in appearance of the joint substrate due to fluid migration.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.

- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter impairing adhesion of sealant.
- B. Clean joints.
- C. Prime joints if required for a specific sealant or substrate as recommended by the sealant manufacturer.
- D. Perform preparation in accordance with ASTM C1193.
- E. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C1193.
- B. Perform acoustical sealant application work in accordance with ASTM C919.
- C. Measure joint dimensions and size backer rods to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.
- H. Pre-compressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

3.4 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution: Protecting installed construction.
- B. Protect sealants until cured.

3.6 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Perform field-test of joint-sealant in accordance with test recommended in ASTM C1193, except as modified below. Method described is similar to method described in less detail in AAMA's "Aluminum Curtain Wall Series No. 13" and in SWRI's "Sealants: The Professionals' Guide."
 - 1. Extent of Testing: Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
- B. Evaluation of Field-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.7 SCHEDULE

- A. Unless noted otherwise, provide sealant at 1) all joints in similar/same materials; 2) all joints between dissimilar materials and 3) in all cracks of any size. For joints or cracks exceeding 1/4 inch in width, use appropriately sized foam backer rod in addition to sealant.
- B. Exterior Joints for Which No Other Sealant Type is Indicated: Type GS.
- C. Control and Expansion Joints in Paving: Type T.
- D. Exterior Wall Seismic Movement Joints: Type G.
- E. Exterior Wall Expansion Joints: Type G
- F. Control, Expansion, and Soft Joints in Masonry, and Between Masonry and Adjacent Work: Type GS with sand.
- G. Lap Joints in Exterior Sheet Metal Work: Type B.
- H. Butt Joints in Exterior Metal Work and Siding: Type B.
- I. Joints between Exterior Metal Frames and Adjacent Work: Type GS.
- J. Under Exterior Door Thresholds: Type B, unless noted otherwise on details.
- K. Interior Joints for Which No Other Sealant is Indicated: Type GI.
- L. Control and Expansion Joints in Interior Concrete Slabs and Floors (not at polished concrete): Type T.
- M. Joints between Plumbing Fixtures and Walls and Floors, and Between Counter tops and Walls: Type W.
- N. In STC-Rated Walls, Between Metal Stud Track/Runner and Adjacent Construction. Between Outlet Boxes and Gypsum Board: Type A.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Manufactured Interior expansion/seismic joint assemblies for: floors, walls, ceilings and soffits.
2. Manufactured Exterior expansion/seismic joint assemblies for: roofs, walls and soffits.

B. Related Sections:

1. Section 031000 - Concrete Forming and Accessories: Execution requirements for placement of joint assembly frames in formwork.
2. Section 033000 - Cast-In-Place Concrete: Expansion and contraction joints in concrete slab-on-grade.
3. Section 076200 - Sheet Metal Flashing and Trim.
4. Section 079200 - Joint Protection: Expansion and control joint sealants.

1.2 REFERENCES

A. ASTM International:

1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: For each expansion control system specified, include plans, elevations, sections, details, splices, blockout requirement, attachments to other work, and line diagram showing entire route of each expansion control system. Where expansion control systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- C. Product Data: Submit joint assembly profiles, profile dimensions, anchorage devices, and finish information.
- D. Samples: Submit one sample of each type of expansion control system indicated 12 inches long, illustrating profile, dimension, color, and finish selected.
- E. Manufacturer's Installation Instructions: Submit rough-in sizes; provide templates for cast-in or placed frames or anchors; and required tolerances for item placement.
- F. Product schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion control system.
 2. Expansion control system location cross-referenced to Drawings.
 3. Nominal joint width.
 4. Movement capability.
 5. Classification as thermal or seismic.
 6. Materials, colors, and finishes.
 7. Fire-resistance ratings.
- G. Product Test Reports: For each fire barrier provided as part of an expansion control system, for test performed by a qualified testing agency.

1.4 QUALITY ASSURANCE

A. Installer Qualifications

1. Company specializing in work of this section.
2. Able to document minimum 5 years continuous experience with 5 successful installations during that period installing exterior seismic expansion control systems of comparable scope and quality as required for work of this Section. Include project references and contact information.
3. Approved by manufacturer as qualified to install work of this Section prior to Bid or accepted by Architect.

B. Pre-Installation Meetings

1. Convene minimum one week prior to commencing work of this section.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements are as instructed by manufacturer.

PART 2 PRODUCTS

2.1 EXPANSION JOINT ASSEMBLIES

- A. Selected products are sized for a 4" wide joint.
- B. Acceptable Manufacturers:
1. Basis of Design: Construction Specialties (The C/S Group).
 2. Balco Inc.
 3. InPro Corporation, JointMaster Expansion Joint Systems.

4. Nystrom.
5. MM Systems Corp.
6. BASF, Watson Bowman Acme Corp.
7. Substitutions: Section 012500 - Substitution Procedures.

C. Models:

1. Basis of Design: SF 400, noted as 4" Joint Cover in Drawings.
 - a. Color - Platinum
2. Basis of Design: VF 400, noted as 4" Foam Expansion Cover in Drawings.
 - a. Color - Black
3. Construction Specialties FCFC400, noted as Interior Expansion Joint Cover in Drawings.
 - a. Color – Black

2.2 MATERIAL

- A. Extruded Aluminum: ASTM B221, 6063 alloy, T6 temper.
- B. Resilient Filler: Neoprene, exhibiting Shore A hardness of 40 - 50 Durometer.
- C. Impergnated, compressable foam block.

2.3 COMPONENTS

- A. Expansion Joint Cover: Aluminum. Refer to Schedule at end of section.
- B. Manufacturer's Caps: End caps and transition caps to suit application. Color to match joint.
- C. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide secure attachment of joint systems.
- D. Backing Paint: Asphaltic type.
- E. Moisture Barrier: Manufacturer's standard moisture barrier consisting of a continuous, waterproof membrane within joint and attached to substrate on sides of joint below the primary cover.

2.4 FABRICATION

- A. Joint Covers: Aluminum support plate (concealed), aluminum frame construction, retainers with resilient neoprene filler strip, designed to permit plus or minus 25 percent joint movement with full recovery, mounting as noted in Schedule.

- B. Back paint components in contact with cementitious materials.
- C. Galvanize embedded ferrous metal anchors and fastening devices.
- D. Shop assemble components and package with anchors and fittings.
- E. Furnish joint components in single length wherever practical. Minimize site splicing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify joint preparation and affected dimensions are acceptable.

3.2 PREPARATION

- A. Provide anchoring devices for installation.
- B. Provide templates and rough-in measurements.

3.3 INSTALLATION

- A. Align work plumb and level, flush with adjacent surfaces.
- B. Rigidly anchor to substrate to prevent misalignment.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution: Protecting installed construction.
- B. Do not permit traffic over unprotected floor joint surfaces.
- C. Terminate exposed ends of joint assemblies with field or factory fabricated termination devices.
- D. Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.
- E. Install strippable coating to protect finish surface.
- F. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instruction.
- G. Protect the installation from damage by work of others. At heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of Work.

END OF SECTION

DIVISION 08

OPENINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire rated and non-rated steel frames.
 - 1. Provide frames for interior glazed lites.
 - 2. Provide frames for rated and non-rated interior and exterior doors.
- B. Related Sections:
 - 1. Section 042113 - Masonry Veneer: Installing anchors and grouting frames in masonry construction.
 - 2. Section 072116 - Blanket Insulation: Sound insulation for metal frames.
 - 3. Section 081313 - Hollow Metal Doors: Metal doors manufactured according to the Hollow Metal Manufacturers Association's standards.
 - 4. Section 081416 - Flush Wood Doors: Retaining applicable fabrication requirements for solid core wood doors installed in steel door frames.
 - 5. Section 087100 - Door Hardware: Hardware, silencers and weatherstripping.
 - 6. Section 088000 - Glazing: Glass in frames.
 - 7. Section 092116 - Gypsum Board Assemblies: Steel framing in gypsum board partitions.
 - 8. Section 099000 - Painting and Coating: Field painting factory-primed frames.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI/BHMA A156.115 - Standard for Hardware Preparation in Steel Doors and Steel Frames.
 - 2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.
 - 3. ANSI A250.6- Hardware on Standard Steel Doors.
 - 4. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- B. ASTM International:
 - 1. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

2. ASTM C518 - Standard for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. Hollow Metal Manufacturers Association:
 1. HMMA 861 - Commercial Hollow Metal Doors and Frames.
- D. Door Hardware Institute:
 1. The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- E. National Fire Protection Association:
 1. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- F. Steel Doors Institute:
 1. SDI-100 Rev. ANSI A250.8 Standard Steel Doors and Frames.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Shop Drawings: Indicate frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.
- C. Provide a schedule of doors and frames using same reference numbers for details and door openings as those on the contract documents. Highlight fire rated doors.
- D. Section 017700 - Closeout Procedures.
- E. Manual for Materials and Finishes: Include dent and scratch repair.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of SDI-100.
- B. Qualifications:
 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
 2. Member Steel Door Institute (SDI).
 3. Provide steel doors and frames from single manufacturer.
- C. Fire Rated Frame Construction: Conform to NFPA 252.

- D. Attach label from agency approved by authority having jurisdiction to identify each fire rated door frame.

- 1. Attach smoke label to smoke and draft control door frames.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Delivery Requirements: Storage and Handling.
- B. Accept frames on site in manufacturer's packaging. Inspect for damage.
- C. Break seal on-site to permit ventilation.
- D. Maintain protected area on site for storage of frames to be installed. Door frames must be stored on pallets or wood sleepers. Do not store directly on earth or concrete.
- E. Handle frames in such a way as to avoid damage or scratches.
- F. Any rust discovered on door frames during construction will result in rejection and replacement of door frame.

PART 2 PRODUCTS

2.1 STANDARD STEEL FRAMES

- A. Acceptable Manufacturers:
 - 1. Curries Assa Abloy.
 - 2. Allegion Steelcraft.
 - 3. Stiles Steel Door + Window Systems.
 - 4. Substitutions: As specified in Section 012500 - Substitution Procedures.
- B. Product Description: Standard shop fabricated galvanized steel frames, rated and non-rated types.
 - 1. Exterior Frames: Level 3, nominal 16 gage/0.053 inch thick material, base metal thickness.
 - 2. Interior Frames: Level 3, nominal 16 gage/0.053 inch thick material, base metal thickness.

2.2 ACCESSORIES

- A. Removable Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws.
- B. Primer: ANSI/SDI Standard A250.10 factory applied.
- C. Silencers: Specified in Section 087100 - Door Hardware.

- D. Weatherstripping and Smoke Seals: Specified in Section 087100 - Door Hardware.
- E. Interior Door Frames Sound Deadening Insulation: Fiberglass batt or mineral wool.
- F. Exterior Door Frame Thermal Insulation: Low expansion, foam-in-place insulation, similar to "Icynene" (Spray or Pour Formula) manufactured by The Icynene Insulation System (905) 890-7325, or approve equal meeting the following:
 - 1. Thermal Value (ASTM C518): R 3.6 hr/sq-ft./degrees F/BTU
 - 2. Corrosion: No significant corrosion when in contact with steel under 85% relative humidity.
 - 3. Bacterial or fungal Growth: No growth; no material deterioration.
 - 4. Fire Characteristics ASTM E84: Flame Spread <20; Smoke Developed <200.
 - 5. Water Absorption: Will not wick water.

2.3 PROVISION FOR HARDWARE

- A. Hardware Reinforcement: Conform to ANSI A156.115 and ANSI A250.6. Factory reinforce, drill, and tap frames to receive mortised hinges, locks, latches, flush bolts, and concealed door closers.
- B. Use hardware templates furnished by hardware manufacturer.
- C. Hardware Reinforcing: Steel, meet or exceed following:
 - 1. Hinges: 7 gauge.
 - 2. Surface Closers: 12 gauge plate reinforcements welded to frames according to type of door closer installation.
- D. Door Silencers: Drill door frame stops to receive silencers at each door swing. Insert plastic plugs to keep holes open during painting and construction activities.
- E. Plaster Guards: Provide at silencers, strike pockets, and hinge reinforcements.
- F. Finish Hardware Locations: Refer to Section 087100 - Door Hardware.
- G. Field Tapping and Drilling: Accepted at surface-applied hardware.

2.4 FABRICATION

- A. Fabricate frames as full welded units. Knock down frames are not acceptable.
- B. Mullions for Double Doors: Removable type, of same profiles as jambs.
- C. Transom Bars for Glazed Lites: Fixed type, of same profiles as jamb and head.

- D. Fabricate frames with hardware reinforcement plates welded in place. Provide mortar guard boxes. Provide heavy duty hinge plate reinforcements with a minimum of 1" continuous weld at top and bottom.
- E. Plaster Guards: Weld 16 gauge steel plaster guards or mortar boxes to frame at back of finish hardware cutouts where finish materials might obstruct hardware operation.
- F. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- G. Prepare frames for silencers. Provide three single silencers for single doors and mullions of double doors on strike side. Provide two single silencers on frame head at double doors without mullions.
- H. Do not provide silencers on frames to be provided with smoke seals or conflicting weatherstripping.
- I. Attach fire rated label to each fire rated frame.
- J. Fabricate frame profiles as detailed on the drawings.

2.5 SHOP FINISHING

- A. Thoroughly clean and chemically treat for maximum adhesion.
- B. Exterior Frames: Compatible with finish paint specified Section 099000 - Painting and Coating.
 - 1. Galvanizing: ASTM A653, A60 galvanized. Wipe coat galvanized steel (WCGS) coating systems not accepted.
- C. Interior Frames: Compatible with finish paint specified of Section 099000 - Painting and Coating.
 - 1. Baked-On Shop Primer: ANSI/SDI Standard A250.10 factory applied, baked-on rust inhibiting paint. Color: Light gray.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify opening sizes and tolerances are acceptable.

3.2 FRAMES INSTALLATION

- A. Install frames in accordance with SDI-100 and DHI. Countersink anchor screws, putty, prime and paint to provide concealed anchor finish.
- B. Coordinate with masonry, steel stud or concrete wall construction for anchor placement.
- C. Coordinate installation of glass and glazing specified in Section 088000.

- D. Coordinate installation of frames with installation of hardware specified in Section 087100 - Door Hardware, and doors in Section 081313 - Hollow Metal Doors.
- E. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.
- F. Install fiberglass insulation in non-rated frames, and mineral wool in rated frames, for sound deadening.

3.3 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

3.4 CLEANING

- A. Thoroughly clean surfaces. Sand scarred and rusty areas smooth and touch up with compatible primer to shop primer and finish paint as specified in Section 099000.

3.5 SCHEDULE

- A. Refer to Door and Frame Schedule in the drawings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes non-rated and rated interior and exterior steel doors.
- B. Related Sections:
 - 1. Section 081213 - Hollow Metal Frames: Metal frames manufactured according to the Hollow Metal Manufacturers Association's standards.
 - 2. Section 084113 - Aluminum Framed Storefronts.
 - 3. Section 087100 - Door Hardware: Hardware, silencers and weatherstripping.
 - 4. Section 099000 - Painting and Coating: Field painting factory-primed doors.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI/BHMA A156.115 - Standard for Hardware Preparation in Steel Doors and Steel Frames.
 - 2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.
 - 3. ANSI A250.6- Hardware on Standard Steel Doors.
 - 4. ANSI/SDI Standard A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- B. ASTM International:
 - 1. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. Door Hardware Institute:
 - 1. The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- D. National Fire Protection Association:
 - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- E. Steel Door Institute:
 - 1. SDI 100 Rev. ANSI 250.8 - Standard Steel Doors and Frames.

2. SDI 108 Recommended Selection and Usage Guide for Standard Steel Doors.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, cut-outs for glazing, and finishes.
- C. Product Data: Submit door configurations and location of cut-outs for hardware reinforcement.
- D. Section 017700 - Closeout Procedures.
- E. Manual for Materials and Finishes: Submit recommended areas to be inspected and inspection intervals. Include dent and scratch repair.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of SDI-100/ANSI A250.8.
- B. Fire Rated Door Construction: Conform to NFPA 252 requirements.
- C. Installed Fire Rated Door and Panel Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.
- D. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.
- E. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
 - 2. Member of Steel Door Institute (SDI).
 - 3. Provide steel doors and frames from single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements.
- B. Protect doors with resilient packaging sealed with heat shrunk plastic.
- C. Break seal on site to permit ventilation.
- D. Any rust discovered on doors during construction will result in the rejection of door and require replacement.

1.6 COORDINATION

- A. Coordinate frame installation with size, location, and installation of service utilities.

- B. Coordinate Work with door opening construction, door frame, and door hardware installation.
- C. Sequence installation to ensure door hardware electric wire connections are achieved in an orderly and expeditious manner.

PART 2 PRODUCTS

2.1 STANDARD STEEL DOORS

- A. Manufacturers:
 - 1. Curries Assa Abloy.
 - 2. Allegion Steelcraft.
 - 3. Stiles Steel Door + Window Systems.
 - 4. Substitutions: As specified in Section 012500 - Substitution Procedures.
- B. Product Description:
 - 1. Exterior Doors (Thermally Insulated): SDI-100. 1-3/4" thick.
 - a. Level 4 - Maximum Duty, Model 2, seamless design.
 - 2. Interior Doors (Non-Rated): SDI-100, 1-3/4 inch thick.
 - a. Level 3 - Extra Heavy Duty, Model 2, seamless design.
 - 3. Interior Doors (Fire Rated): SDI 108, 1-3/4 inch thick.
 - a. Level 3- Extra Heavy Duty, Model 2, seamless design.

2.2 PROVISION FOR HARDWARE

- A. Hardware Reinforcement: Conform to ANSI A156.115 and ANSI A250.6. Factory reinforce, drill, and tap doors to receive mortised hinges, locks, latches, flush bolts, and concealed door closers.
- B. Use hardware templates furnished by hardware manufacturer.
- C. Hardware Reinforcing: Steel, meet or exceed following:
 - 1. Hinges: 10 gauge or 12 gauge channel, full door height, with equivalent threads.
 - 2. Locks: 12 gauge or equivalent number of threads.
 - 3. Surface Closers: 12 gauge by 5-1/4 inch wide U-Channel reinforcement welded to door end channels. Flat reinforcements not accepted.
 - 4. Hold Open Arms: 12 gauge U-Channel.

5. Panic Devices: 14 gauge U-Channels at fastening positions.
6. Floor Check Hinges and Pivots: 7 gauge.
- D. Finish Hardware Locations: Refer to Section 087100 - Door Hardware.
- E. Field Tapping and Drilling: Accepted at surface-applied hardware.

2.3 FABRICATION

- A. Exterior Doors: ANSI A250.8/SDI-100, Level 4, Model 2 (Seamless Design). Passing ANSI A250.4 Acceptance Criteria, Level A (1 million cycles).
 1. Face Sheets: 14 gauge steel.
 2. Core Design: Injected polyurethane foam; R-Value of 2.7 minimum.
 3. Vertical Internal Stiffening: 20 gauge steel hat channels, space 6 inches on center, spot weld to skins.
 4. Vertical Edge Reinforcement: One piece, continuously arc welded full length to face sheets.
 - a. Lock Channel: 14 gauge steel, beveled 1/8 inch in 2 inch.
 - b. Hinge Channel: 12 gauge steel, formed and tapped for hinges.
 5. Top and Bottom Channel Reinforcement: 16 gauge steel.
 6. Top Rail Closure Channel: 16 gauge steel with flush channel filler cap sealed against water penetration.
- B. Interior Steel Doors: ANSI A250.8/SDI-100, Level 3, Model 2 (Flush Seamless Design). Passing ANSI A250.4 Acceptance Criteria, Level A (1 million cycles).
 1. Face Sheets: 16 gauge steel.
 2. Core Design: Polystyrene foam core or phenolic impregnated honeycomb paper core, adhesive laminated to both face sheets, except honeycomb core not accepted at doors exposed to moisture.
 3. Vertical Edge Reinforcement: One piece, continuously arc welded full length to face sheets.
 - a. Lock Channel: 14 gauge steel, beveled 1/8 inch in 2 inch.
 - b. Hinge Channel: 12 gauge steel, formed and tapered for hinges.
 4. Top and Bottom Channel Reinforcement: 16 gauge steel.
- C. Vertical Door Edges: Bevel 1/8 inch in 2 inch at strike side vertical edges and square at hinge side.

- D. Hardware Reinforcement: Fabricate and weld into place. Include concealed stiffeners, reinforcement, edge channels, and moldings fabricated from either cold-rolled or hot-rolled 16 gauge steel.
- E. Exposed Joints: Arc weld continuously, full length. Grind, dress, and make smooth for flush, seamless appearance at edges and joinery.
- F. Welded Construction: Weld door skins to perimeter channels. Glued channels not accepted.

2.4 SHOP FINISHING

- A. Thoroughly clean and chemically treat for maximum adhesion.
- B. Exterior Doors: Compatible with finish paint specified in Section 099000 - Painting and Coating.
 - 1. Galvanizing: ASTM A653, A60 galvanized steel (WCGS) coating systems not accepted.
- C. Interior Doors: Compatible with finish paint specified in Section 099000 - Painting and Coating.
 - 1. Primer: ANSI/SDI Standard A250.10 factory applied, baked-on rust inhibiting paint. Color: Light gray.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

- A. Install doors in accordance with SDI-100/ANSI A250.8 and DHI.
- B. Coordinate installation of doors with installation of frames specified in Section 081213 and hardware specified in Section 087100 - Door Hardware.
- C. Touch-up factory finished doors.

3.3 SITE QUALITY CONTROL

- A. Upon completion of installation, inspect and test fire rated doors in accordance with NFPA 80. Inspection and testing shall be performed by inspector certified by the Door and Hardware Institute.

3.4 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.5 ADJUSTING

- A. Adjust door for smooth and balanced door movement.

3.6 SCHEDULE

- A. Refer to Door and Frame Schedule in the drawings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes rated and non-rated flush wood doors.
- B. Related Sections:
 - 1. Section 081214 - Standard Steel Frames.
 - 2. Section 087100 - Door Hardware.
 - 3. Section 088000 - Glazing.

1.2 REFERENCES

- A. Architectural Woodwork Manufacturers Association of Canada/Woodwork Institute:
 - 1. North American Architectural Woodwork Standards, Version 3.1. (NAAWS)

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special blocking for hardware, factory finishing criteria, identify cutouts for glazing and louvers.
- C. Product Data: Submit information on door core materials and construction, and on veneer species, type and characteristics.
- D. Samples:
 - 1. Submit one sample of door veneer, illustrating wood grain and finish.
- E. Closeout Procedures: Manual for Materials and Finishes.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with NAAWS Section 9, Custom Grade.
- B. Finish doors in accordance with NAAWS Section 5, Custom Grade.
- C. Fire Rated Door and Transom Construction: Conform to one of the following:
 - 1. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
 - 2. UL 10C, Category A.
 - 3. 20-Minute Fire Rated Corridor Doors: Fire tested without hose stream test.

- D. Installed Fire Rated Door and Transom Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.
- E. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements.
- B. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer when stored more than one week.
- C. Accept doors on site in manufacturer's packaging. Inspect for damage.
 - 1. Break seal on site to permit ventilation.

1.6 COORDINATION

- A. Section 013100 -Project Management and Coordination: Coordination and project conditions.
- B. Coordinate Work with door opening construction, door frame and door hardware installation.

1.7 WARRANTY

- A. Section 017700 - Closeout Procedures: Warranties
- B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.
- C. Furnish manufacturer's "Life of Installation" warranty for interior doors.
- D. Include coverage of refinishing and re-hanging of defective products.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. OregonDoor.
- B. Lynden Door.
- C. Masonite Architectural.
- D. Vancouver Door.
- E. VT Industries.

- F. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.2 DOOR TYPES

- A. Interior Doors: 1-3/4 inch thick; solid core; 5-ply construction, fire rated where scheduled.

- 1. Performance Duty Level: Extra Heavy Duty.

2.3 DOOR CONSTRUCTION

- A. Core (Solid, Non-Rated): NAAWS Section 9, Type SCL-Glued Block or PC-Particleboard.

- B. Core (Solid, Fire Rated): NAAWS Section 9, Type FD, fire resistive composite.

- 1. All fire rated doors shall be supplied to meet UL10C positive pressure standards. All required intumescent seals shall be concealed into the edge of the door; frame applied intumescent seals are not acceptable.

2.4 DOOR FACING

- A. Veneer Facing (Interior Flush Doors): NAAWS Grade A, hard white maple, plain sliced with book-matched grain for transparent finish. (DR-1)

- B. Minimum Width of Face Components: 5 inches.

- C. No sharp color contrasts at joints.

2.5 ADHESIVE

- A. Facing Adhesive: Type I - waterproof.

2.6 ACCESSORIES

- A. Glass: As specified in Section 088000 - Glazing.

- B. Glazing Stops:

- 1. Non-rated doors: Wood, of same species as door facing for non-rated doors. Face flush with door face, 1/16 inch reveal at joint, with mitered corners.
 - 2. Rated doors: Rolled steel channel shape, mitered corners.

- C. Acoustical Seals: Specified in Section 087100 - Door Hardware.

2.7 FABRICATION

- A. Fabricate non-rated doors in accordance with NAAWS Section 9 requirements.

- B. Provide lock blocks at lock edge and top of door for closer for hardware reinforcement at all doors.

- C. Vertical Exposed Edge of Stiles: Of same or compatible species as veneer facing for transparent finish.
- D. Bond edge banding to cores.
- E. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Provide solid blocking for through bolted hardware.
- F. Factory pre-fit doors for frame opening dimensions identified on shop drawings.

2.8 FINISH

- A. Factory finish doors in accordance with NAAWS Section 5, Custom Grade.
 - 1. Clear Transparent Type: System 9; UV curable epoxy, polyester, urethane.
- B. Seal all six sides with clear sealer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

- A. Install doors in accordance with NAAWS Section 9 and manufacturer's instructions.
- B. Trim non-rated door width by cutting equally on both jamb edges if needed.
- C. Trim door height by cutting bottom edges to maximum of 3/4 inch if needed.
- D. Machine cut doors for hardware installation.
- E. Coordinate installation of doors with installation of frames specified in Section 081214 - Standard Steel Frames, and hardware specified in Section 087100 - Door Hardware.
- F. Coordinate installation of glass and glazing specified in Section 088000 - Glazing.

3.3 INSTALLATION TOLERANCES

- A. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over imaginary 36 x 84 inches surface area.

- B. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over imaginary 36 x 84 inches surface area.
- C. Maximum Width Distortion (Cup): 1/16 inch measured with straight edge or taut string, edge to edge, over imaginary 36 x 84 inches surface area.

3.4 ADJUSTING

- A. Section 017000 - Execution.
- B. Adjust door for smooth and balanced door movement.
- C. Adjust closer for full closure.

3.5 SCHEDULE

- A. Refer to Door and Frame Schedule on the Drawings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes prefabricated floor hatches, with operable hardware and release mechanism.
- B. Related Sections:
 - 1. Section 061000 - Rough Carpentry: Wood framing for rough opening.
 - 2. Section 055000 - Metal Fabrications: accessory framing materials and folding access ladder.

1.2 REFERENCES

- A. U.S. Department of Labor Occupational Safety & Health Administration:
 - 1. OSHA 29 CFR 1910.23 - Guarding floor and wall openings and holes.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on unit construction, sizes, configuration, jointing methods and locations when applicable, and attachment method.
- C. Manufacturer's Installation Instructions: Indicate special installation criteria and interface with adjacent components.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Hatches to support a minimum live load of 150 psf with a maximum deflection of 1/150th of the span.

2.2 ROOF HATCHES

- A. Manufacturers:
 - 1. Babcock-Davis Hatchways.
 - 2. The Bilco Company. (Basis of design)
 - 3. Dur Red Products.
 - 4. O'Keeffe's Inc.
 - 5. J.L. Industries.
 - 6. Nystrom.
 - 7. Substitutions: Section 012500 - Substitution Procedures.
- B. Product Description: Type Q - Angle Frame Access Door by the Bilco Company.
 - 1. Floor Hatches:
 - a. Single Leaf Personnel Access: 30" x 60".

2.3 COMPONENTS

- A. Flush Steel Cover: ¼" steel diamond pattern.
- B. Frame: ¼" steel angle with strap anchors welded to exterior.
- C. Hardware: Manufacturer's standard finish:
 - 1. Lifting mechanisms: cam-action hinges shall pivot on torsion bars to provide, smooth, easy and controlled cover operation throughout the entire arc of opening and to act as a check in retarding downward motion of the cover when closing.
 - 2. A removable exterior turn/lift handle with a spring loaded ball detent shall be provided to open the cover.
 - 3. Steel hold open arm that automatically locks the cover in the open position.
 - 4. Hinges: Manufacturer's recommended type for specific type of floor hatch, bolted to the underside of the cover.

2.4 ACCESSORIES

- A. Anchorage Devices: Type recommended by manufacturer.
- B. Protective Coating: Red oxide prime paint or manufacturer's standard corrosion resistant finish.

2.5 FABRICATION

- A. Fabricate components free of visual distortion and free of defects. Weld corners and joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify openings and substrate conditions are ready to receive Work of this section.

3.2 INSTALLATION

- A. Install hatches in strict accordance with manufacturer's written instructions and approved submittals.
- B. Install curb assembly, fastening securely to floor decking.
- C. Lubricate hinges for smooth operation. Adjust cover to open and close properly.

3.3 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Wash down exposed surfaces; wipe surfaces clean.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes

1. Interior access doors and panels with frames.

B. Related Sections:

1. Section 033000 - Cast-In-Place Concrete: Casting openings in concrete floors and walls for access doors and floor doors.
2. Section 077233 - Roof Hatches.
3. Section 087100 - Door Hardware: Mortise or rim cylinder locks and master keying.
4. Section 092116 - Gypsum Board Assemblies: Coordinating materials and framing that affect installation of access doors and frames in interior walls and ceilings.
5. Section 095123 - Acoustical Tile Ceilings: Acoustical tile and suspension systems that affect installation of access doors and frames and for access tile in suspended acoustical tile ceilings.
6. Section 099000 - Painting and Coating: Field paint finish.
7. Division 22: Coordination for access to plumbing valves and controls. Coordinate drain connection for floor door.
8. Division 23: Coordination with HVAC for access to hidden controls, dampers, etc.
9. Division 26: Coordination with electrical for required access panels.

1.2 REFERENCES

A. Intertek Testing Services (Warnock Hersey Listed):

1. WH - Certification Listings.

B. National Fire Protection Association:

1. NFPA 80 - Standard for Fire Doors, Fire Windows.

C. Underwriters Laboratories Inc.:

1. UL - Building Materials Directory.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate exact position of access door units.

- C. Product Data: Submit literature indicating sizes, types, finishes, hardware, scheduled locations, and details of adjoining Work.
- D. Manufacturer's Installation Instructions: Submit installation requirements and rough-in dimensions.
- E. Section 017000 - Execution: Project Record Documents- Record actual locations of access units.

1.4 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing products specified with minimum three years documented experience.

1.5 COORDINATION

- A. Section 013100 - Project Management and Coordination: Project Coordination.
- B. Coordinate Work with work requiring controls, valves, traps, dampers, cleanouts, and similar items requiring operation being located behind finished surfaces.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND PANELS

- A. Manufacturers:
 - 1. J. L. Industries.
 - 2. Karp Associates, Inc.
 - 3. Nystrom Products Co.
 - 4. Milcor LTD, Partnership.
 - 5. Substitutions: Under provisions of Section 012500.
- B. Description: Provide for access to controls, valves, traps, dampers, cleanouts, and similar items requiring operation behind inaccessible finished surfaces.
 - 1. Coordinate exact locations with various trades to assure proper placement of access doors and panels.
- C. Interior Non Rated Flush Access Panels:
 - 1. Frame: 16 gage steel with a 1 inch wall flange.
 - 2. Door: Minimum 16 gage steel access door.
 - 3. Hinge: Minimum 90 degree continuous concealed hinge.

4. Finish: Manufacturer's shop primer.
5. Lock: Flush screwdriver-operated steel cam or cylinder lock keyed to district standard.

2.2 FABRICATION

- A. Furnish each access panel assembly manufactured as an integral unit, complete and ready for installation.
- B. Provide attachment devices and fasteners of the type required to secure access doors to the types of support shown.
- C. Flush Access Panels: Fabricate units of continuous welded construction; weld, fill, and grind joints to assure flush and square unit.
- D. Latching Mechanisms: Furnish number required to hold panels in flush, smooth plane when closed.
 1. For cylinder locks, furnish 2 keys per lock and key all locks alike.
 2. For recessed panels, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.
- E. Touch up shop primer and prepare for field paint finish coat.
- F. Size Variations: Obtain acceptance of manufacturer's standard size units which vary slightly from sizes shown or scheduled.

2.3 SHOP FINISHING

- A. Base Metal Protection: Galvanized finish. Prime coat units with baked on primer.
- B. Finish: Field paint to match wall or ceiling surfaces as specified Section 099000.
 1. Lift Assistance: Torsion bars pivoted on cam-action hinges. Automatic hold-open arm.
 2. Finish: mill finish
 3. Hardware: stainless steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions. Coordinate with individual Sections, including Division 22, Division 23, and Division 26 for access doors, as needed, for access to heating, ventilating, air conditioning, electrical and other equipment.
- B. Verify rough openings for access doors and panels are correctly sized and located.

3.2 INSTALLATION

- A. Install access doors per manufacturers' written instructions.
- B. Secure frames rigidly in place, plumb and level in opening, with plane of door and panel face aligned with adjacent finished surfaces.
- C. Position unit to provide convenient access to concealed work requiring access.

3.3 ADJUSTING AND CLEANING

- A. Adjust access panels to operate easily without binding. Verify that integral locking/latching devices operate properly.
- B. Remove panels and frames that are warped, bowed, or otherwise damaged, and replace with new components.
- C. On completion of access panel installation, clean interior and exterior surfaces as recommended by manufacturer.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Non-rated coiling counter door.
2. Operating hardware.
3. Electrical operation.
4. Provide wiring from electric circuit disconnect to door operator to control station.

B. Related Sections:

1. Section 055000 - Metal Fabrications: Framing door opening, steel angle, bent plate, corner guards and bollards.
2. Section 079200 - Joint Sealants: Weatherproof joints at hoods.
3. Section 083113 - Access Doors and Frames: Maintenance openings in ceiling and soffits.

1.2 REFERENCES

A. Underwriters Laboratories:

1. UL 325 - Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- C. Product Data: Submit general construction, component connections and details.
- D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, and adjustment and alignment procedures.
- E. Section 017700 - Closeout Procedures.
- F. Maintenance and Operating Manual: Submit recommended areas to be inspected and inspection intervals. Submit lubrication requirements and frequency, and periodic adjustments required.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Cookson/Cornell, ESC 10.
- B. McKeon Door.
- C. Overhead Door Corp.
- D. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.2 MATERIALS

- A. Overhead Coiling Counter Door. Mounted as detailed, non-rated:
 - 1. Curtain: Conforming to the following:
 - a. Slats: Interlocking, minimum 22 gage stainless steel, flat both sides. Stainless steel angle bottom bar with lift handles and vinyl astragal.
 - 2. Endlocks: Fabricate interlocking slat sections with high strength molded nylon endlocks rieted to ends of alternate slats.
 - 3. Guides: Stainless steel.
 - 4. Roller Shaft Counterbalance: Steel pipe and torsion spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension.
 - 5. Brackets: Fabricate from reinforced steel plate with bearings at rotating support points to support counterbalance shaft assembly and form end closures.
- B. Electric Operator:
 - 1. Description: UL 325, side mounted, open dripproof motor.
 - 2. Motor Enclosure: NEMA MG1 Type 1 enclosure.
 - 3. Motor Rating: Continuous duty, hp as required for door.
 - 4. Motor Voltage: 115 single phase, 60 Hz.
 - 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.

6. Controller Enclosure: NEMA 250 Type 1.
7. Door Speed: 6 inches per second.
8. Brake: Adjustable friction clutch type, activated by motor controller.
9. Control Stations:
 - a. Interior Control Station: Keyed switch operation.
10. Safety Edge: Manufacturer's standard cordless safety edge located at door bottom, full width, sensitized type, to reverse upon striking object.

2.3 SHOP FINISHING

- A. Stainless steel: #4 finish.
- B. Steel: Hot dip galvanized.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify opening sizes, tolerances and conditions are acceptable.

3.2 INSTALLATION

- A. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- B. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- C. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- D. Coordinate installation of electrical service with Division 26. Complete wiring from disconnect to unit components and from fire alarm system to door operator.
- E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 079200 - Joint Sealants.
- F. Install perimeter trim and closures.

3.3 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maintain dimensional tolerances and alignment with adjacent Work.
- C. Maximum Variation From Plumb: 1/16 inch.
- D. Maximum Variation From Level: 1/16 inch.

- E. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.4 ADJUSTING

- A. Section 017000 - Execution: Testing, adjusting, and balancing.
- B. Adjust shutter, hardware and operating assemblies for smooth and noiseless operation.

3.5 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Clean shutter and components.
- C. Remove labels and visible markings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes non-rated coiling doors, operating hardware, electrical operation.
 - 1. Provide wiring from electric circuit disconnect to door operator to control station.
- B. Related Sections:
 - 1. Section 055000 - Metal Fabrications: Framing door opening, steel angle, bent plate, corner guards and bollards.
 - 2. Section 079200 - Joint Sealants: Weatherproof joints at hoods.
 - 3. Section 083113 - Access Doors and Frames: Maintenance openings in ceiling and soffits.
 - 4. Section 092216 - Non Structural Metal Framing: Gage at framing for overhead coiling door openings.
 - 5. Section 099000 - Paints and Coatings: Field painting of factory primed doors.
 - 6. Division 26 - Electrical: Electrical conduit, wiring, and controls.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy- Coated (Galvannealed) by the Hot-Dip Process.
- B. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
 - 3. NEMA MG 1 - Motors and Generators.
- C. Underwriters Laboratories:
 - 1. UL 325 - Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.

- C. Product Data: Submit general construction, component connections and details, wiring diagram and electrical equipment.
- D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, and adjustment and alignment procedures.
- E. Section 017700 - Closeout Procedures.
- F. Maintenance and Operating Manual: Submit recommended areas to be inspected and inspection intervals. Submit lubrication requirements and frequency, and periodic adjustments required.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design:
 - 1. Coiling Service Door: Cookson/Cornell ESD10.
- B. McKeon Door.
- C. Overhead Door Corp.
- D. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.2 MATERIALS

- A. Overhead Coiling Door. Mounted as detailed, non-rated:
 - 1. Curtain: Conforming to the following:
 - a. Slats: No. 5F, minimum 20 gage AISI type 304 stainless steel with bottom bar. Two 2 x 2 x 1/8 inch AISI 300 series stainless steel angles.
 - 2. Endlocks: Alternate slats each secured with two 1/4 inch rivts. Fabricate interlocking sections with high strength nylon.
 - 3. Heavy duty bottom bar: 6 x 2 x 3/8 inch aluminum tubular extrusion.
 - 4. Guides: Minimum 3/16 inch stainless steel angles. Top of inner and outer guide angles to be flared outwards to form bellmouth. Provide removable guide stoppers to prevent over travel of curtain and bottom bar. Standard configuration.

5. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension.
6. Brackets: Fabricate from minimum 3/16 inch steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
7. Electric Operator:
 - a. Description: UL 325, side mounted, open dripproof motor.
 - b. Motor Enclosure: NEMA MG1 Type 1 enclosure.
 - c. Motor Rating: Continuous duty, hp as required for door.
 - d. Motor Voltage: 115 single phase, 60 Hz.
 - e. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
 - f. Controller Enclosure: NEMA 250 Type 1.
 - g. Door Speed: 6 inches per second.
 - h. Brake: Adjustable friction clutch type, activated by motor controller.
8. Control Stations:
 - a. Interior Control Station: Keyed switch operation keyed to district standard.
9. Safety Edge: Manufacturer's standard cordless safety edge located at door bottom, full width, sensitized type, to reverse upon striking object.

2.3 SHOP FINISHING

- A. Stainless Steel: #4 finish.
- B. Aluminum: Clear anodized.
- C. Steel: Hot dipped galvanized. ASTM A123, Grade 85 zinc coating, hot-dip galvanized after fabrication.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify opening sizes, tolerances and conditions are acceptable.

3.2 INSTALLATION

- A. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

- B. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- C. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- D. Coordinate installation of electrical service with Division 26. Complete wiring from disconnect to unit components and from fire alarm system to door operator.
- E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 079200 - Joint Sealants.
- F. Install perimeter trim and closures.

3.3 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maintain dimensional tolerances and alignment with adjacent Work.
- C. Maximum Variation From Plumb: 1/16 inch.
- D. Maximum Variation From Level: 1/16 inch.
- E. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.4 ADJUSTING

- A. Section 017000 - Execution: Testing, adjusting, and balancing.
- B. Adjust door, hardware and operating assemblies for smooth and noiseless operation.

3.5 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Clean doors and components.
- C. Remove labels and visible markings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes aluminum-framed storefronts including aluminum frames, doors, hardware, and glass.
- B. Related Sections:
 - 1. Section 051200 - Structural Steel Framing: Steel support
 - 2. Section 055000 - Metal Fabrications: Steel fabricated: attachment devices, Framed openings.
 - 3. Section 072116 - Blanket Insulation: Insulation materials field installed with aluminum-framed entrances and storefront.
 - 4. Section 072600 - Vapor Retarders: Perimeter vapor seal between glazing system and adjacent construction.
 - 5. Section 072700 - Air Barriers: Perimeter air seal between glazing system and adjacent construction.
 - 6. Section 078400 - Firestopping: Fire stop at system junction with structure.
 - 7. Section 079200 - Joint Sealants: System perimeter sealant and back-up materials.
 - 8. Section 087100 - Door Hardware: Mortised hardware reinforcement requirements affecting framing members, and door hardware items.
 - 9. Section 088000 - Glazing: Glass and glazing requirements.
 - 10. Section 122413 - Roller Shades: Roller Shade supports and attachments to framing members.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
 - 1. AAMA 503 - Voluntary Specification for Field Testing of Metal Storefronts. Curtain Wall and Sloped Glazing Systems.
 - 2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 - 3. AAMA MCWM-1 - Metal Curtain Wall Manual.
- B. ASTM International:
 - 1. ASTM A36 - Standard Specification for Carbon Structural Steel.

2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 3. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 4. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 5. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 6. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 7. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Skylights, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 8. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 9. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- C. National Fenestration Rating Council Incorporated:
1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors.
- D. The Society for Protective Coatings:
1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
 2. SSPC Paint 25 - Red Iron Oxide, Zinc Oxide, Raw Linseed Oil, and Alkyd Primer.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.
- C. Product Data: Submit component dimensions; describe components within assembly, anchorage and fasteners and glass and infill.
- D. Samples: Submit one samples 12 x 12 inches in size illustrating finished aluminum surface, glass units, and glazing materials.
- E. Design Data: Indicate framing member structural and physical characteristics, calculations, dimensional limitations.

- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- G. Section 017700 - Closeout Procedures.
- H. Manual for Materials and Finishes: Submit list of substances harmful to component materials.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA MCWM-1 - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Qualifications:
 - 1. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.
 - 2. Design structural support framing components under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.
- C. Pre-Installation Meeting:
 - 1. Section 013119 - Project Meetings: Pre-installation meeting.
 - 2. Convene minimum 1 week prior to commencing work of this section.

1.5 DELIVERY, STORAGE, AND PROTECTION

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Handle Products of this section in accordance with AAMA MCWM-1 - Curtain Wall Manual #10.
- C. Protect finished aluminum surfaces. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Do not install sealants or glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.7 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Coordinate the Work with installation of firestopping, air barrier, and vapor retarder components or materials.

1.8 WARRANTY

- A. Section 017700 - Closeout Procedures: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for glazed units.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Kawneer Co. Inc. <http://www.kawneer.com>
 - 1. VG 451T, front set, interior glazed.
 - 2. Local Rep: Bud Henson, 360.600.0804.
- B. EFCO Corp, www.efcocorp.com
- C. Substitutions under provisions of Section 012500.

2.2 SYSTEM DESCRIPTION

- A. Aluminum-framed storefront systems includes tubular aluminum sections with supplementary internal support framing, shop fabricated, factory finished, glass and glazing, related flashings, anchorage and attachment devices. Separate exterior aluminum from interior aluminum by a rigid, structural thermal barrier. Frames for interior glazing need not to be thermally broken.
 - 1. Face Width: 2 inch typical, 4 inch where noted on drawings.
 - 2. Back Member Depth: 4 ½ inch.
 - 3. Glazing Infill: 1".
 - 4. Mullions: Profile of extruded sheet aluminum with internal reinforcement of aluminum or shaped steel structural section.
 - 5. Doors: Basis of Design - Kawneer, 500T Insulpour Thermal Entrance.
 - a. Dimensions: Vertical Stile- 5 inch; Top Rail - 5 inch; Bottom Rail - 12 inch; Crossrail - 8 1/4 inch.
 - 6. Related flashings, anchors and attachment devices.

2.3 DESIGN REQUIREMENTS

- A. Performance Requirements:
 - 1. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners, in accordance with ASTM E330 and IBC version indicated on Sheet S001.

2. Deflection: Limit mullion deflection to 1/175 for spans under 13'-6" and 1/240 plus 1/4 inch for spans over 13'-6"; with full recovery of glazing materials.
3. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
4. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E283.
5. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
6. Water Leakage: None, when measured in accordance with ASTM E331. There shall be no leakage at a minimum static air pressure differential of 10 psf.
7. Thermal Transmittance of Assembly: Maximum U-value of 0.40 at operable fenestration; 0.38 at fixed fenestration; and 0.60 at entrance doors: U-Factor as determined, certified, and labeled in conformance to NFRC 100 by independent agency licensed by NFRC. Meet or exceed Washington State Energy Code.
8. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over 12 hour period without causing detrimental effect to system components and anchorage.

B. Regulatory Requirements

1. Conform to Washington State Non-Residential Energy Code for shading coefficients and U-Factors.
2. Safety Glazing: Conform to IBC, Chapter 24.
3. Framing Load Combinations Considerations: Include applicable seismic and wind loads as specified by Structural General Notes.

2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical, 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209, 5005 alloy, H15 or H34 temper.
- C. Sheet Steel: ASTM A653; galvanized to minimum G90.
- D. Steel Sections: ASTM A36; shaped to suit mullion sections, galvanized.
- E. Glass: Specified in Section 088000 - Glazing.

- F. Glazing: Dry glazed with interior and exterior preset EPDM or silicone gaskets, setting blocks and shims as specified by Section 088000. Storefront manufacturer's standard types to suit application and to achieve weather, moisture, and air infiltration requirements.

2.5 COMPONENTS

- A. Filler Plates: Manufacturer's standard aluminum and vinyl filler plates to close off back side of frame at jambs and heads.
- B. Compensation Channel: Aluminum.
- C. Aluminum Back Angle: 1/16" x 1/2" x 1/2".
- D. Hardware: Provide door hardware specified in Section 087100 - Door Hardware.
- E. Flashings: Minimum thickness to match mullion sections where exposed.
- F. Firestopping: Specified in Section 078400.
- G. Vapor Retarder: Specified in Section 072600.
- H. Air Barrier: Specified in Section 072700.
- I. Sealant and Backing Materials:
 - 1. Sealant Used within System (Not Used for Glazing): Manufacturer's standard materials to achieve weather, moisture, and air infiltration requirements.
 - 2. Perimeter Sealant: Specified in Section 079200 - Joint Sealants.
- J. Fasteners: Stainless steel.

2.6 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Reinforce interior horizontal head rail to receive blind track brackets and attachments.
- F. Prepare components with internal reinforcement for door hardware.
- G. Reinforce framing members for imposed loads.

2.7 SHOP FINISHING

- A. Painted Aluminum Surfaces:

1. High Performance Organic Coating: Fluoropolymer coating system complying with AAMA 2605 minimum two-coat, with minimum 70 percent polyvinylidene fluoride resin.
2. Color: Anodized Black (Kawneer #29).
- B. Concealed Steel Items: Galvanized to ASTM A123; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.
- C. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- D. Shop and Touch-Up Primer for Steel Components: SSPC Paint 25 red oxide.
- E. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.
- F. Extent of Finish:
 1. Apply factory coating to surfaces exposed at completed assemblies.
 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings and adjoining air and vapor seal materials are sealed together and ready to receive Work of this Section.

3.2 INSTALLATION

- A. Install wall system in accordance with AAMA MCWM-1 - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and aligning with adjacent Work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.

- F. Install sill flashings per storefront manufacturer's details. Turn up ends and edges; seal to adjacent Work to form water tight dam.
- G. Coordinate attachment and seal of perimeter air and vapor retarder materials.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install integral flashings and integral joint sealers.
- J. Set thresholds in sealant and secure.
- K. Install hardware using templates provided. Refer to Section 087100 - Door Hardware, for installation requirements.
- L. Install infill panels using method required to achieve performance criteria.
- M. Coordinate installation of glass with Section 088000 - Glazing; separate glass from metal surfaces.
- N. Coordinate installation of perimeter sealants with Section 079200 - Joint Sealants.

3.3 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements, Section 017000 - Execution and Section 017700 - Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspection to monitor quality of installation and glazing.
 - 1. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
 - a. Testing: Testing shall be performed by a qualified independent testing agency. Testing Standard per AAMA 503, including reference to ASTM E783 for Air Infiltration Test and ASTM E1105 Water Infiltration Test.
 - 1) Air Infiltration Tests: Conduct tests in accordance with ASTM E783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², whichever is greater.

- 2) Water Infiltration Tests: Conduct tests in accordance with ASTM E1105. No water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.2 psf (300 Pa).

3.5 ADJUSTING

- A. Section 017000 - Execution: Testing, adjusting and balancing.
- B. Adjust operating hardware and sash for smooth operation.

3.6 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution: Protecting installed construction.
- B. Protect finished Work from damage.
- C. Remove protections at substantial completion.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Factory fabricated fiberglass windows with operating sash.
- B. Glazed by factory.
- C. Operating hardware.
- D. Increased scope bid as Alternate 1.

1.2 RELATED REQUIREMENTS

- A. Section 088000 - Glazing.

1.3 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights 2017.
- B. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products 2012.
- C. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- E. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).
- F. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- G. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors 2002 (Reapproved 2018).
- H. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference 2015.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.5 SUBMITTALS

- A. Refer to Section 013300.
- B. Product Data: Provide component dimensions, anchors, fasteners, glass, and internal drainage details.
- C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work, installation requirements.
- D. Manufacturer's Certificate: Certify that products of this section meet or exceed specified requirements.
- E. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
 - 1. Evidence of AAMA Certification.
 - 2. Evidence of WDMA Certification.
 - 3. Evidence of CSA Certification.
 - 4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.
- F. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.
- G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Mockup:
 - 1. Provide fiberglass window portion of multi-component exterior wall mock-up under provisions of Section 014000 - Quality Requirements.
 - 2. When accepted, mock-up will demonstrate minimum standard for the Work.
 - 3. Work of this section shall not proceed until approval of the mock-up.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.
- B. Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.

1.8 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and after installation of sealants.

1.9 WARRANTY

- A. Refer to Section 017700.
- B. Correct defective Work within a five year period after Date of Final Completion.
- C. Provide ten year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same. Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fiberglass Windows:
 - 1. Pella Corporation; Pella Impervia: www.pellacommercial.com/#sle.
 - 2. Cascadia Windows.
 - 3. Substitutions: Refer to Section 012500.

2.2 WINDOW UNITS

- A. Fiberglass Windows: Hollow, tubular, multi-layer fiber reinforced material; factory fabricated; with vision glass, related flashings, anchorage and attachment devices.
 - 1. Configuration: As indicated on drawings.
 - 2. Product Type: AP - Awning projected window and FW - Fixed window in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
 - 3. Color: Manufacturer's standard Black.
 - 4. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.

5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
6. Thermal Movement: Design to accommodate thermal movement caused by 100 degrees F temperature change without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.

2.3 PERFORMANCE REQUIREMENTS

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
 1. Performance Class (PC): CW.
 2. Performance Grade (PG): 50, with minimum design pressure (DP) of 50 psf.
- B. Deflection: Limit member deflection to L/175 (or 3/4 inch max) of the longer dimension with full recovery of glazing materials.
- C. Fenestration Assembly Thermal Transmittance (U-value): Maximum U-value of 0.30 at operable fenestration and 0.38 at fixed fenestration; U-Factor as determined, certified, and labeled in conformance to NFRC 100 by independent agency licensed by NFRC. Meet or exceed Washington State Energy Code.
- D. Window Water Penetration, ASTM E547: No water penetration through window when tested under static pressure of 7.5 psf (54 mph) after 4 cycles of 5 minutes each, with water being applied at a rate of 5 gallons per hour per square foot.
- E. Air Leakage: 0.3 cfm/sq ft maximum leakage when tested at 1.57 psf pressure difference in accordance with ASTM E283/E283M.
- F. Acoustic Performance: Refer to drawings for exact locations.
 1. Typ: 32 STC.
 2. South and East facade: 36 STC.

2.4 COMPONENTS

- A. Frame:
 1. Type: Refer to drawings .
 2. Interior and Exterior Frame: Pultruded, fiberglass composite.
 3. Overall Frame Depth: 3 1/4 inches.
 4. Nominal Wall Thickness of Fiberglass Members: 0.070 inch to 0.135 inch.
 5. Frame Corners:

- a. Mitered.
 - b. Joined and bonded with thermoset polyurethane adhesive, nylon corner lock, and mechanically fastened.
- 6. Interior glazed with weeps on exterior.
- B. Clips: Provide installation clips at block frame.
- C. Fasteners: Stainless steel.
- D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.5 GLASS AND GLAZING MATERIALS

- A. Glazing:
 - 1. Float Glass: ASTM C 1036, Quality 1.
 - 2. Tempered Glass: ASTM C 1048.
 - 3. Type: EPDM foam glazed.
 - 4. Heat-Strengthened Glass.
- B. Refer to Section 088000 for glazing requirements.

2.6 HARDWARE

- A. Operator: Roto operator assembly.
 - 1. Steel worm gear sash operator with hardened gears.
 - 2. Operator base is zinc die cast with painted finish.
 - 3. Operator linkage is 300 series stainless steel.
 - 4. Exposed fasteners are stainless steel.
 - 5. External Hardware Salt Spray Exposure, ASTM B117: Exceed 1000 hours.
 - 6. Hinge slide and hinge arms - 300 series stainless steel.
- B. Locking System: Multi lock System.
 - 1. Single handle locking system.
 - 2. Operate positive-acting arms that reach out and pull sash into locked position.
- C. Limited Opening Hardware: Nominal opening - 3 inches. Stainless steel. Factory installed.
- D. Finish For Exposed Hardware: Match window finish.

2.7 ACCESSORIES

- A. Flashing/Sealant Tape: Pella SmartFlash.
 - 1. Aluminum-foil-backed butyl window and door flashing tape.
 - 2. Maximum Total Thickness: 0.013 inch.
 - 3. UV resistant.
 - 4. Verify sealant compatibility with sealant manufacturer.
- B. Aluminum Back Angles:
 - 1. 1/16 inch x1 inch x1.5 inch
- C. Interior Insulating-Foam Sealant: Low-expansion, low-pressure polyurethane insulating window and door foam sealant.
- D. Exterior Perimeter Sealant: "Pella Window and Door Installation Sealant" or equivalent high quality, multi-purpose sealant as specified in the joints sealant section.

2.8 FABRICATION

- A. Fabricate framing, mullions and sash members with fusion welded corners and joints, in a rigid jig. Supplement frame sections with internal reinforcement where required for structural rigidity.
- B. Form snap-in glass stops, closure molds, weather stops, and flashings for tight fit into window frame section.
- C. Form weather stop flange to perimeter of unit.
- D. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- E. Arrange fasteners to be concealed from view.
- F. Permit internal drainage weep holes and channels to migrate moisture to exterior. Provide internal drainage of glazing spaces to exterior through weep holes.
- G. Double weatherstrip operable units.
- H. Factory glaze window units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.

3.2 INSTALLATION

- A. Install windows in accordance with manufacturer's instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Set sill members and sill flashing in continuous bead of sealant.
- E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

3.3 TOLERANCES

- A. Maximum Variation from Level or Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.

3.4 FIELD QUALITY CONTROL

- A. Provide services of fiberglass window manufacturer's field representative to observe for proper installation of system and submit report.
- B. See Section 014000 - Quality Requirements, for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.
- C. Provide field testing of installed fiberglass windows by independent laboratory in accordance with AAMA 502 and AAMA/WDMA/CSA 101/I.S.2/A440 during construction process and before installation of interior finishes.
 - 1. Perform tests on three individual windows in designated locations as indicated on drawings.
 - 2. Conduct tests on individual windows prior to 5 percent and 50 percent completion of this work.
 - 3. Field test for water penetration in accordance with ASTM E1105 using Procedure B - cyclic static air pressure difference; test pressure shall not be less than 1.9 psf.
 - 4. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 6.27 psf.
 - a. Maximum allowable rate of air leakage is 0.10 cfm/sq ft.
- D. Repair or replace fenestration components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.5 ADJUSTING

- A. Adjust hardware for smooth operation and secure weathertight closure.

3.6 CLEANING

- A. Refer to Section 017700.
- B. Remove protective material from pre-finished surfaces.
- C. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.
- D. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior aluminum, heavy-duty commercial sliding transaction windows.
- B. Related Sections:
 - 1. Section 062000 – Finish Carpentry.
 - 2. Section 079200 – Joint Sealants.
 - 3. Section 081213 – Hollow Metal Frames.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.3 SUBMITTALS

- A. Section 013300 - Submittals: Requirements for submittals.
- B. Product Data: Submit manufacturer's technical product data substantiating that products comply.
- C. Shop drawings: Submit for fabrication and installation of windows. Include details, elevations and installation requirement of finish hardware and cleaning.

1.4 QUALITY ASSURANCE

- A. Qualifications
 - 1. Manufacturer: Company specializing in manufacturing commercial aluminum windows with minimum three years experience.
 - 2. Installer: Company specializing in installation of commercial aluminum windows with minimum three years experience.

1.5 DELIVERY, STORAGE, AND PROTECTION

- A. Section 016500 – Delivery Storage and Handling: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver windows crated to provide protection during transit and job storage.
- C. Inspect windows upon delivery for damage. Unless minor defects can be made to meet the Architect's specifications and satisfaction, damaged parts should be removed and replaced.
- D. Store windows at building site under cover in dry location.

1.6 FIELD CONDITIONS

- A. Field Measurements: Field measure to confirm actual rough opening dimensions prior to fabrication.

PART 2 PRODUCTS

2.1 ALUMINUM WINDOWS

- A. Basis of Design:
 - 1. Interior sliding transaction window: DW3400DU, Deluxe Sliding Service Window manufactured by C.R. Laurence Co., Inc. (800) 421-6144.

2.2 COMPONENTS – INTERIOR SLIDING TRANSACTION WINDOW

- A. Frames: ASTM B221; 6063-T5 extruded aluminum.
- B. Top-hung heavy-duty ball bearing slides.
- C. Poly-pile weather stripping and self-latching handle.
- D. Glazing to be ½” tempered.

2.3 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush and hairline.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to ensure concealment from view.
- E. Prepare components with internal reinforcement for operating hardware.
- F. Furnish internal reinforcement in mullions with primed steel members to maintain rigidity.
- G. Factory glaze window units.

2.4 FINISHES

- A. Interior Sliding Transaction Window: Clear Anodized Finish, AAMA 611.
- B. Handles, Locks, Operators, and Exposed Hardware: Enameled to match window finish.
- C. Galvanizing for Nuts, Bolts and Washers: ASTM A153/A153M.

2.5 ACCESSORIES

- A. Fasteners and Anchors: Stainless steel. Concealed or matching finish of frames.

- B. Visual Glass Dividers: Formed aluminum, fitted against interior of glazed surface, secured with spring loaded steel pins into plastic sockets.
- C. Limit Stops: Resilient rubber.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify wall openings are ready to receive Work of this section.

3.2 INSTALLATION

- A. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- B. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent Work.
- C. Install operating hardware.
- D. Install sealant between frames and hollow metal in accordance with Section 079200.

3.3 TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.

3.4 ADJUSTING

- A. Adjust hardware for smooth operation.

3.5 CLEANING

- A. Remove protective material from factory finished aluminum surfaces.
- B. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant and window manufacturer.

3.6 PROTECTION

- A. Institute protective measures required throughout the remainder of the construction period to ensure that all the windows do not incur any damage or deterioration, at the time of acceptance.

END OF SECTION

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Work under this section includes the complete finish hardware requirements for the project. Quantities listed are for the contractor's convenience only and are not guaranteed. Items not specifically mentioned, but necessary to complete the work shall be furnished, matching the items specified in quality and finish.
- B. Related Sections:
 - 1. Section 08 Hollow Metal Doors and Frames
 - 2. Section 08 Wood Doors
 - 3. Section 08 Aluminum Entrances and Storefronts
 - 4. Section 28 Electronic Security and Safety

1.2 QUALITY ASSURANCE

- A. Product Qualification:
 - 1. To assure a uniform high quality of materials for the project, it is intended that only specified items be furnished. Comparable products may be accepted upon prior approval of architect.
 - 2. Hardware to be new, free of defects, blemishes and excessive play. Obtain each kind of hardware (Mechanical latch and locksets, exit devices, hinges and closers) from one manufacturer except where specified.
 - 3. Fire-Rated opening in compliance with NFPA80. Hardware UL10C/UBC-7-2 (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved bearing hinges and smoke seal. Furnish openings complete.
- B. Supplier Qualifications:
 - 1. Hardware supplier will be a direct factory contract supplier who employs a certified Architectural Hardware Consultant (AHC) available at all reasonable times during the course of the work for project hardware consultation to owner, architect and contractor.
 - 2. Supplier will be responsible for detailing, scheduling and ordering of finish hardware.
 - 3. Conduct pre-installation conference at jobsite. Initiate and conduct with supplier, installer and related trades. Coordinate materials and techniques and sequence complex hardware items and systems installation.
 - 4. Key Conference shall be initiated and conducted with owner to determine system, keyway(s) and structure.
- C. Installer Qualifications:

1. Installer to have not less than 3 years' experience specializing in installation of work in this section. Company must maintain qualified personnel trained and experienced in installing hardware.

13 REFERENCES

- A. NFPA80 – Fire Doors and Windows
- B. NFPA101 – Life Safety Code
- C. NFPA105 – Smoke and Draft Control Door Assemblies
- D. ANSI A117.1 - Accessible and Usable Buildings and Facilities
- E. BHMA – Builders Hardware Manufacturers Association
- F. DHI – Door Hardware Institute

14 SUBMITTALS

- A. Hardware schedule: Submit digital copies of schedule. Organize vertically formatted schedule into Hardware Sets with index of doors and headings, indicate complete designations of every item required for each door or opening. Include the following:
 1. Type, style, function, size, quantity and finish of hardware items.
 2. Name, part number and manufacture of each item.
 3. Fastenings and other pertinent information.
 4. Explanation of abbreviations, symbols and codes contained in schedule.
 5. Door and frame sizes, materials and degrees of swing.
- B. Product Data: Submit digital copies for each product indicated.
- C. Templates: Obtain and distribute templates for doors, frames, and other works specified to be prepared for installing door hardware.
- D. Wiring/Riser diagrams: As required for electric hardware indicated.
- E. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.
- F. Keying Schedule: Prepared by or under the supervision of supplier, after receipt of the approved finish hardware schedule, detailing Owner's final keying instructions for locks.
- G. Samples: Upon request submit material samples.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, handle and protect products to project site under provisions of Division 1 and as specified herein.
- B. Tag each item or package separately, with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver keys to Owner by registered mail.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Years from date of Substantial Completion, for durations indicated.
 - a. Closers: Thirty years
 - b. Automatic operators: Two years
 - c. Exit Devices: Three years mechanical, one year electrical
 - d. Locksets: Three years mechanical, one year electrical

1.7 MAINTENANCE

- A. Extra Materials:
 - 1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - a. 5 EA ND75TD locksets
- B. Maintenance tools:
 - 1. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 - PRODUCTS

2.1 MATERIAL AND FABRICATION

- A. Provide all door hardware for complete work, in accordance with the drawings and as specified herein.
- B. Provide items and quantities not specifically mentioned to ensure a proper and complete operational installation.

22 MANUFACTURERS

- A. Approval of products from manufacturers indicated as “Acceptable Manufacturer” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

ITEM	SCHEDULED MANUFACTURER	ACCEPTABLE MANUFACTURER
Hinges	Ives (IVE)	Stanley
Flush Bolts & Coordinators	Ives (IVE)	None
Locksets & Deadlocks	Schlage (SCH)	None
Exit Devices & Mullions	Von Duprin (VON)	None
Electric Strikes	Von Duprin (VON)	None
Power Supplies	Von Duprin (VON)	None
Cylinders & Keying	Schlage (SCH)	None
Door Closers	LCN (LCN)	None
Automatic Operators	LCN (LCN)	Norton, Besam
Door Trim	Ives (IVE)	None
Protection Plates	Ives (IVE)	None
Overhead Stops	Glynn-Johnson (GLY)	Rixson, ABH
Thresholds & Weatherstrip	Zero (ZER)	NGP, Reese, Pemko

23 HANGING

- A. Conventional Hinges: Hinge open width minimum, but of sufficient throw to permit maximum door swing. Steel or stainless steel pins:
1. Three hinges per leaf to 7 feet, 6-inch height. Add one for each additional 30 inches in height or any fraction thereof.
 2. Provide standard-weight 4 ½ x 4 ½ for 1 ¾” thick doors up to 3’5”. Provide heavy-weight 5 x 4 ½ on doors 36” and over.
 3. Exterior outswing doors to have non removable (NRP) pins.
 4. Pin tips, flat button, finish to match leaves.
 5. Interior doors over 36” – Heavy weight.
 6. Interior doors up to 36” – Standard weight.

24 LOCKSETS, LATCHSETS, DEADBOLTS

- A. Extra Heavy Duty Cylindrical Locks and Latches: Schlage ND Series
1. Provide cylindrical locks conforming to ANSI A156.2 Series 4000, Grade 1.
 2. UL listed for A label and lesser class single doors up to 4ft x 8ft.
 3. Meets A117.1 Accessibility Codes.
 4. Provide solid steel rotational stops to control excessive rotation of lever.
 5. Provide completely refunctionable lockset that allows lock function to be changed to over twenty other common functions by swapping easily accessible parts.

6. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
7. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
8. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
9. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
10. Lever Trim: Solid cast levers without plastic inserts, and wrought roses on both sides.
 - a. Lever Design: Schlage Sparta

25 EXIT DEVICES

A. Panic and Fire Rated Exit Devices: Von Duprin 98/99 Series

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1, AND UL listed for Panic Exit or Fire Exit Hardware.
2. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
3. Quiet Operation: Incorporate fluid damper or other device that eliminates noise of exit device operation.
4. Touchpad: Extend minimum of one half of door width, but not the full length of exit device rail. Provide end-cap with two-point attachment to door. Provide compression springs in devices, latches, and outside trims or controls; tension springs prohibited.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrical requirements.
6. Static Load Resistance, Rim Exit Devices: 2000+ lbs.
7. Latchbolt, Rim Exit Devices: Non-tapered smart latchbolt with 90° latchbolt to strike engagement under stress.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Locate exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion that is removed by use of a keyed cylinder, which is self-locking when re-installed. Provide mullion stabilizers and storage kits at all mullion locations.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set.
 - a. Lever Style: Match lever style of locksets.

26 ELECTRIC STRIKES

A. Manufacturers and Products: Von Duprin 6000 Series

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary-resistant.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide fail-secure type electric strikes, unless specified otherwise.
5. Coordinate voltage and provide transformers and rectifiers for each strike as required.

27 KEYS, KEYING, AND KEY CONTROL

A. See Keying Requirements in this section

28 CLOSERS

A. Surface Closers: LCN 4010/4110 Series

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Certify surface mounted mechanical closers to meet fifteen million (15,000,000) full load cycles. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2 inch (38 mm) diameter with 11/16 inch (17 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within 6-inch (152 mm) top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powdercoating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI/BHMA Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

29 AUTOMATIC OPERATORS

A. Electro-Hydraulic Automatic Operator: LCN 4600 Series

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check valve, sweep valve, latch valve to control door.
6. Provide drop plates, brackets, or adapters for arms as required for details.
7. Provide hard-wired actuator switches for operation as specified.
8. Provide weather-resistant actuators at exterior applications.
9. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.
10. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
11. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

210 OTHER HARDWARE

A. Door stops: Provide stops to protect walls, casework or other hardware.

1. Except as otherwise indicated, provide stops (wall, floor or overhead) at each leaf of every swinging door leaf.
2. Where wall or floor stops are not appropriate, provide overhead holders.

B. Weatherstrip and Gasket

1. Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled.
2. Provide non-corrosive fasteners as recommended by the manufacturer for application indicated.

C. Thresholds

1. Except as otherwise indicated, provide standard metal threshold unit of type, size and profile as detailed or scheduled.

D. Silencers

1. Interior hollow metal frames, 3 for single doors, 2 for pairs of doors.

E. Kickplates

1. Four beveled edges, .050 inches minimum thickness, height and width as scheduled.
Sheet-metal screws of bronze or stainless steel to match other hardware.

211 HARDWARE FINISH

- A. Provide the following finishes unless noted differently in hardware groups:

Hinges	630 Stainless Steel Exterior, 652 Dull Chrome Interior
Locksets	626 Dull Chrome
Exit Devices	626 Dull Chrome
Closers	689 Aluminum
Kickplates	630 Stainless Steel
Other Hardware	626 Dull Chrome
Thresholds	Aluminum
Weatherstrip/Sweeps	Aluminum

212 KEYING REQUIREMENTS

- A. All keyed cylinders shall be subject to a existing Schlage Masterkey system.
- B. Furnish cylinders with construction cores. Following construction supply permanent keyed cores.
- C. Cylinders to be furnished with visual key control with key code. Stamped on the face of the keys and marked on the back or side of the cylinders.
- D. Key Quantities
- | | |
|----|--------------------------------------|
| 6 | EA Master Keys |
| 4 | EA Control Keys |
| 2 | EA Construction Control Keys |
| 10 | EA Construction Keys |
| 3 | EA Change Keys per keyed alike group |

PART 3 - EXECUTION

3.1 PREPARATION

- A. Ensure that walls and frames are square and plumb before hardware installation.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes. Notify Architect of any code conflicts before ordering materials.

32 INSTALLATION

- A. Do not install surface mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation.
- B. Locate floor stops not more than 4 inches from the wall.
- C. Drill pilot holes for fasteners in wood doors and/or frames.

33 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

34 DEMONSTRATION

- A. Demonstrate electrical, electronic and pneumatic hardware system including adjustment and maintenance procedures.

35 PROTECTION/CLEANING


- A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

36 DOOR HARDWARE GROUPS

HW SET: 00
















QTY	DESCRIPTION	CATALOG NUMBER	FINISH MFR
1		BALANCE OF HARDWARE EXISTING	

HW SET: 00A

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	FSIC CORE	23-030		626	SCH
1			BALANCE OF HARDWARE EXISTING			
















*REPLACE EXISTING CORE WITH NEW CONTRACTOR PROVIDED AND KEYED TO NEW SITE
MASTER*

HW SET: 01

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10	 ⚡	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-DT 24 VDC	 ⚡	626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-NL 24 VDC	 ⚡	626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
2	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111 EDA X 4110-61		689	LCN
1	EA	SURF. AUTO OPERATOR	4642 WMS FLUSH CEILING MOUNT	 ⚡	689	LCN
1	EA	ACTUATOR, TOUCHLESS	8310-810D *VESITBULE BOLLARD*	⚡	630	LCN
1	EA	ACTUATOR, TOUCHLESS	8310-813J *INTERIOR JAMB*	⚡	BLK	LCN
1	EA	BOLLARD	RD21	⚡	630	WIK
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
1	EA	DOOR SWEEP	8192AA		AA	ZER
1	EA	THRESHOLD	671 BEVELED EDGES SERIES PER ARCH DETAIL		A	ZER
1	EA	POWER SUPPLY	PS904 900-4RL 120/240 VAC	 ⚡	LGR	SCE
1			CARD READER - WORK OF DIVISION 28			
1	EA		WEATHERSTRIP BY DOOR/FRAME MANUFACTURER			













DOORS NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK DOORS AND ENABLE OUTSIDE ACTUATOR. WHEN DOORS TO BE UNLOCKED, ACCESS CONTROL WILL MAKE DOORS PUSH/PULL AND ENABLE OUTSIDE ACTUATOR. INSIDE ACTUATOR ALWAYS ENABLED. ACTUATORS WILL AUTOMATICALLY OPEN ACTIVE LEAF. DOORS WILL REMAIN LOCKED AND AUTOMATIC OPERATOR WILL DISABLE ON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HW SET: 01A

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10		✎ 689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-DT 24 VDC		✎ 626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-NL 24 VDC		✎ 626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
2	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111 EDA X 4110-61		689	LCN
1	EA	SURF. AUTO OPERATOR	4642 LONG WMS FLUSH CEILING MOUNT		✎ 689	LCN
2	EA	ACTUATOR, TOUCHLESS	8310-810R *WALL*		✎ 630	LCN
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
1	EA	DOOR SWEEP	8192AA		AA	ZER
1	EA	THRESHOLD	671 BEVELED EDGES SERIES PER ARCH DETAIL		A	ZER
1	EA	POWER SUPPLY	PS904 900-4RL 120/240 VAC		✎ LGR	SCE
1			CARD READER - WORK OF DIVISION 28			
1	EA		WEATHERSTRIP BY DOOR/FRAME MANUFACTURER			















DOORS NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK DOORS AND ENABLE OUTSIDE ACTUATOR. WHEN DOORS TO BE UNLOCKED, ACCESS CONTROL WILL MAKE DOORS PUSH/PULL AND ENABLE OUTSIDE ACTUATOR. INSIDE ACTUATOR ALWAYS ENABLED. ACTUATORS WILL AUTOMATICALLY OPEN ACTIVE LEAF. DOORS WILL REMAIN LOCKED AND AUTOMATIC OPERATOR WILL DISABLE ON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HW SET: 02

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10		✂ 689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
2	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-DT 24 VDC		✂ 626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
2	EA	OH STOP	100S		630	GLY
2	EA	SURFACE CLOSER	4111 EDA X 4110-61		689	LCN
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
2	EA	DOOR SWEEP	8192AA		AA	ZER
1	EA	THRESHOLD	545A		A	ZER
1	EA	POWER SUPPLY	PS904 900-4RL 120/240 VAC		✂ LGR	SCE
1			CARD READER - WORK OF DIVISION 28			
1	EA		WEATHERSTRIP BY DOOR/FRAME MANUFACTURER			












DOORS NORMALLY CLOSED AND LOCKED, NO ACCESS. WHEN DOORS TO BE UNLOCKED ACCESS CONTROL WILL MAKE PUSH/PULL. DOORS WILL REMAIN LOCKED ON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HW SET: 03

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10		✂ 689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-DT 24 VDC		✂ 626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-NL 24 VDC		✂ 626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
2	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111 EDA X 4110-61		689	LCN
1	EA	SURF. AUTO OPERATOR	4642 WMS FLUSH CEILING MOUNT		✂ 689	LCN
1	EA	ACTUATOR, TOUCHLESS	8310-810D *EXTERIOR BOLLARD*		✂ 630	LCN
1	EA	ACTUATOR, TOUCHLESS	8310-813J *VESTIBULE JAMB*		✂ BLK	LCN
1	EA	BOLLARD	RD22		✂ 630	WIK
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
2	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	547A		A	ZER
1			CARD READER - WORK OF DIVISION 28			
1	EA		WEATHERSTRIP BY DOOR/FRAME MANUFACTURER			









DOORS NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK DOORS AND ENABLE OUTSIDE ACTUATOR. WHEN DOORS TO BE UNLOCKED, ACCESS CONTROL WILL MAKE DOORS PUSH/PULL AND ENABLE OUTSIDE ACTUATOR. INSIDE ACTUATOR ALWAYS ENABLED. ACTUATORS WILL AUTOMATICALLY OPEN ACTIVE LEAF. DOORS WILL REMAIN LOCKED AND AUTOMATIC OPERATOR WILL DISABLE ON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HW SET: 04

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10		✂ 689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
2	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-DT 24 VDC		✂ 626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
2	EA	OH STOP	100S		630	GLY
2	EA	SURFACE CLOSER	4111 EDA X 4110-61		689	LCN
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
2	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	547A		A	ZER
1			CARD READER - WORK OF DIVISION 28			
1	EA		WEATHERSTRIP BY DOOR/FRAME MANUFACTURER			












DOORS NORMALLY CLOSED AND LOCKED, NO ACCESS. WHEN DOORS TO BE UNLOCKED ACCESS CONTROL WILL MAKE PUSH/PULL. DOORS WILL REMAIN LOCKED ON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HW SET: 05

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE		✂ 630	VON
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1			CARD READER - WORK OF DIVISION 28			
1			POWER SUPPLY - WORK OF DIVISION 28			






DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL WILL MOMENTARILY RELEASE ELECTRIC STRIKE, UNLOCKING DOOR. DOOR WILL REMAIN LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HW SET: 05W









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1HW 5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE		630	VON
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	870AA-S		AA	ZER
1	EA	DOOR BOTTOM	360AA		AA	ZER
1	EA	COVER PLATE	600CPA-BV		A	ZER
1	EA	MOUNTING BRACKET	870SPB			ZER
1			CARD READER - WORK OF DIVISION 28			
1			POWER SUPPLY - WORK OF DIVISION 28			

DOOR NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL WILL MOMENTARILY RELEASE
ELECTRIC STRIKE, UNLOCKING DOOR. DOOR WILL REMAIN LOCKED UPON LOSS OF POWER. FREE
EGRESS AT ALL TIMES.






HW SET: 06

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM SECURITY	ND75TD SPA XN12-035		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	GASKETING	488SBK PSA		BK	ZER






HW SET: 06-STC

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM SECURITY	ND75TD SPA XN12-035		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	GASKETING	488SBK PSA		BK	ZER
1	SET	GASKETING	870AA-S		AA	ZER
1	EA	DOOR BOTTOM	360AA		AA	ZER
1	EA	COVER PLATE	600CPA-BV		A	ZER







HW SET: 07

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	DBL CYL STORE W/DB	L9466T 17A		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	GASKETING	488SBK PSA		BK	ZER







HW SET: 08

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CORRIDOR LOCK	L9456T 17A L583-363 L283-722		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	GASKETING	488SBK PSA		BK	ZER






HW SET: 09

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER








HW SET: 10

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	ND10S SPA		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	SET	GASKETING	870AA-S		AA	ZER
1	EA	DOOR BOTTOM	360AA		AA	ZER
1	EA	COVER PLATE	600CPA-BV		A	ZER






HW SET: 11

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM SECURITY	ND75TD SPA XN12-035		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE






HW SET: 11-STC

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM SECURITY	ND75TD SPA XN12-035		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	SET	GASKETING	870AA-S		AA	ZER
1	EA	DOOR BOTTOM	360AA		AA	ZER
1	EA	COVER PLATE	600CPA-BV		A	ZER







HW SET: 12

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CORRIDOR LOCK	L9456T 17A L583-363 L283-722		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER








HW SET: 13

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	FACULTY RESTROOM	L9485T 17A L583-363 L283-722		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER








HW SET: 14

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4111 AVB SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER












HW SET: 14W

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP & HOLDER	100H		630	GLY
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER











HW SET: 15

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	PANIC HARDWARE	LD-98-NL		626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4111 AVB SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HW SET: 16









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	PANIC HARDWARE	CDSI-98-NL		626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	360AA		AA	ZER
1	EA	COVER PLATE	600CPA-BV		A	ZER

HW SET: 17










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD EPT		628	IVE
1	EA	POWER TRANSFER	EPT10		✂ 689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-NL 24 VDC		✂ 626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4111 AVB SCUSH X 4110-61 X 4110-30		689	LCN
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	655A		A	ZER
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		✂ LGR	SCE
1		CARD READER - WORK OF DIVISION 28				
1	EA	WEATHERSTRIP BY DOOR/FRAME MANUFACTURER				

DOORS NORMALLY CLOSED AND LOCKED. WHEN DOORS TO BE UNLOCKED, ACCESS CONTROL WILL RETRACT AND HOLD LATCHBOLTS, DOORS WILL BE PUSH/PULL. LATCH RETRACTION WILL DISABLE AND DOORS WILL REMAIN LOCKED ON LOSS OF POWER.

HW SET: 18







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	SET	GASKETING	870AA-S		AA	ZER
1	EA	DOOR BOTTOM	360AA		AA	ZER
1	EA	COVER PLATE	600CPA-BV		A	ZER

HW SET: 19











QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PANIC HARDWARE	9849-DT		626	VON
1	EA	PANIC HARDWARE	9849-NL		626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4111 EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7850		689	LCN
1	EA	GASKETING	488SBK PSA		BK	ZER

DOOR(S) NORMALLY UNLOCKED AND HELD OPEN BY WALL MAGNETS. DOOR(S) WILL SELF CLOSE AND LATCH UPON LOSS OF POWER OR SIGNAL FROM FIRE ALARM. FREE EGRESS AT ALL TIMES.












HW SET: 20

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE


HW SET: 21

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
2	SET	CONST LATCHING BOLT	FB61P		630	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4111 AVB SCUSH		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	ASTRAGAL	43STST		STST	ZER

HW SET: 22







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		628	IVE
1	EA	PANIC HARDWARE	LD-XP98-NL		626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS18L		BLK	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	655A		A	ZER

HW SET: 23





QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	MORTISE CYLINDER	30-001		626	SCH
1		BALANCE OF HARDWARE BY DOOR MANUFACTURER				

VERIFY CYLINDER REQUIREMENTS PRIOR TO ORDERING





HW SET: 24

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	PANIC HARDWARE	LD-98-L-BE-17		626	VON
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER















HW SET: 25

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE














HW SET: 25W

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

HW SET: 26








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD		628	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	PANIC HARDWARE	LD-XP98-EO		626	VON
1	EA	PANIC HARDWARE	LD-XP98-NL		626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4111 AVB SCUSH		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
2	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	655A		A	ZER

HW SET: 27






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD EPT		628	IVE
1	EA	POWER TRANSFER	EPT10		✎ 689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-NL 24 VDC		✎ 626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	SURF. AUTO OPERATOR	4642 WMS FLUSH CEILING MOUNT		✎ 689	LCN
1	EA	ACTUATOR, TOUCHLESS	8310-810R *EXTERIOR WALL*		✎ 630	LCN
1	EA	ACTUATOR, TOUCHLESS	8310-813J *INTERIOR JAMB*		✎ BLK	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS18L		BLK	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	655A		A	ZER
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		✎ LGR	SCE
1		CARD READER - WORK OF DIVISION 28				

DOOR(S) NORMALLY CLOSED AND LOCKED. WHEN DOOR(S) TO BE UNLOCKED, ACCESS CONTROL WILL RETRACT AND HOLD LATCHBOLTS AND ENABLE OUTSIDE ACTUATORS. DOOR(S) WILL BE PUSH/PULL, AND PUSHING ACTUATORS WILL AUTOMATICALLY OPEN DOOR(S). LATCH RETRACTION AND AUTOMATIC OPERATOR WILL DISABLE AND DOOR(S) WILL REMAIN LOCKED ON LOSS OF POWER.

















HW SET: 28

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
2	EA	PANIC HARDWARE	9847-L-BE-LBR-17		626	VON
2	EA	SURFACE CLOSER	4111 EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	THRESHOLD	546A		A	ZER

HW SET: 29















QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	ND70TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP	90S		630	GLY
3	EA	SILENCER	SR64		GRY	IVE

HW SET: 30

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10		✂ 689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-DT 24 VDC		✂ 626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-NL 24 VDC		✂ 626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4111 AVB SCUSH		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
2	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	655A		A	ZER
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		✂ LGR	SCE
1		CARD READER - WORK OF DIVISION 28				
















DOOR(S) NORMALLY CLOSED AND LOCKED. VALID CREDENTIAL WILL MOMENTARILY UNLOCK.
DOOR(S) WILL REMAIN LOCKED ON LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HW SET: 31













QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10		✎ 689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-DT 24 VDC		✎ 626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-XP98-NL 24 VDC		✎ 626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
2	EA	OH STOP	100S		630	GLY
2	EA	SURFACE CLOSER	4111 EDA X 4110-61		689	LCN
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
2	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	547A		A	ZER
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		✎ LGR	SCE
1	EA	WEATHERSTRIP BY DOOR/FRAME MANUFACTURER				

DOOR(S) NORMALLY CLOSED AND LOCKED, ACCESS BY VALID CREDENTIAL. WHEN DOOR(S) TO BE UNLOCKED, ACCESS CONTROL WILL MAKE PUSH/PULL. DOOR(S) WILL REMAIN LOCKED ON LOSS OF POWER. FREE EGRESS AT ALL TIMES.








HW SET: 32

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	PANIC HARDWARE	CDSI-98-DT		626	VON
1	EA	PANIC HARDWARE	CDSI-98-NL		626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
3	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
4	EA	FSIC CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4111 EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	WALL STOP/HOLDER	FS495		626	IVE
1	SET	GASKETING	870AA-S		AA	ZER
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
2	EA	DOOR BOTTOM	360AA		AA	ZER
1	EA	THRESHOLD	546A		A	ZER
4	EA	MOUNTING BRACKET	870SPB			ZER

















HW SET: 33

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD		628	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	PANIC HARDWARE	LD-XP98-DT		626	VON
1	EA	PANIC HARDWARE	LD-XP98-NL		626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
2	EA	OH STOP	100S		630	GLY
2	EA	SURFACE CLOSER	4111 EDA X 4110-61		689	LCN
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
2	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	671 BEVELED EDGES SERIES		A	ZER
			PER ARCH DETAIL			
1	EA		WEATHERSTRIP BY			
			DOOR/FRAME MANUFACTURER			

HW SET: 34

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CORRIDOR LOCK	L9456T 17A L583-363 L283-722		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER



HW SET: 35

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	PANIC HARDWARE	CDSI-98-DT		626	VON
1	EA	PANIC HARDWARE	CDSI-98-NL		626	VON
1	EA	MULLION STORAGE KIT	MT54		689	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
3	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
4	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP & HOLDER	100H		630	GLY
2	EA	SURFACE CLOSER	4111 EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP/HOLDER	FS495		626	IVE
1	SET	GASKETING	870AA-S		AA	ZER
1	EA	MULLION SEAL	8780NBK PSA		BK	ZER
2	EA	DOOR BOTTOM	360AA		AA	ZER
1	EA	THRESHOLD	546A		A	ZER
4	EA	MOUNTING BRACKET	870SPB			ZER

HW SET: 36






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1			HARDWARE BY GATE MANUFACTURER			

HW SET: 37






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1			BALANCE OF HARDWARE EXISTING			

VERIFY COMPATIBILITY WITH EXISTING CONDITIONS










HW SET: 38

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	GASKETING	488SBK PSA		BK	ZER








HW SET: 39

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	FACULTY RESTROOM	L9485T 17A L583-363 L283-722		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	GASKETING	488SBK PSA		BK	ZER









HW SET: 40

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM DEADBOLT	B663T		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	PUSH PLATE	8200 4" X 16"		630	IVE
1	EA	PULL PLATE	8302 8" 4" X 16" G		630	IVE
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE







HW SET: 41

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PUSH PLATE	8200 4" X 16"		630	IVE
1	EA	PULL PLATE	8302 8" 4" X 16" G		630	IVE
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE








HW SET: 42

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM DEADBOLT	B663T		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	PUSH PLATE	8200 4" X 16"		630	IVE
1	EA	PULL PLATE	8302 8" 4" X 16" G		630	IVE
1	EA	SURFACE CLOSER	4111 AVB SHCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE






HW SET: 43

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER









HW SET: 44W

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP/HOLDER	FS495		626	IVE
3	EA	SILENCER	SR64		GRY	IVE









HW SET: 45

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	ND70TD SPA		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE












HW SET: 46

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM SECURITY	ND75TD SPA XN12-035		626	SCH
1	EA	FSIC CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4111 AVB SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	360AA		AA	ZER
1	EA	COVER PLATE	600CPA-BV		A	ZER

HW SET: 47

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	PANIC HARDWARE	CDSI-98-NL		626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4111 AVB SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HW SET: 48

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	PANIC HARDWARE	CDSI-98-NL		626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	FSIC CORE	23-030		626	SCH
1	EA	OH STOP & HOLDER	100H		630	GLY
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	360AA		AA	ZER
1	EA	COVER PLATE	600CPA-BV		A	ZER

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes glass for metal frames, doors, windows, storefronts, and curtainwalls.
 - 1. Glass glazing materials and installation requirements are included in this section for other sections referencing this section.
- B. Related Sections:
 - 1. Section 064100 - Architectural Casework.
 - 2. Section 072700 - Air Barriers.
 - 3. Section 079200 - Joint Sealants.
 - 4. Section 081214 - Hollow Metal Frames.
 - 5. Section 081416 - Flush Wood Doors: Glazed doors.
 - 6. Section 081713 - Integrated Metal Door Assemblies.
 - 7. Section 084113 - Aluminum-Framed Entrances and Storefronts.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.
- B. American Society of Civil Engineers:
 - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International:
 - 1. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 - 2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 - 3. ASTM C1193 - Standard Guide for Use of Joint Sealants.
 - 4. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 - 5. ASTM E546 - Standard Test Method for Frost Point of Sealed Insulating Glass Units.
 - 6. ASTM E576 - Standard Test Method for Frost Point of Sealed Insulating Glass Units in the Vertical Position.

7. ASTM E1300 - Standard Practice for Determining the Minimum Thickness of Annealed Glass to Resist a Specific Load.
 8. ASTM E2190 Standard Specification for Insulating Glass Unit Performance and Evaluation
- D. Consumer Product Safety Commission:
1. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Material.
- E. Glass Association of North America:
1. GANA - Sealant Manual.
 2. GANA - Glazing Manual.
 3. GANA - Laminated Glazing Reference Manual

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Product Data: For each glass product and glazing material indicated.
1. Glass: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
 2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors where exposed.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- D. Samples:
1. Glass: Submit one sample, 12 x 12 inch in size, illustrating each glass unit specified, coloration and design.
 2. Glazing Materials: Submit 6 inch long bead of glazing sealant and gaskets, color as selected.
- E. Certificates: Certify products meet or exceed specified requirements.
- F. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual, GANA Sealant Manual, and GANA Laminated Glass Reference Manual for glazing installation methods.

- B. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- C. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
 - 1. Lites more than 9 square feet (sf) in area are required to be Category II materials.
 - 2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites, more than 9 sf. in area, provide glazing products that comply with Category II materials, and for lites 9 sf. or less in area, provide glazing products that comply with Category I or II materials.
- D. Qualifications
 - 1. Installer: Company specializing in performing Work of this section with minimum five years documented experience.
 - 2. Insulating Glass Manufacturer: A qualified insulating-glass manufacturer whose specific production location and equipment for this project is certified by the coated glass manufacturer.
- E. Regulatory Requirements
 - 1. Safety Glazing: Conform to IBC 2406 for locations within doors, windows, and other openings specified by Sections related to work of this Section.
 - 2. Shading Coefficients and U-Factors: Conform to Washington State Non Residential Energy Code.
- F. Mock up
 - 1. Provide under Quality Requirements provisions of Section 014000.
 - 2. Provide glazing portion of multi component exterior wall mock-up as described in Section 014000.
- G. Pre-Installation Meeting
 - 1. Section 013119 - Meetings: Pre-installation meeting.
 - 2. Convene minimum one week before starting Work of this section.
- H. Source Limitations for Glass: Obtain all glazing from single manufacturer.
- I. Source Limitation for Glazing Accessories: Obtain all glazing accessories from single manufacturer.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation or other causes.
- B. Section 016000 - Product Requirements.
- C. Do not install glazing sealants when ambient temperature is less than 40 degrees F.
- D. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Delivery:
 - 1. Deliver glass to site in accordance with manufacturer's instructions.
 - 2. Deliver glass in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer.
- C. Storage:
 - 1. Store glass in accordance with manufacturer's instructions.
 - 2. Store glass in clean, dry area indoors.
 - 3. Protect from exposure to direct sunlight and freezing temperatures.
 - 4. Apply temporary coverings loosely to allow adequate ventilation.
 - 5. Protect from contact with corrosive chemicals.
 - 6. Avoid placement of glass edge on concrete, metal, and other hard objects.
 - 7. Rest glass on clean, cushioned pads at 1/4-points.
- D. Handling:
 - 1. Handle glass in accordance with manufacturer's instructions.
 - 2. Protect glass from damage during handling and installation.
 - 3. Do not slide one lite of glass against another.
 - 4. Do not use sharp objects near unprotected glass.

1.7 WARRANTIES

- A. Glazing Installer to warrant the installed glazing, agreeing to provide full material and labor to replace any and all broken glazing for a period of five (5) years from the date of Substantial Completion- except for breakages caused by misuse, impact, vandalism, or civil unrest.
- B. Glazing Sub-Contractor/installer to warrant and agree to replace all glass units broken by temperature changes, proven flaws in materials or workmanship, and normal deflection up to the specified limits for a period of five (5) years from date of Substantial Completion, excluding damage from misuse, impact, or vandalism.
- C. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass that deteriorates within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
- D. Special Warranty on Insulating Glass: Provide written warranty signed by manufacturer of insulating glass, agreeing to furnish FOB project site replacements for insulating glass units which have deteriorated. Warranty shall be for a period of 10 years from date of Substantial Completion. "Deteriorated" shall be defined as having a failure in the seals of the glass units causing constant or intermittent appearance of condensation or other loss of visual clarity.
- E. Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units which have deteriorated. Warranty shall be for a period of 10 years from date of Substantial Completion. "Deteriorated" shall be defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allow by referenced laminated-glass standard.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Float Glass and Coated Glass:
 - 1. Basis of Design: Guardian (www.guardian.com).
 - 2. Viracon (www.viracon.com).
 - 3. Vitro. (www.vitroglazings.com).
- B. Insulated Units:
 - 1. Basis of Design: Hartung Glass-Seattle, WA. <http://hartung-glass.com>

2. Garibaldi Glass- Burnaby, BC. www.garibaldiglass.com
3. Northwest Industries-Seattle, WA. <http://nwiglass.com>
4. Oldcastle Glass- Langley, BC. www.oldcastleglass.com
5. Vitrum Industries-Langley, BC. www.vitrumindustries.com

C. Substitutions: Under provisions of Section 012500.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Provide glass and glazing materials for continuity of building enclosure weather resistive barrier:
 1. In conjunction with materials described in Section 072700 and 079200.
 2. To utilize inner pane of multiple pane sealed units for continuity of weather resistive seal.
 3. To maintain continuous weather resistive barrier and vapor retarder throughout glazed assembly from glass pane to heel bead of glazing sealant.
- C. Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass as calculated in accordance with applicable code, to design pressure as measured in accordance with ASTM E330, as calculated in accordance with ASCE 7 - Calculation of Wind Loads.
- D. Seismic Requirements: Determine in conformance to ASCE 7, Section 13.5.9.
- E. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E1300 by a qualified professional engineer.
 1. Design Wind Pressures: Refer to Structural General Notes.
 2. Design Snow Loads: Refer to Structural General Notes.
 3. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short duration load.
 4. Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass to resist each of the following combinations of loads:
 - a. Outward design wind pressure minus the weight of the glass. Base design on glass type factors for short-duration load.

- b. Inward design wind pressure plus the weight of the glass plus half of the design snow load. Base design on glass type factors for short duration load.
 - c. Half of the inward design wind pressure plus the weight of the glass plus the design snow load. Base design on glass type factors for long-duration load.
- 5. Differential Shading: Design glass to resist thermal stresses induced by differential shading with individual glass lites.
- F. The center-of-glass deflection of the glazing shall be limited so that all of the following requirements are met:
 - 1. The structural capacity of the glazing composition is not exceeded.
 - 2. The glazing composition remains reliably engaged with a suitable margin of safety under the most critical design condition.
 - 3. The center-of-glass deflection does not exceed 1".
 - 4. The center-of-glass deflection does not exceed the short side dimension of the unit divided by 100.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 FLOAT GLASS PRODUCTS

- A. Float Glass: Comply with ASTM C 1036, Type 1, Class 1, q3, unless otherwise indicated.
- B. Heat Treated Float Glass: Comply with ASTM C 1048, Type 1, Class 1, q3 unless otherwise indicated, of Kind and Condition indicated.
- C. Laminated Float Glass: Comply with ASTM C 1172 and testing requirements in 16 CFR1201 for Category II materials, and with other specific requirements indicated. Use materials that have a proven record of not tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

2.4 MONOLITHIC UNITS

- A. (GL-1) Clear Heat Strengthened Glass: ¼ inch, Quality Q3, Kind HS heat strengthened, Condition A uncoated, float glass.
- B. (GL-2): Clear Tempered, ¼ inch, Kind FT Condition A; where safety glazing is required, unless otherwise indicated. Provide safety glazing label.
- C. (GL-3) Clear Tempered Glass, 3/8 inch, Kind FT, Condition A. Provide safety glazing label where required. Flat polished at exposed edges.

2.5 LAMINATED UNITS

- A. (GL-4) Clear Heat Strengthened Laminated Glass: ¼ inch, Kind HS; two 1/8 inch layers with .060 inch clear pvb interlayer.

2.6 INSULATING UNITS

- A. Low Emissivity Coating (Low E): Low-emissivity coated glass produced by sputter coating technology applied in a vacuum chamber. Coating shall be applied to the #2 surface. Low-emissivity coated glass shall meet the following performance values; values listed have been based on Guardian SN 68 on Clear and Guardian SNX 62/27 on Clear in a double panel 1 inch insulating unit. Approved equals also accepted. Substitutions refer to Section 012500. (No Low E coating on North facing windows, EXCEPT WINDOW UNIT W18. This window is North facing but requires Low-E Coating).

- 1. SN 68 on Clear

- a. Visible light transmittance: 68% minimum.
- b. U-Value: Winter (Argon Filled Cavity Space) - 0.25 maximum.
- c. Solar Heat Gain Coefficient: .38 maximum.
- d. Shading Coefficient: .43 maximum.
- e. Outdoor Visible Light Reflectance: 11% maximum.

- B. Double Pane Insulating Units: Qualify according to ASTM E2190, with glass elastomer edge seal and dehydrated interspace.

- 1. (IG-1) Heat Strengthened/Heat Strengthened.

- a. Total Thickness: 1 inch nominal.
- b. Exterior Pane: GL-1.
- c. Interspace: ½ inch, 90% argon/10% air fill.
- d. Interior Pane: GL-1.

- 2. (IG-2) Tempered/Laminated

- a. Total Thickness: 1 inch nominal.
- b. Exterior Pane: GL-2.
- c. Interspace: ½ inch, 90% argon/10% air fill.
- d. Interior Pane: GL-4.
- e. Provide safety glazing label.

3. (IG-3) Acoustical
 - a. Total Thickness: 1 inch nominal.
 - b. Exterior Pane: GL-4.
 - c. Interspace: ½ inch, 90% argon/10% air fill.
 - d. Interior Pane: GL-4.

2.7 ACCESSORIES

- A. Glazing Materials: Select glazing sealants, tapes, stainless steel spacers, gaskets and additional glazing materials of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units and glazing channel substrates, under conditions of installation and service, as recommended by manufacturer.
- B. Silicone Glazing Sealant: ASTM C920, Type S, Grade NS, Class and Use suitable for glazing application indicated; single component; chemical solvent curing; capable of water immersion without loss of properties; non-bleeding, non-staining, cured Shore A hardness of 15 to 25 and as specified Section 079200.
 1. Structural Silicone Sealant: Conform to ASTM C1184 and provisions of Section 079200.
 2. Color: As selected by Architect from manufacturer's complete range.
- C. Setting Blocks: Silicone compatible EPDM or silicone, 80 to 90 Shore A Durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- D. Spacer Shims: Silicone compatible EPDM or silicone, 50 to 60 Shore A durometer hardness, minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- E. Glazing Gaskets: ASTM C864 Option II, resilient Silicone compatible EPDM or silicone, extruded shapes to suit glazing channel retaining slot, 50 to 60 Shore A durometer hardness, one piece with molded corners, black color.
- F. Glazing Tapes:
 1. Preformed butyl compound with integral resilient tube spacing device, 10 to 15 Shore A durometer hardness, coiled on release paper, size and thickness as required for conditions of installation, black color.
 2. Expanded Cellular Glazing Tapes: Conform to AAMA 800.
 3. Spacer Tape in Continuous Contact with Silicone: Tested for compatibility and approved for intended purpose by sealant manufacturer.

- G. Temporary Glazing Clips: Manufacturer's standard type.
- H. Extruded aluminum J trim for mirror installation.

2.8 GLASS FABRICATION

- A. Insulating Glass Units: Comply with ASTM E2190; Class CBA per ASTM E773 and E774 through IGCC Program.
 - 1. Roll Wave: Orient roll wave in horizontal position and ensure that all lites in an insulating unit are positioned with the same orientation.
 - a. Limit roll wave to a maximum of 0.005" from top to bottom of wave as measured by calibrated industry accepted equipment
 - 2. Sealing System: Dual seal with polyisobutylene (butyl) primary seal and silicone secondary seals as appropriate for glazing application. Use silicone at structural silicone glazed systems as secondary seal.
 - 3. Air Space: For 1-inch insulated units, provide 1/2 inch air space. Provide 1 inch insulated unit with 5/8 inch air space at exterior doors.
 - 4. Spacer Bar: Stainless steel, aluminum or composite warm edge space system; roll formed design filled with desiccant on two sides, minimum. Conforming to IGMA recommendations.

2.9 SOURCE QUALITY CONTROL AND TESTS

- A. Provide shop inspection and testing for safety and insulated glass.
- B. Test samples in accordance with ANSI Z97.1, ASTM E773, ASTM E546, and ASTM E576.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013113 - Project Coordination: Coordination and project conditions.
- B. Verify openings for glazing are correctly sized and within acceptable tolerance.
- C. Verify surfaces of glazing channels or recesses are clean, free of obstructions impeding moisture movement; weeps are clear, and ready to receive glazing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

- C. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.
- D. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- E. Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION

- A. Perform installation in accordance with GANA Glazing Manual and written recommendations of glazing manufacturer/fabricator and manufacturers of aluminum storefront, window, and curtain wall manufacturers.
 - 1. Glazing Sealants: Comply with ASTM C1193.
- B. Exterior Wet/Dry Method (Preformed Tape and Sealant) Installation:
 - 1. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with compatible butyl sealant.
 - 2. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of weather resistive seal.
 - 3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
 - a. Ensure that setting blocks support both exterior and interior pane of glass in an insulating glass unit.
 - 4. Rest glazing on setting blocks and push against tape [and heel bead of sealant] with sufficient pressure to attain full contact at perimeter of pane or glass unit.
 - 5. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line. Place glazing tape on glazing pane or unit with tape 1/4 inch below sight line.
 - 6. Fill gap between glazing and stop with elastomeric glazing sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
 - 7. Apply cap bead of elastomeric glazing sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
- C. Exterior and Interior Gasket Glazed Method (Dry/Dry) Installation:
 - 1. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
 - 2. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

3. Center glass lites in openings on setting blocks that support both exterior and interior panes of glass in the insulating unit and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
 4. Install gaskets so they protrude past face of glazing stops.
- D. Exterior Wet Method (Sealant and Sealant) Installation:
1. Place setting blocks at 1/4 points and install glazing pane or unit.
 - a. Ensure that setting blocks support both exterior and interior pane of glass in an insulating glass unit.
 2. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
 3. Fill gaps between glazing and stops with elastomeric glazing sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the weather resistive seal.
 4. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
- E. Exterior and Interior Butt Glazed Method (Sealant Only) Installation:
1. Temporarily brace glass in position for duration of glazing process. Mask edges of glass at adjoining glass edges and between glass edges and framing members.
 2. Temporarily secure small diameter non-adhering foamed rod on back side of joint.
 3. Apply sealant to open side of joint in continuous operation; thoroughly fill joint without displacing foam rod. Tool sealant surface smooth to concave profile.
 4. Permit sealant to cure then remove foam backer rod. Apply sealant to opposite side, tool smooth to concave profile.
 5. Remove masking tape.
- F. Interior Dry Method (Tape and Tape) Installation:
1. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
 2. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
 - a. Ensure that setting blocks support both exterior and interior pane of glass in an insulating glass unit.

3. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
4. Place glazing tape on free perimeter of glazing in same manner described above.
5. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
6. Knife trim protruding tape.

G. Interior Wet/Dry Method (Tape and Sealant) Installation:

1. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
2. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
 - a. Ensure that setting blocks support both exterior and interior pane of glass in an insulating glass unit.
3. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
4. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
5. Fill gaps between pane and applied stop with elastomeric glazing sealant to depth equal to bite on glazing, to uniform and level line.
6. Trim protruding tape edge.

H. Interior Wet Method (Compound and Compound) Installation:

1. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
 - a. Ensure that setting blocks support both exterior and interior pane of glass in an insulating glass unit.
2. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
3. Locate and secure glazing pane using glazers' clips.
4. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

I. Mirror Glass Installation:

1. Field verify dimension before cutting glass.

2. Prepare surface according to manufacturer's instructions.
3. Ensure mastic is compatible with mirror backing
4. Ensure wall is clean and free of any loose material. New walls should be prime painted and sealed.
5. Apply mastic in a pattern per mastic manufacturer's instructions and in a pattern so that air is allowed to circulate vertically.
6. Support bottom of mirror with continuous, securely anchored "J" channel.
7. Support top and/or sides with mirror clips.
8. Install appropriate setting blocks in bottom channel at quarter points. Install two 1/4" weep holes drilled in between the setting blocks.

3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements.
- B. Monitor quality of glazing and glazing installation.

3.5 MANUFACTURER'S FIELD SERVICES

- A. Section 014000 - Quality Requirements: Manufacturers' field services.
- B. Monitor and report installation procedures, and unacceptable conditions.

3.6 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after Work is complete.
- D. Clean glass and adjacent surfaces.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect installed construction.
- B. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- C. Protect glass from contact with contaminating substances resulting from construction operations. If despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

- D. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits or stains; remove as recommended in writing by glass manufacturer.
- E. Remove and replace glass that is broken, chipped, cracked or abraded or that is damaged from natural causes, accidents and vandalism during construction period.

3.8 SCHEDULE

- A. Refer to Relite and Window types on the drawings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fixed aluminum:
 - 1. Louvers.
 - 2. Operable louvers.
 - 3. Frames.
 - 4. Blank-out panels.
 - 5. Accessories.
- B. Related Sections:
 - 1. Section 054000 - Cold-Formed Metal Framing.
 - 2. Section 074213 - Metal Wall Panels.
 - 3. Section 076200 - Sheet Metal Flashing and Trim.
 - 4. Section 079200 - Joint Sealants: Sealant at louver perimeter.
 - 5. Division 23 - Ducts: Ductwork attachment to louvers.
 - 6. Division 23 - Air Outlets and Inlets: louvers and grilles as part of mechanical work.

1.2 REFERENCES

- A. Air Movement and Control Association:
 - 1. AMCA 500- Test Method for Louvers, Dampers, and Shutters.
- B. ASTM International:
 - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.
- C. Product Data: Submit data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- D. Samples: Submit two 6 x 6 inch in size illustrating finish and color of exterior surfaces.

- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Section 017700 - Closeout Procedures.
- G. Maintenance and Operating Manual: Include maintenance instructions for louver finish.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.6 COORDINATION

- A. Section 013100 - Project Management and Coordination.
- B. Coordinate work with related sections.
- C. Coordinate the Work with installation of metal siding.
- D. Coordinate the Work with installation of mechanical ductwork.

1.7 WARRANTY

- A. Provide ten year manufacturer warranty for louver finish.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Louver: To permit a minimum of 50 percent free area.
- B. Wind Load: Louvers shall be designed to withstand a wind load of 20 psf.
- C. Water Penetration: Not more than 0.01 oz/sq ft of free area at minimum 1000 ft / min free area face velocity. Tested in accordance with AMCA 500.

2.2 LOUVERS

- A. Acceptable Manufacturers:
 - 1. Basis of Design: Airolite Model K6846.
 - 2. Construction Specialties Inc.
 - 3. Greenheck.
 - 4. Ruskin.
 - 5. Industrial Louvers Inc.

6. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.3 COMPONENTS

- A. Aluminum: ASTM B221 6063 alloy, temper; extruded shape;
- B. Bird Screen: Interwoven wire mesh of aluminum, 0.063 inch diameter wire, 1/2 inch open weave, square design.
- C. Blank-Out Panels on Interior of Louver: Locate at inactive louvers including at Boiler Room. 1 inch thick aluminum faced composite panel with rigid polyurethane core.

2.4 ACCESSORIES

- A. Fasteners and Anchors: Stainless steel type.
- B. Manual quadrant actuator with pull chain.
- C. Primer: Zinc chromate, alkyd type.
- D. Flashings: Of same material as louver frame.
- E. Sealants: As specified in Section 079200 - Joint Sealants.

2.5 FABRICATION

- A. Louver Panel Thickness: 6 inches deep.
- B. Louver Blade Design: Drainable type, Sloped at 45 degrees; reinforced with intermediate stiffeners, material thickness of .063" (adjustable blades) and .081" (stationary blades) minimum, integral and lateral rain water stops positioned on blade.
- C. Louver Frame: Channel shape, welded corner joints, material thickness of .081" thick minimum, typ. 125 inch at operable louver.
- D. Intermediate Mullions: Exposed, of extruded aluminum, profiled to suit louver frame.
- E. Head and Sill Flashings: Roll formed to required shape, single length in one piece per location.
- F. Screens: Install screen mesh in shaped frame, reinforce corner construction, shop install to louver with fasteners.

2.6 FACTORY FINISHING

- A. Flouropen 70% Kynar 500 or Hylar 5000 paint system in accordance with Valspar's Elite Specification VE-100-91.
 - 1. Color: To be selected.
- B. Exterior Aluminum Surfaces, Screen, and Blank-Out Panels: Dark bronze, or clear anodized.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify prepared openings are ready to receive Work and opening dimensions are as indicated on shop drawings.

3.2 INSTALLATION

- A. Install louvers level and plumb.
- B. Install flashings and align. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- C. Secure louvers in opening framing with concealed fasteners.
- D. Install bird screen and frame to interior of louver.
- E. Install bird screens to exhaust and intake louvers.
- F. Install perimeter sealant and backing rod in accordance with Section 079200 - Joint Sealants.

3.3 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Strip protective finish coverings.
- C. Clean surfaces and components.

END OF SECTION

DIVISION 09

FINISHES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.
3. Shaft wall assemblies.
4. Drywall trim and finishing (joint tape and compound).
5. Finishing Accessories.

B. Related Sections:

1. Section 054000 - Cold-Formed Metal Framing: For load bearing metal framing for gypsum board support.
2. Section 061000 - Rough Carpentry: For wood framing and furring for gypsum board support.
3. Section 072116 - Blanket Insulation: For insulation and vapor retarders installed in assemblies that incorporate gypsum board and acoustical insulation.
4. Section 078400 - Firestopping: For fire resistive joint and penetration systems.
5. Section 079200 - Joint Sealants: Penetration, acoustical and joint sealants.
6. Section 081213 - Hollow Metal Frames: Coordination of frames and drywall details.
7. Section 092116 - Gypsum Board Assemblies: GWB-1 and GWB-2.
8. Section 092216 - Non-Structural Metal Framing: Wall framing, ceiling suspension systems, wall furring, including fire rated assemblies and shaft wall framing.
9. Section 093000 - Tiling: Coordination of tile backing panels with tiling installation.
10. Section 099000 - Painting and Coating: For finish paints and primers applied to gypsum board assemblies.

1.2 REFERENCES

A. ASTM International:

1. ASTM C475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
2. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.

3. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. to 0.112 in in Thickness.
4. ASTM C1002 - Standard Specification for Steel Self Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
5. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
6. ASTM C1178 - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.
7. ASTM C1396 - Standard Specification for Gypsum Board.
8. ASTM C1513 - Standard Specification for Steel Tapping Screws for Cold Formed Steel Framing Connections.
9. ASTM C1629 - Standard Classification for Abuse Resistant Nondecorated Interior Gypsum Panel Products and Fiber Reinforced Cement Panels.
10. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
11. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
12. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

B. Gypsum Association:

1. GA-214 - Recommended Levels of Gypsum Board Finish.
2. GA-216 - Specifications for the Application and Finishing of Gypsum Panel Products.
3. GA-234 - Control Joints for Fire-Resistance Rated Systems.
4. GA-600 - Fire Resistance Design Manual Sound Control Gypsum Systems.

C. Underwriters Laboratories, Inc.:

1. Fire Resistance Directory.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data for each type of product indicated.

C. Shop Drawings:

1. Indicate special details associated with fireproofing and acoustic seals.
2. Indicate installation details required for seismic design loads.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards. Provide all components of each wall assembly from a single manufacturer.
- B. Assembly Instructions: Keep at the site and make available to installers a copy of installation requirements for each fire rated assembly.
- C. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution. Install mockups representative of partition assemblies designated and as follows:
1. Level of gypsum board finish as indicated for use with wall type indicated.
 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Qualifications:
1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
 2. Installer: Company specializing in performing Work of this section with minimum five years documented experience.
- E. Pre-Installation Meeting:
1. Section 013119 - Project Meetings: Pre-installation meeting.
 2. Convene minimum one week prior to commencing Work of this section.

1.5 PROJECT CONDITIONS

- A. Environmental Conditions: Comply with ASTM C840 requirements for gypsum board application or written recommendations of gypsum board manufacturer, whichever is more stringent, for environmental conditions before, during and after application of gypsum board.
- B. Cold Weather Protection: When ambient outdoor temperatures are below 55 degrees F. maintain continuous, uniform, comfortable building working temperatures of not less than 55 degrees F. for a minimum period of 48 hours prior to, during and following application of gypsum board and joint treatment materials. Do not install interior products until installation areas are enclosed and conditioned.

- C. Ventilation: Provide controlled ventilation during joint finishing operations to eliminate excessive moisture. Avoid drafts during hot, dry weather to prevent excessively fast drying of joint compound.
- D. Dehumidification: Refer to NWCB Technical Document Gypsum Wallboard 300-103 for required drying.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. General: Perform work in accordance with Gypsum Association publications:
 - 1. GA-214 - Recommended Levels of Gypsum Board Finish.
 - 2. GA-216 - Specifications for the Application and Finishing of Gypsum Panel Products.
- B. Fire Rated Construction: Wherever a fire resistance classification is indicated or scheduled for wall construction (1 hour or greater designation), provide materials and methods tested in accordance with ASTM E119 for the type of construction shown, and approved by local building authorities. Fire rated construction shall be continuous where required, whether or not specifically indicated. Provide assemblies as listed in the following:
 - 1. Fire Resistance Directory
 - 2. GA-600

2.2 DESIGN REQUIREMENTS

- A. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated according to ASCE 7 and applicable codes for Seismic Design Category indicated on Structural Drawings.

2.3 GYPSUM BOARD

- A. Acceptable Manufacturers
 - 1. USG, Chicago, IL, 312.436.4000. (<http://www.usg.com>).
 - 2. Georgia-Pacific, (<http://www.gp.com>) Local representative: Jeff Herrmann, 253.756.8191.
 - 3. Certainteed, (<http://www.certainteed.com>) Local representative: Frank Demarinis, 206.612.0019.
 - 4. Substitutions: Under provisions of Section 012500.
- B. Gypsum Wallboard (GWB):

1. USG Sheetrock; Georgia-Pacific ToughRock; Certainteed Gypsum Board or approved equal; ASTM C1396, Type "X", tapered edged, 5/8 inch thick (unless otherwise indicated); furnish boards in maximum lengths available to minimize end-to-end joints; 48-inches wide. Recycled Content: Minimum 10%.
- C. Moisture Resistant Gypsum Wallboard (GWB-MR):
1. Ceilings In Showers And Wet Locations: USG Mold Tough Gypsum Panels, Georgia Pacific DensArmor Plus High Performance Interior Panels, Certainteed Moisture and Mold Resistant with M2Tech or approved equal water and mold resistant panels; ASTM C1278, C1396, C1178, and rated 10 by independent test ASTM D3273 for mold resistance; tapered edged, 5/8 inch thick; furnish boards in maximum lengths available to minimize end-to-end joints; 48-inches wide. Scheduled framing at 16 inch span, maximum. Recycled Content: Minimum 10%.
 - a. At walls adjacent to sinks, provide up to 8'.
- D. Moisture, Mold and Abuse Resistant Gypsum Wallboard (GWB-AR): Manufactured to produce greater resistance to surface abrasion (ASTM D 4977, Level 1), surface indentation (ASTM D5420, Level 1), Soft Body impact (ASTM E695, Level 1) than standard regular type and Type X gypsum board.
1. USG Sheetrock Mold Tough AR, Georgia Pacific Dens-Armor Plus Abuse Guard, Certainteed M2Tech or approved equal; ASTM C1396, Type X, tapered edged, 5/8 inch thick (unless otherwise indicated); furnish boards in maximum lengths available to minimize end-to-end joints; 48 inches wide.
 - a. At classrooms, provide at exposed locations below 4'.
- E. Moisture, Mold and Impact Resistant Gypsum Wallboard (GWB-IR): Manufactured with Type X core, with a fiberglass mesh imbedded in the core for greater resistance to through-penetration (impact resistance). In addition to ASTM D4977 (Level 1), ASTM D 5420 (Level 1) and ASTM E 659 (Level 1), tested in accordance with ASTM C1629 (Level 1) and a score of 10 when tested in accordance with ASTM D3273.
1. USG Fiberock Aqua Tough with Tuff Hide Primer Sealer, Georgia Pacific DensArmor Plus, Impact Resistant Gypsum Interior Panels, Certainteed AirRenew Extreme Impact or approved equal; ASTM 1278 or C1658, Flame Spread 5, Smoke Development 0; tapered edged, 5/8 inch thick; furnish boards in maximum lengths available to minimize end-to-end joints; 48 inches wide. Scheduled framing at 16 inch span, maximum.
- F. Tile Backer Gypsum Wallboard (GWB-TB):
1. USG Fiberock Aqua Tough Tile Backerboard, Georgia Pacific DensShield Tile Backer, Certainteed Diamondback GlasRoc or approved equal. ASTM C1178, Type X, square edged, 5/8 inch thick (unless otherwise indicated); furnish boards in maximum lengths available to minimize end to end joints; 48 inches wide.

- G. Gypsum Ceiling (GWB-1) (GWB-2) Refer to Section 095123. Non sagging.
- H. Liner Panels, Shaft Wall Assemblies: USG "Gypsum Liner Panels - MoldTough or Glass Mat, Georgia Pacific Gypsum DensGlass Shaftliner conforming to ASTM C 1685 or ASTM C 1396 or approved equal 1 inch thick, 24 inch wide, enhance with non-combustible and moisture-resistant core that is encased in a water-resistant, mold and mildew resistant (ASTM E2373), Glass mat facers or 100 % recycled blue face and back paper; UL Classified-Resistant (ASTM E136), flame spread 20 and smoke developed 0 (ASTM E84) with double beveled edges conforming to ASTM C1396, Type "SLX" and ASTM C1396. Furnish in maximum lengths available to eliminate or minimize end-to-end joints; for walls 12 feet or less in height, furnish panels in full length for height required.

2.4 GYPSUM BOARD TRIM ACCESSORIES

- A. Standard Metal Trim: Unless otherwise noted, Beadex Manufacturing Co., Inc. trim is specified. Substitution of trim members by other manufacturers is acceptable conforming to ASTM C1047 and Section 012500 - Substitution Procedures. Provide galvanized steel laminated with paper trim designed for concealed metal and for application without mechanical fastening, unless otherwise specified; sizes compatible with thickness of drywall.
 - 1. Outside Corners: Right angle trim with paper surface to receive cement; Beadex "No. B1."
 - 2. Exposed Edges: "L" shaped trim with paper surface to receive cement; size to suit wallboard thickness. Beadex "No. B4."
 - 3. Edges Abutting Dissimilar Materials: "L" shaped trim with paper surface to receive cement and factory applied masking; size to suit wallboard thickness. Beadex "Premask L."
 - 4. Control Joints: Roll-formed zinc trim with tape-protected 1/4-inch opening, 7/16 inch deep. US Gypsum "No. 093", or approved substitution.

2.5 GYPSUM BOARD JOINT TREATMENT MATERIALS

- A. General: Provide materials as hereinafter specified, complying with ASTM C475; use only compatible compounds from one manufacturer.
 - 1. Joint Tape for Drywall: USG "Sheetrock Brand," or approved high-strength fiber paper tape with feather (sanded) edges.
 - 2. Joint Treatment for Standard Gypsum Wallboard Panels: Joint compound for embedding paper tape and for first fill coat over metal trim and fasteners except as otherwise indicated. Comply with ASTM C475 and manufacturer's recommendations.
 - a. Beadex "Pre-Mixed Taping Compound"
 - b. USG "Ready-Mixed Taping Joint Compound, All Purpose"

- c. Substitutions: As specified in Section 012500 - Substitution Procedures.
- 3. Joint compound for second and third coats, except for Tile Backer Board:
 - a. Beadex "Pre-Mixed Finishing Compound"
 - b. USG "Ready-Mixed, Topping Joint Compound, All Purpose"
 - c. Substitutions: As specified in Section 012500 - Substitution Procedures.
- 4. Joint Treatment for Tile Backer Board: Use exterior rated tape and setting-type taping compound and setting-type, sandable topping compound as recommended by the board manufacturer.

2.6 GYPSUM BOARD MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer of the gypsum board.
- B. Fasteners:
 - 1. Steel Drill Screws: ASTM C1002 and ASTM C1513, for fastening gypsum board to steel members, unless otherwise indicated.
 - a. Comply with ASTM C954, screws for fastening to 10 gauge or heavier steel studs.
 - b. For fastening tile backer board, use screws of type and size recommended by panel manufacturer.
- C. Fire Resistant Seal Compound: As specified in Section 078400 - Firestopping.
- D. Sound Attenuation Blankets: As Specified in Section 072116 - Blanket Insulation.
- E. Acoustical Sealant: As specified in Section 079200 - Joint Sealants.
 - 1. Sealant shall be a paintable, non-hardening, non-bleeding, non-drying, resilient caulk and meet ASTM C834.
- F. Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate. Comply with project's VOC content limits.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with installer present, and including welded hollow metal frames and framing, for compliance with requirements and other conditions affecting performance.

- B. Examine panels before installation. Reject panels that are wet, moisture, mold or otherwise damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. General: Comply with applicable requirements of ASTM C840 and GA 216, fire rated assembly requirements and as specified herein, unless otherwise required by local building authorities.

3.3 FINISHING

- A. Installation: Tape and finish drywall in accordance with GA-214/ASTM C840, for Level of finish indicated below, unless detailed otherwise.
- B. Finishing Schedule:
 - 1. Level 2: Gypsum board above finished ceilings.
 - 2. Level 3: Gypsum board in utilitarian rooms and mechanical/electrical rooms, storerooms, custodial closets, and in restrooms at moisture resistant board behind finishes, except behind ceramic tile, blade second coat smooth.
 - 3. Level 4: Gypsum board in exposed to view (public) areas, and behind items that are mechanically attached including whiteboards, tackboards, casework , panel systems, etc., unless skim coat is required to create a smooth surface at abuse resistant and impact resistant panels.

3.4 GYPSUM BOARD INSTALLATION

- A. Install gypsum board units in accordance with ASTM C840 and manufacturer's instructions.
- B. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing. Stagger joints on opposite sides of partitions.
- C. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing. Stagger joints on opposite sides of partitions.
- D. When gypsum board is to be applied to both ceilings and walls, apply the gypsum board to the ceiling first and then to the walls, unless detailed otherwise.
- E. Use screws when fastening gypsum board to metal furring or framing.
- F. Multiple Layer Applications: Use gypsum backing board for first layer, placed over framing or furring members. Use fire rated gypsum backing board for fire rated partitions. Secure subsequent layers to substrate in manner required by code for indicated fire rating. Apply adhesive in accordance with manufacturer's instructions.
- G. Treat cut edges and holes in tile backer board with sealant.

- H. Place control joints consistent with lines of building spaces as indicated or directed.
- I. Place corner beads at all external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials and at exposed edges.

3.5 SHAFT WALL INSTALLATION

- A. Tape and finish inside of vertical shafts constructed with shaftwall studs if necessary to meet structural requirements and fire rating. Seal all joints between gypsum coreboard and dissimilar materials.
- B. Fill shaft wall stud space, if any, with approved blanket insulation as a sound deadening medium.

3.6 JOINT TREATMENT

- A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
- B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.
- C. Apply in accordance with manufacturer's instructions.

3.7 CONTROL AND EXPANSION JOINTS

- A. Position and install control and expansion joints.
- B. Coordinate with the framing installer to ensure that framing is installed immediately on either side of each control joint.
- C. Conform to GA-234.
- D. Space control joints as indicated or when not indicated, locate as follows (with Architect approval of locations):
 - 1. At maximum 30 foot intervals along continuous wall planes.
 - 2. At maximum 50 foot intervals at continuous ceilings with perimeter relief and each 2500 square foot of ceiling area.
 - 3. At maximum 30 foot intervals at continuous ceilings without perimeter relief.
 - 4. At locations where expansion or control joints occur in the building structure.
 - 5. At transitions with other wall substrates install where gypsum board spans masonry, concrete, metal studs and other materials.
 - 6. Locate control joints to form rectangular or square joints, in "L," "U," "T," or other irregularly shaped areas.

7. Position control joints to intersect light fixtures, air diffusers, door opening, and other areas of stress concentration as detailed or approved.

3.8 ACOUSTICAL ACCESSORY INSTALLATION

- A. Place acoustical insulation where indicated in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
- B. Place acoustical insulation under V.A.V. boxes over partitions above ceiling. Refer to mechanical drawings for V.A.V. box locations.
- C. At all interior walls, install acoustical sealant at gypsum board perimeter for:
 1. Metal Stud Track Framing: Two beads.
 2. Base Layer.
 3. Face Layer.
 4. Caulk all penetrations of partitions by conduit, pipe, ductwork, rough-in boxes, etc.
- D. Method:
 1. Isolate all ductwork and pipe work over 2 inches in diameter (including sprinkler system) at penetrations as follows:
 - a. Provide a sheet metal (22 gauge) sleeve to cover the entire perimeter of a 1 inch to 1-1/2 inch (1/2 inch to 3/4 inch on each side) oversized penetration cut.
 - b. Plaster or caulk sleeve to the wall to ensure an airtight seal.
 - c. If ductwork or pipework penetrates a double wall, use a separate sleeve at each side of the wall (allow no sleeve connection between walls).
 - d. Pack the gap between the penetrating duct or pipe and the sleeve with Acoustical Insulation and seal airtight on both sides of the wall with an outer layer of Acoustical Sealant.
 - e. Do not use wall penetrations to support pipework or ductwork. Support pipe or duct just prior to and just after the penetration, so that the pipe or duct is centered in penetration.
 - f. Use the above penetration treatment regardless of the existence of external duct or pipe insulation. Size penetration large enough to pack additional Acoustical Insulation and apply Acoustical Sealant between the external insulation and the sheet metal sleeve.
 2. Isolate all pipe work 2 inches or less in diameter (including sprinkler system) at penetrations as follows:

- a. Oversize penetration cut by 1/4 inch (1/8 inch each side).
- b. Seal airtight on both sides of the wall with Acoustical Sealant.
- c. Do not use wall penetrations to support pipe work. Support pipe just prior to and just after the penetration, so that pipe is centered in penetration.
- d. Use the above penetration treatment regardless of the existence of external pipe insulation. Size penetration large enough to apply Acoustical Sealant between the external insulation and the pipes.

3.9 TOLERANCES

- A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

3.10 CLEANING AND PROTECTION

- A. Promptly remove any residual joint compound from adjacent surfaces.
- B. Provide final protection and maintain conditions, in manner suitable to Installer, to ensure gypsum board assemblies are without damage or deterioration at time of Substantial Completion.

3.11 SCHEDULES

- A. Refer to finish schedule and details for types and locations.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal studs for partition and ceiling framing as indicated for interior partitions.
2. Suspension systems for gypsum board ceilings and soffits, and for exterior soffits.
3. Wall furring.
4. Backing plates for attaching wall hung items, toilet accessories, surface applied hardware, etc.
5. Seismic bracing for partitions which do not extend to structure and elsewhere as indicated.
6. Installation of access doors in metal framed walls and partitions.
7. Firestop system at head of rated partitions and connecting floor or roof deck assemblies.

B. Related Sections:

1. Section 054000 - Cold Formed Metal Framing: Exterior wall framing.
2. Section 078400 - Firestopping: Safing insulation for edge of slab applications.
3. Section 079200 - Joint Sealants.
4. Section 083113 - Access Doors and Frames: Coordination for installation.
5. Section 092116 - Gypsum Board Assemblies: Wallboard installation and finishing.
6. Section 116600 - Athletic Equipment.

1.2 REFERENCES

A. American Iron and Steel Institute (AISI)

1. AISI S220 - North American Standard for Cold-Formed Steel Framing - Nonstructural Members.

B. ASTM International:

1. ASTM A641 - Standard Specification for Zinc Coated (Galvanized) Carbon Steel Wire.
2. ASTM A653 - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.

3. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 4. ASTM C635 - Standard Specification for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay In Panel Ceilings.
 5. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
 6. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products.
 7. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
 8. ASTM C1002 - Standard Specification for Steel Self Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 9. ASTM E84 - Standard Test Methods for Surface Burning Characteristics of Building Materials.
 10. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 11. ASTM E814 - Standard Test Method for Fire Tests of Penetration Fire Stop Systems.
 12. ASTM E1966 - Standard Test Method for Fire Resistive Joint Systems.
- C. Underwriters Laboratories:
1. UL 2079 - Standard Test for Fire Resistance of Building Joint Systems.
- D. Warnock Hersey International, Inc.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Shop Drawings:
1. Indicate component details, framed openings, anchorage to structure, type and location of fasteners, and accessories or items required of other related work.
 2. Describe method for securing studs to tracks, and for blocking and reinforcement to framing connections.
- C. Product Data: Submit data describing standard framing member materials and finish, product criteria, load charts, and limitations.

- D. Evaluation Reports: Submit evaluation reports certified under an independent third party inspection program administered by an agency accredited by International Accreditation Service (IAS).
- E. Manufacturer's Installation Instructions: Submit manufacturer's installation instructions .
- F. Design Data: Published Load table and criteria indicating section properties, height of wall limitations, combined axial and lateral load limitations, load and deflection criteria, and allowable loads for fasteners and welds.
 - 1. For walls taller than 10 feet, provide stamped calculations for loadings and stresses of walls.
 - 2. For walls less than 10 feet, provide design data above or stamped calculations.
- G. Manufacturer's Certification: Submit manufacturer's certification of product compliance with codes and standards along with product literature and data sheets for specified products.

1.4 QUALITY ASSURANCE

- A. Allowable Tolerances: Provide framing to conform with the following allowable tolerances:
 - 1. Partition Framing: Plumb and located within plus or minus 1/4-inch of required locations.
 - 2. Ceiling Framing: Level within 1/8-inch in 12 feet and erected so that deflection of any component does not exceed deflection limits as indicated in design criteria after installation of all finish materials and equipment.
- B. Fire Assembly Certification: For each fire assembly, Installer shall certify in writing that installed metal support systems are in conformance with types of assemblies required at each location, including for coordination with specific assemblies of other components affecting each fire assembly.
 - 1. Fire-Test-Response Characteristics: Tested in assembly indicated according to ASTM E119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 2. Firestopping System at Head-of Wall: Firestopping shall be tested in accordance with ASTM E1966 "Test Method for Fire Resistant Joint System" or UL 2079 "Standard Test for Fire Resistance of Building Joint Systems" Acceptance Criteria.
 - a. Coordinate adequate separation between head of wall joints and building systems required to allow installation of fire rated assembly and installation of gypsum board in Section 092116 - Gypsum Board Assemblies.
- C. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

- a. Framing Manufacturer: Current member of Steel Stud Manufacturers Association or the Steel Framing Industry Association (SFIA).
- 2. Installer: Company specializing in performing Work of this section with minimum three years documented experience.
- D. Pre-Installation Meeting:
 - 1. Section 013119 - Project Meetings: Pre-installation meeting.
 - 2. Convene minimum one week prior to commencing work of this section.

1.5 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Installation Standard for Framing: ASTM C754 for following assemblies:
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

2.2 DESIGN REQUIREMENTS

- A. Design Criteria for Metal Support Assemblies:
 - 1. Wall Support Framing: Resist lateral force of 5 pounds per square foot for full height partitions, and 200 pounds concentrated load applied anywhere over 10 sq. ft area for partial height partitions, and 100 pounds concentrated load for wall mounted light fixtures.
 - a. Deflection, Typical: Not exceed $L/240$ of the span; $L/360$ behind tile.
 - b. Stud Spacing, Typical: 16 inch O.C, unless otherwise indicated.
 - 2. Shaft Wall Framing: Maximum Deflection based on $L/360$:
 - 3. Ceiling Suspension Systems (Direct Hung): Comply with the minimum sizes and maximum spans for main runners and cross furring channels as indicated in ASTM C754.
 - a. Live Load: Meet Heavy-Duty Class per ASTM C635.
 - b. Deflection, Typical: Not to exceed $L/360$.
 - 4. Ceilings, GWB Framing: Design to support the following loading as indicated in ASTM C754 guidelines:

- a. Live Load: 10 psf plus weight of steel framing.
- b. Deflection, Typical: Not to exceed $L/360$.

2.3 APPROVED MANUFACTURERS

- A. Cemco (www.cemcosteel.com).
- B. SCAFCO Corporation (www.scafco.com).
- C. Steeler, Inc. (www.steeler.com).
- D. ClarkDietrich Building Systems (www.clarkdietrich.com)
- E. Substitutions: Refer to Section 012500 - Substitution Procedures.

2.4 METAL SUPPORT MATERIALS

- A. Metal Studs (Typical Partition Studs)
 - 1. Fabricate from ASTM A653 steel sheet having a minimum yield strength of 33,000 psi; roll-formed "C" shaped with not less than 1-1/4 inch flange with 1/4 inch nominal return, and pre-punched webs for installation of mechanical and electrical items.
 - a. Size: Depth of studs as indicated on drawings and cross referenced with the appropriate height determination table to meet required performance.
 - b. Spacing: As indicated on drawings.
 - c. Gage: Comply with AISI S220 and deflection criteria. 33mils (20 gage) unless noted otherwise. 54mils (16 gage) at walls 12'-0" or taller. Cross reference with the appropriate height determination table to meet required performance.
 - d. Runners: Same gage as studs; size for friction fit to studs; type recommended by stud manufacturer for support of studs, and for vertical abutment of drywall work at other work. Provide top track with minimum 1-1/2 inch long legs, unless otherwise indicated.
 - 2. Cold Formed galvanized steel studs complying with Section 9.2 of ASTM C645.
 - a. Size: Depth of studs as indicated on drawings and cross referenced with the appropriate height determination table to meet required performance.
 - b. Spacing: As indicated on drawings.
 - c. Gage: Comply with ASTM C645 and deflection criteria. Cross reference with the appropriate height determination table to meet required performance.

- d. Runners: Same gage as studs; size for friction fit to studs; type recommended by stud manufacturer for support of studs, and for vertical abutment of drywall work at other work. Provide top track with minimum 1-1/2 inch long legs, unless otherwise indicated.
- 3. Finish: Provide studs and runners with protective coating. Comply with AISI S220. Coatings shall have a protective coating meeting the requirements of ASTM A653, G40, typical and G60 at high moisture locations (locker rooms, cafeteria, toilet rooms or shall have a protective coating with an equivalent corrosion resistance.
 - a. Coatings providing equivalent corrosion resistance to a G40 shall demonstrate equivalent corrosion resistance with an evaluation report acceptable to the authority having jurisdiction.
- B. Direct Hung Suspension System: Double web suspension system bearing "Heavy-Duty" structural classification per ASTM C635.
 - 1. Acceptable Manufacturers:
 - a. Certainteed.
 - b. Armstrong.
 - c. USG.
 - 2. Fabricate from commercial grade cold-rolled electro-galvanized steel. Required items standard with suspension system.
 - 3. Main runners (640) and cross tees (644) shall be 1-1/2 inches high with 1-3/8 inch wide knurled face for screw attachment of drywall. Cross tees (874) shall be 1-1/2 inches high with 15/16 inch face width; these members must be used for support of recessed light fixtures on four (4) sides.
 - 4. Design and construct main runners and cross tees and their splices and intersection connectors to carry a mean ultimate test load of not less than 180 pounds or twice the actual load, whichever is greater, in tension and compression. Provide mechanical interlocking connections at splices and intersections.
- C. Wall Furring Members: AISI S220; minimum 18 mils (25 gage,) hat-shaped. Size 1-1/4 inch face width by 7/8 inch depth. Provide channels with manufacturer's standard zinc protective coating, except meeting ASTM A653, G60 (Z180), hot-dip galvanized zinc coating for exterior locations.
- D. Ponywall Support: Provide manufacturer's support stud and base plate, unless detailed otherwise. ASTM A653; mill certified steel, welded construction.
 - 1. Support Stud: 97 mil, 57 ksi yield strength, 65 ksi tensile strength, G90 galvanized coating.

2. Base Plate: 168 mil, 57 ksi yield strength; 65 ksi tensile strength; G115 galvanized coating.
- E. Shaft Wall Framing: Provide manufacturer's pre-engineered and tested systems constructed from components of gages required. Modify and supplement manufacturer's standard system to comply with performance criteria, including those of governing regulations. Provide runners, stiffeners, braces and similar framing members required to form a complete system; provide depth of support members indicated for wall types. Framing system shall meet the following performance criteria:
1. Maximum Deflection: $L/360$ for partitions constructed of 2-1/2, 3-1/2, 4 and 6 inch studs.
 2. Design Air Pressure: Coordinate with Division 14 subcontractor as appropriate.
 3. Fire Ratings: As indicated.
- F. Shaft Wall Studs: United States Gypsum "C-H Studs," or approved equal certified meeting fire rated assembly; all studs shall be minimum 30 mil (20 gage;) sizes of studs as indicated in partition types on drawings.
1. Runners (tracks): Use stud manufacturer's standard "J-Runners," formed from same gage as wall studs; runners 1 inch by 2-1/4 inches by width of stud.
 2. Finish: Manufacturer's standard galvanized finish.
- G. Restraining Angles (Top of Fire Rated Partitions): AISI S220, minimum 25 gauge, 2½ x 2½ inches minimum. Provide angles with manufacturer's standard zinc protective coating, or be rolled formed from galvanized steel. Angles installed under Section 092116.
- H. Vertical Deflection Clip: Steel Network, "Verticlip SLD", or approved equal meeting UL 2079 and allowing 1-1/2 in unrestrained movement (¾ inch compression and ¾ inch extension); ASTM A653, Grade 50, Class 1, minimum 20 gauge, with 1½ x 3.125 inches legs. Provide angles with manufacturer's standard G 60, hot-dip galvanized protective coating. Angles installed under Section 092116. Coordinate with - Head of Wall Fire Rated Assemblies.
- I. Steel Plate (Top of Rated Partitions Which Are Parallel to Deck Flutes): ASTM A653; minimum 16 gage. Provide steel plates in widths to span two or three metal deck ribs with at least 3 inch projection beyond runner track on either side; plates shall be continuous across top of partitions. Provide plates with galvanized protective coating.
- J. Carrying Channels: ASTM C754; 1-1/2 inches main runner channels, 3/4 inches cross furring channels, cold rolled steel channels, weighing 0.475 pounds per foot; provide channels with manufacturer's standard rust inhibitive prime finish for interior areas, and ASTM A 653, G90 (Z275) hot-dipped galvanized finish for exterior areas.

- K. Wire: ASTM A641, carbon steel wire, galvanized, soft annealed, with Class 1 coating; hanger wire minimum 12 gage; wire for tying channels minimum 16 and 18 gage as specified.
- L. Screws: Products of, or as recommended by stud manufacturer and meeting ASTM C1002.
- M. All other materials not specifically described but required for a complete installation of metal framing shall be in accordance with the recommendations of the manufacturer of framing materials used.

2.5 HEAD OF WALL AT FIRE RATED ASSEMBLIES

- A. Firestopping System: Provide firestop system between top of rated partitions and floor or roof assemblies that has been tested in accordance with ASTM E814, and listed by Underwriters Laboratories, Inc. or Warnock Hersey International, Inc. Firestopping system must meet criteria specified under 1.5 - Quality Assurance and as follows:
 - 1. Deflection: Allow for 1-1/2 inch unrestrained vertical movement without causing failure, but not less than amount required to meet or UL Std 2079 acceptance testing.
 - 2. Metal Deck Assemblies: Approved for use with type and depth of fluted deck(s) indicated on drawings. Provide supplementary anchorage approved in the tested assembly.
 - 3. Concrete Deck Assemblies: Approved for use with deflection track directly attached to concrete substrate. Safing and fire resistant compound is not required as approved under the tested listing.
 - 4. Compatibility: Compatible with proposed sprayed-on fireproofing materials, and shall not impair the fire rating(s) of the metal deck assemblies.
- B. Firestopping Materials: The following materials have been approved, subject to meeting the requirements specified:
 - 1. Safing Insulation: Semi-rigid, un-faced fiber insulation designed for use as a fire stop between top of walls and floor or roof assemblies; insulation shall conform to ASTM C612, Class 1 and 2, and pass ASTM E119 (melt at over 2,000 degrees F.); density four (4) pounds per cubic foot.
 - a. Fire Classification: Flame spread rating of 25 or less and a smoke development of 0 when tested per ASTM E84.
 - b. Owens Corning, "Thermafiber Safing Insulation", or approved equal.
 - 2. Fire Resistant Seal Compound: USG Interiors, Inc. "Firecode Compound", or approved equal fire resistant sealing compound which is listed as part of the fire and smoke system used at top of rated partitions. In all cases, sealing compound must be UL listed and approved by local authorities.

2.6 RELATED MATERIALS

- A. Acoustical Sealant Tape: CRL Norseal Acoustical Sealant V-738, or approved equal; tape 1 inch wide by 1/4 inch thick. Provide tape for underside of floor runner tracks and where specified and at top tracks of ceiling height partitions.
- B. Acoustical Sealant: Refer to Section 079200.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify rough-in utilities are in proper location.

3.2 INSTALLATION OF STEEL FRAMING, GENERAL

- A. Steel Framing Installation Standard: Comply with ASTM C754.
- B. Install supplementary framing, blocking and bracing at terminations in work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, door bumpers, furnishings and similar construction to comply with details indicated.
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement, at locations indicated below to comply with details shown on drawings.
 - 1. Where suspended ceiling assemblies abut building structure horizontally at ceiling perimeters or penetrations of ceiling.
 - 2. Where partition and wall framing abut overhead structure.
 - a. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.
- D. Do not bridge building expansion and control joints with steel framing or furring members, independently frame both sides of joints with framing or furring members or as indicated.

3.3 INSTALLATION OF STEEL FRAMING FOR CEILINGS AND SOFFITS

- A. Suspend ceiling hangers from building structural members as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum not part of supporting structural or ceiling suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying or other equally effective means.

2. Where widths of ducts and other construction within ceiling plenum produce hanger spacings that interfere with the location of hangers at spacing required to support standard suspension system members, install supplemental suspension members and hangers.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards or manufacturers literature whichever is more stringent.
 3. Secure wire hangers to structure, by looping or wire tying, directly to supporting structure, including intermediate framing members. Attach to inserts, eye screws, or other devices appropriate for structure to which hangers are attached as well as for type of hanger involved, in manner that will not cause deterioration or failure, due to age, corrosion or elevated temperatures.
 4. Do not attach hangers to metal roof deck or metal deck tabs.
 5. Do not connect or suspend steel framing from ducts, pipes or conduits.
 - B. Keep hangers and braces 2 inches clear of ducts, pipes and conduits.
 - C. Sway-brace suspended steel framing with hangers used for support.
 - D. Install suspended steel framing components in sizes and at spacing indicated, but not less than required by referenced steel framing installation standard.
 1. Wire Hangers: 0.1620 inch diameter (8 gauge), 4 ft. oc.
 2. Carrying Channels (Main Runners): 1 ½ inch, 4 ft. oc.
 3. Rigid Furring Channels (Furring Members): 16 inches oc.
 - E. Installation Tolerances: Install steel framing components for suspended ceilings to cross furring members are level to within 1/8 inch in 12 ft. as measured both lengthwise in each member and transversely between parallel members.
 - F. Wire-tie or clip furring members to main runners and to other structural supports as indicated.
 - G. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension system abuts vertical surfaces. Mechanically join main beam and cross furring members to each other and butt cut to fit wall track.
 - H. For exterior soffits, install cross-bracing and additional framing to resist wind uplift.
- 3.4 INSTALLATION OF STEEL FRAMING FOR WALLS AND PARTITIONS
- A. Install runners (tracks) at floors, ceilings and structural walls and columns where gypsum board stud system abuts other construction.
 1. Use proprietary tracks for non-rated and fire rated walls and partitions.

2. Install studs full height for all partitions unless noted otherwise.
- B. Installation Tolerances: Install each steel framing and furring member so that fastening surface does not vary more than 1/8 inch from plane of faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at or just above suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
 1. Cut studs 1/2 inch short of full height to provide perimeter relief.
 2. For STC-rated or fire-resistance rated partitions that extend full height, install framing around structural members, as required to support gypsum board closures needed to make partitions continuous from floor to underside of structure above.
 3. Install bridging/spacing bar.
- D. Brace partition framing, not extending full height to structure above, with studs same size and thickness as partition framing. Provide bracing at:
 1. 6'-0" oc. Intervals along length of partitions.
 2. Not less than 6'-0" from partition ends and corners.
 3. Door and window openings.
- E. Terminate partition framing at suspended ceilings where indicated.
- F. Install steel studs and furring in sizes and at spacings indicated.
 1. Space studs 16 inches oc., unless otherwise indicated.
- G. Double stud frame door openings not more than 2 inches from each side of opening and to comply with details indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 1. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- H. Double stud frame openings other than door openings not more than 2 inches from each side of opening and to comply with details indicated or in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.
- I. Install thermal insulation vertically and hold in place with Z-furring members spaced at 24 inches oc.

1. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails or screws designed for masonry attachment, spaced at 24 inches oc.
 2. At exterior corners attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with standard width insulation and continue in regular manner.
 3. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- J. Achieve air tight seal between runners and substrate with acoustic sealant in conjunction with Section 072700 - Air Barriers.
- K. Achieve air tight seal between studs and adjacent vertical surfaces with acoustic sealant in conjunction with Section 072700 - Air Barriers.

3.5 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation From Indicated Position: 1/8 inch in 10 feet.
- C. Maximum Variation From Plumb: 1/8 inch in 10 feet.

END OF SECTION

PART 1

1.1 SUMMARY

- A. Section includes gypsum veneer plastering.
- B. Related Sections:
 - 1. Section 033000 - Cast in Place Concrete.
 - 2. Section 042016 - Concrete Unit Masonry.
 - 3. Section 092116 - Gypsum Board Assemblies: Gypsum backing board substrate.
 - 4. Section 092216 - Non-Structural Metal Framing.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C587 - Standard Specification for Gypsum Veneer Plaster.
 - 2. ASTM C588/C588M - Standard Specification for Gypsum Base for Veneer Plasters.
 - 3. ASTM C631 - Standard Specification for Bonding Compounds for Interior Gypsum Plastering.
 - 4. ASTM C843 - Standard Specification for Application of Gypsum Veneer Plaster.
 - 5. ASTM C844 - Standard Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster.
 - 6. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - 7. ASTM C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases.
 - 8. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - 9. ASTM C1396/C1396M - Standard Specification for Gypsum Board.
 - 10. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 11. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 12. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

- B. Gypsum Association:
 - 1. GA 216 - Application and Finishing of Gypsum Board.
 - 2. GA 600 - Fire Resistance Design Manual Sound Control.
- C. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1168- Adhesive and Sealant Applications.
- D. Underwriters Laboratories Inc.:
 - 1. UL - Fire Resistance Directory.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on veneer plaster products.
- C. Samples: Submit two sample panels, 12 x 12 inch in size illustrating veneer finish and texture.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. Apply gypsum base in accordance with ASTM C844 and GA 216.
 - 2. Apply gypsum veneer plaster in accordance with ASTM C843.
 - 3. Veneer plaster work in accordance with GA 216.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Do not apply veneer plaster when substrate or ambient air temperature is less than 50 degrees F nor more than 80 degrees F; for 24 hours prior to, during operations and after, until building heating system can maintain spaces above minimum temperature.

PART 2 PRODUCTS

2.1 GYPSUM VENEER PLASTER

A. Plaster Materials: United States Gypsum Co. (USG).

1. Web Site <http://www.usg.com>.

B. Metal Moldings: Fry Reglet.

1. Web Site <http://www.fryreglet.com>

2.2 COMPONENTS

A. Gypsum Veneer Plaster: ASTM C587.

B. Gypsum Base: ASTM C588; 5/8 inch square edges, ends square.

C. Gypsum Veneer Base Accessories: ASTM C1047; metal; corner beads, edge trim, and expansion joints.

1. Metal Accessories: Galvanized steel.
2. Plastic Accessories: PVC plastic.
3. Edge Trim: Type LC bead.

D. Acoustic Insulation: Refer to Section 072116.

E. Reinforcing Tape, Joint Compound, Adhesive, Water, Fasteners: GA 216.

F. Bond Coat: ASTM C631, vinyl polymer type.

G. Acoustical Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board assemblies. Refer to Section 079200.

2.3 ACCESSORIES

A. Gypsum Board Screws: ASTM C1002; length to suit application.

1. Screws for Steel Framing: Type S.
2. Screws for Wood Framing: Type W.

2.4 MIXES

A. Mix plaster in accordance with ASTM C587.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify base is flat, joints are taped and sanded, and surface is ready to receive work of this section. Verify joint and surface perimeter accessories are in place.

3.2 PREPARATION

- A. Clean surfaces of dust or loose matter.
- B. Remove projections greater than 1/8 inch and fill depressions greater than 1/4 inch with Portland cement mortar.

3.3 INSTALLATION

- A. Install gypsum base in accordance with GA 216.
- B. Use drywall screws to fasten gypsum board to framing substrate.
- C. Single Layer:
 - 1. Erect gypsum board in direction most practical and economical, with ends and edges occurring over firm bearing.
 - 2. At furred partition faces, place 4 wide strip of gypsum board, same thickness as furring, at perimeter of wall openings and partition.
- D. Install accessories.
- E. Tape, fill, and sand filled joints, edges, corners, openings, and fixings to produce surface ready to receive veneer finish.
- F. Feather coats onto adjoining surfaces so joint camber is maximum 1/32 inch.
- G. Install acoustical sealant within partition assembly.
- H. Apply gypsum veneer plaster in accordance with ASTM C843.
- I. Apply single coat of veneer plaster immediately after dampening substrate to thickness of 3/16 inch.
- J. Finish surface of veneer plaster to match adjacent finish.

3.4 ERECTION TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Maximum Variation From Specified Thickness: Plus or minus 1/64 inch.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes
 - 1. Repair of existing exterior cement plastering.
- B. Related Sections
 - 1. Section 024119 - Selective Demolition.
 - 2. Section 054000 - Cold-Formed Metal Framing.
 - 3. Section 092405 - Exterior Acrylic Plaster Panels.

1.2 REFERENCE STANDARDS

- A. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process 2019.
- B. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters 2015 (Reapproved 2020).
- C. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster 2020b.
- D. ASTM C932 - Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering 2006 (Reapproved 2019).
- E. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster 2020a.

1.3 SUBMITTALS

- A. Refer to Section 013300 for submittals procedures.
- B. Product Data: Provide data on plaster materials and trim accessories.
- C. Samples:
 - 1. Submit two samples, 12 by 12 inch in size illustrating finish color and texture.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.5 FIELD CONDITIONS

- A. Exterior Plaster Work: Do not apply plaster when substrate or ambient air temperature is 40 degrees F or lower, or when temperature is expected to drop below 40 degrees F within 48 hours of application.

PART 2 PRODUCTS

2.1 CEMENT PLASTER APPLICATIONS

2.2 JOBSITE MIXED CEMENT PLASTER

- A. Materials:
 - 1. Sand: Clean, well graded, and complying with ASTM C897.
 - 2. Water: Clean, fresh, potable, and free of mineral or organic matter that could adversely affect plaster.
- B. Plaster Mixes: Proportioned in accordance with ASTM C926; parts by volume.
 - 1. First Coat Over reinforcing mesh.:
 - a. Minimum 2-1/2 parts and maximum 4 parts sand, per total volume of cementitious materials.
 - 2. Second Coat: Same mixture as first coat, without fiber reinforcement, except minimum 3 parts and maximum 5 parts sand.

2.3 ACCESSORIES

- A. Finishing Accessories: ASTM C1063; extruded aluminum alloy (6063 T5), galvanizd steel sheet ASTM A924/A924M G90, rolled zinc, or rigid plastic, unless noted otherwise.
 - 1. Types: As detailed or required for finished appearance.
- B. Bonding Compound: Provide type recommended for bonding plaster to solid surfaces, complying with ASTM C932.
- C. Open grid glass fiber mesh.
 - 1. Basis of Design: Diamondshield, BASF.
- D. Rust Converting Metal Primer:
 - 1. Basis of Design: Corroseal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting this work.

- B. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.

3.2 PREPARATION

- A. Roughen smooth concrete surfaces and apply bonding compound in accordance with manufacturer's written installation instructions.

3.3 MIXING

- A. Mix only as much plaster as can be used prior to initial set.
- B. Mix materials dry, to uniform color and consistency, before adding water.
- C. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

3.4 APPLICATION

- A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
- B. Finish Coats: Match texture to existing texture.

3.5 TOLERANCES

- A. Maximum Variation from True Flatness: 1/4 inch in 10 feet.

3.6 REPAIR

- A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Installation of acrylic plaster panels including stucco base coat, reinforcing mesh and finish installed on cement board.

B. Related Sections:

1. Section 042016 - Reinforced Unit Masonry.
2. Section 054000 - Cold Formed Metal Framing.
3. Section 061643 - Gypsum Sheathing Board.
4. Section 072700 - Air and Moisture Barrier.
5. Section 076200 - Sheet Metal Flashing and Trim.
6. Section 079200 - Joint Sealants.

1.2 REFERENCES

A. American Society for Testing and Materials:

1. ASTM C150 – Standard Specification for Portland Cement.

B. Northwest Wall and Ceiling Bureau:

1. Portland Cement Plaster (Stucco) Resource Guide.

C. Portland Cement Association:

1. Portland Cement Plaster (Stucco) Manual.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Shop Drawings: Indicate dimensions, layout, joints, construction details and methods of anchorage.

C. Product Data: Submit data on plaster materials, characteristics and limitations of products specified.

D. Samples: Submit two samples, 2' x 2' in size illustrating finish color and texture.

E. Section 017700 - Closeout Procedures.

F. Manual for Materials and Finishes: Include instructions for minor repair and removing mildew or efflorescence.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with Northwest Wall and Ceiling Bureau Portland Cement Plaster Resource Guide.
- B. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
 - 2. Installer: Company specializing in performing Work of this section with minimum five years documented experience and trained by manufacturer.
- C. Mockup:
 - 1. Provide and install acrylic plaster panels for exterior wall mock-up under provisions of Section 014000 - Quality Requirements. Coordinate installation with other trades involved in the mock-up.
 - 2. Locate where directed.
 - 3. When accepted, mock-up will demonstrate minimum standard for the Work. Mockup may not remain as part of the Work.
- D. Pre-Installation Meeting:
 - 1. Section 0131 0 – Project Management and Coordination: Preinstallation meeting.
 - 2. Convene minimum one week prior to commencing Work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in a cool, dry location, out of sunlight, protected from weather and other harmful environment, and at a temperature above 40 degree F and below 110 degree F in accordance with manufacturer's instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Site Environmental Requirements: Do not install materials unless site conditions are as recommended in manufacturer's literature.
 - 1. Installation Ambient Air Temperature: Minimum of 40 °F (4 °C) and rising, and remain so for 24 hours thereafter.
 - 2. Substrate Temperature: Do not apply Parex materials to substrates whose temperature are below 40 °F (4 °C) or contain frost or ice.
 - 3. Inclement Weather: Do not apply Parex materials during inclement weather, unless appropriate protection is employed.

4. Sunlight Exposure: Avoid, when possible, installation of the materials in direct sunlight. Application of Finishes in direct sunlight in hot weather may adversely affect aesthetics.
5. materials shall not be applied if ambient temperature exceeds 120 °F (49 °C) or falls below 40 °F (4 °C) within 24 hours of application. Protect base coats from uneven and excessive evaporation during hot, dry weather.
6. Prior to installation, the wall shall be inspected for surface contamination, or other defects that may adversely affect the performance of the materials and shall be free of residual moisture.

1.7 COORDINATION

- A. Section 013100 – Project Management and Coordination: Coordination and project conditions.
- B. Coordinate work with installation of air and moisture barrier.

1.8 WARRANTY

- A. Provide manufacturer's standard 5 year warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: (APP-1)
 1. Parex, Inc., 4125 E. LaPalma Ave., Suite 250, Anaheim, CA 92807.
 - a. Parex, Inc, 121 Dry Hi Base Coat, Reinforcing Mesh, Primers & Acrylic Finish.
 - 1) National Gypsum Company, Inc. 2001 Rexford Road, Charlotte, NC 28211.
 - (a) National Gypsum Company, Inc, PermaBase® Brand Cement Board.
 - b. Substitutions under provisions of Section 012500.

2.2 SYSTEM DESCRIPTION

- A. An exterior coating system consisting of Base Coat with embedded Reinforcing Fabric Mesh, Primer and Finish Coat.
- B. Design / Performance Requirements

1. Structural Design: Exterior wall cladding assemblies capable of withstanding effects of load and stresses from dead loads, wind loads, snow loads and normal thermal movement without evidence of permanent defects of assemblies or components. See Structural drawings for loads.
 - a. Thermal Movements: Provide assemblies that allow for thermal movements resulting from following maximum changes (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components and other detrimental effects:
 - 1) Temperature Change (range): 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), material surfaces.
 - 2) Panel joints shall allow movement of panels during expansion and contraction while preventing uncontrolled penetration of moisture.
 - b. Manufacturing, installation, and sealing shall prevent deformation of exposed surfaces.
2. Cement Board Cladding: Withstand code-imposed design loads and the following criteria:
 - a. Surface Burning Characteristics: Flame Spread – 0 to 15; Smoke Developed – 0 to 15; ASTM E84.
 - b. Falling Ball Impact: min 92 in lbs; ASTM D1037.
 - c. Gardner Impact Test: min 25 in lbs; ASTM D2794.
 - d. Impact Load: 30 lb Impact mass: no cracking of system; ASTM E695.
 - e. Abrasion Resistance: 500 liters, no cracking, checking crazing, erosion, rusting, and/or blistering; ASTM D968.
 - f. Accelerated Weathering: 2000 hours, no cracking, checking crazing, erosion, rusting, and/or blistering; ASTM G153, G154.
 - g. Freeze-Thaw Resistance: 60 cycles, no deterioration 10 cycles, pass; ASTM E2485.
 - h. Fungus Resistance: 28 days, no growth; MIL STD 810B.
 - i. Mildew Resistance: 35 days, no growth; ASTM 3273.
 - j. Moisture Resistance: 14 days, no cracking, checking crazing, erosion, rusting, and/or blistering; ASTM D2247.
 - k. Salt Fog Resistance: 500 hours, no deterioration; ASTM B117.
 - l. Water Penetration: Pass; ASTM E331.

- m. Wind-Driven Rain: 24 hours, no penetration of water; F.S. TT-C-555B
- 3. System Water Penetration: No uncontrolled water penetration as defined in test method when tested to ASTM E 331 at inward static pressure differential of not less than 6.24 psf and not more than 12.0 psf.
- 4. Impact Resistance Classification: Classified in accordance with EIMA classification and impact ranges as follows.
 - a. High Impact Resistance, 90-150 in-lbs (5.7–10.1 J) Impact Range.

2.3 MATERIALS

- A. Base Coat:
 - 1. 121 Dry Hi Base Coat: Copolymer based, factory blend of cement and proprietary ingredients requiring addition of water.
- B. Parex Reinforcing Mesh:
 - 1. 0 Intermediate Impact Mesh: Weight 12 oz per square yard.
 - 2. 357 Corner Mesh: Reinforcing mesh used as corner reinforcement.
- C. Parex Primers:
 - 1. 310 Primer: 100% acrylic based coating to prepare surfaces for Parex finishes.
- D. Parex Finish:
 - 1. Parex Dry-Tex Sand: Factory blended, 100% acrylic polymer based textured finish, integrally colored.
 - a. Texture: Sand Fine.
 - b. Color: To be selected.
- E. Cement Board:
 - 1. Minimum 5/8 inch (16 mm) thick PermaBase® Brand Cement Board complying with ASTM C 1325.
- F. Water: Clean, cool, potable water
- G. Portland Cement: ASTM C150, Type I or Type I-II.

2.4 ACCESSORIES

- A. Fasteners: Stainless steel or corrosion resistant, as instructed by manufacturer.
- B. Continuous Metal Closure and Flashing: Match finish where exposed. Secure using concealed fasteners. Refer to Section 076200.

C. Metal Z Furring:

1. 7/8 inch hat channel, 25 gage. 16 inch oc.
2. Z-clip: 1 1/2 inch leg and depth to accommodate assembly. 16 inch oc vertical. Refer to Wall assemblies.

D. Sealant System:

1. Sealants shall conform to ASTM C920, Grade NS.
2. Perimeter seal joints shall be a minimum width of 1/2 in (12.7 mm).
3. Sealant backer rod shall be closed-cell polyethylene foam.
4. Apply sealant to tracks or base coat.
5. Refer to manufacturer's current bulletin for listing of sealants which have been tested and have been found to be compatible for use with product.
6. Color shall be as selected by Architect.
7. Joint design, surface preparation, and sealant primer shall be based on sealant manufacturer's recommendations and project conditions.
8. Refer to Section 079200.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. General: Carefully inspect all substrate work and verify that such work is complete and ready for work of this section.
- C. Framing: Verify that framing tolerances are in compliance with specifications.
- D. Mechanical and Electrical: Verify services within walls have been tested and approved.

3.2 PREPARATION

- A. Protection: Protect surrounding material surfaces and areas during installation of system.
 1. Provide continuous metal closure at panel joints.

3.3 MIXING

- A. Mix products in accordance with manufacturer's instructions.

3.4 INSTALLATION

A. Cement Board:

1. Install in accordance with this specification and the cement board manufacturer's written instructions.
2. Fasten cement board to Z-furring by corrosion resistant steel screws.
3. Locate screws 8" maximum on center along furring or closer as required by design loads. Screws at board edges shall be placed 3/8" in from the edge. Drive fastener heads flush with the face of the cement board.
4. Stagger all vertical joints of the cement board in a running bond pattern and terminate on framing. Butt together all cement board joints.
5. Install expansion joints at substrate changes and substrate expansion joints. Install vertical cement board control joints not more than 50 feet apart. Cement board on each side of vertical joints shall be backed by a framing stud.
6. Offset horizontal cement board joints a minimum of 12" from horizontal sheathing joints. Offset vertical cement board joints a minimum of one stud space from vertical sheathing joints.
7. Offset cement board joints a minimum of 8" from the corners of openings by "L" cutting the cement board around corners of openings
8. Attach vinyl stop beads at coating perimeters with fasteners and adhesive.

B. Base Coat and Mesh:

1. Embed fiberglass mesh in base coat & adhesive centered over all cement board joints, inside and outside corners, and as diagonal "butterflies" at corners of openings.
2. Using a stainless steel trowel, apply Base Coat approximately 1/16" (1.6 mm) thick to the entire cement board, including previously meshed joints and corners. Lap mesh joints 2 1/2" (64 mm) minimum.
3. Embed Standard Mesh into the wet base coat on the entire base coated surface. Apply additional base coat if required to ensure mesh is completely embedded and to achieve a final nominal thickness of 1/16" (1.6 mm). The mesh shall not be visible and shall show no texture.

4. After the base coat has dried a minimum of 24 hours or longer as required by conditions, the surface shall be examined for any irregularities. The base coat shall have a smooth and continuous texture prior to proceeding to primer and finish coat application. Correct any irregularities to produce a flat surface. Base Coat: Apply base coat and fully embed mesh in base coat; include diagonal mesh patches at corners of openings and reinforcing mesh patches at joints of track sections. Apply multiple layers of base coat and mesh where required for specified impact resistance classification.
- C. Apply optional primer to base coat after drying. Primer may be omitted if it is not required by the Manufacturer's product data sheets for the specified finish coat or otherwise specified for the project.
- D. Finish Coat: Apply finish coat to match specified finish type, texture, and color. Do not apply finish coat to surfaces to receive sealant. Keep finish out of sealant joint gaps.

3.5 ERECTION TOLERANCES

- A. Maximum Variation from True Flatness: 1/8 inch in 10 feet.

3.6 PROTECTION

- A. Provide protection of installed materials from water infiltration into or behind them.
 1. Provide protection of installed finish from dust, dirt, precipitation, freezing and continuous high humidity until fully cured and dry.
 2. Clean exposed surfaces using materials and methods recommended by the manufacturer of the material or product being cleaned. Remove and replace work that cannot be cleaned to the satisfaction of the Architect/Owner.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Suspended metal exposed grid ceiling systems.
2. Acoustical Suspended Ceiling Tiles.
3. Linear Metal Ceiling Panel Assembly.
4. Acoustical Suspended Cloud.
5. Seismic restraint of suspended ceilings.

B. Related Sections:

1. Section 053123 - Steel Roof Decking: Installing hanger accessories, e.g., piercing hanger tabs and rolled-in hanger tabs for attaching suspension systems to steel floor decks.
2. Section 092116 - Gypsum Board Assemblies.
3. Section 092216 - Non-Structural Metal Framing: Ceiling and wall framing for gypsum wallboard systems, including lateral force bracing for ceiling height partitions above acoustical ceilings.
4. Section 098400 - Acoustical Components: ACT-4.
5. Divisions 21, 22 and 23 - Mechanical Sections: Coordinate supports and panel penetrations for HVAC, and fire suppression system penetrations.
6. Divisions 26, 27 and 28 - Electrical Sections: Coordinate supports and panels penetrations for electrical fixtures and equipment.

1.2 REFERENCES

A. American Society of Civil Engineers:

1. ASCE 7 - Minimum Design Loads for Building and Other Structures.

B. American Society for Testing and Materials:

1. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
2. ASTM C636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
3. ASTM E580 - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.

4. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.
5. ASTM E1477 - Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- C. Ceilings and Interior Systems Construction Association:
 1. Cisca - Acoustical Ceilings: Use and Practice.
- D. International Code Council:
 1. ICC Section 803 - Test Specimens.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system. Indicate method of suspension where interference exists.
- C. Product Data: Submit data on metal grid system components and acoustic units.
- D. Building Product Disclosure Requirements: Provide Building Product Disclosure documentation. Any requests for substitution must include this documentation.
 1. Environmental Product Declaration for acoustical ceiling panels.
- E. Samples: Submit one full size samples illustrating material and finish of acoustic units.
- F. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.
- G. Section 017700 - Closeout Procedures: Manual for Materials and Finishes.

1.4 QUALITY ASSURANCE

- A. Single Source: Obtain each type of acoustical ceiling tile and suspension system from a single manufacturer for each product required.
- B. Code Compliance Standards:
 1. ICC International Building Code, Section 803.
 2. American Society for Testing and Materials (ASTM):
 - a. ASTM C635 -Manufacturing of Metal Suspension Systems.
 - b. ASTM C636 - Installation of Metal Suspension Systems in Non-Seismic Applications.

3. American Society of Civil Engineers (ASCE): Std 7, "Minimum Design Loads for Buildings and Other Structures.
4. Ceilings and Interior Systems Contractors Association (CISCA): Comply with "CISCA Ceilings Design Handbook" recommended installation requirements corresponding to the seismic design category(s) (SDC) as indicated.

C. Qualifications:

1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
2. Installer: Company specializing in performing work of this section with minimum five years documented experience approved by manufacturer.

D. Mockup:

1. Section 014000 - Quality Requirements: Requirements for mockup.
2. Construct mock-up, 12 feet x 12 feet, including typical field and edge conditions.
3. Locate where directed by Architect/Engineer.
4. Incorporate accepted mockup as part of Work.

E. Pre-Installation Meeting:

1. Section 013119 - Project Meetings: Pre-installation meeting.
2. Convene minimum one week prior to commencing work of this section.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.

1.6 SEQUENCING

- A. Sequence Work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Install acoustical tile after interior wet work is dry.

1.7 EXTRA MATERIALS

- A. Section 017700 - Closeout Procedures: Spare parts and maintenance products.
- B. Furnish one full carton of each type, size, and color installed. Deliver to Owner, packaged for storage at project closeout.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Allowable Tolerances/Clearances in Plane of Finished Surfaces:
 - 1. Install suspension system level within 1/8 inch in 12 feet, with cumulative tolerance not to exceed 1/4 inch. Gaps and levelness shall be installed within guidelines of ASTM C636.
 - 2. Comply with applicable tolerance requirements of ASTM C636 for exposed members in finished ceiling (ie. abutting sections, cross tees, intersections, etc.).
- B. Seismic Loads for Categories D, E, & F: Design and size components to withstand seismic loads in accordance with the International Building Code, Section 1613.
- C. Design Wind loads per structural Drawings Sheet S501.

2.2 ACCEPTABLE MANUFACTURERS

- A. Armstrong.
- B. Certainteed.
- C. USG.
- D. Substitutions under provisions of Section 012500.

2.3 ACOUSTICAL SUSPENDED TILES

- A. (ACT-1): Armstrong Optima 3252PB; USG Halycon Eco 97316; Certainteed Symphony F 1304B-101-1 or approved equal meeting the following:
 - 1. Size: Refer to Finish and Color Schedule.
 - 2. Material: Fiberglass with acoustically transparent membrane.
 - 3. Type XII, Form 2 Pattern E.
 - 4. Thickness: 1 inch thick.
 - 5. Edges: Reveal or square tegular for 15/16 inch suspension system.
 - 6. NRC: 0.95 per ASTM E1264.
 - 7. CAC: N/A.
 - 8. Light Reflection: LR1 88% minimum per ASTM E1477.
 - 9. Flame Spread: Class A when tested per ASTM E1264.
 - 10. Finish: Acoustical scrim with factory applied latex paint.

11. GreenGuard Gold Certified.
- B. (ACT-2): Armstrong Optima Health Zone 3215PB; USG Mars Healthcare; CertainTeed Symphony F 1340B-RXS-1 or approved equal meeting the following:
1. Size: Refer to Finish and Color Schedule.
 2. Material: Fiberglass.
 3. Type XII, Form 2 Pattern E
 4. Thickness: 1 - 1/2 inch thick.
 5. Edges: Square tegular for 15/16 inch suspension system.
 6. NRC: 0.95 per ASTM E1264.
 7. Articulation Class: 190.
 8. Light Reflection: LR1 86% minimum per ASTM E1477.
 9. Flame Spread: Class A when tested per ASTM E1264.
 10. Finish: Factory applied latex paint on acoustically transparent membrane.
 11. GreenGuard Gold Certified.
- C. (ACT-3): Armstrong Optima 3255PB; USG Halcyon Eco 97317; CertainTeed Symphony F 1344B-IOF-1 or approved equal meeting the following:
1. Size: Refer to Finish and Color Schedule.
 2. Material: Fiberglass.
 3. Type XII, Form 2 Pattern E.
 4. Thickness: 1 inch thick.
 5. Edges: Reveal or square tegular for 15/16 inch suspension system.
 6. NRC: 0.95 per ASTM E1264.
 7. Articulation Class: 190.
 8. Light Reflection: LR1 88% minimum per ASTM E1477.
 9. Flame Spread: Class A when tested per ASTM E1264.
 10. Finish: Factory applied latex paint on acoustically transparent membrane.
 11. GreenGuard Gold Certified.

- D. (ACT-7): Armstrong Calla High NRC 2846; USG Mars High NRC; CertainTeed Symphony High NRC or approved equal meeting the following:
1. Size: Refer to Finish and Color Schedule.
 2. Material: Wet formed mineral fiber with acoustically transparent membrane.
 3. Thickness: 1- 3/4 inch thick.
 4. Type IV, Form 2, Pattern E.
 5. Edges: Reveal or tegular for 15/16 inch suspension system.
 6. NRC: 0.85 per ASTM E1264.
 7. CAC: Minimum 35, min. (continuous ceiling) per ASTM E1264.
 8. Articulation Class: 170.
 9. Light Reflection: LR1 85% minimum per ASTM E1477.
 10. Flame Spread: Class A when tested per ASTM E1264.
 11. Finish: Acoustically transparent membrane with factory applied latex paint.
 12. Greengard Gold Certified.
- E. (GWB-1): Suspended gypsum ceiling. Refer to Section 092116 - Gypsum Board Assemblies. Finish per Section 099000 - Painting and Coating.
- F. (GWB-2): Wire- hung acoustic gypsum ceiling; 2 - layer GWB, w/ 8 inch acoustic batt. Refer to Section 092116 - Gypsum Board Assemblies. Finish per Section 099000 - Painting and Coating.

2.4 ACOUSTICAL SUSPENDED CLOUD

- A. (ACT-5): Armstrong Optima PB Capz; USG Halycon Canopies; or approved equal meeting the following:
1. Size: Refer to Finish and Color Schedule.
 2. Material: Fiberglass with acoustically transparent membrane.
 3. Thickness: 7/8 or 1 inch thick.
 4. Edges: Square for 15/16 inch suspension system.
 5. NRC: 0.90 per ASTM E1264.
 6. CAC: Minimum 35, min. (continuous ceiling) per ASTM E1264.
 7. Light Reflection: LR1 90% minimum per ASTM E1477.

8. Flame Spread: Class A when tested per ASTM E1264.
 9. Finish: Manufacturer's standard factory-applied latex paint.
 10. GreenGuard Gold Certified.
- B. (ACT-6): Armstrong Calla High CAC #8809; Mars High NRC/CAC or approved equal meeting the following:
1. Size: Refer to Finish and Color Schedule.
 2. Material: Wet formed mineral fiber with acoustically transparent membrane.
 3. Type IV, Form 2, Pattern E.
 4. Thickness: 1 inch thick.
 5. Edges: Reveal or square tegular for 15/16 inch suspension system.
 6. NRC: 0.80 per ASTM E1264.
 7. CAC: Minimum 40, min. (continuous ceiling) per ASTM E1264.
 8. Articulation Class: 170.
 9. Light Reflection: LR1 85% minimum per ASTM E1477.
 10. Flame Spread: Class A when tested per ASTM E1264.
 11. Finish: Acoustically transparent membrane with factory applied latex paint.
 12. Greenguard Gold Certified.

2.5 LINEAR METAL CEILING PANEL ASSEMBLY

- A. Acceptable Manufacturers:
1. Basis of Design: Certainteed, Box Series 4.
 2. Ceilings Plus Barz.
 3. Armstrong Diverge.
 4. Substitutions under provisions of Section 012500.
- B. MC-1 for interior and exterior applications.
1. Substrate: Aluminum.
 2. Perforated pattern:
 - a. Open Area: 23%

- b. Centers: 0.120 inch. Staggered. Diameter: 0.060 inch.
 - c. Staggered.
 - d. Diameter: 0.060 inch.
- 3. Fire Rating: Class A.
- 4. Panel Length: Refer to Drawings.
- 5. Panel Profile: Refer to Drawings.
- 6. Flat Recessed Closure: 5/8 inch roll formed aluminum hat shaped closure panel to snap-fit between ceiling panels.
- 7. Finish: Refer to Finish and Color Schedule.
- 8. Greenguard Gold Certified.
- C. Linear Suspension System:
 - 1. Carrier: Universal hat shaped, .038 inch roll formed aluminum section with hook shaped tabs spaced to receive ceiling panels at 2 inch on center and 27/32 inch apart. Support holes spaced 4 inch on center. Factory applied black enamel finish.
 - 2. Hanger wire: 12 gage galvanized carbon steel hanger wire.
 - 3. Seismic/Wind Uplift Compression Struts: 1 1/2 inch deep, 16 gage, cold rolled steel C channels.
- D. Accessories:
 - 1. 1.5 inch - 1.5 pcf poly wrapped fiberglass.
 - 2. Panel End Caps: Formed, stamped, or milled end caps with matching finish.
 - 3. Panel Splice: Formed aluminum insert designed to snap fit between ends of two ceiling panels. Finish: To be selected by Architect.
 - 4. Infill strips.

2.6 SUSPENSION SYSTEMS

- A. Seismic Design Categories (SDC): Support systems shall comply with ASCE 7, SDC's D, E and F, ASTM C636, and meet CISCA guidelines for areas subject to severe risk.
 - 1. Load Limits Per CISCA: Loads include actual average weight of grid, panels. Light fixtures and air terminals.

- B. Heavy-Duty Exposed Grid Suspension System with 'Tee' suspension system with aluminum cap, double web suspension system with 15/16 inch wide bottom flange; suspension system shall have "heavy-duty" structural classification per ASTM C635 and in compliance with ASCE 7. For Kitchen/Serveries/Food prep provide USDA/FSIS corrosion-resistant steel.
 - 1. Cross tees shall be of same web height as main runners. Provide cross tees with off-set ends for a flush fit with main runners.
 - 2. Factory punch main runners to accept cross tees at the indicated module.
 - 3. Exposed members fabricated from commercial grade cold rolled steel. Provide suspension system complete with accessory items indicated or required for a complete installation.
 - 4. Design and construct main runners and cross tees and their splices and intersection connectors to carry a mean ultimate test load of not less than 180 pounds or twice the actual load, whichever is greater, in tension and in compression with a 5-degree misalignment of the members in any direction. Provide mechanical interlocking connections at splices and intersections.
 - 5. Provide manufacturer's standard hot-dipped galvanized or electro-galvanized finish; exposed bottom flange shall have manufacturer's standard low gloss baked-on enamel finish.
 - 6. Color, Typical: Match USG Interiors "#50 Flat White."
 - 7. Standard Edge Moldings and Trim: Comply with SDC, above.

2.7 MISCELLANEOUS MATERIALS

- A. Hanger Wires: Minimum 12 gage wire for 4-foot spacing and 10-gage wire for 5-foot spacing, carbon steel, galvanized, soft annealed, with Class 1 coating.
- B. Tie Wire: Not less than 16 gage galvanized, soft annealed mild steel wire.
- C. Fasteners: ICC approved; type and size to meet specified load requirements.
- D. Retention/Hold down clips: Concealed attachment to grid assembly to prevent panel displacement.
- E. Seismic Clips: As required by applicable code for seismic design category.
 - 1. Basis of Design:
 - a. USG ACM7 Seismic Clip OR Armstrong BERC2 -Used with 7/8 inch wall molding.
 - b. USG 4-Way Seismic Expansion Joint Clip or Armstrong SJCG- Seismic Joint Clip. The clip is compatible with 15/16 and 9/ 16 inch grid systems.
- F. Filler Panels: Field cut to size and match specified product.

- G. Moldings: Extruded aluminum for mounting to suspension system as indicated. Finish to match suspension system.
 - 1. Angle Molding: Armstrong Model #7800 or USG Angle Molding.
 - 2. Channel Molding: Armstrong Model #7835 or USG Channel Molding.
 - 3. Substitutions under provisions of Section 012500.
- H. Trim: As needed to complete installation.
 - 1. Basis of Design: USG Compasso Elite or Armstrong Axiom Transitions Assembly.
 - 2. Finish: To match suspension system.
 - 3. Height necessary for transition from acoustical ceiling to drywall suspension system.
- I. Reveal Column Ring: Prefinished black aluminum column ring reveal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify layout of hangers will not interfere with other work.

3.2 INSTALLATION

- A. Lay-In Grid Suspension System:
 - 1. Install suspension system in accordance with ASTM E580 and ASTM C636 and as supplemented in this section.
 - 2. Install system capable of supporting imposed loads to deflection of 1/360 maximum.
 - 3. Locate system on room axis according to reflected plan.
 - 4. Install after major above ceiling work is complete. Coordinate location of hangers with other work.
 - 5. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
 - 6. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers and related carrying channels to span extra distance.
 - 7. Do not support components on main runners or cross runners when weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.

8. Do not eccentrically load system, or produce rotation of runners.
 9. Perimeter Molding:
 - a. Install edge molding at intersection of ceiling and vertical surfaces into bed of acoustic sealant.
 - b. Use longest practical lengths.
 - c. Miter and rivet corners.
 - d. Install at junctions with other interruptions.
 10. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.
- B. Seismic Restraint: Install seismic restraint as specified herein, and as shown on detail. Ceiling areas of 144 square feet or less surrounded by walls which connect directly to the structure do not require seismic bracing. Comply with special inspection requirements of ICC Evaluation Report.
1. Where substantiating design calculations are not provided, the minimum horizontal restraint shall be affected by four #12 gage wires secured to main runner with four tight twists in 1½ inches and within 2 inches of cross tees intersection and splayed 90 degrees from each other at an angle not exceeding 45 degrees from plane of ceiling. Wires must be taut. Install fasteners for securing hanger wires to structure in accordance with manufacturer's recommendations.
 2. Install vertical struts to main runners and extend to structure above as indicated and required by applicable codes. If electrical conduit is used, slot lower portion to fit over ceiling runner; upper conduit section shall lap lower section a minimum of 4 inches; secure lap portion with two screws. Install vertical struts as ceiling height partitions, spaced not to exceed 8 feet on center.
 3. Place horizontal restraint points not to exceed 12 feet on center in both directions with first point within 6 feet from each wall.
 4. Independently support terminal ends of each cross tee and main runner a maximum of 8 inches from each wall with #12 gage hanger wires.
 5. Attach main runners and cross tees to perimeter members at two adjacent walls with ½ inch clearance between wall and main runners and cross tees maintained at other two walls; attach runners to perimeter members with 1/8 inch blind rivets.
 6. At the perimeter of the ceiling area where main or cross runners are not attached, provide interconnection between runners and tees at free end using metal strut to prevent lateral spreading. Where the perpendicular distance from the wall to the first parallel runner is 12 inches or less, this interlock is not required.
- C. Lay-In Acoustical Tile (ACT):

1. Fit acoustical tile in place, free from damaged edges or other defects detrimental to appearance and function.
2. Lay directional patterned units in basket weave pattern. Fit border trim neatly against abutting surfaces.
3. Install units after above ceiling work is complete.
4. Install acoustical tiles level, in uniform plane, and free from twist, warp, and dents.
5. Cutting Acoustic Units:
 - a. Cut to fit irregular grid and perimeter edge trim.
 - b. Cut square reveal edges to field cut units.
 - c. Double cut and field paint exposed edges of tegular units.
6. Where round obstructions occur, install preformed closures to match perimeter molding.

3.3 ERECTION TOLERANCES

- A. Installation Tolerances: Not to exceed the following:
1. Main Runners: Level within 1/8 in 12 feet.
 2. Main Runner to Cross Runner Deviation: maximum 1/32 inch of the required center distance.
 3. Deviation Between Main Runner End Splices:
 - a. Vertical: maximum 1/16 inch.
 - b. Horizontal: maximum 1/16 inch.
 4. Visually Apparent Angular Displacement of Longitudinal Axis of One Runner to Another: None.
 5. Gaps Between Assembly Devices In Grid: maximum 1/16 inch.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cushioned wood floors.
 - 2. Sheet vapor retarder on substrate surface.
 - 3. Plywood subflooring cushion pads.
 - 4. Surface finishing and game lines.
 - 5. Refinish existing athletic wood flooring at gym and stage.
 - 6. Transition strips.
- B. Products Installed but Not Furnished under this Section
 - 1. Section 096500 - Resilient Flooring: Rubber base.
 - 2. Section 116600 - Athletic Equipment: Equipment inserts.
- C. Related Sections
 - 1. Section 033000 - Cast-In-Place Concrete: Concrete floor surface.

1.2 REFERENCES

- A. American Lumber Standards Committee:
 - 1. ALSC Lumber Program.
- B. APA - The Engineered Wood Association:
 - 1. APA Product Reports.
- C. ASTM International:
 - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. Maple Flooring Manufacturers Association:
 - 1. MFMA Sports Floors- Grading Rules.

1.3 SUBMITTALS

- A. Submit under provisions of Section 013300 - Submittal Procedures.
- B. Shop Drawings:

1. Indicate floor joint pattern, grain direction, and termination details.
 2. Indicate provisions for expansion and contraction, base, base corner details, and game insert or socket devices.
 3. Indicate location, size, design, and color of colored game lines.
- C. Product Data: Provide data for resilient blocks, floor materials, floor coating, and game insert socket devices.
- D. Samples: Submit one sample 12 x 12 inch in size illustrating floor finish, color, game line colors, and sheen.
- E. Certification: Provide certification Installer and Flooring System meets qualifications listed below.
- F. Manufacturer's MFMA Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- G. Submit under provisions of Section 017700 - Closeout Procedures.
- H. Manual for Materials and Finishes: Submit MFMA's Care Instructions. Include a suggested schedule for cleaning, stripping, and re-finishing, stain removal methods, and polishes and waxes.

1.4 QUALITY ASSURANCE

- A. Work: In accordance with the following:
1. Lumber Grading Agency: Certified by ALSC.
 2. Plywood Grading Agency: APA or other code approved quality control agency.
 3. Maple Flooring Manufacturers Association.
- B. Qualifications:
1. Installer: MFMA Mill Accredited Installation Company with MFMA Accredited Installer on site for the duration of the wood floor installation.
 2. Flooring system: Meet or exceed the MFMA PUR Standards (Performance and Uniformity Rating Standards) and be submitted with a MFMA PUR Compliance Letter.
- C. Manufacturer's representative must be present throughout floor installation to verify acceptance of flooring system.
- D. Regulatory Requirements:
1. Conform to applicable code for flame/smoke rating requirements in accordance with ASTM E84.

- E. Mockup:
 - 1. Provide mockup of floor system.
 - 2. Construct one mockup, 8 feet long by 8 feet wide, which includes accessories and finish.
 - 3. Locate where directed.
 - 4. Mockup may remain as part of the Work.
- F. Pre-Installation Meeting:
 - 1. Convene one week prior to beginning installation of work in this section under provisions of Section 013119 - Project Meetings.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not install wood flooring until wet construction work is completed.
- B. Do not install flooring until moisture content of concrete floor has stabilized at 12 percent maximum and ambient air at installation space is not less than 65 degrees F.
- C. Provide heat, light, and ventilation prior to installation.
- D. Maintain room temperature and relative humidity in accordance with adhesive manufacturer's and MFMA instructions for a period of two days prior to delivery of materials, during, and after installation.

1.6 EXTRA MATERIALS

- A. Provide 10 sq yd of extra wood flooring material.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Action Floor Systems, Excel NR <http://www.actionfloors.com/>
- B. Aacer Flooring, <http://aacerflooring.com/sports-flooring/> .
- C. Horner Sports Flooring Company. <http://www.hornerflooring.com/>
- D. Robbins Sports Surfaces, <http://www.robbinsfloor.com/>.
- E. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.2 WOOD MATERIALS

- A. Gym Flooring: Species and grade stamped on underside of each piece, conforming to the following: (WDF-1)

1. Species: White Hard Maple.
 2. Grade: Second and better. For areas under stacked portion of telescoping bleachers that are normally concealed from view, provide Third and Better Grade.
 3. Treatment: Kiln dried.
 4. Cut: Flat Grain.
 5. Moisture Content: 7 to 9 percent.
 6. Actual Thickness: 25/32 inch.
 7. Actual Width: 2-1/4 inches.
 8. Edge: Tongue and Groove.
 9. End: End matched.
 10. Length: Random, minimum of 9 inches.
 11. Backs: Channeled (kerfed) for stress relief.
- B. Factory fabricated subfloor panels: Two layers, 15/32 inch thick, APA Rated Sheathing, Span Rating of 32/16, Exposure 1 pre-assembled with 7/16 inch manufacturer's standard natural rubber pads.
- C. Provide structural support below flooring layers for bleachers in stacked position and open position as required in accordance with installer's recommendations.

2.3 BASE MATERIALS

- A. Ventilating Base: Molded rubber, 4 inch high with a 3 inch toe, ventilating type, with adhesives and accessories, color as selected. (RB-2)

2.4 ACCESSORIES

- A. Vapor Retarder: Black polyethylene sheeting, 6 mil thick; 2 inch wide self adhesive, reinforced tape for joint sealing.
- B. Resilient Pads: 3/4" thick conical extruded rubber material, unsealed air channels for resiliency; compressible to 1/16 inch under a 40 psi load with full and immediate recovery. Resilient Pad shall be one piece EPDM, Natural Rubber, or Polyurethane; no granular pads.
- C. Interior transitions/thresholds between dissimilar flooring materials: Refer to Section 087100.
1. Size and Shape: As required for floor material heights.
 2. Center under door or as indicated.
 3. Adhesive: Manufacturer's recommendation.

- D. Nails/adhesives: Type recommended by flooring manufacturer.

2.5 FINISHES

- A. Comply with current edition of MFMA's published specifications for gymnasium sealers and finishes for maple floors. Provide sealer and finish produced by same manufacturer.
1. Sealers: MFMA Group 1 - Water Based Sealers.
 2. Group 5: Water-Based Finish.
 3. Marking Paint: Type recommended by manufacturer and compatible with the finish.
 - a. Color: To be selected from manufacturer's complete (custom and standard) range.
 - b. Multiple color selections required for game line differentiation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify slab-on-grade is smooth and flat to plus or minus 1/8 inch in 10 feet.
- B. Where concrete slabs do not conform to tolerances specified in Section 033500 and above, make flat and level. Perform work as necessary to provide substrate within acceptable tolerances.
1. Grind or remove concrete ridges and warps.
 2. Fill voids and swales using cementitious overlay conforming to requirements of flooring manufacturer.
- C. Verify that required floor mounted utilities are in proper location.

3.2 PREPARATION

- A. Broom clean substrate surfaces.

3.3 INSTALLATION - FLOORING

- A. General: Comply with sports-floor assembly manufacturer's written instructions, but not less than written recommendations of MFMA applicable to flooring type indicated.
- B. Place vapor retarder, lap edges and ends 6 inches, tape seal and spot glue in place.
- C. Install panels end to end in a brick pattern at right angles to the direction of the finish flooring leaving a 1/4 inch gap between panel ends.
- D. Place solid blocking at all bleacher stack areas and doorways to allow for no deflection. Limit flooring deflection to 1/8 inch under 2/3 distance of Gymnasium bleachers from stacking position.

- E. Machine fasten strip flooring parallel with main playing court at 12 inches o.c. Provide 2 inch expansion voids at perimeter and all vertical obstruction.
- F. Arrange flooring with end matched grain set flush and tight.

3.4 INSTALLATION - ACCESSORIES

- A. Provide threshold at centerline of door openings and where flooring terminates with other floor areas.
- B. Install base at floor perimeter to cover expansion space in accordance with manufacturer's instructions. Miter inside corners and use premolded outside corners.
 - 1. Mechanically attach base at CMU and storefront locations.
- C. Install floor sockets, inserts and cover plates to a depth sufficient to ensure flush top surface with sanded floor surface.

3.5 FINISHING

- A. Sand flooring to smooth even finish with no evidence of sander marks in accordance with MFMA standards. Remove all existing finish and striping. Take precautions to contain dust. Remove dust by vacuum.
- B. Mask off adjacent surfaces.
- C. Apply filler and three finish coats in accordance with floor finish manufacturer's instructions and MFMA standards.
- D. Apply first coat, allow to dry and buff with steel wool to remove irregularities in accordance with MFMA standards. Vacuum clean and wipe with damp cloth.
- E. Apply second coat. Allow to dry. Lightly buff with steel wool and vacuum clean in accordance with MFMA standards.
- F. Apply colored games lines 2 inches wide to layout indicated on Drawings and shop drawings. Use current rules of association having jurisdiction. Color for lines to be selected by Owner.
- G. Apply last coats of finish.

3.6 CLEANING

- A. Clean work under provisions of Section 017700 - Closeout Procedures.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean and polish floor surfaces in accordance with manufacturer's instructions.

3.7 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 017000 - Execution.
- B. Prohibit traffic on floor finish for 48 hours after installation.
- C. Protect sports floors during remainder of construction period to allow finish to cure and to ensure that flooring and finish are without damage or deterioration at time of Substantial Completion.
 - 1. Do not cover sports floors after finishing until finish reaches full cure, and not before seven days after applying last finish coat.
- D. Do not move heavy and sharp objects directly over sports floors. Protect fully cured floor finishes and surfaces with plywood or hardboard panels to prevent damage from storing or moving objects over sports floors.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Linoleum Flooring and Covering.
2. Linoleum Wall Covering,
3. Resilient Flooring.
4. Rubber Stair Treads.
5. Rubber base.
6. Transition strips.
7. Moisture and pH testing of concrete slab prior to installation.

B. Related Sections:

1. Section 033000 - Cast-in-Place Concrete: Slab finishes in spaces to receive floor coverings and for vapor retarder and granular base below slabs-on-grade. Moisture and pH testing of concrete.
2. Section 035400 - Cast Underlayment.
3. Section 096816 - Carpeting: Transition strips in conjunction with carpet installation.

1.2 REFERENCES

A. ASTM International:

1. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
2. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading.
3. ASTM F1861 - Standard Specification for Resilient Wall Base.
4. ASTM F1869 - Standard Test Method for Measuring Vapor Emission Rate of concrete Subfloor Using Anhydrous Calcium Chloride.
5. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes.

B. National Fire Protection Association:

1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

C. Environmental Protection Agency:

1. 40 CFR 59, Subpart D (EPA Method 24) National Volatile Organic Compound Emission Standards for Architectural Coatings.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Shop Drawings: Indicate seaming plan.
- C. Product Data: Submit data describing physical and performance characteristics; including installation instructions.
- D. Samples:
 1. Submit one sample, 12 x 12 inch in size illustrating color and pattern for each resilient flooring product specified.
- E. Section 017700 - Closeout Procedures.
- F. Manual for Materials and Finishes: Submit suggested schedule for cleaning and maintaining.

1.4 QUALITY ASSURANCE

- A. Single Source: Obtain each type of product required, including adhesives and accessories from one manufacturer throughout the Project.
- B. Pre-Installation Meeting:
 1. Convene one week prior to beginning installation of work in this section under provisions of Section 013119 - Project Meetings.
- C. Fire Resistance of Floor Coverings: Comply with IBC, Section 804 Interior Floor Finish; determined in accordance with NFPA 253 "Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Heat Source."
- D. Indoor Air Quality: Comply with 40 CFR 59, Subpart D (EPA Method 24) requirements for adhesives as indicated.
- E. Moisture/pH Testing: Verify concrete floors are dry so that maximum moisture emission from concrete shall not exceed manufacturer's installation requirements. Test in accordance with ASTM F1869 (surface) and ASTM F2170 (core) and exhibit negative alkalinity, carbonization, or dusting. Perform one test of each type for each 1000 square feet of resilient flooring area. Refer to Section 033000 - Cast-In-Place Concrete.

1.5 PROJECT CONDITIONS

- A. Maintain minimum room temperature of between 65 deg F and 85 deg F in spaces to receive resilient flooring.

- B. Store flooring materials (including adhesive and welding rod) in spaces where they will be installed for at least 48 hours before beginning installation.
- C. Ambient relative humidity should be between 40% and 60%.
- D. In areas exposed to intense or direct sunlight, protect products of this section prior to installation and during installation and adhesive curing periods by covering light source.
- E. Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by manufacturer's recommended bond and moisture test.

1.6 MAINTENANCE

- A. Extra Materials: After completion of work, deliver to project site at a location designated by the Owner's Representative, replacement materials from same manufactured lot as materials installed. Package extra materials in manufacturer's original unopened cartons with each carton clearly labeled. Provide the following quantities:
 - 1. Tile: Furnish 1 box for each 100 boxes or fraction thereof of each color, pattern and size of tile installed.
 - 2. Base: Furnish 10 linear feet for each 1000 linear feet or fraction thereof of each color and size of base installed.

1.7 WARRANTY

- A. RF-1: 10 year manufacturer's warranty.

PART 2 PRODUCTS

2.1 LINOLEUM COVERING

- A. Acceptable Manufacturers:
 - 1. Basis of Design: Forbo.
 - a. (LIN-1)(LIN-2): Marmoleum Real.
 - b. (LIN-3): Marmoleum Fresco.
 - 2. Substitutions: Under provisions of Section 012500.
- B. Linoleum covering, vertical application and linoleum flooring: Meets or exceed ASTM F2034 Standard Specification for Linoleum Sheet Flooring Type 1.
 - 1. Color: Refer to Finish and Color Schedule.
 - 2. Thickness:

- a. Wall and ceiling: 1 inch.
- b. Flooring: 12 inch (3 mm).
- 3. Backing: Jute.
- 4. Width: 79 inch.
- 5. Static Load Limit: ASTM F970, 850 psi.
- 6. Critical Radiant Flux: ASTM E648, Class I, not less than 0.45 W/sq. cm.
- 7. Smoke Generation, ASTM E662, <450; Pass.
- 8. 100% USDA Certified BioBased Product.
- C. Seaming Method: Conventional seams.
- D. Base: Rubber base.
- E. Aluminum trim.

2.2 RESILIENT FLOORING

- A. Acceptable Manufacturers:
 - 1. Basis of Design: Altro, Reliance 25.
 - 2. Substitutions: Under provisions of Section 012500.
- B. Composition: Aluminum trioxide and colored quartz aggregate throughout thickness of PVC.
 - 1. Type 1, Grade 1, Class A, smooth flooring. ASTM F1303.
 - 2. Color: Refer to Finish and Color Schedule (RF-1).
 - 3. Wear Layer/Overall Thickness: 2.0 mm with .8 mm wear layer, heterogeneous construction.
 - 4. Roll/Sheet Width & Length: 6 feet 7 inches x 65 feet- 5 inch.
 - 5. Backing: Non-woven polyester/cellulose glass fiber reinforcement scrim.
 - 6. Slip Resistance: ADA compliant, ASTM D 2047 James Machine, SCoF Dry .8 / Wet 0.9; DIN 51130 Ramp Test - R 10.
 - 7. ANSI/NSFI B101.3: 38 wet DCOF.
 - 8. Static Load Limit: ASTM F 970, Standard Test Method for Static Load Limit, Modified - 2000 psi.

9. Fire Performance: ASTM E 648, Standard Test method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class I, ASTM E662 Smoke Development.
 10. Indentation: EN 433; <0.10 mm.
 11. Wear (Abrasion) resistance: EN 660; <10%, 50,000 cycles.
 12. VOC emissions: CA 01350 - Pass; FloorScoor - Certified.
 13. Manufactured with rapidly renewable bio-based content.
 14. Ortho-phthalate-free.
- C. Seaming Method: Heat welded seams.
- D. Base: Integral Cove.
- E. Aluminum trim.

2.3 RUBBER STAIR TREADS

- A. Acceptable Manufacturers
1. Basis of Design: Roppe.
- B. Resilient rubber stair treads and stringer, ADA, visually -impaired, and California Title 24 Compliant.
1. Color: Refer to Finish and Color Schedule. (RBST-1) (RBST-2)
 2. Tread Profile: No. 80 Ribbed Design.
 3. Homogeneous composition of 100% synthetic rubber, high quality additives, and colorants.
 4. ASTM F2169 Standard Specification for Resilient Star Treads, Type TS, Class1 and 2, Group 1 and 2.
 5. Exceeds ASTM E648 Class 1 Flammability requirements.
 6. Tensile Strength: ASTM D412 – 1200 psi.
 7. Hardness: ASTM D2240 – Not less than 85 Shore A.
 8. Abrasion Resistance: ASTM D3389 – less than 1 gram weigh loss.
 9. Slip Resistance: ASTM D2047 – Meets or exceeds a static coefficient of friction of 0.8.
 10. ASTM E648/NFPA 253: Class 1.
 11. ASTM E662/NFPA 258: Less than 450

12. Stringer:
 - a. Color: Refer to Finish and Color Schedule.
 - b. Height: 10 inches.

2.4 RUBBER FLOORING

- A. Acceptable Manufacturers:
 1. Basis of Design: Roppe.
 2. Substitutions: Under provisions of Section 012500.
- B. Construction: Manufactured in a single layer. Calendered and vulcanized with a base of natural and synthetic rubbers, stabilizing agents and pigmentation.
 1. Thickness: 3 mm
 2. Color: Refer to Finish and Color Schedule. (RF-2)
 3. Texture: Smooth.
 4. Hardness Shore A: ASTM D2240, 97.
 5. Modulus at 10% Elongation: ASTM D412; 482.28 psi.
 6. Coefficient of Friction (Dry): ASTM D2047; >0.80.
 7. Abrasion Resistance: ASTM D3389; .04 g loss.
 8. Critical Radiant Flux: ASTM E648; >0.45 W/cm² (Class 1).
 9. Optical Density of Smoke: ASTM E662; <450.
 10. Wear Layer Thickness: ASTM F410; >1 mm.
 11. Resistance to Chemicals: ASTM F925; Compliant.
 12. Static Load Limit (Tested at 250 psi): ASTM F970; .001 in.
 13. Static Load Limit (Tested at 800 psi): ASTM F970; .003 in.
 14. Heat Resistance: ASTM F1514; Compliant.
 15. Light Resistance: ASTM F1515; Compliant.
 16. Dimensional Stability of Tiles: ASTM F2199; Compliant.
 17. Resistance to Fungi: ASTM G21; No growth.
 18. Indoor Air Quality: CA 01350; Compliant.

19. Manufactured without: BPA, Formaldehyde, Halogens, Heavy Metals, Isocyanates, Phthalates and PVC.
- C. Seaming Method: Conventional seams.
- D. Base. Rubber Base (RB-3) Basis of Design - Roppe 700 Series TP Ruber Wall Base.
 1. ASTM F1861 - Resilient Wall Base Type TP, Group 2, Styles A & B.
 2. ASTM E648 (NFPA 253) - Critical Radiant Flux Class 1, ≥ 0.45 W/cm².
 3. ASTM E662 (NFPA 258) - Smoke Density Passes, ≤ 450 .
 4. ASTM E84 - Flammability Class A.
 5. CAN/ULC-S102.2 - Surface Burning 10 Flame Spread Rating, 60 Smoke Developed Classification.
 6. ASTM F925 - Chemical Resistance, Excellent with chemicals listed in standard.

2.5 RUBBER BASE

- A. Acceptable Manufacturers:
 1. Basis of Design: Roppe, <http://roppe.com>.
 2. Tarkett, <https://commercial.tarkett.com>
 3. Burke, <http://www.burkeflooring.com>.
 4. Flexco, <http://www.flexcofloors.com>.
 5. Substitutions: Under provisions of Section 012500.
- B. Construction: Extruded rubber base meeting requirements of ASTM F1861 (RB-1, RB-2), Type TS (thermoset vulcanized extruded rubber); 1/8-inch thick; uno; coil stock factory pre-molded end stops and corner units; top set cove style. Molded ASTM (RB-3)
 1. At casework, match height installed on adjacent wall. Provide taller base if needed or where shown on drawings.
 2. Premolded external corners.
 3. Color: Refer to Finish and Color Schedule. (RB-1) (RB-2) (RB-3)

2.6 INSTALLATION MATERIALS

- A. Interior transitions/thresholds between dissimilar flooring materials:
 1. Metal: Schlüter® - Schiene Series, as selected and approved or specifically detailed, pre-fabricated stainless steel or approved equal.

- a. Size and Shape: As required for floor material heights.
 - b. Center under door or as indicated.
 - c. Adhesive: Manufacturer's recommendation.
- 2. Rubber: Roppe, as selected and approved or specifically detailed.
 - a. Size and Shape: As required for floor material heights.
 - b. Center under door or as indicated.
 - c. Adhesive: Manufacturer's recommendation.
 - d. Color: To match RB-1.
- B. Primers: Non-staining type as recommended by manufacturer.
- C. Adhesives: Recommended by the manufacturer for the conditions of the installation; adhesives shall be low-odor and meet VOC's requirements; in all cases, adhesives shall not exhibit any long lasting noxious off-gassing. Provide white colored adhesives for all areas.
- D. Underlayments (Forming Transitions and Patching Compounds): Recommended by flooring manufacturer.
- E. Sealant per Section 079200.
- F. Other Materials: Provide incidental and accessory materials, tools for testing and installation required for completion of resilient floor installation.
- G. Cove former at resilient flooring: Acceptable material, sized to suit application. Install using double sided contact tape.
- H. Vinyl perimeter/edging around every drain, floor sink and clean out and at edging/start/stop of resilient flooring.
- I. Cap Strip at resilient flooring: Stainless steel, sized to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 feet and are ready to receive Work.
- B. Moisture/pH Testing: Verify concrete floors are dry as specified in Quality Assurance above.
- C. Beginning of installation means acceptance of existing substrate and site conditions.
- D. Sample test concrete for proper adhesive bond.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is cured.
- C. Clean substrate.
- D. Apply primer as required to prevent "bleed-thru" or interference with adhesion by substances which cannot be removed.

3.3 INSTALLATION - SHEET FLOORING

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.
- B. Net fim seams at LIN-1, LIN-2 and LIN-3. Seams must be underscribed, net fit with no gaps or fullness and placed into wet adhesive and rolled immediately with a hand seam roller. Roll each drop or cut of installed material immediately after placement into adhesive with a 100 pound roller in both directions, first through the width and then the length. Additional rolling after the seaming is complete and before leaving the room or 30 minutes after initial rolling is required. Comply with manufacturer's instructions.
- C. Double cut sheet; provide heat welded seams at RF-1.
- D. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install transition strips at unprotected or exposed edges, where flooring terminates, and where indicated. Secure transition strips by adhesive. Include transitions from carpet and ceramic tile.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints. Where scribed against columns and c-channels, provide sealant to match P-2.

3.4 INSTALLATION - BASE

- A. Fit joints tightly and make vertical. Install in longest possible lengths. Miter internal corners. At external corners gouge back of base including two stress relief gouges at the bottom of the base in accordance with manufacturer's instructions. Install external corners so base toe has a continuous flow/shape around the corner.
- B. Install base on solid backing. Bond tightly to wall surface. At returns 1 foot or shorter, apply continuous pressure until adhesive is fully cured.
- C. Scribe and fit to door frames and other interruptions.

3.5 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean, seal, and maintain resilient flooring products.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution: Protecting installed construction.
- B. Prohibit traffic on resilient flooring for 48 hours after installation.
- C. Provide other approved protection, if finished flooring is to be exposed to construction traffic, and remove protection at substantial completion.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Carpet tile.
 - 2. Accessories.
 - 3. Transition strips.
 - 4. Walk off mat.
- B. Related Sections:
 - 1. Section 033000 - Cast-in-Place Concrete: Moisture and pH testing of concrete.
 - 2. Section 096500 - Resilient Flooring: Base finish and transition strips.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- B. Carpet and Rug Institute:
 - 1. CRI Carpet Installation Standard - Standard for Installation of Commercial Carpet.
 - 2. CRI Green Label Plus Testing Program.
 - 3. CRI Model Specifications for Commercial Carpets.
- C. Certified Floor Covering Installers:
 - 1. CFI Certification Process.
- D. Consumer Products Safety Commission:
 - 1. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.
- E. National Fire Protection Association:
 - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.

- B. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of transitions with adjacent materials.
- C. Product Data: Submit data on specified products, describing physical and performance characteristics and method of installation.
- D. Building Product Disclosure Requirements: Provide Building Product Disclosure documentation. Any requests for substitution must include this documentation.
 - 1. Environmental Product Declaration for carpeting.
- E. Samples:
 - 1. Submit one 24 x 24 inch carpet samples illustrating color and pattern design for each carpet color selected.
 - 2. Submit one 36 inch long samples of transition strip material.
- F. Manufacturer's Instructions: Submit recommended procedures for routine and periodic cleaning.
- G. Section 017700 - Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
 - 1. Floor Finishes: Comply with one of the following:
 - a. Class I, minimum 0.45 watts/sq cm, when tested in accordance with NFPA 253.
 - b. CPSC 16 CFR 1630.
- B. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
 - 2. Installer: Company specializing in performing work of this section with minimum five years documented experience.
 - a. CFI Certified Carpet Installers.
- C. Pre-Installation Meeting:
 - 1. Section 013119 - Project Meetings: Pre-installation meeting.
 - 2. Convene minimum one week prior to commencing work of this section.

- D. Moisture/pH Testing: Verify concrete floors are dry so that maximum moisture emission from concrete shall not exceed manufacturer's installation requirements. Test in accordance with ASTM F1869 (surface) and F2170 (core) and exhibit negative alkalinity, carbonization, or dusting. Perform one test of each type for each 1000 square feet of flooring area covered by this section. Refer to Section 033000 - Cast-In-Place Concrete.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.
- B. Store materials in area of installation for 48 hours prior to installation.

1.6 PROJECT CONDITIONS

- A. Store roll goods in a controlled climate at a temperature between 65-90 degree F, and a relative humidity below 65%. Stand roll on its end, making sure plastic wrap is secured tightly around roll or lying side by side. Do not stack.
- B. Temperature of interior environment, including the sub floor should be no lower than 65 degree F and no higher than 90 degree F at least 72 hours prior to, during and after installation.
- C. All products and installation materials should be stored between 65 degree F and 90 degree F for at least 48 hours prior to installation. Relative humidity should not exceed 65%.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Milliken.
- B. Substitutions: Section 012500 - Substitution Procedures.

2.2 COMPONENTS

- A. Milliken, Journal, Inscription: Tufted, Textured Loop.
 - 1. Color and Style: Refer to Finish and Color Schedule. (CPT-1)
 - 2. Standard Backing: PVC-Free WellBAC™ Comfort Cushion
 - 3. Tile Size: 50 cm x 50 cm (19.7" x 19.7")
 - 4. Yarn Type: ECONYL® Solution-Dyed Nylon Type 6
 - 5. StainResist/Soil Release: StainSmart
 - 6. Tufted Face Weight: 15.5 oz/sq. yrd
 - 7. Gauge: 1/12
 - 8. Stitches Per Inch: 10.

9. Finished Pile Height: 0.156 inch.
10. Finished Pile Thickness: 0.094 inch.
11. Tufts: 120/in sq.
12. Average Density Finished: 5,821
13. Dye method: 100% Solution Dyed.
14. Colorfastness to Light: > 4 at 80 hours (AATCC 16E).
15. Flammability Rating, Flooring Radiant Panel ASTM E648: Class 1.
16. Smoke Generation: Less than 450 (ASTM E662).
17. Static Rating: 3.5 kV.
18. Recycled Content by Total
 - a. Standard Backing: 48% Pre-Consumer, 8.1% Post-Consumer
19. CRI Green Label Plus: GLP7205 CARpet Category 13X..
20. NSF/ANSI 140 Carpet: Platinum.
21. Nominal Total Thickness: 0.31 inch.
22. Methenamine Pill Test (CPSC FF-1-70 or ASTM D2859: Self-Extinguishing.
23. Tention Appearance Retention Rating: Heavy Traffic End-Use Application.
24. Recomend Installation Method: Ashlar.

2.3 WALK OFF MAT

A. Walk Off Mat: Tandus-Centiva

1. Color and Collection: Refer to Finish and Color Schedule. (WOM-1)
2. Total Product Thickness: 0.355 in.
3. Primary Backing: Non-woven synthetic fiber.
4. Secondary Backing: Refer to paragraph below.
5. Face Weight: 29 oz/sq yd.
6. Gauge: 1/10.
7. Stitches Per Inch: 9.0
8. Pile Height Average: .185 inch.

9. Fiber System: TDX Nylon.
10. Dye method: 100% Solution Dyed.
11. Fluorine-Free Soil Protection: Eco-Ensure.
12. Flammability Rating: Flooring Radiant Panel, ASTM E648. Class 1.
13. Smoke Generation: Less than 450 (ASTM E662).
14. Static Rating: Less than 3.0 kV.
15. CRI Green Label Plus: GLP9744.
16. Antimicrobial Chemicals: No antimicrobials (EPA Registered pesticides) added to product (ASTM E2471-05).

2.4 ACCESSORIES

- A. Sub-Floor Filler: Cementitious Type recommended by flooring material manufacturer.
- B. Primer: Recommended by carpet manufacturer.
- C. PH Blocker/Floor Primer: Recommended by carpet manufacturer.
- D. Moisture tolerant adhesive: Compatible with carpet material and concrete subfloors and meeting the moisture testing requirements of flooring manufacturer. Recommended by flooring manufacturer to comply with manufacturer's warranty. Meet South Coast Air Quality Management District, SCAQMD Rule 1168.
- E. Interior transitions/thresholds between dissimilar flooring materials: Schlüter® - Schiene Series, as selected and approved or specifically detailed, pre-fabricated stainless steel or approved equal.
 1. Size and Shape: As required for floor material heights.
 2. Center under door or as indicated.
 3. Adhesive: Manufacturer's recommendation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate conditions under provisions of Section 013100 - Project Management and Coordination.
- B. Verify that 90% of samples of substrate surfaces not exceed ¼ inch and 100% of samples not exceed 3/8 inch gap.
- C. Moisture/pH Testing: Verify concrete floors are dry as specified in Quality Assurance above.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- C. Clean substrate.

3.3 INSTALLATION

- A. Do not mix carpet from different cartons unless from same dye lot.
- B. Cut carpet roll clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- C. Install carpet with pile direction aligned as indicated on shop drawings.
- D. Locate change of color or pattern between rooms under door centerline.
- E. Fully adhere carpet to substrate.
- F. Trim carpet neatly at walls and around interruptions.
- G. Conceal exposed edges.

3.4 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean and vacuum carpet surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 017000 - Execution: Protecting installed construction.
- B. Prohibit traffic on flooring for 48 hours after installation.
- C. Provide other approved protection, if finished flooring is to be exposed to construction traffic, and remove protection at substantial completion. Do not use plastic sheeting.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Tackable Wallcovering.
 - 2. Vinyl Wallcovering.
 - 3. Accessories.
 - 4. Surface preparation and prime painting.
- B. Related Sections:
 - 1. Section 092116 - Gypsum Board Assemblies: Appropriate finish for gypsum board surfaces under wall coverings.
 - 2. Section 099000 - Painting and Coating: Preparation and priming of substrate surfaces.
 - 3. Section 101100 - Visual Display Units.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Green Seal:
 - 1. GS-11 - Product Specific Environmental Requirements.
- C. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate wall elevations with seaming layout.
- C. Product Data: Submit data on covering and adhesive.
- D. Samples: Submit one sample of covering, 12 x 12 inch in size illustrating color, finish, and texture.
- E. Test Reports: Indicate verification of flame and smoke ratings, when tested by UL.
- F. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention and substrate preparation requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017700 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.

1.5 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
 - 1. Textile Wall Coverings: Comply with:
 - a. Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Perform Work in accordance with local code/standard.
- C. Qualifications
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
 - 2. Installer: Company specializing in performing work of this section with minimum three years documented experience.

1.6 MOCKUP

- A. Section 014000 - Quality Requirements: Requirements for mockup.
- B. Construct mockup panel of approved width, full height, illustrating installed covering, joint seaming technique and substrate preparation.
- C. Locate where directed by Architect/Engineer.
- D. Incorporate accepted mockup as part of Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Inspect roll materials on site to verify acceptance.
- C. Protect packaged adhesive from temperature cycling and cold temperatures.
- D. Do not store roll goods on end.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements.

- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by adhesive or covering product manufacturer.
- C. Maintain these conditions 24 hours before, during and after installation of adhesive and covering.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surfaces.

1.9 EXTRA MATERIALS

- A. Section 017700 - Closeout Procedures: Spare parts and maintenance products.
- B. Supply 25 linear feet of each color and pattern of covering; store where directed.
- C. Package and label each roll by manufacturer, color and pattern and destination room number.

PART 2 PRODUCTS

2.1 TACKABLE WALL COVERINGS

- A. Acceptable Manufacturers
 - 1. Basis of Design: Bulletin Board, Forbo, Hazelton, PA 18202. 800.842.7839.
(<http://www.forboflooringna.com/>)
 - 2. Koroseal Wall Talkers (www.walltalkers.com)
 - 3. Wolf Gordon. (<http://www.wolf-gordon.com>)
 - 4. Substitutions: Under provisions of Section 012500.
- B. Tackable Outer Surface.
 - 1. Color: Refer to Color and Finish Schedule. (TWC-1) (TWC-2)
 - 2. Fire Resistance: Class B (ASTM E84)
 - 3. Gauge: 1/4".
 - 4. Width: 48".
 - 5. Backing: Jute.

2.2 VINYL WALLCOVERING

- A. Basis of Design: Designtex
 - 1. Vinyl Wallcovering - Type II (textured) laminated with UV Cured Top Coat UV2.
 - a. Color: Refer to Color and Finish Schedule. (VWC-1)
 - b. Contents: 100% PVC face with poly-cotton osnaburg or polyester non-woven backing.

- c. Width: 54 inch.
- d. Weight/thickness: 20 oz/lin yd.
- e. Print technology: UV curable inkjet.
- f. Fire rating: ASTM E84 class A.
- g. Mold/Mildew/Bacterial Resistance: ASTM G21, Passed all requirements of CCCW-408-D.
- h. Panels printed with 2 inch bleed on all edges and between panels. An overlap/double cut installation method is used.
- i. Custom image to be provided by Architect.

2.3 ACCESSORIES

- A. Clear anodized aluminum metal trim for tackable surface per architectural drawings:
 - 1. Basis of Design:
 - a. Integral Corner Trim: Fry Reglet FCP Integral Outside Lap Corner. 3/8 inch reveal depth.
 - b. J trim: Fry Reglet, FCP J trim, 3/16 inch return for 1/4 inch thick product.
 - c. H trim: Aluminum divider 5/16 inch face for 1/4 inch thick product.
- B. Adhesive: Type recommended by tackable wall covering manufacturer to suit application to substrate, mildew and water resistant, strippable type.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that substrate surfaces are prime painted and ready to receive work, and conform to requirements of the wall covering manufacturer.
- B. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.
- C. Beginning of installation means acceptance of existing substrate.

3.2 PREPARATION - TACKABLE WALL COVERING

- A. Surface Preparation: Refer to Forbo Bulletin Board - Forbo Flooring Systems, <https://www.youtube.com/watch?v=AVcwF-17-WA>
- B. Repair damages and fill crevices in non-smooth walls and sand the surface. Clean walls free of dust.

- C. Cut product to length and width shown on the drawings.
- D. If recommended by adhesive manufacturer, apply primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth. Vacuum clean.

3.3 PREPARATION - VINYL WALL COVERINGS

- A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.
- B. Wash impervious surfaces with tri-sodium phosphate, rinse and neutralize; wipe dry.
- C. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove existing coatings that exhibit loose surface defects.
- E. Marks: Seal with shellac those which may bleed through surface finishes.
- F. Apply primer sealer to substrate surfaces to wallcovering manufacturer's written recommendations. Allow to dry. Lightly sand smooth.
- G. Vacuum clean surfaces free of loose particles.

3.4 INSTALLATION - TACKABLE WALL COVERING

- A. Match lot numbers of each roll.
- B. Layout panels on walls to verify sizes and spacings. Install panels flush with adjacent finished material. Check approved shop layout drawings.
- C. Locate joints as shown on drawings.
- D. Apply adhesive in accordance with manufacturer's instructions.
- E. Use Butt Seam install method. Apply outer layer to substrate. Ensure full bond to substrate. Direct scribe at molding/base. Pattern scribe where no base/molding. Heavily weight completed panels to eliminate bowing and twisting as adhesive dries.
- F. Install trim at perimeter of panels. Anchor to wall with concealed sheet metal angle clips behind installed panels, 24 inches o.c.

3.5 INSTALLATION - VINYL WALL COVERING

- A. Install products per manufacturer's written instructions.
- B. Razor trim edges on flat work table, changing blade often to prevent rough cut edges. Do not razor cut on gypsum board surfaces.
- C. Apply covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tight.

- D. Do not seam within 2 inches of internal corners or within 6 inches of external corners.
- E. Install covering before installation of bases, counter tops, hardware or items attached to or spaced slightly from wall surface. Do not install covering more than ¼ inch below top of resilient base.
- F. Install termination trim as detailed.
- G. Remove excess adhesive while wet from seam before proceeding to next covering sheet. Wipe clean with dry cloth.

3.6 CLEANING

- A. Provide post-installation cleanup per manufacturer's written instructions.
- B. Section 017700 - Closeout Procedures: Final cleaning.
- C. Clean coverings of excess adhesive, dust, dirt, and other contaminants.
- D. Reinstall wall plates and accessories removed prior to work of this section.

3.7 PROTECTION

- A. Protect finished installation.

3.8 SCHEDULES

- A. Refer to finish and color schedule and elevations for locations of materials.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyester Acoustical Panels.
2. Ceiling diffusers bid as Alternate #10.
3. Acoustical Duct Liner.
4. Anchoring devices and preparation of anchorages.

B. Related Sections:

1. Section 042016 - Reinforced Unit Masonry: CMU substrate.
2. Section 092116 - Gypsum Board Assemblies: Wall substrate.
3. Section 095123 - Acoustical Tile Ceilings.
4. Section 099000 - Painting and Coating: Painting unfinished substrates prior to panel installation.

1.2 REFERENCES

A. ASTM International:

1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM C423 - Standard Test for Sound Absorption and Sound Absorption Coefficient by the Reverberation Room Method.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Product Data: Submit data for items specified in this section, anchoring devices, and fabrics.
- C. Manufacturer's Installation Instructions: Submit standard and special installation for encountered substrate conditions.
- D. Section 017700 - Closeout Procedures: Manual for Materials and Finishes.
- E. Building Product Disclosure Requirements: Provide Building Product Disclosure documentation. Any requests for substitution must include this documentation.
 1. Environmental Product Declaration for polyester acoustic panels.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing acoustical panels with five years documented experience.
- B. Applicator: Company specializing in installing work of this section with five years documented experience.
- C. Field Samples:
 - 1. For each type of panel specified, provide a field sample panel, illustrating installed appearance.
 - 2. Locate where directed.
 - 3. Accepted sample may remain as part of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements - Storage and protection requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperatures above 60 degrees F, unless required otherwise by manufacturer's instructions.
- B. Maintain these conditions 24 hours before, during, and after installation of sound absorbing panels.
- C. Provide lighting level of 80 ft candles measured mid-height of wall surfaces, and at center of coffer surfaces.

1.7 EXTRA STOCK

- A. Provide 25 lineal feet in roll width of each color of fabric. Material to be in factory-approved container with wrapping to preserve fabric while in storage.
- B. Package and label each roll by room number in which installed; store where directed.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Conform to requirements for fire performance and smoke development in accordance with IBC Section 803.

2.2 POLYESTER ACOUSTICAL PANELS

- A. Acceptable Manufacturers:
 - 1. Basis of Design: F-sorb. www.f-sorb.com

2. Substitutions under provisions of Section 012500.
- B. (AP-1)(AP-2): 7 NRC. 100% formaldehyde free. 6.0 density.
 1. Flame Spread Index: 10.
 2. Smoke Developed Index: 185.
- C. (ACT-4): 1.05 NRC. 100% formaldehyde free.
 1. Flame Spread Index: 10.
 2. Smoke Developed Index: 185.
 3. Color: Refer to Finish and Color Schedule. (ACT-4)
- D. Fasteners: Wafer Tek Screws.
- E. Adhesive: Recommended by manufacturer.
- F. Finish (AP-1)(AP-2)
 1. Acoustical coating:
 - a. Basis of Design: ProCoat Products, Inc. 260 Centre Street, Suite D, Holbrook MA 02343. 718.767.2270.
 - b. Custom Color: Refer to Finish and Color Schedule. (AP-1)(AP-2)
 2. Test apply a sample to ensure proper coverage and color consistency.
 3. Comply with panel manufacturer's guidelines and coating manufacturer's recommendations.
 4. Refer to Section 099000 for additional requirements.

2.3 ACOUSTICAL DUCT LINER

- A. Acceptable Manufacturers:
 1. Knauf.
 2. Owens Corning.
 3. Substitutions under provisions of Section 012500.
- B. AP-5: Refer to Finish and Color Schedule.
 1. 1.5 PCF.
 2. .95 NRC.
 3. Formaldehyde free.

2.4 DIFFUSING PANELS

A. Acceptable Manufacturers:

1. Conwed Designscape. <http://conweddesignscape.com>
2. Lamvin, Inc. Oceanside, CA. <http://www.lamvin.com/>
3. G&S Acoustics, St. Louis MO, <http://www.gsacoustics.com>
 - a. Local Rep: Jerald Schwarz, Schwarz & Associates, Inc 206-218-3489 - Jerald@div-9.com
4. Substitutions: Under provisions of Section 012500.

B. Ceiling Mounted Diffusers: Asymmetric pyramidal/barrel/wedge units.

1. Size: Refer to Drawings.
2. Finish: To be selected.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify substrates have been painted/finished prior to panel installation.
- B. Verify that substrate surfaces are ready to receive work, and conform to requirements of the panel manufacturer.
- C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.
- D. Beginning of installation means acceptance of existing surfaces.

3.2 INSTALLATION

- A. Check pre-manufactured panels for proper dimension to fit openings/layout.
- B. Do not install panels which are not true to required dimension or not square and level.
- C. Comply with manufacturer's installation directions.
 1. ACT-4: Mechanically attach panels to deck.
 2. AP-1: Adhesively apply as recommended by manufacturer.
- D. Ceiling Mounted Diffusers: Refer to Section 095123.

3.3 CLEANING

- A. Clean off dirt, fingerprint smudges and excess sealant from exposed panel faces.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. In general, the principal items of work include, but are not limited to, the following:
 - 1. Preparation of surfaces.
 - 2. Surface preparation, priming and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
 - 3. Painting and finishing of all exposed-to-view interior and exterior surfaces, except as otherwise indicated or specified.
 - a. Paint all surfaces unless otherwise indicated, scheduled, factory finished or indicated to receive a finish in other Sections of the specifications.
 - b. Refer to the Finish Schedule, notes on the drawings and Part 2 - PRODUCTS in this Section for a general guide to the painting requirements.
 - 4. Field painting of all exposed-to-view mechanical and electrical items such as pipes, ducts, hangers, conduits, and like items in rooms or areas scheduled to be painted.
 - 5. Field painting of prime painted finished door hardware to match the door frame. Hardware includes, but is not limited to, coordinators' housing and associated door closer mounting brackets on door frames, astragals, and other items as required.
 - 6. Sprinkler Piping: Contractor shall include in his bid to cover painting of all exposed sprinkler piping. It is the Contractor's responsibility to verify the extent of exposed sprinkler piping.
 - 7. Touch-up paint all blemished or otherwise disfigured paint on all surfaces which occur prior to acceptance of the building by the Owner.
 - 8. Touch-up paint for field-welded connections on materials that have a hot-dipped galvanized coating.
- B. Where items or surfaces are not scheduled or specifically mentioned, paint these items the same as adjacent similar materials or areas. If finish is not designated, the Architect will select these from the paint systems specified.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels, except surface mounted raceways (Wire-mold) shall be prepared, primed and painted to match adjacent surfaces.
 - 1. Prefinished items include the following factory-finished components:
 - a. Architectural woodwork and casework.
 - b. Acoustical wall panels.

- c. Toilet partitions.
 - d. Finished mechanical and electrical equipment.
 - e. Light fixtures.
 - f. Distribution cabinets.
2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
- a. Foundation spaces.
 - b. Furred areas.
 - c. Ceiling plenums.
 - d. Pipe spaces.
 - e. Duct shafts.
3. Finished metal surfaces include the following:
- a. Anodized aluminum
 - b. Stainless steel.
4. Operating parts include moving parts of operating equipment and the following:
- a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections:

- 1. Section 051200 - Structural Steel Framing: Shop priming of exposed steel shapes.
- 2. Section 055000 - Metal Fabrications: Shop primed items.
- 3. Section 081214 - Hollow Metal Frames: Field finishing.
- 4. Section 081314 - Hollow Metal Doors: Field finishing.
- 5. Section 092116 - Gypsum Board Assemblies: Finishing requirements for paints specified.

6. Section 095123 - Acoustical Tile Ceilings.

1.2 REFERENCES

A. Green Seal:

1. GS-11- Green Seal Environmental Standard for Paints and Coatings.

B. South Coast Air Quality Management District (SCAQMD):

1. SCAQMD Rule 1113 - Architectural Coatings (Amended June 3, 2011)

1.3 DEFINITIONS

- A. Exposed Surfaces: The term “exposed surfaces” includes areas visible when permanent or built-in fixtures, covers, grilles, and similar components are in place. Extend painting in these areas as required to maintain the system integrity and provide desired protection.
- B. DFT (dry film thickness): Minimum thickness, measured in mils (0.001 inch) of a coat of paint in the cured state.
- C. Gloss Ratings: Determine in accordance with ASTM D 523, measured at 60 degree angle of incidence.

Gloss Level (GL)	Traditional Name	Gloss at 60 degrees	Sheen at 85 degrees
Gloss Level 1	Matte or Flat	maximum 5 units	maximum 10 units
Gloss Level 2	Low Sheen	maximum 10 units	10-35 units
Gloss Level 3	Egg Shell	10-25 units	10-35 units
Gloss Level 4	Satin	20-35 units	minimum 35 units
Gloss Level 5	Semi-Gloss	35-70 units	
Gloss Level 6	Gloss	70-85 units	
Gloss Level 7	High Gloss	more than 85 units	

1.4 SUBMITTALS

- A. General: Make submittals in accordance with Section 013300 - Submittal Procedures.
- B. Product Data: Submit complete list of products proposed for use, including technical data on each product to verify compliance; organize list to indicate painting systems to be used with each substrate.
1. Organize the paint submittal to follow the format in 2.1, G and H of this Section in order to indicate painting systems to be used with each substrate.
 2. Submittal shall contain any proposed revisions to specifications (i.e. surface preparation, method of application, etc.) which contractor feels are necessary in their execution of the Contract.

3. Any proposed revisions must be approved by the Architect prior to proceeding with the Work.
- C. Submit paint manufacturer's product data sheets and Material Safety Data Sheets highlighting VOC limits for each paint or coating used in the building.
- D. Samples: Using approved materials, prepare and submit samples of each type of finish, gloss, and color for approval. Label samples with color number, name and date. Provide one (1) samples each.
 1. Prepare paint color samples on 8-1/2 inch by 11 inch heavy, durable non porous paper.
 2. Furnish additional samples as required until colors and finishes are approved.
 3. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.
- E. Submit samples on the following substrates for the Architect's review of color and texture only:
 1. Ferrous Metal: Provide one 4-inch square sample of flat metal and one 8-inch long sample of solid metal for each color and finish.
- F. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- G. Section 017700 - Closeout Procedures.
 1. Include a Paint Project Summary with finish schedule, including detail designating where each product/color/finish was used, Product Data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 QUALITY ASSURANCE

- A. Single Source:
 1. To the maximum extent practicable, select a single manufacturer to provide all materials required by this Section, using additional manufacturers to provide systems not offered by the selected principal manufacturer.
 2. For each individual system, provide primer and other undercoat paint produced by same manufacturer as finish coat. Use only thinners approved by paint manufacturer and use only within recommended limits.
 3. Contractor grades are not acceptable.

- B. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this project with a record of successful in-service performance. The contractor is to have a foreman on site during preparation and painting work.
- C. Visual Standards: Each distinct area of the finished Work shall be free of variations in color and sheen, runs, sags, holidays, blistering, checking, cracking, scratches and other signs of poor workmanship.
- D. Pre-Work Meeting
 - 1. Convene minimum one week prior to commencing work of this section.
- E. Mockup:
 - 1. Provide and apply paint for classroom mock-up under provisions of Section 014000 - Quality Requirements. Coordinate installation with other trades involved in the mock-up.
 - a. When accepted, mock-up will demonstrate minimum standard for the Work.

1.6 DELIVERY, STORAGE AND HANDLING

- A. General: Comply with requirements specified in Section 016000 - Product Requirements.
- B. Deliver materials to building in sealed, original, labeled containers bearing manufacturer's name, type of material, brand name, color designation, and instructions for mixing and thinning.
- C. Store materials in tightly covered containers when not in actual use in a place specifically assigned for that purpose which is well-ventilated, dry and out of direct sunlight. Store materials in a manner so as not to exceed the manufacturer's temperature limitations.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing and application.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Air temperature and substrate temperature and relative humidity shall be within the manufacturer's established limits. Do not apply exterior paint when the following conditions exist, unless requirements of paint manufacturers are more restrictive.
 - 1. Temperature: If surface and ambient temperature is above 90 degrees F, or below 50-degrees F.
 - 2. Relative Humidity: If relative humidity is above 85 percent.
 - 3. Weather: During damp and inclement weather or during excessively windy weather.

- B. Lighting: Do not proceed with work under this section unless adequate lighting is available. Provide lighting level of at least 50 candlepower per square foot, measured mid-height at substrate surface.
- C. Ventilation: Provide adequate ventilation as required for the type of paint and cleaning materials used. If necessary, consult paint manufacturer for recommendations.
- D. Protection: Protect surrounding areas against damage due to painting operations. At a minimum, surrounding areas shall be covered with polyethylene sheeting and waterproof masking tape. The Owner shall not be responsible for Contractor's selection or method of protection.
 - 1. Protective coverings shall be secured against wind and shall be vented to prevent collection of moisture on covered surfaces.
 - 2. Provide "wet paint" signs as required to protect newly painted surfaces.
- E. Precautions: Take all precautions to prevent fire; open containers of inflammable materials only when needed; keep rubbing cloths and oily rags in tightly closed containers and remove from site daily. Dispose of hazardous materials in accordance with all local, State and Federal regulations.

1.8 COORDINATION

- A. Review other sections in which prime paints are to be provided to ensure compatibility of total coating system for various substrates. Notify Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

1.9 TESTING FOR ADHESION

- A. Field Testing: Field test primers which are to be applied. The purpose of this field testing will be to ensure compatibility and total adhesion of the materials to the various substrates. Notify Architect if results of any test are not in total conformance with the paint manufacturer's specifications. Commencement of work constitutes full responsibility for any resulting unsatisfactory finish.

1.10 RIGHT OF REJECTION

- A. Architect shall have the right to reject materials or work that does not comply with these specifications. Work so rejected shall be redone as directed. Work rejected and ordered to be redone shall be done at the Contractor's expense, and at no extra cost to the Owner.

1.11 MAINTENANCE

- A. Extra Materials: Furnish Owner with an additional 1 gallon of each material and color applied along with color book.

1.12 WARRANTY

- A. Warrant and guarantee the work of this section against failure or non- performance for one year from the date of final acceptance. Failure or non-performance shall be corrected promptly upon discovery by the owner. Correction work will follow project specifications.
- B. Warranty not applicable for failure of substrates, or work by others.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Sherwin-Williams Company, Tel. 1-800-321-8194 (Technical Hotline), Website <http://www.sherwin-williams.com>
- B. Benjamin Moore, Tel. 1-800-642-5678 Ext. 2217, Website <http://www.benjaminmoore.com>
 - 1. Local Rep: Amy Griffin, 206.492.4228, Amy.Griffin@Benjaminmoore.com
- C. PPG Architectural Coatings, Website: <http://www.ppgac.com/>
 - 1. Local Rep: Susan Williams, 206.450.5245, suwilliams@ppg.com
- D. Miller Paints, Website: <http://www.millerpaint.com/>
 - 1. Local Rep: Holly Davidson, 425.457.0983.
- E. Rodda/Cloverdale Paint Company, Website <http://www.roddapaint.com>
 - 1. Local Rep: Jeff McIntyre, 206.396.7074.
- F. Substitution Requests: Submit for acceptance under provisions of Section 012500.

2.2 PAINT MATERIALS

- A. Material Compatibility: Provide block fillers, primers, undercoats and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- C. VOC Compliance: Unless otherwise specified, comply with the current version of Green Seal GS-11, supplemented by the SCAQMD Rule 1113 for VOC limits.
- D. Apply all products to achieve recommended (DFT) dry film thickness as published on manufacturer's product data sheets.
- E. Exterior Surfaces:
 - 1. Galvanized Metal: Doors and frames

- a. One Primer Coat: Water Based Corrosion Resistant Primer.
 - 1) Sherwin Williams: Pro Industrial Pro-Cryl Universal Primer B66W01310 (<100 g/L VOC).
 - 2) PPG Paints: 4020 Pitt-Tech Plus DTM Industrial Primer.
 - 3) Benjamin Moore: Ultra Spec® HP Acrylic Metal Primer HP04.
 - 4) Rodda: Rodda Precision Coatings DTM 1300V100 Primer.
 - 5) Miller Paint: Acrimetal DTM Primer Interior Exterior 5000.
 - b. Two Finish Coats: Water Based Light Industrial Polyurethane Gloss, resistant to light abrasion and softening by constant hand contact.
 - 1) Sherwin Williams: Pro Industrial Waterbased Alkyd Urethane Enamel B53-11150 Series. (<50 g/L).
 - 2) PPG Paints: 4216HP Pitt-Tech Plus 4216HP Semi-Gloss.
 - 3) Benjamin Moore: Super Spec HP® Urethane Alkyd Gloss Enamel P22.
 - 4) Rodda Precision Coatings PC6 Waterborne Polyurethane.
 - 5) Miller Paint: Acrimetal DTM Semi Gloss Interior/Exterior 5200.
 - c. Note: Comply with manufacturer's wash and etch/surface preparation instructions.
2. Galvanized Metal: Other trim and miscellaneous surfaces.
- a. One Primer Coat: Water Based Corrosion Resistant Primer.
 - 1) Sherwin Williams: Pro Industrial Pro-Cryl Universal Primer B66W00310 (<100 g/L VOC).
 - 2) PPG Paints: 4020 Pitt-Tech Plus DTM Industrial Primer.
 - 3) Benjamin Moore: Corotech Acrylic Metal Primer V110.
 - 4) Rodda: Cloverdale 70323 Ecologic® Rustex Primer.
 - 5) Miller Paint: Acrimetal DTM Primer Interior Exterior 5000.
 - b. Two Finish Coats: High Performance Acrylic Latex, Semi-Gloss.
 - 1) Sherwin Williams: Pro Industrial Acrylic Semi-Gloss, B66 Series.
 - 2) PPG Paints: 4216HP Pitt-Tech Plus 4216HP Semi-Gloss

- 3) Benjamin Moore: Ultra Spec® HP D.T.M. Acrylic Low Lustre Enamel HP25.
 - 4) Rodda: Cloverdale 70623 Ecologic Interior - Exterior, 100% Acrylic Latex Semi-Gloss Finish.
 - 5) Miller Paint: Acrimetel DTM Semi Gloss Interior/Exterior 5200.
 - 6) Behr Premium Interior/Exterior Direct-to-Metal Semi-Gloss 3200.
 - c. Note: Wash and etch new unprimed surfaces as specified above.
3. Non Galvanized Shop primed Ferrous Metal: Including exposed to weather structural beams, columns and support members.
 - a. One Intermediate Coat: Surface tolerant, 2 part Polyamide Epoxy.
 - 1) Sherwin Williams: Macropoxy 646-100 B58W620 at 5.0-10.0 mils (<100 g/L VOC).
 - 2) PPG Paints: Amercoat 2 VOC High Solids Epoxy (<100 g/L VOC).
 - 3) Benjamin Moore: Corotech Polyamide Epoxy Coating V400.
 - 4) Rodda: Carboline Carboguard 890 VOC.
 - 5) Miller Paint: Amercoat 2 VOC High Solids Epoxy (<100 g/L VOC).
 - b. One Finish Coat: High Solids Polyurethane, Gloss.
 - 1) Sherwin Williams: Hi-Solids Polyurethane 100 B65W625 (<100 g/L VOC).
 - 2) PPG Paints: Amercoat 2 VOC High Solids Epoxy (<100 g/L VOC).
 - 3) Benjamin Moore: Corotech, V500 Aliphatic Acrylic Urethane.
 - 4) Rodda: Carboline Carbothane® 134 VOC.
 - 5) Miller Paint: Amercoat 2 VOC High Solids Epoxy (<100 g/L VOC).
4. Existing Stucco:
 - a. One primer coat: Concrete and Masonry Sealer, typ. Spot repair and prime with elastomeric primer recommended by manufacturer where repair needed on CMU at building.
 - 1) Sherwin Williams: Loxon Concrete and Masonry Primer.
 - 2) PPG Paints: 17-921XI Series Seal Grip I/E Universal Acrylic Primer.

- 3) Benjamin Moore: Ultra Spec Masonry Interior/Exterior 100% Acrylic Masonry Sealer 608.
- 4) Rodda: pHlex-tite Acrylic Latex Primer 512301.
- 5) Miller: Kril Latex Primer 620-0.
- b. Two Finish Coats: 100% Acrylic Coating, flat, typ. Satin at concrete columns.
 - 1) Sherwin Williams: A-100 Exterior Acrylic Latex Paint, (<50 g/L VOC).
 - 2) PPG Paints: Sun Proof Exterior Latex, 76-45 Series (95 g/L VOC).
 - 3) Benjamin Moore: Ultra Spec Exterior (45 g/L VOC).
 - 4) Rodda: 421101 CoverCoat XL Exterior Acrylic Velvet (<50 g/L VOC).
 - 5) Miller Paint: Kril Exterior Velvet , 5900(<50 g/L VOC).

F. Interior Surfaces

1. Gypsum Wallboard: Typical walls and ceilings in class rooms, offices, living spaces, etc.
 - a. One Primer Coat: Top commercial grade zero VOC GWB primer.
 - 1) Sherwin Williams: ProMar 200 Zero VOC Primer B28 Series.
 - 2) PPG Paints: 6-4900XI Speedhide Zero Interior Zero VOC Latex Sealer.
 - 3) Benjamin Moore: Ultra Spec 500 Interior Primer N534.
 - 4) Rodda: 503601 MP Ultra Low VOC Interior Primer/Sealer.
 - 5) Miller Paint: Acrylitex MPI 50 Primer/Sealer.
 - b. Two Finish Coats: Top commercial grade zero VOC latex, Eggshell.
 - 1) Sherwin Williams: ProMar 200 Eg-Shel, B20-2600.
 - 2) PPG Paints: 6-4310XI Speedhide Zero Interior Zero VOC Latex Eggshell.
 - 3) Benjamin Moore: Ultra Spec 500 Interior N538, Eggshell.
 - 4) Rodda: 523601 MP Ultra Low Interior Satin Finish.
 - 5) Miller Paint: Performance Plus Eggshell Interior Latex 1303.
2. Gypsum Wallboard: Wet area walls and ceilings including toilet rooms, janitor closets, kitchens, locker rooms and other areas subject to increased moisture and/or cleaning. Excludes shower rooms.

- a. Primer: Top commercial grade zero VOC GWB primer.
 - 1) Sherwin Williams: ProMar 200 Zero VOC Primer B28 Series. (VOC's: 0 g/L.)
 - 2) PPG Paints: 6-4900XI Speedhide Zero Interior Zero VOC Latex Sealer.
 - 3) Benjamin Moore: Ultra Spec 500 Interior Primer N534.
 - 4) Rodda 503601 MP Ultra Low VOC Interior Primer/Sealer.
 - 5) Miller Paint: Acrylitex MPI 50 Primer/Sealer.
 - b. Two Finish Coats: Single component high performance water based epoxy modified acrylic, Semi-gloss.
 - 1) Sherwin Williams: Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss K46 Series. (VOC's: 150 g/L.)
 - 2) PPG Paints: 16-510 Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy.
 - 3) Benjamin Moore: Corotech, Pre-Catalyzed Waterborne Wall Epoxy — Semi-Gloss V341.
 - 4) Rodda: Cloverdale 70623 Ecologic Interior - Exterior, 100% Acrylic Latex Semi-Gloss Finish.
 - 5) Miller Paint: 16-510 Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy.
3. Gypsum Wallboard: Shower rooms.
- a. One Primer Coat: Top commercial grade zero VOC GWB primer.
 - 1) Sherwin Williams: ProMar 200 Zero VOC Primer B28 Series.
 - 2) PPG Paints: 17-921XI Seal Grip Acrylic Universal Primer.
 - 3) Ultra Spec 500 Interior Primer N534.
 - 4) Rodda: Carboline Carbocrylic 120.
 - 5) Miller Paint: Premium Super Seal Primer 2250.
 - b. Two Finish Coats: Solvent based epoxy, Semi-Gloss.
 - 1) Sherwin Williams: Macropoxy 646-100 B58W620 at 5.0-10.0 mils (<100 g/L VOC).
 - 2) PPG Paints: Amercoat 2 VOC High Solids Epoxy (<100 g/L VOC).

- 3) Benjamin Moore: Corotech V440 Waterborne Amine Epoxy.
 - 4) Rodda: Carboline Carboguard 890 VOC.
 - 5) Miller Paint: Amercoat One Multi Purpose Single Component Epoxy Semi Gloss.
4. DryFall, Multiple Substrates: Including exposed overhead structure, concrete, properly prepared metal, as well as pipes, ducts, hangers, conduits, and like items.
 - a. One Finish Coat: Water Based Dryfall, Eggshell.
 - 1) Sherwin Williams: Low VOC Waterborne Dryfall, B42 Series, (<50 g/L VOC).
 - 2) PPG Paints: 6-724XI Speedhide Super Tech Interior Dry-Fog Eggshell
 - 3) Benjamin Moore: 395 Latex Dry Fall Flat.
 - 4) Rodda 533801 Dryfall Acrylic Latex Eggshell Dryfall Coating.
 - 5) Miller Paint: . 6-724XI Speedhide Super Tech Interior Dry-Fog Eggshell.
 - b. Additional coats may be required to achieve uniform color, hiding and appearance.
 - c. Clean galvanized steel surfaces as specified above.
5. Structural Shop Primed Ferrous Metal:
 - a. One Primer Coat:
 - 1) Sherwin Williams: Macropoxy 646-100 Fast Cure Epoxy B58-620 (100 g/L VOC).
 - 2) PPG Paints: Amerlock 2 VOC High Solids Epoxy (<100 g/L VOC).
 - 3) Benjamin Moore: COROTECH V410 Fast Dry Polyamide Epoxy.
 - 4) Rodda: Carboline Carboguard 890 VOC.
 - 5) Miller Paint: Amerlock 2 VOC High Solids Epoxy (<100 g/L VOC).
 - b. Two Finish Coats: Water based acrylic urethane.
 - 1) Sherwin Williams: Waterbased Acrolon 100 Urethane B65W700 Series (<100 g/L VOC).
 - 2) PPG Paints: Amershield VOC Gloss Urethane (<100 g/L VOC).
 - 3) Benjamin Moore: COROTECH V540 Waterborne Urethane.

- 4) Rodda: Carboline Carbothane® 134 VOC.
- 5) Miller Paint: Amersfield VOC Gloss Urethane (<100 g/L VOC).
6. Ferrous Metal: Including factory primed Doors, Frames and Guard rails.
 - a. One Primer Coat: Prime unprimed, bare metal (only), with water based corrosion resistant primer.
 - 1) Sherwin Williams: Pro Industrial Pro-Cryl Universal Primer B66W00310 (<100 g/L VOC).
 - 2) PPG Paints: 4020 Pitt-Tech Plus DTM Industrial Primer.
 - 3) Benjamin Moore: Ultra Spec® HP Acrylic Metal Primer HP04.
 - 4) Cloverdale 70323 Ecologic® Rustex Primer.
 - 5) Miller Paint: Acrimetal DTM Primer Interior Exterior 5000.
 - b. Two Finish Coats: Light industrial water based coating, Semi-Gloss, resistant to harsh cleaners, light abrasion and softening by constant hand contact.
 - 1) Sherwin Williams: Pro Industrial Pre-Catalyzed W/B Epoxy Semi-Gloss K46 Series (141 g/L VOC).
 - 2) PPG Paints: 16-510 Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy.
 - 3) Benjamin Moore: Corotech Pre-Catalyzed Waterborne Epoxy Semi Gloss V341.
 - 4) Rodda: Cloverdale 70623 Ecologic Interior - Exterior, 100% Acrylic Latex Semi-Gloss Finish.
 - 5) Miller Paint: Waterborne Epoxy Semi Gloss 183-5-10.
7. Factory primed or unprimed miscellaneous metal: Including Mechanical and Electrical and Equipment Items. Prep as appropriate for substrate.
 - a. Prime all bare metal as needed with water based corrosion resistant primer.
 - 1) Sherwin Williams Pro Industrial Pro-Cyl Univeral Primer B66W00310 (<100 g/L VOC).
 - 2) PPG Paints: 4020 Pitt-Tech Plus DTM Industrial Primer.
 - 3) Benjamin Moore: Ultra Spec® HP Acrylic Metal Primer HP04.
 - 4) Rodda: Cloverdale 70323 Ecologic® Rustex Primer.
 - 5) Miller Paint: Acrimetal DTM Primer Interior Exterior 5000.

- b. Exposed Insulated Piping:
 - 1) Finish Coats: Match paint specified on adjacent walls or surfaces.
 - c. Exposed Galvanized Ducts, Piping, Conduits, etc.:
 - 1) Finish Coat: Match paint specified on closest adjacent walls or surfaces.
 - d. Exposed Ferrous Piping, Hangers (and like items):
 - 1) Finish Coat. Match paint specified on adjacent walls or surfaces.
 - e. Interior of all Ducts at Grilles, Registers and Diffusers: One Coat.
 - 1) Sherwin Williams: ProMar 200 Zero VOC Black.
 - 2) PPG Paints: Speedhide Interior Flat Black Latex 6-753.
 - 3) Benjamin Moore: Ultra Spec 500, Black.
 - 4) Rodda 513601 MP Ultra Low Interior Gloss Level 1 Flat Finish Black.
 - 5) Miller Paint Acrimetal DTM Velvet Black 310-277.
 - f. Unprimed grilles and diffuser face plates, Match paint specified on adjacent walls or surfaces.
8. Plywood Backboards (where not Fire Retardant treated) - Fire Retardant Coating.
- a. One Primer Coat: Water based wood primer.
 - 1) Sherwin Williams: Multi-Purpose Zero VOC Int/Ext Latex Primer Sealer B51 Series.
 - 2) PPG Paints: Seal Grip Interior Primer/Finish 17-951.
 - 3) Benjamin Moore: Sure Seal Latex Primer Sealer 027.
 - 4) Rodda: 502001 Unique II Interior Latex Enamel Undercoat Primer.
 - 5) Miller Paint: Miller Prime Stain blocking Primer 470-011.
 - b. Two Finish Coats: Fire Retardant.
 - 1) Flame Control 20-20, (55 g/L VOC)
 - 2) Benjamin Moore: INSL-X LFR-110 Latex Fire Retardant Coating.
 - 3) PPG Paints: Speedhide Interior Flat Fire Retardant Latex 42-7XI.
 - 4) Miller Paint: Fire Free Class A Flat Coating.
9. Interior Pre-primed Mechanical Wall Grilles and Diffusers.

- a. Two Finish Coats: Match paint specified on adjacent walls or surfaces.
- 10. Colors: Each paint color must be accurately mixed to ensure color continuity. No allowance will be granted for mis-matched paint of the same color when viewed under normal lighting conditions. Refer to Finish and Color Schedule for color selections.
- G. Provide primer and finish coats which are compatible with each other and with prime coats provided under other Sections. Provide barrier coats over incompatible primers or remove and re-prime as required.
- H. Tint each undercoat a lighter shade than finish coat so that numbers of coats can be easily discerned. No color mixing will be allowed at the job-site.
- I. Thinner: Type as recommended by the paint manufacturer. Use thinner only when recommended by the paint manufacturer, and then only in a quantity as indicated on the label.
- J. Primers: Primers, except metal primers, shall be white in color for inspection purposes.
- K. Secondary Products: Secondary products not specified by name and required for the job such as shellac, oils, patching compounds, putty, etc., shall be "best grade" products.

PART 3 EXECUTION

3.1 EXAMINATION

- A. General: Examine surfaces to receive paint finish for conditions that will adversely affect execution, performance, or quality of work and which cannot be put into an acceptable condition through reasonable preparatory work as specified herein.
 - 1. Surfaces which are unfit to receive the work of this section shall be repaired, replaced or re-finished such that they are acceptable and such that the work of this section may be done as specified. It shall be the responsibility of the General Contractor to ensure that these provisions are strictly enforced.
 - 2. Commencement of Work constitutes acceptance of surfaces and conditions.

3.2 SURFACE PREPARATION (GENERAL)

- A. General: Surface preparations and cleaning procedures shall be in strict accordance with the instructions and specifications of the paint manufacturer and with the requirements of this specification.
- B. Removal of Fixtures: Cooperate with other trades and coordinate removal of fixtures, hardware items, and equipment, as required for painting work. Items to be removed on surfaces to be painted include: switch and receptacle plates, escutcheons and like plates, surface-mounted equipment, free-standing equipment which blocks access to painting surfaces, grilles and louvers at duct openings into finished spaces, and other items as required and directed.

- C. Painting of Factory-Primed Door Hardware: Prior to painting, mask all operating parts so that item works freely after paint is dry. Remove any excess paint from operating parts and clean and free-up the operation of any parts which do not operate smoothly due to the painting operation.
- D. Pre-Cleaning: Remove oil and grease prior to mechanical cleaning as hereinafter specified by methods outlined in SSPC-SP 1 "Solvent Cleaning."

3.3 SURFACE PREPARATION

- A. At existing surfaces to be painted, comply with PDCA Level 3 Surface Preparation for Repainting and Maintenance Receiving Architectural Coatings.
- B. Uncoated Ferrous Metal: For interior metals not requiring paint, surfaces are to remain as received from the factory.
- C. Shop-Coated Ferrous Metal: Thoroughly degrease surfaces and clean using solvent (SSPC-SP 1). Remove loose rust, blistered and peeling paint to bare metal by scraping, sanding, wire brushing, or other abrasion methods in accordance with SSPC-SP 2 or SP 3; feather edges of adjacent sound paint. Dull glossy surfaces by scuff-sanding and wipe down. Spot-prime all abraded portions, rust areas, and bare surfaces with specified primer on same day of surface preparation. Finish prime after spot priming has dried thoroughly.
- D. Galvanized Metal: Clean surfaces to remove factory films and oily residue as recommended by the paint manufacturer. Responsibility for insuring that the surface is properly prepared rests with the painting sub-contractor. Clean galvanized metal the same day to be painted.
- E. Gypsum Wallboard: Remove all dust and dirt with a brush; if necessary, clean surfaces using damp rags or sponges. Repair of surface defects is specified in Section 092116.
- F. Wood Products: Remove dust, dirt, and other foreign material. Remove oil or grease. Sand as appropriate.

3.4 CLEANING PRIOR TO PAINTING

- A. Remove dust and loose deleterious materials from all surfaces before beginning painting operations. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

3.5 APPLICATION OF PAINT

- A. Mixing: Mix paint materials in accordance with the manufacturer's instructions and directions. Mix often enough during application to keep the paint uniform and to ensure complete dispersion of pigment and a uniform composition.

1. Prepare multiple component coatings using all of the contents of the container for each component as packaged by the manufacturer. Mixing of partial kits will not be permitted. Multiple component coatings that have been mixed shall not be used beyond their pot life. Only the components specified and furnished by the manufacturer, including thinner if required, shall be mixed.
- B. Application: Apply paint in accordance with the manufacturer's directions. Use techniques best suited for substrate and type of material being applied. Brushes and rollers shall be of a type best suited for the type of material being applied.
1. Apply intermediate and finish coats within the manufacturer's recommended top coating time periods.
 2. When applying paint to drywall, use a roller nap no greater than 3/8 inch so as to achieve a light stipple finish.
 3. Brush and level out paint applied to metal door frames to achieve a nearly sprayed-on appearance.
 4. If metal doors are not sprayed, finish may be applied with 1/4 inch nap roller.
- C. Apply each coat of paint as a continuous film of uniform thickness, free from holidays, sags, crawls, pinholes, blisters, unevenness in color, or other evidence of poor workmanship. Repaint thin spots or areas missed in the application and allow to dry before applying next coat of paint.
1. Give special attention to ensure that surfaces, such as edges, corners, crevices, welds and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 2. Each coat shall be free of dirt, dust, moisture, etc., prior to application of next coat.
- D. Allow each coat of paint to thoroughly dry, full thickness of the film, before application of the succeeding coat. Paint is considered dry for recoating when the next coat can be applied without the development of any detrimental film irregularities such as wrinkling, lifting, or loss of adhesion of the previous coat.
- E. Coverage for each paint material is specified as either the total minimum dry film thickness in mils, or the spreading rate in square feet per gallon over the surface designated. Actual coverage rate will vary depending upon the texture and porosity of the surface, climatic conditions, etc.
1. The number of coats specified is the minimum required, irrespective of the coating thickness.
 2. In the event the required paint thickness is not achieved, apply additional coats until the required thickness is obtained.
 3. Do not exceed manufacturer's recommended maximum film build-up per coat (wet mils).

- F. Recoat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat to ensure a finish coat with no burn-through or other defects.
- G. Sand lightly between coats of enamel to produce an even, smooth finish. Wipe to remove dust before recoating.
- H. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.
- I. Do not paint over any code-required labels or any equipment identification or nomenclature plates.
- J. Tops and bottoms of metal doors shall be finished the same as the faces (primed and two finish coats of painted).

3.6 DAMAGED PAINT SURFACES

- A. General: Before final acceptance of the work by the Architect, repair or re-finish painted surfaces which have been damaged at no additional cost. Refinish whole wall where portion of finish is not acceptable.
- B. Painted Structural Steel: Areas of chipped, peeled, or abraded paint shall be hand or power sanded, feathering the edges. Prime and finish coat the areas using the same material as originally scheduled. Depending on the extent of repair and its appearance, an overall finish coat may be required by the Architect to achieve uniform appearance.

3.7 CLEAN-UP

- A. General: During the progress of the work, remove from the project all discarded paint materials, rubbish, cans and rags. Leave premises clean and in orderly condition.
- B. Cleaning: Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.8 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Remove temporary protective wrappings after completing painting operations.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Preparation of surfaces.
 - 2. Abrasion resistant coating.
- B. Related Sections:
 - 1. Section 099000 - Painting and Coating.

1.2 SUBMITTALS

- A. Refer to Section 013300 - Submittals for submittal procedures.
- B. Product Data: Provide technical data on each product.
- C. Samples: Submit two 8- 1/2 x 11 inch in size.
- D. Certificate: Certify that products of this section meet or exceed specified requirements.

1.3 QUALITY ASSURANCE

- A. For each individual system, provide primer and other undercoat paint produced by same manufacturer as finish coat.
- B. VOC Compliance: Unless otherwise specified, comply with the current version of Green Seal GS-11, supplemented by the SCAQMD Rule 1113 for VOC limits.
- C. Apply all products to achieve recommended (DFT) dry film thickness as published on manufacturer's product data sheets
- D. Visual standards: Each distinct area of the finished Work shall be free of variations in color and sheen, runs, sags, holidays, blistering, checking, cracking, scratches and other signs of poor workmanship.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to building in sealed, original, labeled containers bearing manufacturer's name, type of material, brand name, color designation, and instructions for mixing and thinning.
- B. Store materials in tightly covered containers when not in actual use in a place specifically assigned for that purpose which is well-ventilated, dry and out of direct sunlight. Store materials in a manner so as not to exceed the manufacturer's temperature limitations.

- C. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing and application.

1.5 FIELD CONDITIONS

- A. Environmental Conditions: Air temperature and substrate temperature and relative humidity shall be within the manufacturer's established limits.
- B. Lighting: Do not proceed with work under this section unless adequate lighting is available. Provide lighting level of at least 50 candlepower per square foot, measured mid-height at substrate surface.
- C. Ventilation: Provide adequate ventilation as required for the type of paint and cleaning materials used. If necessary, consult paint manufacturer for recommendations.
- D. Protection: Protect surrounding areas against damage due to painting operations. At a minimum, surrounding areas shall be covered with polyethylene sheeting and waterproof masking tape. The Owner shall not be responsible for Contractor's selection or method of protection.
 - 1. Protective coverings shall be secured against wind and shall be vented to prevent collection of moisture on covered surfaces.
 - 2. Provide "wet paint" signs as required to protect newly painted surfaces.
- E. Precautions: Take all precautions to prevent fire; open containers of inflammable materials only when needed; keep rubbing cloths and oily rags in tightly closed containers and remove from site daily. Dispose of hazardous materials in accordance with all local, State and Federal regulations.

1.6 WARRANTY

- A. Contractor Warranty: The contractor shall fully warrant and guarantee the work of this section against failure or non- performance for one year from the date of final acceptance. Failure or non-performance shall be corrected promptly upon discovery by the owner. Correction work will follow project specifications.
- B. Warranty not applicable for failure of substrates, or work by others.

PART 2 PRODUCTS

2.1 ABRASION RESISTANT COATING SYSTEM

- A. Basis of Design Manufacturer: Proformax.
- B. Substitutions under provisions of Section 012500.
- C. Description:
 - 1. One coat primer: Ceramic Sphere Undercoat.

2. Two coats scrubbable stain resistant coating: Advanced Interior Coating.
3. Top coat protective coating: Interior Surface Defender.
 - a. Finish appearance: Clear.
 - b. Scrub Rating: 6500 scrubs; ASTM 2486.
 - c. Resin Type: Acrylic Polyurethane.
 - d. Volume Solids: 31%.
 - e. Weight Solids: 33%.
 - f. Wet Film Thickness: 4 mils.
 - g. Dry Film Thickness: 2 mils.
 - h. Viscosity @ 77 degree F: 69.
 - i. Max VOC: 150 g/L.
 - j. Flash point: Non Combustible.
- D. Provide the paint colors as indicated in the Finish and Color Schedule. (P-5)(P-6)

2.2 ACCESSORIES

- A. Secondary Products: Secondary products not specified by name and required for the job such as shellac, oils, patching compounds, putty, etc., shall be "best grade" products.

PART 3 EXECUTION

3.1 EXAMINATION

- A. General: Examine surfaces to receive paint finish for conditions that will adversely affect execution, performance, or quality of work and which cannot be put into an acceptable condition through reasonable preparatory work as specified herein.
 1. Surfaces which are unfit to receive the work of this section shall be repaired, replaced or re-finished such that they are acceptable and such that the work of this section may be done as specified. It shall be the responsibility of the General Contractor to ensure that these provisions are strictly enforced.
 2. Commencement of Work constitutes acceptance of surfaces and conditions.

3.2 SURFACE PREPARATION

- A. General: Surface preparations and cleaning procedures shall be in strict accordance with the instructions and specifications of the paint manufacturer and with the requirements of this specification.

- B. Removal of Fixtures: Cooperate with other trades and coordinate removal of fixtures, hardware items, and equipment, as required for painting work. Items to be removed on surfaces to be painted include: switch and receptacle plates, escutcheons and like plates, surface-mounted equipment, free-standing equipment which blocks access to painting surfaces, grilles and louvers at duct openings into finished spaces, and other items as required and directed.
- C. Existing Painted Walls: Remove all flaking paint with a scraper. Remove all dust and dirt with a brush; if necessary, clean surfaces using damp rags or sponges. Repair of surface defects is specified in Section 092116. Spot prime repaired surfaces.
- D. Remove dust and loose deleterious materials from all surfaces before beginning painting operations. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

3.3 APPLICATION OF PAINT

- A. Mixing: Mix paint materials in accordance with the manufacturer's instructions and directions. Mix often enough during application to keep the paint uniform and to ensure complete dispersion of pigment and a uniform composition.
- B. Application: Apply paint in accordance with the manufacturer's directions. Use techniques best suited for substrate and type of material being applied. Brushes and rollers shall be of a type best suited for the type of material being applied.

3.4 DAMAGED PAINT SURFACES

- A. General: Before final acceptance of the work by the Architect, repair or re-finish painted surfaces which have been damaged at no additional cost. Refinish whole wall where portion of finish is not acceptable.

3.5 CLEAN-UP

- A. General: During the progress of the work, remove from the project all discarded paint materials, rubbish, cans and rags. Leave premises clean and in orderly condition.
- B. Cleaning: Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Remove temporary protective wrappings after completing painting operations.

3.7 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

END OF SECTION

DIVISION 10
SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Factory framed whiteboards.
 - 2. Factory Framed tackboards.
- B. Related Sections:
 - 1. Section 061000 - Rough Carpentry: Wood grounds.
 - 2. Section 092116 - Gypsum Board Assemblies: Non-Structural Metal Framing.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A424 - Standard Specification for Steel, Sheet, for Porcelain Enameling.
 - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- B. National Fire Protection Association:
 - 1. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate wall elevations, dimensions, joint locations and special anchor details.
- C. Product Data: Submit data on markerboards, tackboards, trim and accessories.
- D. Samples: Submit one 6 x 6 inch in size illustrating materials and finish, color and texture of boards and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017700 - Closeout Procedures: Closeout procedures.
- B. Operation and Maintenance Data: Submit Operation and Maintenance Data.

1.5 QUALITY ASSURANCE

- A. Flame Resistant Fabric: Passes when tested in accordance with NFPA 701, Test 1 or Test 2.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.8 WARRANTY

- A. Section 017700 - Closeout Procedures: Product warranties.
- B. Warranty: Include coverage of markerboard surface from discoloration due to cleaning, crazing or cracking and staining.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. White Boards and Tack Boards:
 - 1. Basis of Design: Claridge Products & Equipment Inc (www.claridgeproducts.com <<http://www.claridgeproducts.com>>).
 - a. Series 5.
 - 2. MooreCo (<<http://moorecoinc.com>>).
 - 3. Marsh Industries Inc (www.marsh-ind.com <<http://www.marsh-ind.com>>).
- B. Substitutions: Section 012500.

2.2 WHITE BOARD MATERIALS (WB-1)

- A. Steel Sheet ASTM A424, Type I, commercial quality. Pre clean and treat for application of architectural porcelain on a continuous coil process.
 - 1. Outer face sheet: 28 ga, magnetic.
 - 2. Provide ground and cover coats of ceramic frit by firing operation.
 - a. Firing Temperature: Enamel shall be fired at lowest possible temperatures to reduce steel and porcelain stresses and achieve superior enamel and hardness.
 - 3. Class 1 finish rating.
- B. Aluminum Extrusions: ASTM B221, 6061 alloy, temper selected by manufacturer as most appropriate for condition.
- C. Core material: 7/16" MDF.

- D. Foil Backing: Aluminum foil sheet.
- E. Adhesives: Type recommended by manufacturer.

2.3 TACKBOARDS (TB-1) MATERIALS

- A. Tackable outer surface:
 - 1. ¼ inch thick self-healing, burlap backed cork to match TWC-1.
 - 2. Fire Resistance: Class B (ASTM E84).
- B. Core: ¼" thick, tempered hardboard.
- C. Adhesive: Type recommended by manufacturer to suit application to substrate, mildew and water resistant, strippable type.
- D. Metal trim: Clear anodized aluminum, maximum 5/8 inch face trim.

2.4 ACCESSORIES

- A. Map Hooks: One hook for each 3 ft. of rail.
- B. Flag holder.

2.5 FABRICATION

- A. Shop Assembly: White board and tackboard units.
- B. Frame: Extruded aluminum, concealed fasteners; 5/8 inch wide.
- C. Provide marker tray full length of each white board.
- D. Splice Joint: Concealed spline of sheet steel.

2.6 FINISHES

- A. Porcelain Enamel: Glass fibered enamel, baked to vitreous surfaces; Porcelain Enamel Institute Type A; Color: white.
- B. Aluminum Frame and Marker Tray: Anodized with satin finish.

VISUAL DISPLAY UNITS

3.1 EXAMINATION

- A. Verify internal wall blocking is ready to receive Work and positioning dimensions are as indicated on shop drawings.
- B. Verify that interior temperature and humidity approximate normal conditions of building occupancy. Do not install boards on damp walls or in damp and humid weather without heat in the building.

3.2 INSTALLATION

A. White boards:

1. Comply with manufacturer's instructions for installing hangers.
2. Establish bottom of perimeter frame at 3'-0" above finished floor.
3. Butt panels tight with concealed spline to hairline joint.

B. White boards and Tack boards:

1. Secure units level and plumb, with no bows at perimeter edges.
2. Keep perimeter trim straight in accordance with manufacturer's recommendations.
3. Layout panels on walls to verify sizes and spacings. Check approved shop layout drawings.

3.3 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Cover markerboard surfaces with protective cover, taped to frame.
- C. Remove temporary protective cover at date of Substantial Completion.

3.4 SCHEDULE

- A. Refer to Interior Elevations for locations.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Panel Signage and Attachment Devices.
2. Dedication Plaque.
3. Dimensional Letters and Numerals and Attachment Devices.
4. Custom Painted Exterior Wall Graphic.

B. Related Sections:

1. Section 042113 - Masonry Veneer: Masonry substrate.
2. Section 081314 - Hollow Metal Doors.
3. Section 081416 - Flush Wood Doors.
4. Section 088000 - Glazing.
5. Section 092116 - Gypsum Board Assemblies: Drywall substrate.
6. Section 099000 - Painting and Coating.
7. Division 23 - Mechanical Identification.

1.2 REFERENCES

A. American National Standard:

1. ANSI/ICC A117.1- Standard for Accessible and Usable Buildings and Facilities, Chapter 7- Communication Elements and Features.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures.

B. Submit complete shop drawings indicating all materials, sizes, configurations, applicable substrate mountings, sign styles, wording and lettering locations, anchorages and accessories and overall dimensions for each.

1. Computerized Output: Furnish computerized samples of signs and graphics at a scale duplicating final appearance.
2. Submit signage schedule complete with location of each sign and required copy; include floor plans if required.

3. Furnish location template drawings for items supported or anchored to permanent construction.
- C. Product Data:
 1. Submit manufacturer's product literature indicating units and design selected.
 2. Submit manufacturer's technical data and installation instructions for each sign type required.
- D. Samples:
 1. Submit full size finished samples illustrating installation at glazing and construction methods for sign types for Architect's approval prior to fabrication and delivery to jobsite.
 2. Submit one sample illustrating full size sample letters, of type, style, finish and color specified including method of attachment.
 3. Include installation template and hardware.
- E. Submit manufacturer's installation instructions under provisions of Section 013000.
- F. Section 017700 - Closeout Procedures.
- G. Manual for Materials and Finishes:
 1. Provide appropriate checklist for aiding in reordering after Date of Substantial Completion. Maintain schedule program for five years for ordering new signage as required by Owner.
 2. Submit maintenance data and cleaning requirements for all exterior surfaces.

1.4 QUALITY ASSURANCE

- A. Uniformity of Manufacturer: For each sign form and graphic image process indicated, furnish products of a single manufacturer.
- B. Manufacturer: Company specializing in fabrication and installation of signs with at least three (3) years documented experience. Submit a list of installations and other substantiating data that demonstrates experience in sign work similar to that indicated on drawings and in these specifications.
- C. Sign finish shall be smooth, free of scratches, cutting marks or other imperfections. Sign material laminations shall be smooth, consistent and free of bubbles, bulging and foreign matter, and shall not delaminate or cause discoloration or deterioration of any materials used in fabrication.
- D. Comply with ADA Codes and Federal Regulations. Provide signs for assuring access for persons with disabilities in accordance with federal, state, and local regulations.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Product storage and handling requirements.
- B. Package signs, labeled in name groups.
- C. Store adhesive attachment tape at ambient room temperatures.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Sign Solutions (406) 777-1004.
- B. Davis Signs (206) 287-9800.
- C. Foley Signs (206) 324-3040.
- D. M3 Messengercorp (206) 342-1900.
- E. Martin Signs (206) 768-5183.
- F. Western Neon, (206) 682- 7738.
- G. TubeArt (206) 223-1122.
- H. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.2 WALL MOUNTED TACTILE SIGNAGE

- A. Room Identification Signs
 - 1. ADA Type Plaques with raised graphics and clear integral domed Grade II Braille.
 - 2. Material: 1/8 inch matte clear acrylic.
 - 3. Changeable room identification signs: 1/8 inch matte clear acrylic faceplate with clear inner-layer to form window pocket and painted 1/8 inch backplate layer to window support assembly.
 - a. Provide white card inserts for initial installation; copy on inserts by Owner.
 - 4. Integrally formed raised text and Braille.
 - 5. Face and edges of plaques to be smooth, free of scratches, cut marks or other imperfections. Square corners.

6. Provide sign lettering and graphics in the sizes and configurations as shown on the drawings and details.
 7. Lettering: All lettering shall be executed in such a manner that all edges and corners of the letter forms are correctly spaced, true, clean, precise and must accurately reproduce the letter form. Letter height must conform to ADA keeping to a minimum of 5/8" and a maximum of 2".
 8. Text: Refer to drawings.
 9. Braille: Raised 1/32 inch. Refer to drawings.
- B. Rooms with Fire Sprinkler Riser/Fire Alarm Control Panels
1. 1/8 inch matte clear acrylic.
 2. 1 inch high white letters on red background.
 - a. Fire Sprinkler Riser Room.
 - b. Fire Alarm Control Panel.
 - c. Fire Alarm Control Equipment.
- C. Mounting: Signs are to be installed using tamperproof mechanical fasteners countersunk. Signs on glass are to be installed using industrial strength double sided tape and clear silicone adhesive.
1. Provide 1/8" acrylic layer for glass backup on opposite side of glass as shown in drawings. If no acrylic back layer, glass backups shall be of .015" vinyl backups furnished with peel-off pressure sensitive adhesive.
 2. Mount exterior signs with four tamperproof countersunk screws into drilled inserts into masonry veneer.

2.3 DEDICATION PLAQUE

- A. Acceptable Manufacturers:
1. Basis of Design: Gemini Sign Letters.
 2. Substitutions under provisions of Section 012500.
- B. Description:
1. Copy: Raised horizontal stroke.
 2. Finish: Sand with brushed aluminum surface.
 3. Border: No border.
 4. Clear coat: Satin.

5. Mount: Blind.

2.4 DIMENSIONAL LETTERS & SYMBOLS

- A. Acceptable Manufacturers:
 1. Basis of Design: Gemini Sign Letters.
 2. Substitutions under provisions of Section 012500.
- B. Brushed Aluminum Letters.
- C. Flat cutout letters of 1/2 inch thick aluminum.
- D. Lettering and Sizes: As indicated on drawings.

2.5 CUSTOM EXTERIOR PAINTED WALL GRAPHIC

- A. Graphic to be provided by Architect.
- B. Acrylic paint: Refer to Section 099000.

2.6 FINISHES

- A. Wall Mounted Tactile Signage
 1. Background Color: Subsurface applied. Refer to drawings for colors (location), where not indicated custom color to be selected by architect.
 2. Graphics color: Refer to drawings for colors (location), where not indicated custom color to be selected by architect.
- B. Dimensional Letters & Symbols
 1. Finish: Satin aluminum 1333.

2.7 ACCESSORIES

- A. Mounting Hardware: Tamperproof chrome screws.
- B. Tape Adhesive: Double sided tape, permanent adhesive.
- C. Provide adhesive cement appropriate for type substrate, as shown for dimensional letters and symbols.
- D. Provide adhesive backed vinyl signs complying with IBC Section 703.7.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Verification of existing conditions before starting Work.

3.2 PREPARATION

- A. All signs shall be inspected and approved by Contractor prior to installation to site.
- B. Architect's review does not constitute approval of deviations, if any, from the approved sample unless their acceptance is specifically noted.
- C. Signs which are reviewed by Architect and which do not comply with contract requirements, will require another review by Architect after necessary corrections or repairs have been made.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install signs after surfaces are finished, in locations indicated.
- C. Install signage in locations with mounting types indicated on drawings in accord with approved shop drawings. Square, plumb, and level units as required.
- D. Install inserts at date of Substantial Completion complete with all proper copy in place.
- E. Dimensional Letter Signage: Locate dimensional letters with spacing based on full size computer generated installation drawings secured to structure as required to resist anticipated loads.
 - 1. Flush mounted: Set studs in adhesive cement. No space between metal letter and mounting surface.
 - 2. Final Location: As approved in field by Architect based on full size drawings.

3.4 TOLERANCES

- A. Sign panels to remain flat under installed conditions with 1/16 inch tolerance, plus or minus, from corner to corner.

3.5 CLEANING

- A. Wall Mounted Tactile Signage: Clean and remove excess adhesive.
- B. Dimensional Letters and Numbers: Clean and polish, remove excess adhesive.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid Phenolic Core toilet compartments.
2. Floor mounted, head rail braced.
3. Urinal screens, wall mounted and floor-to-ceiling post mounted.

B. Related Sections:

1. Section 061000 - Rough Carpentry: Wood blocking and curbing, in wall blocking for partition panel support.
2. Section 092216 - Non-Structural Metal Framing: Supports that attach ceiling-hung and floor-and-ceiling anchored units to the overhead structural system.
3. Section 102800 - Toilet, Bath and Custodial Accessories: Toilet tissue dispensers, grab bars, and similar accessories.

1.2 REFERENCES

A. U.S. Department of Justice, ADA - Americans with Disabilities Act:

1. ADA Standards for Accessible Design.

1.3 SUBMITTALS

- A. Submit shop drawings, product data and manufacturer's installation instructions under provisions of Section 013300 - Submittal Procedures.
- B. Indicate on shop drawings, partition plan and elevation views, dimensions, details of wall and floor supports and door swings.
- C. Provide product data on panel construction, hardware and accessories.
- D. Submit one sample 2 x 2 inch in size, illustrating panel finish, color and sheen.
- E. Section 017700 - Closeout Procedures: Manual for Materials and Finishes.

1.4 QUALITY ASSURANCE

- A. Single Source: Provide compartments and screens manufactured by nationally recognized manufacturer of compartments and screens of the types specified; only one manufacturer shall be used in the work.
- B. ADA Requirements: Comply with all national and local regulations regarding access by handicapped persons.

1.5 WARRANTY

- A. Special Warranty: 10 year limited warranty for panels, doors and stiles against corrosion, warpage, breakage, delamination and defects in factory workmanship.

PART 2 PRODUCTS

2.1 SOLID PHENOLIC CORE TOILET COMPARTMENTS

- A. Manufacturers:
 - 1. Basis of Design: ASI Group.
 - 2. Ampco.
 - 3. Bobrick.
 - 4. Bradley.
 - 5. General Partitions.
 - 6. Substitutions: Under provisions of Section 012500 - Substitution Procedures.
- B. Product Description: Floor mounted overhead braced.
- C. Urinal: Floor anchored, post to ceiling screen. Manufacturer's standard post design of 1- 3/4 inch square aluminum tube with satin finish; with stainless steel No 4 satin brushed finish shoe and sleeve cap.
- D. Components
 - 1. Toilet Compartments: Solid phenolic cores with high pressure melamine faces integral to the core material.
 - a. Color: Refer to Finish and Color Schedule (TC-1).
 - 2. Door and Panel Dimensions:
 - a. Thickness: 3/4 inch doors, 1/2 inch panels.
 - b. Door Width: 24 inch
 - c. Accessible Door Width: 36 inch, out-swinging.
 - d. Height: 60 inches.
 - e. Thickness of Pilasters: 3/4 inch.
- E. Accessories

1. Pilaster Shoe: Formed, Type 304 stainless steel with No. 4 finish, 3 inch high, concealing floor fastenings. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
2. Head Rails: Hollow anodized aluminum tube, 1 x 1-5/8 inch size, with anti-grip profiles and cast socket wall brackets.
3. Brackets: Full height, anodized aluminum.
4. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
 - a. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
5. Hardware: Polished stainless steel.
 - a. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
 - b. Nylon bearings.
 - c. Thumb turn door latch with exterior emergency access feature.
 - d. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 - e. Coat hook with rubber bumper; one per compartment, mounted on door panel.
 - f. Provide door pull for out swinging doors.
 - g. Provide metal heat sink at bottom of doors and partitions.

2.2 FABRICATION

- A. Mount hardware with tamper-resistant fasteners.
- B. Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that site conditions are ready to receive work and opening dimensions are as indicated and instructed by the manufacturer.
- B. Verify correct spacing of plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing, where required.
- D. Beginning of installation means acceptance of existing substrate.

3.2 INSTALLATION

- A. Install partitions secure, plumb, and level in accordance with manufacturers' instructions.
- B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to bracket with through sleeve tamperproof bolts and nuts.
Locate headrail joints at pilaster center lines.
- E. Conceal floor fastenings with pilaster shoes.
- F. Mount coat hook not more than 54 inches above floor.
- G. Install door strike and keeper with door bumper on each pilaster in alignment with door latch.
- H. Adjust hinges to locate in-swing doors in partial open position when unlatched. Returns outswing doors to closed position.

3.3 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16".

3.4 CLEANING

- A. Remove protective maskings. Clean surfaces.
- B. Field touch-up of scratches or damaged finish will not be permitted.
- C. Replace damaged or scratched materials with new materials.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Overhead metal curtain track and guides.
2. Curtains.

B. Related Sections:

1. Section 055000 - Metal Fabrications: Above ceiling supports for track.
2. Section 095113 - Acoustical Panel Ceilings: Suspended ceiling system to support track.

1.2 REFERENCES

A. ASTM International:

1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. National Fire Protection Association:

1. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

1.3 SUBMITTALS

A. Submit under provisions of Section 013300 - Submittal Procedures.

B. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, and attachment details.

C. Product Data: Provide data for curtain fabric characteristics.

D. Samples:

1. Submit one fabric sample, 12 x 12 inch in size illustrating fabric color.
2. Submit 12 x 12 inch sample patch of curtain cloth with representative hem stitch detail, heading with reinforcement, and carrier attachment to curtain header.

E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

F. Section 017700 - Closeout Procedures.

G. Manual for Materials and Finishes: Include stain removal methods.

1.4 QUALITY ASSURANCE

- A. Conform to applicable IBC code and NFPA 701 for flame/smoke rating requirements in accordance with ASTM E84 for curtain fabric.
- B. Mockup:
 - 1. Provide mockup of curtain, track and accessories under provisions of Section 014000.
 - 2. Locate where directed.
 - 3. Mockup may remain as part of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 016000.
- B. Accept curtain materials on site and inspect for damage.
- C. Store curtain materials on site and deliver to the Owner for installation when requested.

1.6 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings and instructed by the manufacturer.

1.7 MAINTENANCE

- A. Submit under provisions of Section 017700 - Closeout Procedures.
- B. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Track: Surface mounted.
- B. Performance Requirements:
 - 1. Track: Support vertical test load of 50 lbs without visible deflection of track or damage to supports.
 - 2. Track Size: Safely support moving loads.
 - 3. Track and Mounting: Sufficiently rigid to resist visible deflection and without permanent set.

2.2 ACCEPTABLE MANUFACTURERS

- A. Pryor Products. (www.pryorproducts.com)

- B. CS, Construction Specialties. (www.c-sgroup.com)
- C. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.3 TRACK MATERIALS

- A. Track: Extruded aluminum sections; one piece per cubicle track run; channel profile.
- B. Track End Stop: To fit track section.
- C. Curtain Carriers: Nylon roller to accurately fit track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.
- D. Wand: Fiberglass, attached to lead carrier, for pull-to-close action.

2.4 CURTAIN MATERIALS

- A. Curtain: Close weave polyester; anti-bacterial, self deodorizing, sanitized, preshrunk, flame-proofed to NFPA 701 and requirements of authority having jurisdiction.
- B. Curtain: (CC-1)
 - 1. Basis of Design: To be selected
 - 2. Color: Refer to Finish and Color Schedule.
 - 3. Width: 72 inch.
 - 4. Repeat: 80 inch length x 72 inch width.
 - 5. Weight: 10 oz/linear yard.
 - 6. Flame Retardancy: NFPA 701.
 - 7. Cleaning Code: WS - Water/Solvent.
- C. Open Mesh Cloth: Open weave to permit air circulation; flameproof material, same color as curtain.

2.5 FINISHING

- A. Exposed Surfaces: White enamel finish.

2.6 FABRICATION

- A. Manufacture curtains of one piece, sized 10 percent wider than track length. Terminate curtain 15 inches from floor.
- B. Curtain Heading: Double thickness 2 inches wide, with metal grommet holes for carriers 6 inches on center, double fold bottom hem 2 inches wide. Lock stitch seams in two rows. Turn seam edges and lock stitch.

- C. Fabricate track bend with minimum 12 inch radius, without deforming track section, or impeding movement of carriers.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and above ceiling supports are ready to receive work.

3.2 INSTALLATION

- A. Install curtain track secure and rigid, true to ceiling line.
- B. Install end cap and stop device.
- C. Secure track to ceiling system.
- D. Install curtains on carriers ensuring smooth operation.

3.3 SCHEDULE

- A. Provide in rooms Health 135.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes operable folding partition; ceiling track, ceiling guards, and hardware.
- B. Related Sections:
 - 1. Section 087100 - Door Hardware: Lock cylinders for panels.
 - 2. Section 098400 - Acoustical Components: Fabric.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 3. ASTM E413 - Standard Classification for Rating Sound Insulation.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate opening sizes, track layout, details of track and required supports, static and dynamic loads, adjacent construction and finish trim, and stacking sizes.
- C. Product Data: Submit data on partition operation, hardware and accessories available.
- D. Samples for Review: Submit one sample of each surface finish, 12 x 12 inches size, illustrating quality, colors selected, and texture.
- E. Manufacturer's Instructions: Submit special procedures, perimeter conditions requiring special attention and installation sequence.
- F. Certificates: Certify partition system meets or exceeds specified acoustic requirements.
- G. Section 017700 - Closeout Procedures.
- H. Operation and Maintenance Manual: Submit recommended cleaning methods, cleaning materials, and stain removal methods. Describe cleaning materials detrimental to finish surfaces and hardware finish.

1.4 QUALITY ASSURANCE

- A. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

B. Qualifications:

1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
2. Installer: Company specializing in performing work of this section with minimum three years documented experience approved by manufacturer.

1.5 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Coordinate Work with other sections providing panel finish materials to this section.

1.6 WARRANTY

- A. Warrant operable partitions jointly by partition manufacturer, installer, and General Contractor against defects in materials and workmanship as follows:
 1. Track system, including trolley assemblies, support brackets for a period of five (5) years from date of Substantial Completion; labor for replacement of track system shall be included.
 2. Panels construction (steel weldment, faces, internal reinforcing, and trolley attachment plated) and gasket system (top, bottom, end panel and inter-panel seals) for a period of ten (10) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Sound Transmission Classification (STC): As specified, calculated in accordance with ASTM E413, based on tests performed in accordance with ASTM E90, on partition size of 100 sq ft.

2.2 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Hufcor, Inc. - 642 series.
- B. Advanced Equipment Corp. - Alpha series.
- C. Modernfold, Inc. - 940 series.
- D. Substitutions: Section 012500 - Substitution Procedures.

2.3 COMPONENTS

- A. Partition Construction:
 1. Side opening; paired panels, center stacking.

2. Sound Transmission Class (STC): Minimum 47+/- 1.
 3. Panel weight to be no less than 8.0 lbs/ft².
- B. Panels:
1. Panel Substrate Facing: Steel sheet, 18 gage, welded to panel frame.
 2. Core: 16 gage formed sheet steel frame top, bottom, jambs, and intermediates; welded construction, internally stiffened by welded steel members with fibrous glass sound attenuating material at core.
 3. Thickness (without finish): 4 inches.
 4. Width: 4' typ.
 5. Trim: Integral factory applied aluminum vertical edge and face protection.
 6. Hinges: Manufacturer's standard low profile hinge.
 7. Panel to Panel Seals: Grooved and gasketed astragals; continuous flexible ribbed vinyl seal fitted to panel edge construction; color to match panel finish.
- C. Track: Composite clear, extruded, anodized aluminum; thickness and profile designed to support live and dead loads, bracket aluminum panel guides, seals, 1/2" diameter rods and attachment to structure, and track connectors. Rated up to 900 lbs a panel.
- D. Carriers: Ball bearing, steel wheels on trolley carrier at top of every panel, sized to carry imposed loads, with threaded 3/4" pendant bolt for vertical adjustment.
- E. Hardware: Latching door handles of cast steel satin chrome finish; lock cylinder master keyed to building keying system.
- F. Acoustic Seals:
1. Vertical interlocking sound seals between panels (astragals) of a reversible tongue and groove configuration shall be required in each panel edge, permitting universal panel operation. Astragals shall be steel for maximum durability and fire resistance. Rigid plastic astragals or astragals in only one panel edge are not acceptable.
 2. Horizontal top seals shall be mechanically retractable 1" seals activated at same time as bottom mechanical seal. Sweep seals only not acceptable.
 3. Horizontal bottom floor seals shall be manually activated operable bottom seals providing nominal 2" operating clearance with an operating range of +/-0.50". Automatic seals are not accepted.
- G. Accessories: White enameled ceiling closure, aluminum jamb and head molding, fittings and attachments, and intermediate meeting posts.
- H. Acoustic Sealant: Specified in Section 079200.

2.4 FACTORY FINISHING

- A. Acoustical Fabric. (FAB-1)
- B. Stage side: PLAM -3 and PLAM-4.
 - 1. Refer to drawings for locations.
- C. Exposed Aluminum: Gray.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify field measurements are as indicated on shop drawings.
- C. Verify track supports are laterally braced and will permit track to be level within 1/4 inch of required position and parallel to floor surface.
- D. Verify floor flatness of 1/8 inch in 10 feet, non-cumulative.
- E. Verify wall plumbness of 1/8 inch in 10 feet, non-cumulative.

3.2 INSTALLATION

- A. Fit and align partition assembly level and plumb.
- B. Lubricate moving components.
- C. Apply acoustic sealant to achieve required acoustic performance.
- D. Field apply surface finishes.

3.3 ADJUSTING

- A. Section 017000 - Execution: Testing, adjusting, and balancing.
- B. Adjust partition assembly to provide smooth operation from stacked to full open position. Do not over-compress acoustic seals.
- C. Visually inspect partition in full extended position for light leaks to identify potential acoustical leak.
- D. Adjust partition assembly to achieve lightproof seal.

3.4 CLEANING

- A. Section 017700 - Closeout Procedures: Final cleaning.
- B. Clean finish surfaces and partition accessories.

3.5 DEMONSTRATION AND TRAINING

- A. Demonstrate operation of partition and identify potential operational problems.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Corner guards.
- B. Related Sections:
 - 1. Section 061000 - Rough Carpentry: Support blocking for corner guard anchors.
 - 2. Section 092116 - Gypsum Board Assemblies: Non-Structural Metal Framing; Supplementary framing, blocking, and bracing needed to attach and support impact-resistant wall protection products.

1.2 PERFORMANCE REQUIREMENTS

- A. Corner Guards: Resist lateral impact force of 100 lbs. at any point without damage or permanent set.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit physical dimensions, features, mounted measurements, and anchorage details.
- C. Sample: Submit 1 section of corner guard, 24 inch long, illustrating component design, configuration color and finish.
- D. Section 017700 - Closeout Procedures: Manual for Materials and Finishes.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with requirements for physically handicapped.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.6 COORDINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Coordinate Work with wall or partition sections for installation of concealed blocking or anchor devices.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Construction Specialties Inc. (C/S)
- B. Babcock-Davis.
- C. InPro Corporation.
- D. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.2 COMPONENTS

- A. Corner Guards - Surface Mounted:
 - 1. Models: C/S Acrovyn CO-8 or SCO-8 to suit application. (CG-1)
 - 2. Material: type 304 Stainless Steel.
 - 3. Height: To match adjacent door height (7'-8").
 - 4. Width: 3 ½ ".
 - 5. Finish: Satin.
- B. Mounting: Manufacturer's standard screw attachment.

2.3 FABRICATION

- A. Fabricate components with tight joints, corners and seams.
- B. Pre-drill holes for attachment.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify rough-in for components are correctly sized and located.

3.2 INSTALLATION

- A. Position bottom of corner guard at top of wall base.

3.3 SCHEDULES

- A. Refer to floor plans for locations.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Toilet accessories.
2. Shower and tub accessories.
3. Custodial accessories.
4. Standard framed mirrors.

B. Related Sections:

1. Section 092116 - Gypsum Board Assemblies: Non-Structural Metal Framing; Placement of backing plate reinforcement for wall hung accessories.
2. Section 093000 - Tiling.
3. Section 102113 - Toilet Compartments.
4. Section 102600 - Wall Protection: Corner guards.

1.2 REFERENCES

A. ASTM International:

1. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
2. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
3. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
4. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
5. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
6. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
7. ASTM C1036 - Standard Specification for Flat Glass.

B. Federal Specification Unit:

1. FS A-A-3002 - Mirrors, Glass.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, attachment methods.
- C. Section 017700 - Closeout Procedures: Manual for Materials and Finishes.

1.4 COORDINATION

- A. Section 013100 - Project Management and Communication: Coordination and project conditions.
- B. Coordinate the Work with placement of internal wall reinforcement to receive anchor attachments.

PART 2 PRODUCTS

2.1 TOILET AND BATH ACCESSORIES

- A. Manufacturers:
 - 1. Bobrick Washroom Accessories. <http://www.bobrick.com/Bobrick/> (basis of design)
 - 2. American Specialties, Inc. <http://www.americanspecialties.com/>
 - 3. Bradley Corp. <http://www.bradleycorp.com/>
 - 4. Substitutions: Section 012500 - Substitution Procedures.

2.2 COMPONENTS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of seamless metal sheets, with flat surfaces.
- B. Keys: Furnish keys for each lockable accessory to Owner; master key accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269, stainless steel.
- E. Galvanized Sheet Steel: ASTM A653, G90 zinc coating.
- F. Framed Mirror Glass: Framed mirror manufacturer's standard.
- G. Adhesive: Contact type, waterproof.

- H. Fasteners, Screws and Bolts: Hot dip galvanized, tamper-proof.
- I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 TOILET ROOM ACCESSORIES

- A. Surface Mounted Toilet Tissue Dispenser (OFCI):
 - 1. Product: Bobrick B-2888
- B. Surface Mounted Paper Towel Dispenser (OFCI):
 - 1. Product: Bobrick 72860.
- C. Wall Mounted Soap Dispenser (OFCI):
 - 1. B-2111 manufactured by Bobrick.
- D. Seat Cover Dispenser (OFCI):
 - 1. Minimum capacity: 500 seat covers.
 - 2. Product: B301 manufactured by Bobrick.
- E. Combination Sanitary Napkin/Tampon Dispenser:
 - 1. Door: Seamless door with returned edges and tumbler lock.
 - 2. Cabinet: Fully welded, thick sheet.
 - 3. Operation: 25 cent coin required to operate dispenser. Provide locked coin box, separately keyed.
 - 4. Identify dispensers without using brand names.
 - 5. Minimum capacity: 20 napkins and 30 tampons.
 - 6. Product: B37063 50 ADA manufactured by Bobrick.
- F. Sanitary Napkin Disposal Unit:
 - 1. Product:
 - a. B-354 manufactured by Bobrick (Toilet Partition Model).
- G. Mirrors: Stainless steel framed, 6 mm thick tempered glass, abrasion-resistant coated mirror.
 - 1. Size: As indicated on Drawings.
 - 2. Frame: 0.04 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; No.4 finish.

3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
4. Product:
 - a. B2908 manufactured by Bobrick (Standard).
- H. Electric Hand Dryers: Basis of Design - WORLD Dryer Brand, Model A
 1. Automatic hand dryer.
 2. Electro-mechanical timer with 25 Amp switch.
 3. 30 second drying cycle.
 4. 2100 watt wire heating element.
 5. 70°F temperature rise.
 6. IPX1 ingress protection.
 7. Motor:
 - a. Thermally-protected, universal brush-type motor 1/10 HP, operating at 7,500 RPM.
 - b. 200 CFM air flow at a velocity of 7,300 LFM.
 8. Materials:
 - a. Cover material: 1/4 inch thick, Cast Iron, porcelain enamel finish.
 - b. Wall-mounted base, die-cast aluminum.
 - c. Nozzle, die-cast zinc alloy finish, bright chrome.
 9. Unit Size: (HxWxD)
 - a. 9.5 inch x 11.3 inch x 8.3 inch.
- I. Grab Bars: Stainless steel, 1-1/2 inches outside diameter, minimum 18 ga. wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
 1. Length and configuration: As indicated on Drawings.
- J. Coat Hook: Heavy-duty stainless steel, surface mounted hat and coat hook with concealed mounting bracket and wall plate, satin nickel plate finish.
 1. Product: B-6827 manufactured by Bobrick.
 2. Mount on door of Staff Toilet rooms.

3. Locate as directed by Architect at all offices and staff rooms, one per room.

2.4 SHOWER ACCESSORIES

- A. Shower Curtain Rod: Stainless steel tube, 1-1/4 inch outside diameter, 18 ga. inch wall thickness, satin-finished, with 2 9/16 inch square, minimum 20 ga. thick satin-finished stainless steel flanges, for concealed mounting.
 1. Product: B-6047 manufactured by Bobrick.
- B. Shower Curtain: Opaque vinyl, 0.008 inch thick, matte finish, with antibacterial treatment, flame resistant and stain-resistant fabric.
 1. Size: 42 x 72 inches, hemmed edges.
 2. Grommets: Corrosion-resistant metal; pierced through top hem on 6 inch centers.
 3. Color: White.
 4. Product: 204-2 manufactured by Bobrick.
- C. Shower curtain hooks: Stainless steel spring wire designed for snap closure.
 1. Product: 204-1 manufactured by Bobrick.
- D. Folding Shower Seat: Wall-mounted surface; welded tubular seat frame, structural support members, hinges and mechanical fasteners of Type 304 stainless steel, L-shaped, seat, reversible.
 1. Seat: Solid phenolic one-piece seat with slats, of color as selected.
 2. Product: B-5181 manufactured by Bobrick.
- E. Robe Hook: Heavy-duty stainless steel, single-prong circular bracket and backplate for concealed attachment, satin nickel plate finish.
 1. Product: B-2116 manufactured by Bobrick.

2.5 CUSTODIAL ROOM ACCESSORIES

- A. Utility shelf with Mop and Broom Holder and rag hooks: Type 304, with satin finish.
 1. Shelf: 18 ga; 1 1/2" return edge; 8" deep; 36" long.
 2. Drying rod: Stainless steel; 1/4" diameter.
 3. Mounting brackets: 18 ga; welded to shelf.
 4. Holders: 4 spring-loaded rubber cam holders.
 5. Hooks: 3 stainless steel; 16 ga.

6. Product: B-224 x 36 manufactured by Bobrick.

2.6 FACTORY FINISHING

- A. Per specified product manufacturer's standards.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify exact location of accessories for installation.
- C. Verify field measurements are as indicated on Drawings.
- D. Refer to Section 061000 - Rough Carpentry, for installation of fire-treated wood blocking or 6" by 20 gauge metal strapping in walls.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install plumb and level, securely and rigidly anchored to substrate.
- B. Mounting Heights and Locations: As indicated on Drawings and/or required by ADA.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Exterior LED Message Board.
 - 2. Bid as Alternate 7.
- B. Related Sections
 - 1. Division 26 - Electrical.

1.2 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Submit product data indicating material characteristics, dimensions and specifics for proper installation and maintenance.
- C. Section 017700 - Closeout Procedures.

1.3 QUALITY ASSURANCE

- A. Compliance Information:
 - 1. UL listed.
 - 2. UL Energy verified.
 - 3. FCC compliant.

1.4 COORDINATION

- A. Coordinate the work under provisions of Section 013113.

1.5 WARRANTY

- A. Provide five-year warranty on all equipment under provisions of Section 017700.

PART 2 PRODUCTS

2.1 EXTERIOR LED SIGNAGE

- A. Acceptable Manufacturers:
 - 1. Basis of Design: Daktronics, Inc.
 - 2. Nevco.
 - 3. Substitutions accepted under Section 012500.

- B. Basis of Design: Daktronics, Galaxy GS-6 Series.
 - 1. Line and column spacing: 19.8 mm.
 - 2. Character Height: 5.5 inch.
 - 3. Pixel Configuration: 1 red, 1 green, 1 blue.
 - 4. Maximum Brightness: 11000 nits.
 - 5. Color Capability: 281 trillion color.
 - 6. Horizontal Viewing Angle: 140 degrees.
 - 7. Vertical Viewing Angle: 70 degrees.
 - 8. Horizontal Readability Angle: 160 degrees.
 - 9. Vertical Readability Angle: 90 degrees.
 - 10. Minimum Viewing Distance: 45 foot.
 - 11. Graphic Capability: Text, graphics, logos, basic animation, video clips, multiple font styles and sizes.
 - 12. Matrix Size: 32 x 80.
- C. Control Software: Venus Control Suite.
 - 1. Cloud based servers hosted by manufacturer.
 - 2. Display to receive information via internet connection (Cat 5/6, fiber or Wireless Ethernet Bridge)
 - 3. Operation is mobile and desktop browser supported.
 - 4. Power: 120/240 VAC single phase.
 - 5. Display Dimming: 64 levels (automatic, scheduled or manual control).
 - 6. Operating temperature: -40 degrees to 120 degrees F with 99% RH non-condensing.
 - 7. Compliance Information: UL and cUL Listed, UL-Energy Verified, FCC compliance.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that installation locations are ready to receive equipment and anchorages are adequate to support loads.
- B. Beginning of installation means that the installer accepts the existing conditions.

3.2 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions, drawings, and approved shop drawings.
- B. Install anchor fasteners, test anchors to verify that they will support equipment securely without unwanted movement or deflection.

3.3 TOLERANCES

- A. Installation: Plumb, level, and true. Maximum to 1/8 inch variation between top and bottom of sign.

3.4 ADJUSTING

- A. Repair damaged signs and finishes to conceal evidence of corrective work, or replace with new, as directed by Architect.
- B. Make repairs and adjustments for fabrication not conforming to specified requirements as directed by Architect.

3.5 CLEANING

- A. Leave premises clean, free from residue due to work of this Section.
- B. Clean sign face and exposed components using water, soft cloth, mild detergent to prevent scratching and damage to finish.

3.6 DEMONSTRATION

- A. Provide demonstration to Owner personnel as to the proper use and operation of electronic message signage.

3.7 PROTECTION

- A. Protect signs from damage during Work of this Contract, prior to Owner occupancy.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Portable fire extinguishers.
2. Fire extinguisher cabinets.
3. Brackets for wall mounting.
4. Key lock boxes.

B. Related Sections:

1. Section 042113 - Masonry Veneer: For blockout for Key Lock Box.
2. Section 061000 - Rough Carpentry: Wood blocking for wall-mounted mounting brackets and cabinets.
3. Section 078400 - Firestopping: Firestopping sealants at fire-rated cabinets.
4. Section 092116 - Gypsum Board Assemblies: Rough opening framing.
5. Section 101400 - Signage: Directional signage to out-of-sight fire extinguishers and cabinets.
6. Division 28 - for Key lock box wiring infrastructure.

1.2 REFERENCES

A. National Fire Protection Association:

1. NFPA 10 - Standard for Portable Fire Extinguishers.

B. Underwriters Laboratories Inc.:

1. UL - Fire Protection Equipment Directory.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements.
- B. Product Data: Submit extinguisher operational features, color and finish, anchorage details.
- C. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.
- D. Section 017700 - Closeout Procedures.
- E. Maintenance and Operating Manuals: Submit test, refill or recharge schedules and re-certification requirements.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install extinguishers when ambient temperature is capable of freezing extinguisher components.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Conform to NFPA 10.
- B. Provide portable fire extinguishers and cabinets classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.

2.2 COMPONENTS

- A. Acceptable Manufacturers
 - 1. Basis of Design: Larsen's Manufacturing Co.
 - 2. JL Industries.
 - 3. Potter Roemer.
 - 4. Substitutions: Section 012500.
- B. Extinguishers (FE)
 - 1. Dry Chemical Type: Red steel tank, Model MP-5, typ manufactured by Larsen's Manufacturing Co., with pressure gage. UL approved multipurpose type, 5 lb. capacity, UL rating 2A10BC, typ.
 - 2. Wet Chemical Type: Silver tank, Model WC-6L, manufactured by Larsen's Manufacturing Co., with pressure gage. Meets 6L K class listing. UL approved.
 - a. Locate as directed by Architect 30' maximum from cooking lines.
- C. Cabinets (FEC)
 - 1. Cabinet: 304 Stainless steel, fire rated with same hourly rating as wall
 - a. Semi-recessed, typ. Larsen's Model FS SS 2409-R3 Full .060 with letters door style and latch.
 - b. Surface mounted at CMU wall locations. Larsen's Model SM SS 2409 Full .060 with letters door style and latch.
 - 2. Trim Type: Returned to wall surface, with 2½ inch projection.

3. Door: 304 Stainless steel, reinforced for flatness and rigidity; latch with glass access.
4. Door Glazing: Clear acrylic.
5. Cabinet Mounting Hardware: Appropriate to cabinet.

D. Accessories

1. Extinguisher Brackets: Standard brackets by Larsen's Manufacturing Co.; size for specified extinguisher. Use brackets to hang extinguishers at specified locations. Provide manufacturer's standard designed wall bracket to prevent accidental dislodgement of extinguisher of sizes required for type and capacity of extinguisher required; furnish in manufacturer's standard plated finish.
2. Graphic Identification:
 - a. Wording: "Fire Extinguisher" on each cabinet door.

E. Fabrication

1. Fire Rating Construction: Double wall cabinet construction with 5/8" interstitial space filled with fire barrier material. Size depth of cabinet to match wall construction.
2. Pre-drill for anchors.
3. Hinge doors for 180 degree opening with continuous piano hinge.
4. Glaze doors with resilient channel gasket glazing.

2.3 KEY LOCK BOXES

- A. Basis of Design: Knox-Box, Model 3200 series.
1. Hinged door, recessed mount, heavy duty, standard capacity, black color with tamper switch and recessed mounting kit (RMK). Contact the fire Chief in the jurisdiction for which the project is located. The Fire Chief will furnish signed authorization forms for ordering the Key Lock Box. Coordinate with mason for actual blockout location. Refer to the drawings for locations indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Coordination and project conditions.
- B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

- A. Install cabinets plumb and level in wall openings, maximum 48 inches from finished floor to top of extinguisher handle.
- B. Install wall brackets, maximum 48 inches from finished floor to top of extinguisher handle.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets or on wall brackets.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Welded lockers at corridors and kitchen.
2. Locker Benches.

B. Related Sections:

1. Section 061000 - Rough Carpentry: In-wall blocking and plywood.
2. Section 096500 - Resilient Flooring: Rubber Base for (RB-1).

1.2 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
- B. Product Data: Provide data on locker benches.
- C. Shop Drawings: Indicate bench layout and details.
- D. Manufacturer's Installation Instructions: Indicate component installation assembly.
- E. Section 017700 - Closeout Procedures.
- F. Manual for Materials and Finishes: Submit information on adjusting, repairing, and replacing locker doors and latching mechanisms.

1.3 DELIVERY, STORAGE, AND PROTECTION

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Debourgh APEX.
 1. Contact: Mark Severson, Mark@vibetechspecialties.com, 503.407.0375.
- B. List Industries, Marquis Protector.
 1. Contact: Tim Marshall, Tim@northwest-school-eq.com, 503.650.8025.
- C. Substitutions: Under provisions of Section 012500.

2.2 MATERIALS

- A. Sheet Steel: Mild cold-rolled and leveled furniture steel, free from buckle, scale, and surface imperfections. ASTM A1008.
- B. Fasteners: Cadmium, zinc, or nickel plated steel; exposed bolt heads, slotless type; self-locking nuts or lock washers for nuts on moving parts.
- C. Equipment: Hooks of cadmium-plated or zinc-plated steel.

2.3 COMPONENTS

- A. Debourgh Apex Hallway Locker: All welded continuous angle iron framed construction with exposed welds sanded smooth. No bolts, screws or rivets to be used in assembly of locker units.
 - 1. Sides and Intermediate Partitions: Constructed of 1-inch by 1-inch by 1/8-inch steel angle iron frame with 16 gauge solid domestic cold rolled sheet steel welded to steel angle frames.
 - 2. 16 gage flat top.
 - 3. Exterior sides, tops, bottoms, and fascia. Constructed of 16 gage domestic cold rolled sheet steel for maximum durability.
 - 4. Tier Dividers: Extending to fascia, creating a separation between the upper and lower lockers' openings/doors.
 - 5. Backs: Solid sheet of 18 gage cold rolled sheet steel welded to frames of sides and intermediate partitions.
 - 6. Shelves and Intermediate Partitions: Constructed of 16 gage cold rolled sheet steel welded to sides and intermediate partition construction. Shelves provided in lockers 60 inches and taller, located to provide a minimum of 12 inches clearances.
 - 7. Doors: 1 inch by inch by 1/8 inch angle iron frame with 14 gage.
 - a. Louvered door providing 7% ventilation per square inch.
 - 8. Latching: Sentry I Single Point Latch.
 - a. Latching mechanism operated by a steel handle welded to a three point cremone type assembly.
 - b. Latching rods, 3/8 inch diameter, engage top and bottom edge of locker frame. A 3/16 inch thick center latch engages door jamb.
 - c. Prepared for receiving padlocks.
 - d. Integral built-in Master lock.

9. Hinges: 3 inch five knuckle, 14 gage heavy-duty fast pin welded to both door and frame. Locker doors 42 inches high or less shall have 2 hinges. Doors over 42 inches shall have 3 hinges.
 10. Pressure Treated Wood Base and Blocking. Refer to section 061000 - Rough Carpentry.
 11. Reinforced Bottom: Provide 16 gage spacer channel welded to locker bottom from front to back for a more secure installation (when closed bases are not used).
 12. Filler panels: Manufacturer's standard fabricated from 18 gage solid steel finished to match lockers.
 13. Recessed Locker Trim: 18 gauge solid steel finish to match lockers.
- B. Marquis Protector: Fully framed, all welded corridor lockers conforming to the following:
1. Hat Shelves, Tier Dividers and Bottoms: 16 gage. Weld dividers to side panels and flush at locker face angle providing a rigid frame for each locker door.
 2. Standard 16 gage flat top.
 3. Backs: 18 gage; continuous; welded to each vertical side panel frame member.
 4. Vertical Sides: 18 gage full framed solid sides.
 5. Frames: 16 gage hollow T tubular sections and channel frame members; enclose all four edges of the side panel with entire assembly MIG welded to form rigid frame for each locker. Channel frame members welded to front and rear vertical frame members. Anchor bearing surface 1 ¼ inch wide x 12 inch deep.
 6. Security-Plus Doors: 14 gage cold rolled sheet steel with single bend at top and bottom and double bends at sides; 3" wide 18 gage full height channel door stiffener MIG welded to hinge side of door and top and bottom door return bends. Spot weld to inside of door face.
 7. Latching mechanisms: 11 gage single point latch MIG welded to frame prepared for receiving padlocks.
 8. Hinges: 3 ½ inch high, 7 knuckle, 13 gauge, heavy duty style. Right hand side hinged. Three for doors over 48 inches high; two for doors under 48 inches high. Weld securely to unit body and rivet to unit door.
 9. Pressure Treated Wood Locker Base and Blaching. Refer to section 061000 - Rough Carpentry.
 10. Recessed Locker Trim: 18 gauge solid steel finish to match lockers.

2.4 ACCESSORIES

- A. One double prong ceiling hook and 2 single prong wall hooks.

- B. Number Plates: Manufacturer's standard polished aluminum number plate.
- C. Built-In Combination lock at each locker. Provide ADA Compliant locks at lockers intended to meet ADA guidelines. Provide control key, combination change key and combination control charts.

2.5 FABRICATION

- A. Locker Units:
 - 1. Two tier - 15 inch wide x 15 inch deep x overall 72 inch height plus 4 inch base.
- B. Provide end panels, filler panels, and recess trim to close off all openings.
- C. Finish edges smooth without burrs.
- D. Secure rubber bumpers to door strike.
- E. Attach number plates.

2.6 LOCKER BENCHES

- A. Benches: 1 1/4 x 9 inch wide (Typ) and ADA 20 inch wide where shown on drawings; bench top of hardwood butcher block, corners radiused 1" and edges radiused 3/8", sanded smooth, sealed and varnished with two coats; support brackets as shown, fabricated in accordance with Section 055000.

2.7 FINISHES

- A. Clean, degrease, and neutralize metal; prime or galvanize and finish with baked polyester powder coat.
- B. Finish locker doors and bodies in colors as selected from manufacturer's standard colors.
 - 1. Color:
 - a. Refer to Finish and Color Schedule. (LKR-1)(LKR-2)
- C. Seal concrete. Refer to Section 071910.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify bases and embedded anchors are properly sized.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install lockers plumb and square.

- C. Place and secure on prepared base.
- D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.
- E. Bolt adjoining locker units together to provide rigid installation.
- F. Install end panels, filler panels and recess trim.
- G. Test all combination locks to meet requirements.
- H. Replace components that do not operate smoothly.

3.3 CLEANING

- A. Section 017700 - Closeout Procedures: Cleaning installed work.
- B. Clean locker interiors and exterior surfaces.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal storage shelving units, adjustable type, open configuration.
2. Accessories: As indicated and as required for complete assembly.

1.2 REFERENCES

- #### A. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

1.3 SUBMITTALS

- #### A. Submit under provisions of Section 013300 - Submittal Procedures.
- #### B. Shop Drawings: Indicate shelving plan layout, and configuration. Include schedule for distribution.
- #### C. Product Data: Provide data on types, sizes and accessories.
- #### D. Manufacturer's Installation Instructions: Indicate component installation.
- #### E. Section 017700 - Closeout Procedures: Manual for Materials and Finishes.

1.4 DELIVERY, STORAGE, AND HANDLING

- #### A. Deliver, store, protect and handle products to site under provisions of Section 016000 - Product Requirements.
- #### B. Protect shelving finish from damage.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- #### A. Western Pacific Storage Systems.
- #### B. Lyon Metal Products Inc.
- #### C. Penco Products.
- #### D. Republic Storage Systems.
- #### E. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.2 SYSTEM DESCRIPTION

- #### A. Shelving Units:

1. Width: 36 inches
 2. Depth: 12, 18, and 24 inches as shown on drawings.
 3. Height: 84 inches
 4. Mounting: Free standing, anchored to floor and wall.
 5. Base: Metal base
- B. Seismic Forces: Conform to IBC Chapter 16. Design shelving with seismic braces; anchors, and stiffeners as applicable for Seismic Categories D, E, and F. Include ICC approved anchors.

2.3 MATERIALS

- A. Sheet Steel: ASTM A653/A653M, stretcher leveled; to the following minimum thicknesses:
1. Shelving: 14 gauge frame with 5/8" particle board decking.
 2. Shelf Clips: 12 gauge.
 3. Seismic Foot plate: minimum 14 gauge.

2.4 FABRICATION

- A. Fabricate shelving units to clip together to form an adjustable rigid assembly.
- B. Posts: Offset steel angles, punched at 1½ inches o.c. to receive shelf clips and capable of supporting total specified shelf loading without deflection.
- C. Shelves: Formed and flanged welded corners, 800 lbs. capacity. Designed to be freestanding without sway bracing.
- D. Anchors and Fasteners: As required for a complete and assembled unit; enameled or chrome finish:
1. Wall ties.
 2. Tie plates between units.
 3. Aisle ties (at peninsular units).
- E. Finish edges smooth without burrs.

2.5 FINISHES

- A. Clean, degrease, and neutralize metal; prime and finish with manufacturer's standard baked enamel.
- B. Color: Color as selected from manufacturer's standard range.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install shelving plumb and square.
- C. Bolt adjoining shelving units together to provide rigid installation.
- D. Install seismic foot plate & anchor to floor. Install wall ties for anchoring to wall.
- E. Install accessories.

3.2 CLEANING

- A. Clean work under provisions of 017700 - Closeout Procedures.
- B. Clean shelving surfaces.

3.3 SCHEDULES

- A. Shelving units and depths as indicated on drawings.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes flagpole, mounting and accessories.
- B. Related Sections:
 - 1. Section 033000 - Cast-In-Place Concrete: Concrete footings for flagpoles.
 - 2. Section 079200 - Joint Sealants: Elastomeric sealant filling the top of foundation tube.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM B241 - Standard Specification for Aluminum and Aluminum Alloy Seamless Pipe and Seamless Extruded Tube.
 - 2. ASTM C150 - Standard Specification for Portland cement.
- B. National Association of Architectural Metal Manufacturers:
 - 1. Metal Finishes Manual.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions.
- B. Section 017700 - Closeout Procedures: Manual for Materials and Finishes.

1.4 QUALITY ASSURANCE

- A. Manufacturing Standards: Provide flagpole as a complete unit produced by a single manufacturer, including fittings accessories, bases, and anchorage devices.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Spiral wrap flagpoles with heavy Kraft paper or other protective wrapping and prepare for shipment in hard fiber tube or other protective container.
- B. Deliver flagpoles and accessories completely identified for installation procedure. Handle and store flagpoles to prevent damage or soiling.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Design Criteria: Provide flagpoles and installations constructed to withstand a 90 mph wind velocity minimum when flying flag of appropriate size. Use heavy pipe sizes if required for flagpole type and height shown.

- B. Pole Construction: Construct pole and ship to site in one piece if possible. If more than one piece is necessary, provide snug-fitting, precision joints with self-aligning, internal splicing sleeve arrangement for weather-tight, hairline field joints.

2.2 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Pole-Tech Company, Inc.
- B. Concord American.
- C. Morgan-Francis Co.
- D. Acme/Lingo Flagpoles, LLC.
- E. American Flagpole.
- F. Eder Flag Manufacturing Co, Inc. & Baartol Company, a Division of Eder Flag Mfg. Col. Inc.
- G. Substitutions under provisions of Section 012500.

2.3 FLAGPOLE TYPE

- A. Aluminum Flagpole: Fabricate aluminum flagpoles from seamless extruded tubing complying with ASTM B241, alloy 6063-T6, having a minimum wall thickness of .156 inch, tensile strength not less than 35,000 psi and a yield point of 30,000 psi. Heat-treat and age-harden flagpole after fabrication.
 - 1. Provide cone tapered aluminum flagpole, 30' height above ground.
 - 2. Ability to fly three flags.

2.4 FLAGPOLE MOUNTING

- A. Provide manufacturer's standard base system for the type of flagpole installation required.
- B. Foundation Tube: For ground-set flagpoles, provide 16 gauge minimum galvanized corrugated steel tube, or 12 gauge rolled steel tube, sized to suit flagpole and installation. Furnish complete with welded steel bottom base and support plate, lighting ground spike, and steel centering wedges, all welded construction. Provide loose hardwood wedges at top for plumbing pole after erection. Galvanize steel parts after assembly, including foundation tube.
 - 1. Provide manufacturer's standard flash collar, finished to match flagpole.

2.5 FITTINGS

- A. External Halyard System: Furnish poles with external halyard system consisting of a manually operated, revolving cast aluminum truck. Cast aluminum cleat mounted with machine screws. Provide white polypropylene halyard and all attachments necessary for a complete installation.

- B. Finial Ball: Manufacturer's standard flush seam ball, size to match pole butt diameter.
 - 1. 14 gauge spun aluminum.

2.6 ACCESSORIES

- A. Flags: All-weather.
 - 1. Provide 5' x 8' sewn fabric US flag.
 - 2. Provide 4' x 6' sewn fabric POW/MIA flag.
 - 3. Provide 4' x 6' sewn fabric Washington state flag.

2.7 FINISHES

- A. Aluminum:
 - 1. Pole: Fine, directional, polished satin brush finish per AA M32.
 - 2. Finial Ball: Gold anodized.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Excavation: Excavate for foundation concrete to neat clean lines in undisturbed soil. Provide forms where required due to unstable soil conditions. Remove wood, loose soil, rubbish and other foreign matter from excavation, and moisten earth before placing concrete.
- B. Concrete: Provide concrete composed of Portland cement, coarse aggregate, fine aggregate and water, mixed in proportions to attain 28-day compressive strength of not less than 3,000 psi. Use not less than 5 sacks of Portland cement, complying with ASTM C150, per cubic yard of wet concrete.
- C. Place concrete immediately after mixing. Perform chuting to avoid segregation of mix. Compact concrete in place by use of vibrators to consolidate. Moist-cure exposed concrete for not less than 7 days, or use a non-staining curing compound in freezing weather.
- D. Finish trowel exposed concrete surfaces to smooth, dense surface. Provide positive slope for water runoff to base perimeter.
- E. Flagpole Installation: Install flagpoles as shown and in compliance with final shop drawings and manufacturer's instructions.
- F. Provide positive lightning ground for each flagpole installation.

END OF SECTION

DIVISION 11
EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. The purpose of this section is to describe the commissioning process specific for those sections found in Division 11.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. General Responsibilities: The Contractor's commissioning responsibilities applicable to Food Services are as follows:

1. In each purchase order or subcontract written, include requirements for submittal data, commissioning documentation, O&M data and training.
2. Attend a commissioning kick-off meeting and/or other meetings necessary to facilitate the Commissioning process.
3. Contractors shall assist in clarifying the installation, operation, maintenance, and control of commissioned equipment if requested by the Commissioning Authority, (CA).

- B. COORDINATION

1. Refer to Section 01 91 00 for a listing of all sections where commissioning requirements are found, for systems to be commissioned and for testing requirements.

1.3 SUBMITTALS

- A. General Submittals: Contractor shall provide to the Commissioning Authority, through established channels, normal cut sheets and shop drawing submittals, and recommended manufacturer's installation and start-up checklists for CA approval.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 INSTALLATION

- A. Installation Checklists: The Contractor shall complete the manufacturer's recommended installation and start-up checklist(s).
- B. Provide a copy of these checklists to the CA when complete.

3.2 CLOSEOUT ACTIVITIES

- A. Testing: The Contractor shall complete the manufacturers recommended tests indicated in this Section with the consultant/AHJ present.
 - 1. Food services: Testing of the kitchen equipment will be done prior to training and with the Food Services consultant present.
 - a. Grease Hood: The Kitchen grease hood will be tested with the fire alarm and suppression system and can run concurrent with the Fire Marshall's test if proper notification is given to the Architect, Commissioning Authority, and Owner's Representative.
 - b. Refrigeration: Operate refrigeration equipment over a continuous 5-day (120-hour) period and test for full range of functions. Include Kitchen refrigeration testing on the schedule for BAS Functional Performance Tests.
- B. Training: The Owner personnel shall be trained on procedures related to those areas listed in the Division 11 specifications.

3.3 DOCUMENTS REQUIRED

- A. The General Contractor will provide the following documentation before Final Acceptance:
 - 1. Submittals and manufacture's checklists for kitchen equipment.
 - 2. Completed Inspection Forms with approval signatures of all Authority Having Jurisdiction, including Health Department, Food Service Consultant, and Fire Marshall.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Permanent fall protection system attached to roof(s).
2. Final system design to provide fall protection to individuals performing routine roof maintenance.
3. Training of Owner's maintenance personnel.

B. Related Sections:

1. Section 051200 - Structural Steel Framing.
2. Section 052100 - Steel Joist Framing.
3. Section 053123 - Steel Roof Decking.
4. Section 055000 - Metal Fabrication - Fixed aluminum ladder.
5. Section 075200 - Modified Bituminous Membrane Roofing.
6. Section 076200 - Sheet Metal Flashing.

1.2 REFERENCES

A. American National Standards Institute:

1. ANSI Z359 - Fall Protection Code.

B. American Society for Testing and Materials:

1. ASTM B221 - Standard Specifications for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

C. Occupational and Safety Health Administration:

1. OSHA Rule on Fall Protection in General Industry (29 CFR 1910 Subpart I).
2. OSHA Rule on Safety Standards for Fall Protection in the Construction Industry, (29 CFR 1910 and 1926, Subpart M).

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

1. Note: Review by A/E design engineer is for the sole purpose of verifying that the Contractor's proposed anchor mounting detail does not adversely impact the building primary structure.

- B. Product Data: Submit manufacturer's data for manufactured materials and products showing in sufficient detail that the product complies with the contract requirements.
- C. Shop Drawings: Submit shop drawings showing plan layout and anchorage details, including all components and accessories.
 - 1. Show size, type and locations of each system component; show type and size of anchor bolts.
 - 2. Include structural analysis data.
 - 3. Maintenance Data: Written instructions for maintenance of fall prevention safety devices to be included in the operation and maintenance manual.
 - 4. Shop drawings shall be submitted and approved by the equipment manufacturer's design engineer.
 - 5. Shop drawings shall be submitted to and approved by the roofing manufacturer to verify proposed flashing and counterflashing and to ensure that the required roofing warranty is not compromised by the fall protection system installation.
 - 6. Furnish proof of installer's certification approval by manufacturer.
- D. Closeout Submittals
 - 1. Section 017700 - Closeout Procedures: Maintenance and Operating Manuals.
 - 2. Include the following at time of Project Closeout:
 - a. Submit copies of roof information card which states the maximum service capacity and number of users allowed on the system at any one time; cards shall be mounted at all entry points in weather tight frames.
 - b. Submit manufacturer's data on all components, including part numbers.
 - c. Provide documentation that is consistent with applicable OSHA, ANSI and IWCA standards.
 - d. As-Built Drawings.
 - e. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Single Source: Obtain all materials and equipment required under this Section from a single manufacturer.

- B. Manufacturer's Qualifications: Engage a single firm to assume undivided responsibility for the design and fabrication of all fall protection system components. Firm shall have a minimum of five (5) years documented experience in the fabrication of such components similar to that required for this Project.
- C. Installer's Qualifications: Fall protection system manufacturer or firm authorized, trained and certified by the manufacturer and who offers a regular inspection and maintenance service on such systems.
- D. Design engineer: Employ a firm with a minimum of 10 years' experience designing fall protection systems employing a registered professional engineer, licensed in the project location and experienced in designing fall protection systems, to design all component items to meet the "Structural Performance" requirements, including sizing and spacing of all attachments to the building structure. This engineer shall prepare, stamp and sign all required calculations; this same engineer shall also approve the equipment manufacturer's shop drawings.
- E. OSHA Standards: Comply with Occupational Safety and Health Administration Standards for the Construction Industry 29 CFR 1926.500 Subpart M (Fall Protection), and with applicable State Administrative Code safety standards for Fall Restraint and Fall Arrest.
- F. Testing: Perform quality control tests for each system per manufacturer's requirements.

1.5 COORDINATION AND SCHEDULING

- A. Coordinate with work of Sections 051200 and 052100 for ordering of structural steel and joists.
- B. Coordinate with work of Section 053123 to meet requirements of roof anchor manufacturer.
 - 1. Steel Deck: Minimum 24 gauge, or provided with additional deck reinforcing per manufacturer's instructions.
- C. Coordinate with work of Section 076200 for placement of flashings to ensure water-tight integrity of roof.

1.6 WARRANTY

- A. See Section 017700 for additional warranty requirements.
- B. Correct defective Work within one year period after Date of Substantial Completion.
- C. Provide lifetime manufacturer warranty.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: RoofSafe Anchor, 3M, DBI Sala, 800.328.6146.
https://www.3m.com/3M/en_US/worker-health-safety-us/solutions/fall-protection/

- B. XS Impact Breakaway Anchors System, XS Platforms US, Chico CA 95928, 530.343.1400.
www.xsplatforms.com
- C. Constant Force, Latchways, Houston, TX, 888.250.8357. www.latchways.com
- D. Substitutions: Under the provisions of Section 012500.

2.2 SYSTEM DESCRIPTION

- A. Provide structural fall protection system capable of withstanding loads and stresses within limits and under conditions specified in OSHA and other applicable safety codes.

2.3 SYSTEM DESIGN

- A. Design Responsibility: Engage a registered structural engineer licensed in the project location to complete the design of the fall protection system as specified in this Section to meet the following "Structural Performance" requirements.
 - 1. The trade contractor for Work under this Section is totally responsible for complying with all safety requirements as stated in the above Reference Standards, including all applicable Federal and State regulations.
 - 2. The General Contractor is responsible for reviewing and coordinating secondary steel requirements and roof penetrations.
 - a. Provide fall protection design before submittals for work of Sections 051200 and 052100 have been reviewed.
 - 3. System to be designed in accordance with OSHA regulations and ANSI Z359.6 Standards.
- B. Provide final design, installation, and services required for installation of complete roof top fall protection system. Include anchorage information, roughing in dimensions, templates, and such information required to perform related work needed by work of this Section.
- C. Attachment of anchors that transfer the loads into building structural framing are not accepted.
- D. Structural Performance: Design system to comply with the following fall protection system requirements as demonstrated by calculations prepared by the manufacturer's design engineer and/or the Contractor's structural engineer.
 - 1. Roof anchors, for safety snap connection by individual workers capable of withstanding a 5000 pound load or safety factor of 2 meeting the requirements of OSHA 1926.502(d)(8).
- E. Performance Requirements: System and components tested for resistance of following loads:

1. Comply with current applicable OSHA, ANSI, IWCA and state regulations and standards.
 2. Design fall protection anchors to resist loads imposed by fall protection systems. End anchors should resist a minimum of 5000 lbs. Intermediate anchors should resist the loads imposed by a fall event with a safety factor.
- F. Submit load paths and calculations for review.

2.4 MATERIALS

- A. Steel Plates, Bars: ASTM A36.
- B. Steel Tubing: ASTM A500, cold formed.
- C. Aluminum: ASTM B221.

2.5 COMPONENTS

- A. Roof Anchor/Post consisting of mechanisms necessary to absorb energy when triggered and perform in manner specified without attaching to structural frame of building. 316 Stainless Steel, electropolished.
- B. Base Plate: As recommended by fall prevention device manufacturer.
- C. Attachment hardware: As recommended by fall prevention device manufacturer.

2.6 FABRICATION

- A. Fabricate anchoring devices as recommended by the manufacturer to provide adequate support for intended use. Shop fabricate required anchorage posts using structural steel with material test certificates for full material traceability.
- B. Welding: AWS structural specification D1.1 by certified welders.
 1. If butt welds are used, then surplus welding material is to be ground off to ensure exposed surfaces are smooth. Fillet welds shall not be ground.
- C. Fabricate joints in a manner to discourage water accumulation.

2.7 FINISH

- A. Stainless Steel: Electropolished for corrosion resistance.
- B. Structural Steel: Zinc Galvanized for corrosion resistance.
- C. Aluminum: Anodized.
- D. Aluminum: Powder coated.

2.8 ACCESSORIES

- A. Fasteners: Designed to support a load on the system of 2 times the maximum design load without failure.
- B. Signage: Provide signs and system identification tags.
- C. Flashing and Sealants: Comply with requirements of Division 07.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine all substrates in the field to which equipment items are to be attached. Notify the General Contractor of any conditions detrimental to the proper and timely completion of the work.
- B. Verify conditions comply with structural requirements for proper system performance.
- C. Do not proceed with the installation of any equipment item until such conditions are rectified and corrected in a manner acceptable to the installer.

3.2 PREPARATION

- A. Coordinate location of fall protection equipment indicated to be attached to surface of roofing system, and furnish anchoring devices with templates and diagrams.

3.3 INSTALLATION

- A. Install all equipment items in accordance with approved shop drawings and manufacturer's instructions.
- B. Install all work true, level, tightly fitted, and flush to adjacent surfaces where required for installation.
- C. Where contact is made between dissimilar metals, protect components to prevent corrosion.
- D. Provide on-site inspection by factory trained representative.

3.4 ADJUSTMENT

- A. Verify that all work under this Section has been completed correctly and that all installed items function properly. Adjust items where necessary to ensure satisfactory operation.
- B. Replace damaged or malfunctioning items.

3.5 TESTING AND INSPECTION

- A. Test fall protection system for compliance with the following requirements:
 - 1. Ensure that system components operate as specified.

3.6 TRAINING

- A. After system has been installed, notify Owner's Representative of date and time for manufacturer's factory-authorized service representative to meet with Owner's maintenance personnel to provide instructions in proper operation of the fall protection system. Training session shall be "hands-on" and shall take place at the job site and shall include, but not limited to, the following:
1. Basic knowledge to inspect and oversee the care of the fall protection system.
 2. Anchoring and tie-off techniques to be employed.
 3. Owner is to provide personnel and equipment to record the training, if desired.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Dishwashers.
2. Ranges and Hoods.
3. Clothes Washer and Dryer.
4. Microwave.
5. Standard Size Refrigerators.
6. Under counter Refrigerators.

B. Related Sections:

1. Plumbing requirements are specified in Division 22.
2. Electrical services and connections are specified in Division 26.

1.2 REFERENCES

A. Federal Trade Commission:

1. EnergyGuide.

1.3 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Submit manufacturer's specifications and installation instructions for each type of residential equipment, including data indicating compliance with requirements. Submit operating and maintenance instructions for each item of residential equipment.
- C. Schedule: Submit schedule of residential equipment, using same room designations shown on drawings.
- D. Section 017700 - Closeout Procedures: Operations and Maintenance Manual.

1.4 QUALITY ASSURANCE

- A. Certification Labels: Provide residential equipment which complies with standards and bears certification labels as follows:
 1. Energy Ratings: Provide energy guide labels with energy cost analysis (annual operating costs) and efficiency information as required by Federal Trade Commission.
 2. UL Standards: Provide residential equipment with UL labels.

- B. Uniformity: Provide products of same manufacturer for each type of residential equipment required.
 - 1. To greatest extent possible, provide residential equipment by single manufacturer for entire project.

1.5 DELIVERY AND STORAGE

- A. Deliver and handle equipment under provisions of Section 016000 - Product Requirements.
- B. Deliver products to project site in manufacturer's undamaged protective containers, after spaces to receive them have been fully enclosed.

1.6 WARRANTY

- A. Submit manufacturer's standard written warranty for each item of residential equipment under provisions of Section 017700 - Closeout Procedures.

PART 2 PRODUCTS

2.1 MATERIALS AND FABRICATION

- A. Specified Manufacturers are indicated in the following schedule. Acceptable manufacturers offering equivalent products in addition to those listed are:
 - 1. Whirlpool.
- B. Refer to plans and interior elevations for locations and quantities.

2.2 PRODUCTS

- A. Range: GE JS660SLSS
 - 1. 30" slide - in range with Storage Drawer.
 - 2. ADA Compliant.
 - 3. Total Capacity 5.3 Cu Ft.
 - 4. Cooktop Surface: Black Ceramic Glass.
 - 5. Oven Cleaning Type: Self - Clean.
 - 6. Dimensions (WxHxD): 29 7/8 x 37 1/4 x 28 1/4 inch.
- B. Range Hood: GE Profile Series # JVX5305SJSS
 - 1. 30" wide vented hood.
 - 2. Energy Star Qualified.
 - 3. Approximate Dimensions (WxHxD): 29 7/8 x 5 1/2 x 20 inch.

4. 2 speed, 270 CFM venting system.
- C. Dishwasher: GE Built-In Dishwasher #GDT225SSLSS
1. Energy Star Qualified.
 2. ADA Compliant.
 3. Dimensions: 23 3/4 (W) x 32 1/4 (H) x 23 1/2 (D) inch.
 4. Calrod HeaterWatts: 1100 max.
 5. Current: 8.9 A.
 6. Volts: 120.
 7. 51 dBA.
- D. Refrigerator: GE Energy Star #GTE18ISHSS
1. Energy Star Qualified.
 2. ADA Compliant.
 3. Dimensions: 29 1/2 (W) x 66 5/8 (H) x 34 1/2 (D) inch.
 4. Total Capacity: 18.2 cu ft.
 5. 120v; 60Hz; 15 A.
- E. Undercounter Refrigerator: Haier HC46SF10SV
1. Dimensions: 20 1/4 (W) x 32 1/8 (H) x 22 1/4 (D) inch.
 2. Total Capacity: 4.5 cu ft.
 3. Recessed Handle.
 4. 115V/60Hz.
- F. Microwave: GE Profile Series # PES7227SLSS (CFCI)
1. ADA Compliant.
 2. Total Capacity: 2.2 cu ft.
 3. Dimensions: 24 (W) x 13 1/2 (H) x 18 1/2 (D) inch.
 4. 1100 watts.
 5. Control Type: Electronic Touch.
- G. Washer Dryer Combination: GE Unitized Spacemaker #GUD27EESNWW

1. Energy Star Qualified.
 2. Dimensions: 26 3/4 (W) x 75 7/8 (H) x 30 7/8 (D) inch.
 3. Washer Capacity: 3.9 cu ft.
 4. Dryer Capacity: 5.9 cu ft.
 5. Wash Basket Type: Stainless Steel.
- H. Washer: GE GFW430SSMWW
1. Energy Star Qualified.
 2. ADA Compliant
 3. Approximate Dimensions: 27 x 39 3/4 x 33 1/2 in (W xH x D)
 4. Total Capacity: 4.5 cu ft.
- I. Dryer: GE GFD43ESSMWW
1. Energy Star Qualified.
 2. ADA Compliant
 3. Approximate Dimensions: 27 x 39 3/8 x 33 in (W xH x D)
 4. Total Capacity: 7.5 cu ft.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's instructions and recommendations.
- B. Built-In Equipment: Securely anchor units to supporting cabinetry or countertops and concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate for proper operation of equipment.
- D. Utilities: Refer to Division 22 and 26 for plumbing and electrical requirements.

3.2 ADJUST AND CLEAN

- A. Testing: Test each item or residential equipment to verify proper operation. Make necessary adjustments.
- B. Accessories: Verify that accessory items required have been furnished.

- C. Cleaning: Remove packing material from residential equipment items and leave units in clean condition, ready for operation.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES: FOOD SERVICE EQUIPMENT

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 0 and Division 1 Specification Sections, apply to this Section.

1.2 RELATED WORK:

- A. Rough-ins and Final Connections: Service lines from rough-in to point of final connections are provided by plumbing and electrical contractors.
- B. Electrical: Wiring, conduit, fuses, breakers, final disconnects, junction boxes, and other required electrical apparatus not built-in or mounted on equipment are provided by electrical contractor.
- C. Plumbing: Controls, regulators, valves, stops, traps, strainers, checks, grease traps, and fittings not mounted on/in equipment are provided by plumbing contractor.
- D. Mechanical: Ductwork from above finished ceiling to building exhaust and supply fans, flue pipes, exhaust and supply fans for hoods, room ventilation, and air supply blowers are provided by mechanical contractor.
- E. Miscellaneous:
 - 1. Provides backing plates or blocking in wall or ceiling partitions.
 - 2. Provides fittings secured to structural ceiling to accommodate hangers.
 - 3. Provides the forming of architectural enclosures, floor, wall openings or recesses for equipment.
 - 4. Caulks and seals Cold Storage Room floor sections to building floor.
 - 5. Finishes floors (masonry or poured-in-place) in cold storage rooms, concrete curbs and pads.

1.3 SYSTEM DESCRIPTION

- A. Delegated Design: Design canopy hoods with fire protection system, walk-in cold storage rooms, and seismic restraint of equipment using performance requirements and design criteria indicated, including comprehensive engineering analysis by a qualified professional engineer licensed by the State.
- B. Fabricated Equipment: Constructed to configuration, dimension, detail, and design as shown with materials and workmanship as specified.
- C. Manufactured Equipment: Mass produced and referenced by manufacturer's name and model number.

- D. Each model number includes the code *H011 as a suffix. This code is known as the Specified Identification System. It is not to be removed by the bidders. Its purpose is to identify the Food Service Consultant to the vendors providing equipment in the event it is necessary to communicate questions, clarifications, and comments, from prior to bid award through the final purchase. It is to be used on all correspondence, including fax and e-mail, when communicating with manufacturer representatives and factories.

1.4 DEFINITIONS

- A. Furnish - Supply and deliver to Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- B. Install (set in place) - Work at Project Site, including actual unloading, unpacking, assembly, erecting, rigging, placing, anchoring, applying, finishing, curing, protecting, cleaning, and similar operations, ready for final utility connections by other Sections as appropriate.
- C. Coordinate – Relay required information requested by other trades to ensure they are able to correctly perform their work related to the food service or laundry equipment installation.
- D. Provide - Furnish and install complete, ready for intended use.
- E. Contractor - All references to the Contractor in this Section 114000 shall refer to the Contractor. Reference to any other Contractor shall be specific, such as General Contractor, Plumbing Contractor, Electrical Contractor, Architect, designated, etc.

1.5 LAWS, ORDINANCES AND STANDARDS

- A. STANDARDS: Except as otherwise indicated, comply with the following standards as applicable to the manufacture, fabrication, and installation of the work of this Section:
 - 1. Air Conditioning and Refrigeration Institute (ARI): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration system(s), components, and installation.
 - 2. American Gas Association (AGA): Comply with AGA standards for gas heated equipment and provide equipment with the AGA seal. Automatic safety pilots shall be provided on all equipment, where available. (Canadian Gas Association or alternate testing lab's seals may be accepted if acceptable to local code jurisdictions.)
 - 3. American National Standards Institute (ANSI): Comply with ANSI Z21-Series standards for gas-burning equipment and provide labels indicating name of testing agency.
 - 4. American National Standards Institute (ANSI): Comply with ANSI B57.1 for compressed gas cylinder connections and with applicable standards of the Compressed Gas Association for compressed gas piping.
 - 5. American National Standards Institute (ANSI): Comply with ANSI A40.4 and A40.6 for water connection air gaps and vacuum breakers.
 - 6. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE): Comply with the applicable regulations and the latest edition of standards for remote refrigeration system(s), components, and installation.
 - 7. American Society of Mechanical Engineers (ASME): Comply with ASME Boiler Code requirements for steam generating and steam heated equipment and provide ASME inspection, stamp, and registration with National Board.

8. American Society for Testing and Materials (ASTM): Comply with ASTM C1036 for flat glass.
9. American Society for Testing and Materials (ASTM): Comply with ASTM C1048 for heat-treated flat glass – Kind HS, Kind FT coated and uncoated glass.
10. American Welding Society (AWS): Comply with AWS D1.1 structural welding code.
11. National Electric Code (NEC): Comply with NFPA Volume 5 for electrical wiring and devices included with food service equipment, ANSI C2 and C73, and applicable NEMA and NECA standards.
12. National Electrical Manufacturers Association (NEMA): Comply with NEMA LD3 for high-pressure decorative laminates.
13. National Fire Protection Association (NFPA): Comply with the applicable sections of the NFPA for exhaust hood, ventilators, duct and fan materials, hoods fire suppression systems, construction and installation, as well as local codes and standards.
14. National Sanitation Foundation (NSF): Comply with the latest Standards and Revisions established by NSF for equipment and installation. Provide NSF Seal of Approval on each applicable manufactured item and on items of custom fabricated work. (UL Sanitation approval and seal may be accepted if acceptable to local code jurisdictions.)
15. Sheet Metal and Air Conditioning National Association (SMACNA): Comply with the latest edition of SMACNA guidelines for seismic restraint of kitchen equipment and applicable local regulatory agencies requirements.
16. Underwriters Laboratories (UL): Provide either UL labeled products for electrical components and assemblies or, where no labeling service is available, "recognized markings" to indicate listing in the UL "Recognized Component Index". (Canadian Standards Association or alternate testing lab's seals may be accepted if acceptable to local code jurisdictions.)
17. UL 300 Standard: Wet chemical fire suppression systems for exhaust hoods/ventilators shall comply with these requirements.
18. American with Disabilities Act (ADA): Comply with requirements as applicable to this Project.
19. Refrigeration Service Engineers Society (RSES): Comply with the applicable regulations, the latest edition of standards for remote refrigeration system(s), components and installation, and the 1995 requirements of the Montreal Protocol Agreement.
20. All refrigerants used for any purpose shall comply with the 1995 requirements of the Montreal Protocol Agreement and subsequent revisions and amendments. No CFC refrigerants shall be allowed on this Project.
21. All refrigeration components installation, repairs, and/or associated work on any refrigeration system, self-contained or remote, shall be performed by a Certified Refrigeration Mechanic.
22. Comply with all applicable local codes, standards and regulations, and any special local conditions (example only: City of Los Angeles Testing Lab requirements or seismic standards compliance).
23. Jails, prisons, and all detention facilities shall comply with Correctional Standards as applicable to the specific Project. Verify the level of security and construction required with the Project Architect and provide all items in compliance. As a minimum, no part or component of any item provided shall be easily removable and used as a weapon.
24. Subway grating installed in floor drain troughs must meet IBC 1104.3.1 standards for maximum opening sizes in grates.
25. Confirm all drawings, specifications, and project documentation meet all federal, state, and local codes and regulations.

1.6 CONTRACTOR QUALIFICATIONS

- A. In addition to requirements of Related Sections 1.02, submit evidence of compliance with the following qualifications and conditions:
1. Five (5) years minimum continuous operation under the same company name and ownership.
 2. Evidence of Company's financial stability and financial ability to complete this Project without endangering that stability.
 3. List a minimum of comparable size and scope projects completed in the last five (5) years with Owner's contact name and telephone number.
 4. Have manufacturer's authorization to purchase, distribute, and install all items specified with this Project.
 5. Maintain a staff or have access to personnel with a minimum of five (5) years experience in the installation of comparable size and scope projects, and meeting NSF standards and requirements. (UL Sanitation standards and requirements may be accepted if acceptable to local code jurisdictions.)
 6. Maintain or have access to a fabrication shop meeting NSF standards and labeling requirements. (UL Sanitation approval and seal may be accepted if acceptable to local code jurisdictions.) If other than the Contractor's own fabrication shop, they shall have five (5) years minimum experience in the fabrication of comparable size, scope, and level of quality projects. The Contractor shall submit their company name and credentials to the Architect, who shall have the right of approval or disapproval
 7. Maintain a staff or have access to personnel experienced in the preparation of professional style shop drawings and submittals.
 8. Maintain or have access to manufacturer's authorized service personnel together with readily available stock of repair and replacement parts.
 9. Any sub-Contractor employed by Contractor for this Project shall comply with the same qualification requirements.

1.7 SUBSTITUTIONS

- A. Refer to Division 1 for Substitution Request requirements.

1.8 APPROVED SUBSTITUTIONS AND/OR LISTED ALTERNATES

- A. Substitutions approved as noted in article 1.07 and/or any Listed Alternate Manufacturers listed in these Itemized Specifications or added by Addendum may be utilized in lieu of the primary specified manufacturer with the following conditions and understanding:
1. The Project Documents are designed and engineered using the primary specified manufacturer and model. The Contractor shall assume total responsibility for any deviations required due to the utilization of a substitution/alternate manufacturer or model including, but not limited to, fitting alternates into the available space, providing directions for required changes, and assuming any and all associated costs for utility, building, food service design, architectural, or engineering changes directly or indirectly related to the substitution.

2. The Contractor shall be responsible for supplying the model, which is equal to the primary specified model in regards to general function, features, options, sizes, accessories, utility requirements, finish, operation, and listing approvals. If the Owner or their appointed representative determines at any time during the construction and installation, prior to the final acceptance of the Project, that the substitution/alternate model submitted is not equal to the primary specified model, the Contractor shall assume all associated cost and implications required to replace the model submitted with the correct model.
3. The bid proposal shall clearly state any substitutions/alternates which will be utilized, including the manufacturer and model number. The proposal shall also include a data sheet for each substitution/alternate with any and all deviations between the primary specified manufacturer and the substitution/alternate manufacturer itemized and listed on the data sheet. The manufacturers' cut sheets are not acceptable as a substitute for the data sheet. Complex alternates, such as utility distribution systems, exhaust hoods, ventilators, etc., shall include a shop drawing specific to the Project.
4. Inclusion of an alternate manufacturer in the Itemized Specifications is not intended to indicate that there is an equal alternate unit to match every primary specified unit. It shall be the responsibility of the Contractor to insure that the alternate unit submitted matches the primary specified unit and meets the other conditions, as stated above.
5. Manufacturers not approved as substitutions or listed as a Listed Alternate will not be permitted unless submitted for prior approval, as described above and in the General and Supplementary Conditions and applicable Division-1 Specifications Sections.
6. Submittal of a substitution/alternate manufacturer or model shall indicate agreement to the above stated conditions. Solely at the Owner's discretion, failure to comply with any of these conditions or to supply complete and correct data information shall result in the Contractor being required to provide the primary specified manufacturer at no additional cost to the Owner or to adjust the Contract cost.

1.9 DISCREPANCIES

- A. Where discrepancies are discovered between the drawings and the specifications regarding quality or quantity, the higher quality or the greater quantity shall be included in the Bid Proposal. The Contractor shall notify the Architect, in writing, of any discrepancies discovered and await clarification prior to proceeding with the items or areas in question.

1.10 SUBMITTALS

- A. The Contractor shall review all submittals for basic compliance with the Contract Documents and correct as required prior to submitting to the Design Team (Architects/Engineers/Consultants/Owner) for review. Failure to comply with this requirement, the submission of submittal(s) which are significantly inconsistent with the Contract Documents, or inconsistencies that are discovered during review by a Design Team member shall be justification for reimbursement by the Contractor to the Design Team member's company for the "lost" time or for the time required for a second review.
- B. Rough-In Drawings:
 1. Submit electronic PDF file for approval. After approval, reproduce and supply the required number of distribution prints for record and construction purposes.

2. Submit 1/4 inch (1:50) scale rough-in drawings for approval. These drawings shall be dimensioned from grid lines showing location of ducts, stubs, floor and wall sleeves for ventilation, plumbing, steam, electrical, refrigeration lines, beverage lines, concrete base and curb dimensions as required for equipment so supported.
 3. Site-verify mechanical, electrical and ventilating rough-in and sleeve locations.
 4. The Contractor shall be responsible for the accuracy of the information on their submittals.
 5. In the event rough-ins have been accomplished before the award of this contract, the Contractor shall check the existing facility and make adjustments to their equipment to suit building conditions and utilities, where possible. If not possible, the Contractor shall so state in a letter to the Owner and Architect with reasons and an alternate method and pricing.
- C. Shop Drawings:
1. Submit electronic PDF file for approval. After approval, reproduce and supply the required number of distribution prints for record and construction purposes.
 2. Submit shop drawings for items of custom fabrication included in this contract. Shop drawings shall be submitted at 3/4 inch (1:20) and/or 1-1/2 inch (1:10) scale and shall show dimensions, materials, details of construction, features and options, installation and relation of adjoining work requiring cutting or close fitting. Shop drawings shall also indicate reinforcements, anchorage and related work required for the complete installation of fixtures.
 3. Before proceeding with the fabrication of any item, the Contractor shall be responsible for verifying and coordinating all dimensions and details with site dimensions and conditions.
- D. Product Data Submittal Manuals:
1. Submit electronic PDF file of Product Data Submittal Manuals with a cover sheet and detailed information on every item included in this Section for approval. Detailed information shall include, but not be limited to, item number, description, quantity, model numbers, options and accessories provided, exact utility requirements, manufacturer's cut-sheets, reference to specific shop drawings, etc. Distribute one additional copy of installation and start-up instructions to the Installer. Mark each data sheet with the applicable project equipment item number. Each data sheet shall include NEMA plug and receptacle configuration for applicable items, where applicable. Every cover sheet and associated detailed submittal shall provide sufficient and complete information to verify that the Contractor is providing each item in compliance with the Contract documents.
 2. Architect review of drawings, shop details, product data brochures, and service and parts manuals is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract documents or departures there from. The Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of assembly, and for performing their work in a safe, satisfactory, and professional manner.

1.11 OPERATION AND MAINTENANCE DATA MANUALS

- A. Operation and Maintenance Manuals (Service and Parts Manuals): Three (3) bound sets of manuals shall be furnished for items of standard manufacture on/or before the date of the first event to occur of the following: demo/start-up, start-up for intended use by the Owner/Operator, completion of installation of kitchen equipment contract package, or final acceptance of installation by Owner. Manuals shall be in alphabetical order according to manufacturer, including item numbers and utility options provided for the equipment installed.
 - 1. Installing company's name, address, telephone number, and date of completed installation.
 - 2. Serial numbers of principal pieces of equipment.
 - 3. Part numbers of all replaceable items.
 - 4. Lubrication data and belt sizes.
 - 5. Electrical characteristics including data for motors and heaters.
- B. Service Agency List: Submit a complete list of local service agencies with the service and parts manuals for included manufacturers, complete with telephone numbers for all buy-out equipment installed.
- C. Provide video tapes for maintenance, training, operation, etc. where available from the manufacturer.

1.12 AS-BUILT/ RECORD DOCUMENTS

- A. Maintain one record set of Food service Equipment Plans with any related corrections, revisions, additions, deletions, changes, etc. noted during construction and installation. Provide an "as-built" set in reproducible transparency form and electronic computer disk form.
- B. Provide one (1) final set of Product Data Submittal Manuals with any related corrections, revisions, additions, deletions, changes, etc. noted during construction and installation as a specifications record set.
- C. These documents shall be provided on/or before the date of the first event to occur of the following: demo/start-up, start-up for intended use by the Owner/Operator, completion of installation of kitchen equipment contract package, or final acceptance of installation by Owner.
- D. Provide two (2) final complete set of Submittals to be retained by Architect as a Record Set.

1.13 SCHEDULE

- A. General: Time is of the essence in this agreement. Acceptance constitutes a guarantee that the Contractor can and will obtain materials, equipment, and manpower to permit overall completion of the entire building project on schedule upon notice to proceed. The Contractor shall coordinate their work with the progress schedule, as prepared and updated periodically by the General Contractor or Construction Manager.

- B. The Contractor shall notify the Food Service Consultant and the Architect in writing of anticipated delays not within the realm of control of the Contractor immediately upon the Contractor's realization that delays are imminent.
- C. The Contractor will not be granted relief for failure to meet schedules or failure of manufacturers to meet promised delivery dates unless the Contractor can establish, in writing, that orders were received by the manufacturer with reasonable lead times.
- D. The Contractor shall pay extra charges resulting from special handling or air shipment in order to meet the schedule if insufficient time was allowed in placing factory orders.

1.14 PRODUCT HANDLING

- A. Delivery of Materials: Deliver materials (except bulk materials) in manufacturer's containers fully identified with manufacturer's name, trade name, type, class, grade, size, color, power requirement, if any, and item number.
- B. Storage of Materials, Equipment and Fixtures: Contractor is responsible for receiving and warehousing of equipment and fixtures until ready for installation. The Contractor will store materials, equipment, and fixtures in sealed containers. They shall be stored off the ground and under cover, protected from damage.
- C. Handling Materials and Equipment: The Contractor will verify and coordinate conditions at the building site, particularly door and/or wall openings and passages to assure access for all equipment. Pieces too bulky for existing facilities shall be hoisted or otherwise handled with apparatus as required. All special handling equipment charges shall be arranged for and paid for by the Contractor.

1.15 PRODUCT PROTECTION

- A. The Contractor is responsible to protect their equipment against theft or damage during the progress of the project until final acceptance by the Owner. Items delivered to the job site at the Owner's or Contract Manager's request before the site is ready for installation should be signed for as approved by the Owner or Contract Manager.
- B. The Contractor will use all reasonable means to protect the materials of this Section before, during, and after installation and to protect the associated work and materials of the other trades.
- C. Pre-fabricated walk-in boxes, on-site and installed in advance of the rest of the equipment are not to be used for general storage by other trades and should be locked before leaving the site. Damage and theft resulting from the failure to secure boxes shall be repaired or replaced at the Contractor's own expense. The Contractor shall be available, as needed, to open and secure walk-in boxes for the other trades to perform their work related to these walk-in boxes, within the other trades' schedules as not to delay their work.
- D. Contractor will verify if the flooring is to be acid washed. In the event of this type of cleansing, any equipment constructed of stainless steel shall not be delivered until a minimum of 24 hours after the final cleansing is completed.

1.16 WARRANTY

- A. Work shall be guaranteed against defects for one (1) year from the date of operation of the equipment. The Contractor will provide a written warranty of each component to include work in this Section to cover all testing and re-testing as may become necessary for one year past the Contract final acceptance date. Any equipment, system, or element failing to perform as directed in this Section shall be repaired or replaced at no cost to the Owner (including labor and transportation), excluding replacement cost of damaged components or work caused by misuse of the equipment.
- B. Additional Warranty: Refrigeration systems shall include a start-up and one-year service and maintenance contract in addition to the regular one-year warranty as stated above, plus an additional four-year warranty on sealed portions of condensing units, including refrigerant lost. This shall include all refrigerators, ice cream makers and cabinets, ice makers, freezers, dispensers, walk-in coolers/freezers compressors, and/or any other items with refrigeration system(s).

PART 2 PRODUCTS

2.1 EQUIPMENT

- A. Equipment schedule: Refer to schedule on Food service Drawings and Part 2 Itemized Specifications for equipment included in this Section.

2.2 MATERIALS

- A. Metals:
 - 1. Stainless Steel: AISI Type 302/304, hardest workable temper, and No.4 directional polish. Standard gauges are noted in these specifications under Heading 2.04; Section B.1.
 - 2. Galvanized Steel Sheet: ASTM A526, except ASTM A527 for extensive forming; ASTM A525, G90 zinc coating, chemical treatment.

Note: Where painted finish is indicated, provide mill phosphatized treatment in lieu of chemical treatment.

- 3. Steel Sheet: ASTM A569 hot-rolled carbon steel.
 - 4. Galvanized Steel Pipe: ASTM A53 or ASTM A120, welded or seamless, schedule 40, galvanized.
 - 5. Steel Structural Members: Hot rolled or cold formed, carbon steel unless stainless steel is indicated.

Note: Galvanized Finish (G.I.): ASTM A123 hot-dipped zinc coating, applied after fabrication.

- 6. Aluminum: ASTM B209B221 sheet, plate and extrusions (as indicated), alloy, temper and finish as determined by manufacture / fabricator, except 0.40-mil natural anodized finish on exposed work unless another finish is indicated.
- B. Plastic Laminate: NEMA LD3, Type 2, 0.050" thick, except Type 3, 0.042" for post-forming smooth (non-textured). Color and texture as selected by the Architect/Interior Designer.

1. Comply with NSF Standard No. 35.
 2. Veneered with approved waterproof and heat proof cement. Rubber base adhesives are not acceptable.
 3. Applied directly over close grained plywood, such as solid Mahogany or solid Birch, of selected, smooth, sanded stock to ensure a smooth ripple-free laminated surface; or commercial grade furniture particle board, Cortron or equal.
 4. If specified plywood or particle board is unavailable, submit specifications and sample of alternate material for approval. If specified for a "wet" area, only marine grade wood products will be approved for these areas.
 5. Exposed faces and edges shall be faced with 1/16 inch (1.6mm) thick material. Cover corresponding backs with approved backing and balancing sheet material. No unfinished exposed plywood/particle board will be acceptable.
- C. Hardwood Work Surfaces: Laminated edge grained hard maple (*Acer saccharum*), NHLA First Grade with knots, holes and other blemishes culled out, kiln dried at 8 percent or less moisture, waterproof glue, machined, sanded, and finished with NSF approved oil-sealer.
- D. Solid Surface Material (SSM): Unless otherwise specified, provide 1/2" thick 100% homogeneous filled acrylic material meeting ANSI Z124.6 Type 6, as manufactured by DuPont Company and known as Corian. Color(s) and pattern(s) as selected by the Architect/Interior Designer.
1. Comply with NSF Standard No. 51.
 2. Acrylic adhesive shall be used for all joints.
 3. Install directly over 3/4" thick (minimum) substrate of close grained plywood, such as solid Mahogany or solid Birch, of selected, smooth, sanded stock to ensure a smooth ripple-free surface or a commercial grade furniture particle board, Cortron or equal. Provide additional bracing and support as required by the SSM manufacturer.
 4. Fabrication shall be by a fabricator trained by DuPont factory authorized training personnel and Certified as a Commercial Corian Fabricator.
 5. Installation shall be by an installer trained by DuPont factory authorized training personnel and Certified as a Commercial Corian Installer.
 6. All fabrication and installation of Corian and all components attached to or installed in or through Corian shall be in compliance with manufacturer's instructions and the DuPont Corian Food Service Guidelines and Design Manual. Of particular concern are the sections, details, and instructions on the installation of drop-in or built-in hot or cold components.
 7. All other Solid Surface Material (SSM), which may be specified by others to be used in food service areas, must comply with NSF certification and ANSI Standard No. 51.
- E. Insulation:
1. For low temperature applications, such as ice bins, cold pans, or fabricated under counter freezers, use urethane, rigid board foam or foamed-in-place, not less than 2 inches (50mm) thick, except that vertical surfaces of cold pans and ice bins may be 1 inch (25mm) thick. Insulation shall be bonded at joints to prevent condensation on exterior.
 2. For refrigerated applications, such as fabricated undercounter refrigerators, use urethane rigid board foam or foamed-in-place, or Styrofoam rigid board foam 2 inches (50mm) thick, bonded at joints.
 3. For heated type applications, such as plate warmers, use block type rock wool, minimum 1 inch (25mm) thick.

4. At counter tops, subject to heat from cooking equipment and refrigeration compressors, use 1 inch (25mm) thick B&Z Products (1-800-999-0890) Marinite I, or equal, to insulate underside of top.
 5. Marinite material shall be added between freezer or refrigerator and 14 gauge (2.0) stainless steel top.
 6. All insulation shall be fully encased or enclosed.
- F. Joint Materials:
1. Sealants: 1-part or 2-part, polyurethane or silicone based, liquid elastomeric sealant, non-solvent release type, Shore A hardness of 30, except 45 if subject to traffic. Sealants shall be NSF Listed for use in food zones. Installation shall comply with applicable requirements of NSF Standards.
 2. Backer Rod: 3/8 inch or larger joints shall be polyurethane rod stock, larger than joint width.
 3. Gaskets: Solid or hollow (but not cellular) neoprene or polyvinyl chloride, light grey, minimum of 40 Shore A hardness, self-adhesive or prepared for either adhesive application or mechanical anchorage.
- G. Paint and Coatings:
1. Provide the types of painting and coating materials which, after drying or curing, are suitable for use in conjunction with food service, durable, non-toxic, non-dusting, non-flaking, mildew resistant, and comply with governing regulations for food service.
 2. Galvanize Repair Paint: MIL-P-21035.
 3. Sound Deadener: NSF listed sound deaden material such as latex sound deadener for internal surfaces of metal work and underside of metal counters and tables between work top and underbracing.
 4. Pretreatment: SSPC-PT2 or PT3, of FS TT-C490.
 5. Primer Coating for Metal: FS TT-P-86, type suitable for baking, where indicated.
 6. Enamel for Metal: Synthetic type, FA TT-P-491, type suitable for baking, where indicated.

2.3 FABRICATED PRODUCTS

- A. Hardware:
1. General: Manufacturer's standard, but not less than ANSI 156.9 Type 2 (Institutional), satin finish stainless steel or dull chrome finish on brass, bronze, or steel.
 2. Hinged Door Hardware: Hinged doors shall be mounted with heavy duty NSF approved hinges with Component Hardware Group, Model No. P62-1010 pulls, or equal. Catches shall be heavy-duty magnetic type, except as otherwise indicated.
 3. Drawer Hardware: Slides to be 200 pounds minimum capacity per pair, 300 series stainless steel, full extension, side-mounting, self-closing type, with stainless steel ball bearings and positive stops, Component Hardware Group Series S52, or equal. Pulls shall be Component Hardware Group, Model No. P62-1 012, or equal.
 4. Sliding Door Hardware: Sliding doors shall be mounted on large, quiet ball bearing rollers in 14-gauge (2.0mm) stainless steel overhead tracks, and be removable without the use of tools. Bottom of cabinet shall have stainless steel guide-pins and not channel tracks for doors.
 5. All hardware shall be identified with manufacturer's name and number so that broken or worn parts may be replaced.

B. Casters:

1. Type and size as recommended by caster manufacturer, NSF approved for the type and weight of equipment supported, but not less than 5 inch (127mm) diameter heavy-duty, ball bearing, solid or disc wheel with non-marking grease proof rubber, neoprene or polyurethane tire, unless otherwise specified. Minimum width of tread shall be 1-3/16 inch (30mm). Minimum capacity per caster shall be 250 pound (113.4kg), unless otherwise noted in itemized specifications.
2. Provide solid material wheels with stainless steel rotating wheel guard.
3. To be sanitary, provide sealed wheel and swivel bearings and polished plated finish per NSF.
4. Unless otherwise indicated, equip each item with two (2) swivel-type casters and two (2) fixed casters. Provide foot brakes on two (2) casters on opposite front corners of equipment.
5. Unless equipment item is equipped with another form of all-around protective bumper, provide circular rotating bumper above each caster, 5 inch (127mm) diameter tire of light grey synthetic rubber (hollow or closed-cell) on cadmium-plated disc.

C. Plumbing Fittings, Trim and Accessories:

1. General: Where exposed or semi-exposed, provide bright chrome plated brass or polished stainless steel units. Provide copper or brass where not exposed.
2. Vacuum Breakers: Provide with food service equipment as listed in the itemized specifications.
3. Water Outlets: At sinks and at other locations where water is supplied (by manual, automatic or remote control), furnish commercial quality faucets, valves, dispensers or fill devices of the type and size indicated and as required to operate as indicated.
4. Waste Fittings: Except as otherwise indicated, furnish 2 inch (50mm) remote-lever waste valve and 3-1/2 inch (89mm) strainer basket.

D. Electrical Materials:

1. General: Provide standard materials, devices and components as recommended by the manufacturer or fabricator, selected and installed in accordance with NEMA standards and recommendations and as required for safe and efficient use and operation of the food service equipment without objectionable noise, vibration and sanitation problems.
2. Before ordering equipment, confirm pertinent electrical requirements with the serving electrical utility, such as actual voltages available, number of phases and number of wires in the system.
3. Wire electrical work for fabricated equipment completely to a junction or pull box which is wholly accessible and mounted on the equipment. Wiring shall be labeled for outlet or item served. Verify local requirements for UL Listing on complete assembly, and provide if required.
4. Components shall bear the UL label or be approved by the prevailing authority.
5. Provide Custom fabricated refrigerator units with vapor tight light receptacles, shatterproof lamps and automatic switches. Conceal wiring.
6. Controls and Signals: Provide recognized commercial grade signals, on-off push buttons or switches, and other speed and temperature controls as required for operation, complete with pilot lights and permanent signs and graphics to assist the user of each item. Provide stainless steel cover plates at control and signal electrical boxes. Locate controls and switches out of heat zones, in easily accessible locations that preclude accidental contact by employees.

7. Internal Wiring of Fixtures and Equipment:
 - a. The Contractor shall be responsible for internal wiring of electrical devices built into or forming an integral part of fabricated equipment items. Wiring will be in metal conduit, connected to an accessible pull-box or j-box, and tagged for intended use. Refer to Section 26 Specifications for color coding of wiring.
 - b. Each standard item shipped in sections shall be properly connected internally and verified by the Contractor.
 - c. Furnish dish washers and conveyors internally wired to junction box or distribution panel as specified, including push button switches, motors, immersion heaters, solenoids, etc.
 - d. Where light fixtures are specified or detailed as part of counters, furnish and install cases or fixtures, light fixtures, lamps and shields. Provide warm white lamps unless otherwise specified. If fluorescent light fixtures are specified, provide ballasts and include shields. Provide shields for all light fixtures.
 - e. Wiring for built-in strip heaters or immersion-type elements shall be provided as follows:
 - 1) In heat zone: shall have UL approved insulation and be not less than 300-volt rated heat resistant insulation with nickel wire.
 - 2) Connection wiring extended in raceway or conduit to junction or pull box shall be not less than 600 volt rated heat resistant insulation covered wire, UL approved, or equal.
 - f. Wiring for fabricated refrigerator and freezer cabinets shall be UL approved insulated cable from exterior junction box to internal components, within insulation unless code requires metallic conduit:
 - 1) Conduit shall be Electrical Metallic Tubing, rigid or flexible (Greenfield). For freezer applications, Seal-Tite Flex or approved equal shall be used.
 - 2) Internal wiring shall be UL approved rubber covered 600 volt rated conductor, except door heaters, which shall be Nichrome wire with silicone braided jacket, having resistance of 10.4 watts per lineal foot.
 - 3) Mount convenience outlets, lighting receptacles, (rubber or porcelain) and door switches in approved boxes. Convenience outlets for evaporators shall be twist lock type. Solid connections, as for freezer evaporators, shall be made vapor tight.
 - g. Exposed flexible steel conduit on kitchen equipment shall be neoprene jacketed Seal-Tite conduit equal to Anaconda type "UA". UL approved, complete with approved liquid tight connectors on each end, and designed to provide electrical grounding continuity.
 - h. Exposed electrical conduit used in kitchen wet area applications, except for flexible connections, shall be rigid galvanized steel. Thin wall conduit (EMT) shall not be permitted for wet areas. Exposed outlet boxes shall be liquid tight type, with threaded hubs.
8. Convenience and Power Outlets:
 - a. Make cutouts and install appropriate boxes or outlets in fabricated fixtures, complete with wiring, conduit, outlet and stainless steel cover plate.
 - b. Outlets and plugs shall conform to NEMA standards.
 - c. Electrical outlets and devices shall be first quality "Specification Grade".
 - d. Furnish GFCI outlets where adjacent to sink compartments, as per the National Electrical Code.
9. Plugs and Cords: Where cords and plugs are provided, they shall comply with National Electrical Manufacturer's Association (NEMA) requirements. Indicate NEMA configuration for each applicable item.

10. Heating Equipment:
 - a. Install electric and heating equipment as to be readily cleanable or removable for cleaning.
 - b. Steam heated custom fabricated equipment shall be a self-contained assembly, complete with control valves located in an accessible position.
11. Motors: Totally enclosed type, except drip-proof type where not exposed to a dust or moisture condition; ball bearings, except sleeve bearings on small timing motors; windings impregnated to resist moisture; horse-power and duty-cycle ratings as required for the service indicated.
12. Power Characteristics: Refer to Division 26 specifications for project power characteristics. Also, refer to individual equipment requirements, for loads and ratings.

2.4 FABRICATION OF METAL WORK

A. General Fabrication Requirements:

1. Remove burrs from sheared edges of metalwork, ease the corners and smooth to eliminate cutting hazard. Bend sheets of metal at not less than the minimum radius required to avoid grain separation in the metal. Maintain flat, smooth surfaces without damage to finish.
2. Reinforce metal at locations of hardware, anchorages, and accessory attachments wherever metal is less than 14 gauge (2.0mm) or requires mortised application. Conceal reinforcements to the greatest extent possible. Weld in place, on concealed faces.
3. Exposed screws or bolt heads, rivets, and butt joints made by riveting straps under seams and then filled with solder will not be accepted. Where fasteners are permitted, provide Phillips head, flat or oval head machine screws. Cap threads with acorn nuts, unless fully concealed in inaccessible construction, and provide nuts and lock washers unless metal for tapping is at least 12 gauge (2.5mm). Match fastener head finish with finish of metal fastened.
4. Where components of fabricated metal work are indicated to be galvanized and involve welding or machining of metal heavier than 16 gauge (1.6mm), complete the fabrication and provide hot-dip galvanizing of each component, after fabrication, to the greatest extent possible (depending upon available dip-tank sizes). Comply with ASTM A123.
5. Welding and Soldering:
 - a. Materials 18-gauge (1.27mm), or heavier, shall be welded.
 - b. Seams and joints shall be shop welded or soldered as the nature of the material may require.
 - c. Welds must be ground smooth and polished to match original finish.
 - d. Where galvanizing has been burned off, clean and touch up the weld with high grade aluminum paint.
6. Provide removable panels for access to mechanical and electrical service connections, which are concealed behind or within food service equipment, but only where access is not possible and not indicated through other work.
7. Closures: Where ends of fixtures, splash backs, shelves, etc., are open, fill by forming the metal or welding sections, if necessary, to close entire opening flush to walls or adjoining fixtures.
8. Rolled Edges: Rolled edges shall be as detailed, with corners bull nose, ground and polished.

9. Coved Corners: Stainless steel food service equipment shall have 1/2 inch (13mm) or larger radius coves in horizontal and vertical corners, and intersections, per NSF standards.
- B. Metal and Gauges:
1. Except as otherwise indicated, fabricate exposed metalwork from stainless steel. Fabricate the following components from the gauge of metal indicated and other components from not less than 20 gauge (0.8mm) metal:
 - a. Table and counter tops: 14 gauge.
 - b. Sinks and drain boards: 14 gauge.
 - c. Shelves: 16 gauge.
 - d. Front drawer and door panels: 18 gauge (double pan construction).
 - e. Single pan doors and drawer fronts: 16 gauge.
 - f. Enclosed base cabinets: 18 gauge.
 - g. Enclosed wall cabinets: 18 gauge.
 - h. Exhaust hoods and ventilators: 18 gauge.
 - i. Pan-type insets and trays: 16 gauge.
 - j. Removable covers and panels: 18 gauge.
 - k. Skirts and enclosure panels: 18 gauge.
 - l. Closure and trim strips over 4" wide: 18 gauge.
 - m. Hardware reinforcement: 12 gauge.
 - n. Gusset plates: 10 gauge.
- C. Work-Surface Fabrication:
1. Fabricate metal work surfaces by forming and welding to provide seamless construction using welding rods matching sheet metal, grinding and polishing. Where necessary for disassembly, provide waterproof gasketed draw-type joints with concealed bolting.
 2. Reinforce work surfaces 30 inches on center both ways with galvanized or stainless steel concealed structural members. Reinforce edges, which are not self-reinforced, by formed edges.
- D. Metal Top Construction:
1. Metal tops shall be one-piece welded construction, including field joints. Secure to a full perimeter galvanized steel channel frame cross-braced not farther than 2'-6" (760mm) on center. Fasten top with stud bolts or tack welds. If hat sections are used in lieu of channels, close ends.
 2. Use properly designed draw fastening, trim strip, or commercial joint material to suit requirement, only if specified.
- E. Structural Framing:
1. Except as otherwise indicated, provide framing of minimum 1 inch (25mm) pipe-size round pipe or tube members with mitered and welded joints and gusset plates ground smooth. Provide 14 gauge (2.0mm) stainless steel tube for exposed framing, and galvanized steel pipe for concealed framing.
 2. Where indicated, flange rear and end edges up to form splashes integrally with top, with vertical and horizontal corners coved of not less than 1/4 inch (6mm) radius, die formed. Turn back splashes 1 inch to wall across top and ends with rounded edge on break, unless otherwise specified.

3. For die-crimped edges, use inverted "V" 1/2 inch (13mm) deep inside and 2 inch (38mm) deep on outside, unless otherwise shown. For straight down flanges, make 1-3/4 inch (45mm) deep on outside. For bull nose edges, roll down 1-3/4 inch (45mm).
 4. Edges: die-formed, integral with top. For rounded corners, form to 1 inch radius, weld, and polish to original finish.
- F. Field Joints: For any field joint required because of size of fixture, use butt-joints, reinforce on underside with angles of same material, bolt together with non-corrosive bolts and nuts, field weld, grind and polish.
- G. Pipe Bases: Construct pipe bases of 1-5/8 inch (41mm) diameter 18 gauge (1.2mm) stainless steel tubing. Fit legs with polished stainless steel sanitary adjustable bullet feet to provide for adjustment of approximately 1-1/2 inch (38mm), without exposing threads. Space legs to provide ample support for tops, precluding any possibility of buckling or sagging and in no case more than 6'-0" centers.
- H. Legs and Cross-rails:
1. Equipment legs and cross rails shall be 1-5/8 inch (41mm), 16-gauge (1.59mm) stainless steel tubing.
 2. Welds at cross rails shall be continuous and ground smooth. Please note: tack welds are not acceptable.
 3. Camber bottom of legs inward and fit with a stainless steel bullet-type foot with not less than 2 inch (50mm) adjustment. Flanged feet with bolt holes may be required dependent on design applications. Provide proper type feet in compliance with local codes. Use stainless steel in all applications.
 4. Peg free standing legs to floor with 1/4 inch (6mm) stainless steel rod.
 5. Components:
 - a. Stainless Steel Gusset: Stainless steel exterior to fit 1-5/8 inch (41mm) tubing, with Allen screw for fastening and adjustment. Not less than 3 inches (76mm) diameter at top and 3-3/4 inch (95mm) long. Outer shell 16-gauge (1.6mm) stainless steel, reinforced with 12-gauge (2.5mm) mild steel insert welded interior shell, or approved equal.
 - b. Stainless Steel Low Counter Legs: Stainless steel exterior 5-3/4 inch (146mm) minimum, 7 inch (178mm) maximum length with stainless steel 3- 1/2 inch (89mm) square plate with four counter-sunk holes, welded to top for fastening.
 - c. Stainless Steel Adjustable Foot: Stainless steel 1-1/2 inch (38mm) diameter tapered at bottom to 1 inch (25mm) diameter, fitted with threaded cold rolled rod for minimum 1-1/2 inch (38mm) diameter x 3/4 inch (19mm) threaded bushing plug welded to legs, or approved equal. Push-in foot not acceptable.
 6. Fasten legs to equipment with gussets, as follows:
 - a. Sinks: Reinforced with bushings and set screw.
 - b. Metal Top Tables and Dish Tables: Welded to galvanized steel channels, 14-gauge (1.98mm) or heavier, anchored to top with screws through slotted holes.
 - c. Wood Top Tables: Welded to stainless steel channels, 14-gauge (1.98mm) or heavier, anchored to top with screws through slotted holes.
- I. Shelves:
1. Construct solid shelves under pipe base tables of 16 gauge stainless steel, with 1-1/2 inch turned down and under edges on exposed sides, and 2 inch turn up against walls or equipment. Fully weld to pipe legs.

2. In fixtures with enclosed bases, turn up shelves on back and sides with 1/4 inch (6mm) (minimum) radius and feather slightly to ensure a tight fit to enclosure panels.
- J. Sinks:
1. Construct sinks of 14 gauge stainless steel with No.4 finish inside and outside.
 2. Form back, bottom and front of one piece, with ends and partitions welded into place. Partitions: double thickness, 1 inch minimum space between walls. Multiple compartments shall be continuous on the exterior, without applied facing strips or panels.
 3. Cove interior vertical and horizontal corners of each tub not less than 1/4 inch radius, die formed. Outer ends of drain boards to have roll rim risers not less than 3 inches high.
 4. Drill faucet holes in splashes 2-1/2 inches below top edge. Verify center spacing with faucet specified.
 5. Sink insets shall be deep drawn of 16-gauge (1 .59mm), or heavier, polished stainless steel. Weld into sink drain boards with 1-1/2 inch x 1-1/2 inch x 14 gauge stainless steel angle brackets, securely welded to sinks and galvanized cross angles spot welded to underside of drain boards to form an integral part of the installation.
 6. The bottom of each compartment shall be creased such as to ensure complete drainage to waste opening. Slope bottom of sink bowls toward outlet.
- K. Drains, Wastes and Faucets:
1. Furnish and install T&S Brass faucets model B-3940-01 stainless steel rotary drain assembly with connected overflow assembly, in die-drawn inset type sinks and bain-marie sinks.
 2. Other custom fabricated sinks shall be furnished with T&S Brass faucets model B3940-01 stainless steel rotary drain assembly, with S/S cap nut over overflow outlet. Waste connection shall have 2 inch (50mm) external thread size, with 1-1/2 inch (38mm) internal thread size.
 3. Rotary Handle: Of sufficient length to extend to front edge of sink. No riveting, screws or soldering permitted to fit drains to sinks, with all parts of drains easily removable for servicing and replacement. Rotary handle bracket to be provided as part of the sink fabrication.
 4. Water pans for steam tables shall be fitted with 1 inch (25mm) drains with chrome-plated brass stand pipes.
 5. All faucets furnished with equipment included in this Section shall be lead free and comply with NSF Standard #61, Section #9, such as manufactured by Fisher, Chicago, or T&S. Where the itemized specifications list a faucet by manufacturer and model, the Contractor shall verify that the listed faucet complies with this requirement.
 6. If the listed faucet does not comply, the Contractor shall submit similar model which does comply from the same manufacturer where available or from one of the above manufacturers.
- L. Workmanship:
1. Best quality in the trade. Field verify dimensions before fabricating, conform all items to dimensions of building, neatly fit around pipes, offsets and other obstructions.
 2. Fabricate only in accordance with approved shop drawings, showing pipes, obstructions to be built around, and location of utilities and services.

M. Enclosures:

1. Provide enclosures, including panels, housings, and skirts for service lines, operating components and mechanical and electrical devices associated with the food service equipment, except as specifically indicated to be "open".
2. Where equipment is exposed to customer view, enclose of service lines, operating components, and mechanical and electrical devices.

N. Casework:

1. Enclosure: except as otherwise indicated, provide each unit of casework (base, wall, overhead and free-standing) with a complete-enclosure metal cabinet, including fronts, backs, tops, bottoms, and sides.
2. Bases shall be made of 18-gauge (1.27mm) stainless steel sheets reinforced by forming the metal.
3. Ends, partitions and shelves are stainless steel.
4. Unexposed backs and structural members are galvanized.
5. Vertical ends and partitions are single wall, with a 2 inch (50mm) face.
6. Sides and through partitions are flush with bottom rail, welded at intersections.
7. Shelves: Provide adjustable standards for positioning and support of shelves in casework, except bottom shelf of cabinet mounted on legs or as specified. Turn back of shelf units up 2 inches and hem. Turn other edges down to form open channel. Reinforce shelf units to support 40 pounds per square foot loading, plus 100 percent impact loading.
8. Bottom front rail of bases set on masonry platform shall be continuously closed and sealed to platform.

O. Doors:

1. Metal doors shall be double-cased stainless steel. Outer pans shall be 18-gauge (1.27mm) stainless steel with corners welded, ground smooth and polished. Inner pan shall be 20-gauge (.95mm) stainless steel fitted tightly into outer pan with a sound-deadening material such as Celotex or Styrofoam used as a core. The two pans shall be tack welded together and joints solder filled. Doors shall finish approximately 3/4 inch (19mm) thick and be fitted with flush recessed type stainless steel door pulls.
2. Wood doors shall be fabricated as detailed. If Formica or other plastic surfaces are used, sides and backs must be laminated.
3. Hinged doors shall be mounted on heavy-duty NSF approved hinges, or as noted on plans or specifications.

P. Drawer Assemblies:

1. Assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly with fully enclosed housing.
2. Slide assembly consists of one pair of 200 pound stainless steel roller bearing extension slides, with side and back enclosure panels, front spacer angle, two drawer carrier angles secured to slides and stainless steel front.
3. Drawer bodies for general storage are to be 20 inches x 20 inches (508mm x 508mm), with 18 gauge stainless steel containers.
4. Drawers intended to hold food products shall be removable type with 12 x 20 (305mm x 508mm) stainless steel food pans in a stainless steel assembly.
5. Drawer fronts are double cased, 3/4 inch (19mm) thick with 18 gauge (1.27mm) stainless steel welded and polished front pan. Steel back pan is tightly fitted and tack welded. Sound deaden with rigid insulation material.

6. Provide drawers with replaceable soft neoprene bumpers or for refrigerated drawers, a full perimeter soft gasket.
- Q. Closed Base: Where casework is indicated to be located on a raised-floor base, prepare casework for support without legs and for anchorage and sealant application, as required for a completely enclosed and concealed base.
- R. Support from Floor: Equip floor supported mobile units with casters and equip items indicated as roll-out units with manufacturer's standard one-directional rollers. Otherwise, and except for closed-base units, provide pipe or tube legs with adjustable bullet-design feet for floor supported items of fabricated metalwork. Provide 1-1/2 inch adjustment of feet (concealed threading).
- S. Shop Painting:
1. Clean and prepare metal surfaces to be painted. Remove rust and dirt. Apply treatment to zinc coated surfaces which have not been mill phosphatized. Coat welded and abraded areas of zinc coated surfaces with galvanize repair paint.
 2. Apply 1.5 mil (dry film thickness) metal primer coating, followed by 2, 1.0 mil (dry film thickness) metal enamel finish coatings.
 3. Bake primer and finish coatings in accordance with paint manufacturer's instructions for a baked enamel finish.
- T. Sound Deadening:
1. Sound deaden underside of metal tops, drain boards, under shelves, cabinet interior shelves, etc., above the underbracing/reinforcing/framing only.

2.5 FILTER EXHAUST HOODS

- A. Filter Exhaust Hoods:
1. 18 Gauge type 304 stainless steel external welded construction, in accordance with the latest edition of NFPA No.96, including all applicable appendices. Exposed welds to be ground and polished.
 2. Grease Removal: UL classified, non-adjustable, stainless steel grease filters with drip-channel gutters, drains and collection basins.
 3. Light Fixtures: Furnish type of fixture specified. Fixtures shall be UL listed for hoods, NSF approved, with sealed safety lenses and stainless steel exposed conduit for wiring.
 4. Exhaust Duct: Furnish welded stainless steel formed duct collars at ceiling or wall duct connections, where exposed. Furnish exposed to view ductwork as specified. Verify size and location of duct connections required in this contract, before fabrication. Other ductwork will be by the Mechanical Section.
 5. Fire Extinguishing System: Pre-piped liquid chemical or water fire suppressant system, as specified, complying with applicable local and NFPA regulations. Wet chemical fire suppression systems shall comply with UL 300 Standards.

2.6 REFRIGERATION EQUIPMENT

- A. General:
1. Furnish either single or multiple compressor units, as specified or recommended by the manufacturer for the sizes and variations between connected evaporator loads as indicated.

2. Furnish units of the capacities indicated, arranged to respond to multiple-evaporator thermostats and defrosting timers. Include coils, receivers, compressors, motors, motor starters, mounting bases, vibration isolation units, fans, dryers, valves, piping, insulation, gauges, winter control equipment and complete automatic control system.
 3. Refrigerant: Pre-charge units with type or types recommended by manufacturer for services indicated, with quick-disconnect type connections where specified, ready to receive refrigerant piping runs to evaporators and (where remote) to condensers. All refrigerant and associated components shall comply with the requirements of the Montreal Protocol Agreement. No CFC refrigerants or associated components shall be allowed on this Project. HFC refrigerants and components shall be used where available. HCFC refrigerants and components, with a minimum 2010 phase-out date, and intermediate replacement refrigerants are to be used only when HFC refrigerants are not available. Contractor shall be responsible for coordinating with manufacturers. Provide refrigerant leak monitoring devices where required by federal, state, or local codes.
 4. The minimum outdoor operating ambient temperature for design of units is -10 degrees Fahrenheit, or as applicable for extreme low local conditions. The maximum indoor design temperature for operation of compressor units is 95 degrees Fahrenheit. The maximum outdoor ambient design temperature shall be determined with prevailing conditions at mounting location(s) of compressor(s), such as sun exposure, limited ventilation, high fences/walls, roof color and materials, local climatic extremes, etc., but in no case shall it be less than 100 degrees Fahrenheit.
- B. Components:
1. Coils: Coils for fabricated refrigerators shall have vinyl plastic coatings, stainless steel housings and shall be installed in such a manner as to be replaceable.
 2. Expansion Valves: Remote refrigeration system shall be complete with thermostatic expansion valves at the evaporator.
 3. Thermometers:
 - a. Fabricated refrigerated compartments to be fitted minimally with a flush dial thermometers, with chrome plated bezels and to be provided as specified.
 - b. Thermometers shall be adjustable and shall be calibrated after installation.
 - c. Thermometers shall have an accuracy of ± 2 degrees Fahrenheit (1 degree Centigrade).
 4. Hardware:
 - a. Refrigerator hardware for fabricated refrigerator compartments shall be heavy-duty components.
 - b. Self closing hinges.
 - c. Latches to be magnetic edge mount type, unless specified or detailed otherwise.
 5. Locks:
 - a. Doors and drawers for walk-in coolers/freezers and reach-in refrigerated compartments, both fabricated and standard, shall be fitted with cylinder locking type latches and provided with master keys.
- C. Cold Pans: Ice pans, refrigerated pans and cabinets shall be provided with breaker strips, where adjoining top or cabinet face materials, to prevent transfer of cold.
- D. All open top mechanically cooled custom fabricated or standard buy-out refrigerators and/or cold pans shall comply with NSF Standard #7 requirements, as of April 1, 1998. The Contractor shall verify that the specified unit complies with this requirement or submit a similar model, which does comply, from the same manufacturer where available.

- E. Ventilation of Refrigerated Equipment:
 - 1. Adequate ventilation shall be provided for custom fabricated equipment with integral refrigeration condensing units, both built-in and drop-in. If flow through ventilation cannot be provided, provide flow direction partitions and an additional fan capable of cooling the condensing unit.
 - 2. If, in the opinion of the Contractor, additional room ventilation is required to ensure correct operating temperatures of standard buy-out, custom fabricated or remote refrigeration condensing units, or compressor rack assemblies, they shall so state in a letter to the Architect for evaluation and direction.

2.7 MISCELLANEOUS MATERIALS

- A. Nameplates: Whenever possible, locate nameplates and labels on manufactured items, in accessible position, but not within customer's normal view. Do not apply name-plates or labels on custom fabricated work, except as required for compliance with governing regulations, insurance requirements, or operator performance.
- B. Manufactured Equipment Items: Furnish items as scheduled or herein specified. Verify dimensions, spaces, rough-in and service requirements, and electrical characteristics before ordering. Provide trim, accessories and miscellaneous items for complete installation.
- C. Insert Pans:
 - 1. General: Provide cut-outs, openings, drawers, or equipment specified or detailed to hold stainless steel insert pans with a full complement of pans as follows:
 - a. One (1) stainless steel, 20-gauge (0.95mm) minimum, solid insert pan for each space, sized per plans, details, or specifications.
 - b. Where pan sizes are not indicated in plans, details, or specifications, provide one full-size pan for each opening.
 - c. Provide maximum depth pan to suit application and space.
 - 2. Provide 18-gauge (1.27mm) removable stainless steel adapter bars where applicable.
 - 3. Provide all cut-outs and openings or equipment specified or detailed to hold stainless steel insert pans with a hinged stainless steel removable night cover.
- D. Tray Slides: Before fabrication of counters with tray slides, verify:
 - 1. Size and shape of tray. Edge of tray shall not overhang outer support/slider by more than 2". If edge of tray exceeds this dimension, notify Architect, in writing, for evaluation and adjustment, if necessary.
 - 2. Configuration of corners, turns, and shape of tray slides for proper support and safe guidance of trays.
 - 3. Tray slide capable of supporting 200 pounds per linear foot, live load.
- E. Self-leveling dispensers: Verify type and make of ware, dimensions and weight, request samples from Operator and submit to the dispenser manufacturer for proper sizing and calibration of dispensers.
- F. Carbon dioxide (co') equipment: Where equipment requires connection with compressed co' cylinder for operation, provide proper sized cylinder manifold and control system (integral with equipment) with proper connectors for Department of Transportation (DOT) approved type cylinders, complete with cylinder safety devices and supports.

- G. Reasonable quietness of operation of equipment is a requirement. The Kitchen Equipment Contractor will be required to replace or repair any equipment producing out-of-the-ordinary intolerable noise. This also includes providing and installing bumpers and gaskets for doors and drawers on fabricated and standard manufactured items and sound insulation where feasible.

2.8 ITEMIZED SPECIFICATIONS

- A. Refer to the following pages for specific specification information on each item included in this Section.

ITEM 1 CAN RACK: 1 REQUIRED

- A. New Age, model 97294 *H011.

ITEM 2 DRY STORAGE SHELVING: 1 LOT REQUIRED

- A. Metro, Super Adjustable Super Erecta *H011 Brite shelving. Shelf sections shall be five tier high using individual posts with adjustable feet, top caps, and joining clamps equally spaced over 86-5/8 inch plated posts with bottom shelf located 8 inches above finished floor. Install in sizes and configuration as shown on Sheet FS100.
- B. Include one 22" x 48" HP2248PD dunnage rack.
- C. Verify room size before ordering.

ITEM 3 WALK-IN COLD STORAGE ROOMS: 2 REQUIRED

- A. Imperial Brown Manufacturing, modular sandwich panel design Foam-A-Lite *H011 cold storage rooms complete in configuration shown on Sheet FS100. Each room shall incorporate the following:
 - 1. Provide each cooler and freezer with walk-in doors and door frames 48 inch x 78 inch stainless steel inside and out with 14 inch x 14 inch insulated glass window (heated for freezer) and 36" high 1/8" polished aluminum diamond tread plate interior and exterior kick plates. Doors hinged as shown on plan. Include Kason #944 deadbolt mortise locksets with interior safety releases, Kason #1229 chrome pull handles, Kason #1094000013 concealed mounting door closers, and Kason #1248 chrome spring assisted hinges (three per door). Hinge doors as shown on plans.
 - 2. Provide 36" high 1/8" polished aluminum diamond tread plate wainscot on exposed exterior face of walk-in cold storage rooms.
 - 3. Exposed exterior, closure panels, and trim strips to adjacent walls and ceiling shall be 22 gauge stainless steel finish. Exposed interior shall be .040 stucco embossed aluminum except ceiling which shall be .040 aluminum with baked white acrylic finish. Unexposed surfaces shall be 26 gauge galvanized steel.
 - 4. Finished exterior height of 8 foot-4 inches. Interior height of rooms shall be 8 foot-0 inches. Wall and ceiling insulation shall be 4 inch thick foamed in place, Class 1, urethane insulation.
 - 5. Install freezer only in floor depression complete with 4" prefabricated high density urethane floor panel. Install in recess with 4" concrete topping slab by GC. Anchor cooler wall panels to concrete floor per details and manufacturers recommendation. See Sheet FS300 for walk-in details.

6. Install surface mounted 4-1/2 inch diameter dial thermometer above each door.
 7. Heated vacuum vent for freezer.
 8. Provide 3/8 inch diameter nylon coil hangers mounted on 3 inch x 3 inch aluminum plates with nuts and retainers to support evaporator hung from ceiling panel.
 9. Furnish penetrations to accommodate all electrical, plumbing, and refrigeration lines. Furnish stainless steel escutcheons.
 10. Provide Keil LED48X754-CL-N LED cooler and freezer ceiling light fixtures as noted on Sheet FS103 (one fixture per room). Field connections under Division 26. Include lamps.
 11. Provide Kason, model 1908-603 press type switches mounted inside and outside of each room as indicated on electrical plan.
 12. All electrical conduits shall be run concealed within the walk-in walls or above the ceiling panels (coordinate with electrician).
 13. Refer to Architectural Room Finish Schedule for cooler/freezer wearing floor and cove base material inside and out by Division 9.
 14. Temperature monitor/alarm system provided with smart defrost system specified under Item 4.
 15. Sealants for all walk-in panel penetrations: 1-part or 2-part, polyurethane or silicone based, liquid elastomeric sealant, non-solvent release type, Shore A hardness of 30, except 45 if subject to traffic. Sealants shall be NSF Listed for use in food zones. Installation shall comply with applicable requirements of NSF Standards.
- B. Walk-ins shall comply with current state energy codes.
- C. Walk-ins shall be installed by this manufacturer or this manufacturer's certified installer only and must have a minimum 5 years' experience installing Imperial walk-ins.
- D. Walk-in doors are to be secured in the "open" position until the concrete sub-floor cures and until manufacturer states that it is safe to close. Oxidized panels will be replaced at the Contractors' expense.
- E. Walk-ins shall bear the State Seal.

ITEM 4 REFRIGERATION SYSTEMS: 2 REQUIRED

- A. System A: Freezer @ -10°F to +0°F
1. Evaporator: Trenton TPLP207LES2DR8-ESPE; 7,000 BTU at -10°F suction temperature. Include expansion valve, drier-strainer, liquid line solenoid, room thermostat, and electric defrost system.
 2. Condensing Unit: Trenton TEZA020L8-HT3D; 7,300 BTU at +90°F ambient air temperature. Include crank case heater.
- B. System B: Cooler @ +35°F to +40°F
1. Evaporator: Trenton TPLP209MAS1DR8-ESP; 8,687 BTU at 20°F suction temperature. Include expansion valve, drier strainer, liquid line solenoid, and room thermostat.
 2. Condensing Unit: Trenton TEZA008H8-HT2D; 8,500 BTU at 90° ambient air temperature. Include crank case heater.
- C. Each system shall incorporate the following:
1. Flexible vibration eliminator in suction line.

2. Circuit breaker, automatic starting switch, motor protectors and pressure limit switch, all enclosed with interconnecting wire installed in a junction box ready for line connections.
 3. Liquid line dehydrator filter of ample capacity.
 4. Suction line filter of ample capacity.
 5. Thermal expansion valve for evaporator.
 6. Thermostat set to cut-in at -3°F and cut-out at -6°F for freezer. Cut-in at +38°F and cut-out at +34°F for refrigerator.
 7. Suction pressure regulator.
 8. Crank case heaters.
 9. Refrigerant Lines: Hard copper type "L" with "Silfos" brazed joints. Use refrigeration service tubing.
 10. Full charge refrigerant and oil.
 11. Condensing units are located outside on grade as noted on Sheet FS100. Refer to sheet A101A for exact location. Raised pad specified by architectural division.
 12. Provide one piece all welded 14 gauge stainless steel enclosure shroud to conceal surface run refrigeration lines on exterior building wall. Coordinate conditions, size, and fastening method with G.C.
- D. Where refrigerant suction lines are trapped, use next size smaller pipe in vertical portion of the trap than that indicated to acquire sufficient gas velocity for proper oil return.
- E. Provide anti-sweat pipe covering 3/4 inch Armstrong Armaflex or equivalent for suction lines from evaporator to condensing unit.
- F. Provide painted 1 inch drain tubing from evaporator to nearest indirect drain as shown on Sheet FS101. Trap at outlet end.
- G. Provide Raychem, model H611250 heating cable with H900 power connection to wrap all drain lines running through freezer.
- H. Evaporators and condensing units as shown on the Contract Documents shall be installed under the supervision of a licensed Refrigeration Contractor subject to review by the Consultant.
- I. Provide testing, charging, adjusting, operational testing, and cleaning of equipment and lines.
- ITEM 5 WALK-IN FREEZER SHELVING: 1 LOT REQUIRED
- A. Metro, Metroseal 3 *H011 Super Adjustable wire shelving. Shelf sections shall be four tier high using 74-5/8 inch high individual posts with casters, and top caps. Bottom shelf shall be positioned 8" above finished floor. Install in configuration and sizes as shown on Sheet FS100.
 - B. Include one 22" x 48" HP2248PD dunnage rack.
 - C. Verify room size before ordering.

ITEM 6 WALK-IN COOLER SHELVING: 1 LOT REQUIRED

- A. Metro, Metroseal 3 *H011 Super Adjustable wire shelving. Shelf sections shall be four tier high using 74-5/8 inch high individual posts with casters, and top caps. Bottom shelf shall be positioned 8" above finished floor. Install in configuration and sizes as shown on Sheet FS100.
- B. Include one 22" x 48" HP2248PD dunnage rack.
- C. Verify room size before ordering.

ITEM 7 SPEED RACKS: 2 REQUIRED

- A. Existing equipment. Relocate and reinstall in position shown.

ITEM 8 UTILITY CARTS: 2 REQUIRED

- A. Existing equipment. Relocate and reinstall in position shown.

ITEM 9 CORNER/CHANNEL GUARDS AND LOW WALL CAP: 1 LOT REQUIRED

- A. Fabricate as detailed and construct vertical corner/channel and low wall guards of one piece all welded 14 gauge stainless steel. Install in locations shown on Sheet FS100. Install with stainless steel screws.
- B. Seal guards to walls and at joints as required.

ITEM 10 POINT OF SALE SYSTEM: 1 LOT REQUIRED

- A. Owner furnished and installed.

ITEM 11 ALA CARTE SERVING COUNTER: 1 REQUIRED

- A. Fabricate as detailed and construct top, backsplash, and pass-thru opening frame of one piece all welded 14 gauge stainless steel. Reinforce underside of top and install on a cabinet base constructed of 3/4 inch marine grade plywood with all exposed and accessible plywood surfaces faced with plastic laminate as selected by the Architect. Include the following:
 - 1. 16 gauge stainless steel wall mount shelf as detailed. Install on 14 gauge stainless steel wall brackets. Seal to wall.
 - 2. Drawer and Door Hardware: Stainless steel full extension drawer slides, Component Hardware model P46-1010 stainless steel drawer pulls and Blum Modul 170 concealed hinges.
 - 3. Coordinate pass-thru frame interface with coiling door provided by General Contractor.
- B. Clip and seal to wall.
- C. Finished base material furnished and installed by G.C.

ITEM 12 UNDERCOUNTER REACH-IN REFRIGERATOR: 1 REQUIRED

- A. Traulsen, model UHT48-LR *H011 with CK26 2-3/4" casters in lieu of standard.

ITEM 13 WALL MOUNT MERCHANDISING DISPLAY GRID: 1 REQUIRED

- A. Eagle Group, model Walstor *H011 modular wall system consisting of the following:
 - 1. Two (2) model WM3648 wall mats install side by side. Center on wall starting at 12" above counter top.
 - 2. Four (4) model WAL-1-1848 double shelf kits. Install shelves with 18" clearance from counter top.
 - 3. Six (6) model PH3RD 1/3 size plan holders with stainless steel pans. Install as shown on wall mat.
 - 4. Sixteen (16) model MDH-12 merchandise display hooks installed as shown on wall mat.
- B. Verify space before ordering.

ITEM 14 MANUAL CAN OPENER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in position shown.

ITEM 15 MOBILE WASTE RECEPTACLES: 5 REQUIRED

- A. Rubbermaid, model FG263200 *H011 with FG264043 dolly and FG263100 matching lid. Color: grey.

ITEM 16 VEGETABLE PREP SINK TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model DCS-1824-14-B63(L)-B106(R) *H011 custom fully welded sink table. Sink table shall incorporate the following:
 - 1. Fisher Manufacturing, model 53457 spray rinse faucet with 8" swing spout centered between sinks. Include wall bracket.
 - 2. Two Fisher Manufacturing, model 22209 rotary waste assemblies with 14 gauge stainless steel lever support brackets welded to underside of sink.
 - 3. Model TMSC cantilever shelf above each drainboard (refer to elevations for lengths). Seal post openings in backsplash.
 - 4. Sound deaden underside of top and sink compartments.
 - 5. Stainless steel under shelves as detailed.
 - 6. Left and right end splashes.
 - 7. Provide adequate height and space for parking of Item 15 Waste Receptacle under left drain board.
- B. Field verify wall to wall dimensions before fabricating. Install assembly complete. Clip and seal to walls.

ITEM 17 SLIM JIMS: 3 REQUIRED

- A. Rubbermaid, model FG354000 *H011. Color: light gray.

ITEM 18 HAND WASHING SINKS: 3 REQUIRED

- A. Advance Tabco, model 7-PS-62 *H011.
- B. Seal to wall.

- C. Soap and paper towel dispensers furnished and installed by Owner.

ITEM 19 PREP WORK TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model WKS-9630-A6S *H011 with the following accessories:
 - 1. Two model SDAS-202006S stainless steel drawer assemblies as shown.
 - 2. Model TMSC cantilever shelf installed with 18" clear to table top. Seal post openings in backsplash.
 - 3. Sound deaden underside of top.
- B. Install assembly complete. Clip and seal to wall.

ITEM 20 HOT WATER DISPENSER: 1 REQUIRED

- A. Bunn, model HW2-SST *H011. Include EQ-17-TL water filter system.

ITEM 21 MICROWAVE OVEN: 1 REQUIRED

- A. Panasonic, model NE-1054 *H011.

ITEM 22 CANOPY HOOD (TYPE II): 1 REQUIRED

- A. Captive-Aire, model 6018VHB-G-2 *H011, Type II, 11'-3" long x 2'-6" high 18 gauge stainless steel exhaust only canopy hood. Refer to factory file #4744110. The hood shall incorporate the following:
 - 1. Flush LED light fixtures as shown on Captive-Aire factory drawings. Furnish and install lamps.
 - 2. Light and fan HMI control to be wall mounted adjacent to hood per Sheet FS103.
 - 3. Include 18 gauge stainless steel removable closure panels and trim as required to seal hood to ceiling and walls. Verify ceiling height. Submit shop drawings.
 - 4. Install hood with 80" clearance from finished floor.
- B. Exhaust and supply duct work and fans furnished and installed by Division 23.

ITEM 23 STAINLESS STEEL WALL FLASHING: 1 LOT REQUIRED

- A. Fabricate 20 gauge stainless steel Number 4 finish wall flashing bonded to gypsum board with heat resistant mastic beginning directly above base tile on wall and terminating 2" above bottom edge of canopy hood. Flashing shall run full length of canopy hood.
- B. Install flashing with no exposed fasteners or screws in interlocking sections of equal lengths. Verify that surfaces are flat and smooth with a maximum variation of 1/16" in 10 feet.
- C. Install assembly complete.

ITEM 24 DOUBLE STACK COMBI-OVEN/STEAMERS: 2 REQUIRED

- A. Alto Shaam, model CTC7-20E-Double *H011 with the following accessories:
 - 1. Stacking Hardware.
 - 2. OptiPure, model OPS175CR/10 Reverse Osmosis System.
 - 3. Four fry baskets.
 - 4. 6" Heavy-duty caster set with brakes.

- B. Install assembly complete.

ITEM 25 NOT USED

ITEM 26 NOT USED

ITEM 27 NOT USED

ITEM 28 MOBILE MIXER CART: 1 REQUIRED

- A. Advance Tabco, model MX-SS-242 *H011 with caster set, two with brakes.

ITEM 29 20-QUART MIXER: 1 REQUIRED

- A. Hobart, model HL-200 *H011 with standard accessory package.

ITEM 30 POT WASHING SINK TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model TCS-(2)1824-(1)2824L-14-B30 *H011 fully welded sink table. Sink table shall incorporate the following:
 1. Fisher Manufacturing, model 53457 spray rinse faucet with 8" swing spout centered between right and center sinks. Include wall bracket.
 2. One Fisher Manufacturing, model 53120 splash mount faucet centered between left and center sinks.
 3. Three Fisher Manufacturing, model 22209 rotary waste assemblies with 14 gauge stainless steel lever waste brackets welded to underside of table.
 4. Model TMSC table mount cantilever shelves as detailed. Seal post openings in backsplash.
 5. Right end splash.
 6. Sound deaden underside of top and sink compartments.
 7. Stainless steel under shelf below drain boards.

- B. Install assembly complete. Clip and seal to walls.

ITEM 31 MOBILE POT AND PAN SHELVING: 1 REQUIRED

- A. InterMetro, model PR48VX3 *H011 modified to have top shelf with cutting board/tray drying rack and two intermediate and bottom shelves to be flat louvered with 4" high end and back shelf ledges.

ITEM 32 FOLD DOWN EYE WASH STATION: 1 REQUIRED

- A. Requirements by Plumbing Division.

ITEM 33 CLEAN DISHTABLE: 1 REQUIRED

- A. Fabricate as detailed and construct top and backsplash of one piece all welded 14 gauge stainless steel. Reinforce underside of top with enclosed stainless steel hat sections. Sound deaden underside of top and mount on a stainless steel leg stand consisting of circular gussets, tubular legs, and adjustable bullet feet. Reinforce legs with 16 gauge stainless steel shelf and/or leg braces as shown. Dishtable shall incorporate the following:
 1. Install table limit switch furnished with Item 34.

- B. Install assembly complete.
- C. Clip and seal to walls.

ITEM 34 VENTLESS WAREWASHER WITH BOOSTER HEATER: 1 REQUIRED

- A. Hobart, model CL44eN-VL-RL *H011 for right to left operation with the following:
 - 1. Drain tempering kit.
 - 2. Table limit switch.
 - 3. Flanged stainless steel feet.
 - 4. Common electrical connection.
 - 5. Three each sheet pan and combination racks.
- B. Install assembly complete.

ITEM 35 DISPOSER: 1 REQUIRED

- A. Salvajor, model 200-SA-6-1/2" *H011. Provide with model ARSS-LD control center.
- B. Install assembly complete in sink as shown.

ITEM 36 HOSE REEL WITH RECESSED CONTROL CABINET: 1 REQUIRED

- A. Fisher, model 29610 *H011 with 35' hose. Include model 1801 reel rinse control box assembly.
- B. Contractor is to coordinate recess in wall with General Contractor for cabinet.
- C. Seal assembly to wall.

ITEM 37 SOILED DISHTABLE WITH TRAY RETURN PASS-THRU: 1 REQUIRED

- A. Fabricate as detailed and construct top, back/endsplashes, and pass-thru tray return pass-thru frame of one piece all welded 14-gauge stainless steel. Include all welded integral stainless steel sink as shown. Reinforce underside of top with enclosed stainless steel hat sections. Sound deaden underside of top and sink compartments and mount on a stainless steel leg stand consisting of circular gussets, tubular legs, and adjustable bullet feet. Reinforce legs with 16-gauge stainless steel shelves and/or leg braces as shown. Soiled Dishtable shall incorporate the following:
 - 1. Fisher Manufacturing, model 53457 spray rinse faucet with 8" swing spout centered at sink. Include wall bracket.
 - 2. Pre-rinse sink to include 14-gauge stainless steel removable rack glides held in place with stainless steel bar stock welded to sink sides.
 - 3. 14 gauge stainless steel disposer control bracket welded to underside of drainboard.
 - 4. Coordinate pass-thru frame interface with coiling door provided by General Contractor.
- B. Install assembly complete.
- C. Clip and seal to walls.

ITEM 38 MOBILE SOAK SINK: 1 REQUIRED

- A. Advance Tabco, model 9-FSS-20 *H011. Include corner bumpers.

ITEM 39 PASS-THRU HEATED/REFRIGERATED HOLDING CABINETS: 2 REQUIRED

- A. Traulsen, model RDH232WPUT-FHS/G *H011 with doors hinged standard. Include the following:
 - 1. Provide interior sections with adjustable stainless steel universal type tray slides adjustable to 4" on center.
 - 2. Glass doors with locks facing student side.
 - 3. Set of four (4) 4-5/8" high caster set.
 - 4. Dial thermometer.
- B. Install assembly complete.

ITEM 40 ELECTRIC CAN OPENER: 1 REQUIRED

- A. Edlund, model 270-NSF *H011.

ITEM 41 ISLAND WORK TABLE WITH OVERSHELF: 1 REQUIRED

- A. Pacific Stainless Products, model WKT-8430-IS *H011 fully welded "spec line" table with the following accessories:
 - 1. Two model SDAS-202006S stainless steel drawer assemblies as shown.
 - 2. Model TMSS8412P full length table-mount shelf. Install with 18" clear from bottom edge of shelf to table top.
 - 3. Two undertable mount stainless steel electrical receptacles. Include 16 gauge stainless steel chaseway for electrical conduit to be routed to each receptacle per Sheet FS103.
 - 4. Flanged feet.
- B. Install assembly complete.

ITEM 42 NOT USED

ITEM 43 NOT USED

ITEM 44 SERVING COUNTER: 1 REQUIRED

- A. Fabricate as detailed and construct top, end splash, and integral tray slide of one piece all welded 14 gauge stainless steel. Reinforce underside of top and install on a cabinet base constructed of steel sheets; stainless steel where exposed. Include 3/4 inch marine grade plywood student side removable panels with all exposed and accessible plywood surfaces faced with plastic laminate as selected by the Architect. Cut-out top and install drop-in equipment as shown. Include the following:
 - 1. Premier Metal and Glass, model TM2N-A full length food guard with Hatco GRN Heat lamps and LED lights as detailed in black finish. Use counter mount narrow flanges. Seal flanges to counter top. Horizontal top glass to be 10" wide. Provide with #223/B under counter mount with grommets. Horizontal top glass to be 10" wide.
 - 2. Provide under counter mounting plate for food guard per manufacturer's recommendation.
 - 3. Drawer Hardware: Stainless steel full extension drawer slides.

- B. Install cabinet on 4" high enclosed stainless steel channel base. Seal to wall.
- C. Finished base material furnished and installed by G.C.

ITEM 45 DROP-IN HOT WELLS: 2 REQUIRED

- A. Wells, model MOD-300TDM/AFS *H011 with the following accessories:
 - 1. Drain screens.
- B. Install assembly complete.

ITEM 46 DROP-IN HEATED HOT PLATES: 2 REQUIRED

- A. Hatco, model GRSBF-36-I *H011 with optional GRSB-FLUSH-TSTAT flush mount thermostatic control box with lighted power switch mounted in apron.
- B. on per details.

ITEM 47 DROP-IN REFRIGERATED COLD WELLS: 2 REQUIRED

- A. Atlas Metal, model WCM-2 *H011 with remote switch and stainless steel adapter bars.
- B. Install assembly complete.

ITEM 48 PORTABLE TRAFFIC CONTROL RAILINGS: 1 LOT REQUIRED

- A. Tensator, TensaBarrier system, model 889T2B *H011 double tape system with Basics Base and modular cassette in black wrinkle finish.
- B. Refer to Sheet FS100 for layout and configuration.
- C. Verify tape color with Architect.

ITEM 49 MOBILE DOUBLE-SIDED MILK COOLER: 1 REQUIRED

- A. Existing equipment. Relocate and reinstall in location shown.

ITEM 50 MOBILE DOUBLE-SIDED REFRIGERATED SALAD BAR: 1 REQUIRED

- A. Low Temp Colorpoint, model 74-CFMA-L-EB *H011 with the following accessories:
 - 1. 36" counter top height.
 - 2. 34" tray slide height.
 - 3. Beaded stainless steel tray slides (double sided).
 - 4. Premier Metal and Glass, model TMIR-A full length double-sided food guard in black finish. Use counter mount as required to fit LTI counter. Seal flanges to counter top.
 - 5. Plastic laminate faced base cabinet in color and pattern as selected by the Architect.
- B. Install assembly complete.

ITEM 51 MOBILE DOUBLE-SIDED CONDIMENT BAR: 1 REQUIRED

- A. Low Temp Colorpoint, model 50-ST-L-EB *H011 with the following accessories:
 - 1. 36" counter top height.
 - 2. 34" tray slide height.
 - 3. Beaded stainless steel tray slides (double sided).
 - 4. Premier Metal and Glass, model TMIR-A full length double-sided food guard in black finish. Use counter mount as required to fit LTI counter. Seal flanges to counter top.
 - 5. Plastic laminate faced base cabinet in color and pattern as selected by the Owner.
- B. Install assembly complete.

ITEM 52 MOBILE CASHIER COUNTERS: 2 REQUIRED

- A. Low Temp Colorpoint, model 28-CSE-L *H011 with the following accessories:
 - 1. 36" counter top height.
 - 2. Stainless steel bottom shelf.
 - 3. Plastic laminate faced base cabinet in color and pattern as selected by the Architect.
 - 4. Locking cashier drawer.
- B. Install assembly complete.

ITEM 53 STAFF LOCKERS (HALF SIZE): 6 REQUIRED

- A. Specified by Architectural Division.

PART 3 EXECUTION

3.1 SUPERVISION

- A. A competent supervisor, representing the Contractor, shall be present at all times during progress of the Kitchen Equipment Contractor's work.

3.2 SITE EXAMINATION

- A. Verify site conditions under the provisions of the General Conditions, Supplementary Conditions and applicable provisions of Division 1 Sections. Notify the Architect, in writing, of unsatisfactory conditions for proper installation of food service equipment.
- B. Verify wall, column, door, window, and ceiling locations and dimensions. Fabrication and installation should not proceed until dimensions and conditions have been verified and coordinated with fabrication details.
- C. Verify that wall reinforcement or backing has been provided and is correct for wall supported equipment. Coordinate placement dimensions with wall construction Section.
- D. Verify that ventilation ducts are of the correct characteristics, and in the required locations.
- E. Verify that utilities are available, of the correct characteristics, and in the required locations.

3.3 INSTALLATION

- A. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.
- B. Install items in accordance with manufacturer's instructions.
- C. Set each item of non-mobile and non-portable equipment securely in place, leveled and adjusted to correct height. Anchor to supporting substrate where indicated, and where required for sustained operation and use without shifting or dislocation. Conceal anchorages wherever possible. Adjust counter tops and other work surfaces to a level tolerance of 1/16 inch (maximum offset, and plus or minus on dimension, and maximum variation in 2'-0" run from level or indicated slope). Provide anchors, supports, bracing, clips, attachments, etc., as required to comply with the local seismic restraint requirements. The Guidelines for Seismic Restraint of Kitchen Equipment, as prepared for the Sheet Metal Industry Fund of Los Angeles and endorsed by SMACNA, should be followed.
- D. Complete field assembly joints in the work (joints which cannot be completed in the shop) by welding, bolting-and-gasketing, or similar methods as indicated and specified. Grind welds smooth and restore finish. Set or trim flush, except for "T" gaskets as indicated.
- E. Provide closure plates and strips where required, with joints coordinated with units of equipment.
- F. Provide sealants and gaskets all around each unit to make joints airtight, waterproof, vermin-proof, and sanitary for cleaning purposes.
- G. Joints up to 3/8 inch wide will be stuffed with backer rod to shape sealant bead properly, at 1/4 inch depth.
- H. At internal corner joints, apply sealant or gaskets to form a sanitary cove of not less than 3/8 inch radius.
- I. Shape exposed surfaces of sealant slightly concave with edges flush with faces of materials at joint.
- J. Provide sealant filled or gasketed joints up to 3/8 inch joint width. Wider than 3/8 inch, provide matching metal closure strips, with sealant application each side of strips. Anchor gaskets mechanically or with adhesives to prevent displacement.
- K. Treat enclosed spaces, inaccessible after equipment installation, by covering horizontal surfaces with powdered borax at a rate of 4 ounces per square foot.
- L. Insulate to prevent electrolysis between dissimilar metals.
- M. Cut and drill components for service outlets, fixtures, piping, conduit, and fittings.
- N. Coordinate the installation of approved dry pendant sprinkler head in each cooler and freezer. Sprinkler heads should be installed in coolers/freezers only if required by local codes.
- O. Verify and coordinate the mounting heights of all wall shelves and equipment, with equipment located below them for proper clearances.

- P. Coordinate with the Plumbing and Electrical Divisions and provide holes in food service equipment for plumbing and electrical service to and through the fixtures, as required. This includes welded sleeves, collars, ferrules, or escutcheons. Locate these services so that they do not interfere with intended use and/or servicing of the fixture. No alterations of the building are allowed without written permission by the General Contractor and/or Architect. (i.e. – routing refrigerant lines).

3.4 ADJUSTING

- A. Test and adjust equipment, controls and safety devices to ensure proper working order and conditions.
- B. Repair or replace equipment, which is found to be defective in its operation, including units which are below capacity or operating with excessive noise or vibration.

3.5 CLEANING AND RESTORING FINISHES

- A. After completion of installation and completion of other major work in food service areas, remove protective coverings and clean food service equipment internally and externally.
- B. Restore exposed and semi-exposed finishes, to remove abrasions and other damages, polish exposed metal surfaces and touch-up painted surfaces. Replace work, which cannot be successfully restored.
- C. Polish glass, plastic, hardware and accessories, fixtures and fittings.
- D. Wash and clean equipment and leave in a condition ready for the Owner to sanitize and use.

3.6 TESTING, START-UP AND INSTRUCTIONS

- A. Delay the start-up of equipment until service lines have been tested, balanced, and adjusted for pressure, voltage and similar considerations and until water and steam lines have been cleaned and treated for sanitation.
- B. Make arrangements for demonstration of food service equipment operation and maintenance in advance with the Owner/Operator.
- C. Demonstrate food service equipment to familiarize the Owner and the Operator on operation and maintenance procedures, including periodic preventative maintenance measures required. Include an explanation of service requirements and simple on-site service procedures as well as information concerning the name, address and telephone number of qualified local source of service. The individual performing the demonstration shall be knowledgeable of operating and service aspects of the equipment.
- D. Provide a written report of the demonstration to the Owner, outlining the equipment demonstrated and malfunctions or deficiencies noted. Indicate individuals present at demonstration.
- E. Final Cleaning: After testing and start-up, clean the food service equipment and leave in a condition ready for the Owner to sanitize and use.

3.7 CLEAR AWAY

- A. Throughout the progress of their work, the Contractor shall keep the working area free from debris and shall remove rubbish from premises resulting from work being done by them. At the completion of their work, the Contractor shall leave the premises in a clean and finished condition.

END OF DOCUMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Double face mobile shelving.
 - 2. Through wall book depository.
 - 3. Under counter book cart.

1.2 SUBMITTALS

- A. Submit under provisions of Section 013300 - Submittal Procedures.
- B. Shop Drawings: Indicate shelving plan layout, and configuration.
- C. Product Data: Provide data on types, sizes and accessories.
- D. Manufacturer's Installation Instructions: Indicate component installation.
- E. Section 017700 - Closeout Procedures: Manual for Materials and Finishes.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 016000.
- B. Protect shelving finish from damage.

1.4 REGULATORY REQUIREMENTS

- A. Comply with IBC for fastening and bracing of shelving.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Double Face Book Shelving:
 - 1. Double Face Units: 36" W x 12" D x 42" overall height.
 - 2. Each individual mobile unit consists of 36" W back to back bookshelves with closed shared center panel.
 - 3. Mounting: Mobile.
 - 4. Base: Metal.
 - 5. Shelves: 3 plus base shelf.
- B. Through Wall Book Depository:

1. Basis of Design: Kingsley Hallpass Interior ThruWall, Model 43-8105
2. Material: Heavy duty stainless steel faceplate and depository door flap at exterior 4-sided aircraft grade aluminum chute that extends 8-inches to the interior.
3. Overall Dimensions: 22-7/8 W x 8-13/16" D x 11" H with an opening of 19-5/8" W x 3-1/2" H.
4. ADA Compliant.

2.2 ACCEPTABLE MANUFACTURERS

- A. Borroughs Wilsonstak.
- B. Tennsco Estey.
- C. Spacesaver.
- D. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.3 MATERIALS

- A. Sheet metal: Cold rolled, Class 1 steel.
- B. PLAM: NEMA LD3.
- C. Type: Weld Frame (WF) closed base shelf, 16 gage.
- D. Base Shelves: 18 gage steel, with backstop and raised end panels.
- E. Shelf End Brackets: 16 gauge steel.
- F. Adjustable Standard Shelves: Support book loads of 50 pounds per square foot. 18 gage.
- G. Shared Center Panel: Plam faced; attaching hardware.
- H. Steel end panels, canopy tops and shelves: Plastic laminate over particle board core with 3mm PVC edging to match PLAM. Mill edging to 1/8" radius.
- I. Include the necessary modifications to floor anchor the shelving system and meet seismic zone requirements without the use of top bracing.

2.4 ACCESSORIES

- A. As need to complete installation.
 1. Upright Filler Channels: 24 gage.
 2. Reinforcing gussets: 16 gage.
 3. Provide 18 gage 6 inch high dividers; 4 per shelf.

- 4. Corner and intermediate fillers: 18 gage steel, 2 panels with tightly fitting top. Same height as abutting frames. Same depth as bases.
- B. Hinged Periodical Shelves: Provide (6) 12 inch sloping shelves installable in typical single face units. 18 gage display and storage shelves. 16 gage pivots and shelf brackets.
- C. Docking Magnets.
- D. Kingsley, 44 Under Counter Book Cart: #30-9044, Aluminum Cart.

2.5 FINISH

- A. Frame: Clean, neutralize and etch. Electrostatic powder coated.
 - 1. Color: To be selected.
- B. PLAM: To be selected.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install shelving plumb and square.
- C. Bolt adjoining shelving units together to provide rigid installation.

3.2 CLEANING

- A. Clean work under provisions of 017000 - Execution.
- B. Clean shelving surfaces.

3.3 SCHEDULES

- A. Refer to drawings for number and location of units.
- B. Periodical Display Extra Shelving: Provide (6) 12 inch sloping shelves installable in typical single face units.

END OF SECTION

GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Electrically operated in ceiling mounted projection screens.
 - 2. Related accessories.
- B. Related Sections:
 - 1. Section 061000 - Rough Carpentry: In wall blocking.
 - 2. Section 092116 - Gypsum Board Assemblies.
 - 3. Division 26 - Electrical: Conduit and electrical service.

1.2 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Submit manufacturer's wiring diagram for electrically operated controls and detailed drawings showing concealed mounting.
- C. Product Data: Submit manufacturer's product data on materials, finishes, operation of unit, and electrical requirements.
- D. Manufacturer's Installation Instructions: Submit detailed installation instructions including rough-in measurements.
- E. Section 017700 - Closeout Procedures: Operation and Maintenance Manual.
 - 1. Submit parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
 - 2. Submit technical information for servicing operating equipment.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver projection screens after building is enclosed, other work within spaces where screens are to be installed is substantially complete, and installation of screens is ready to take place.
- C. Protect projection screens from damage before, during and after installation.

1.4 COORDINATION

- A. Section 013100 - Project Management and Coordination: Requirements for coordination.

- B. Coordinate installation of ceilings, walls, electric service power characteristics, and location.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Da-Lite, Lare Tensioned Cosmopolitan Electrol.
- B. Draper, Premier XL.
- C. Substitutions under provisions of Section 012500.

2.2 COMPONENTS

- A. General: Provide manufacture's standard UL-listed and -marked units consisting of case, screen, motor, controls, mounting accessories and other components as required for a complete installation and complying with requirements indicated for screen surface, controls and for case, motor and screen under description of operating and type.
- B. Viewing Surface of Screen: Comply with the following requirements for type of viewing surface:
 - 1. Matte white, washable surface, flame and mildew resistant. For use with and type projector where light can be controlled. GREENGUARD for Children and Schools certified.
- C. Motor-In-Roller-Operated Screens: Units designed and fabricated for recessed ceiling installation and complying with the following requirements:
 - 1. Screen Case: Fabricated in one piece from 22-gauge steel with flat back design with vinyl-covered or baked-enamel finish, with end caps forming mounting brackets.
 - 2. Motor: Instant reversing motor of size and capacity recommended by screen manufacturer, with permanently lubricated ball bearings, automatic thermal overload protection, preset limit switches to automatically stop screen in "up" and "down" position, and positive stop action to prevent coasting; mounted inside roller with vibration insulators to reduce noise transmission and remotely controlled as indicated.
 - 3. Screen: Mildew- and flame-resistant vinyl-coated glass fiber or polyvinyl fabric with viewing surface complying with requirements indicated, with top edge mounted on, and securely anchored to 3" diameter rigid metal roller supported by vibration- and noise-absorbing supports and bottom edge formed into a pocket holding a 3/8" diameter metal rod, with ends of rod protected by plastic caps.
 - a. Size of viewing surface: 120 (H) x 160 (W) inch.
 - b. Provide extra drop length of dimension and where indicated.
 - c. Provide 2 inch wide black border.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Project Management and Coordination: Verification of existing conditions before starting work.
- B. Verify rough-in opening and conditions are acceptable.
- C. Verify electrical power is available and of correct characteristics.

3.2 INSTALLATION

- A. Install projection screens at location indicated on Drawings.
- B. Coordinate with electrical connection.
- C. Securely anchor to supporting substrate.
- D. Install to produce smoothly operating screen with plumb and straight vertical edges and plumb and flat viewing surfaces when lowered.
- E. Test electrically-operated units to verify screen controls, limit switches, closure and other operating components are in optimum functioning conditions.

3.3 ADJUSTING

- A. Section 017000 - Execution: Requirements for balancing and adjusting.
- B. Adjust installed unit for smooth and balanced operation.

3.4 CLEANING

- A. Section 017700 - Closeout Procedures: Final Cleaning.
- B. Remove protective coverings from finished surfaces. Clean surfaces and components ready for inspection.

3.5 DEMONSTRATION

- A. Section 017700 - Closeout Procedures: Requirements for demonstration and training.
- B. Demonstrate electrically operated projection screens to Owner. Allow one hour duration for demonstration.

3.6 PROTECTION OF FINISHED WORK

- A. Section 017000 - Execution.
- B. Do not permit use of projection screens after installation.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Flammable Safety cabinet.

1.2 SUBMITTALS

- A. Submit under provisions of Section 013300 - Submittal Procedures.
- B. Submit product data indicating material characteristics, dimensions and specifics for proper installation and maintenance.
- C. Shop Drawings: Indicate equipment locations, large-scale plans, elevations, cross sections, rough-in and anchor placement dimensions and tolerances, and clearances required.
- D. Third party independent test report evaluations of fume hood.
- E. Section 017700 - Closeout Procedures: Operations and Maintenance Manual.

1.3 COORDINATION

- A. Coordinate the work under provisions of Section 013100 - Project Management and Coordination.

PART 2 PRODUCTS

2.1 GENERAL

- A. Supplier shall be responsible for furnishing all components required for complete installation of products including additional supports, framing, anchors, other necessary accessories/fasteners for anchorage as required for particular conditions of installation in each case.

2.2 SAFETY STORAGE CABINETS

- A. Acceptable Manufacturers:
 - 1. Basis of Design: Just-Rite.
 - 2. Flinn Scientific, Inc.
 - 3. SciMatCo.
 - 4. Substitutions accepted under Section 012500 - Substitution Procedures.
- B. Sure-Grip EX Flammable Safety Cabinets: Cabinets meet all applicable OSHA and NFPA standards.
 - 1. Color: Yellow.

2. 45 gallon capacity. Exterior dimensions: 43 W x 18 H x 18 D inch. 18 Gage CR steel.
3. Two self -closing doors with hazard labels on both doors.
4. Cylinder lock keyed to district standard.
5. Meet NFPA 1 and the International Fire Code.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that installation locations are ready to receive equipment, substrate surfaces are finished and mechanical and electrical services are in place.
- B. Beginning of installation means that the installer accepts the existing conditions.

3.2 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.
- B. According to standards required by authorities having jurisdiction.
- C. Anchor equipment securely in place.
- D. Sequence installation to accommodate required utility connections.
- E. Touch up surfaces with minor damage caused during installation and replace damaged components.

3.3 ADJUSTING

- A. Section 017000 - Execution: Requirements for starting and adjusting.
- B. Adjust operating equipment to most efficient operation.

3.4 CLEANING

- A. Prior to Final Acceptance, clean equipment items thoroughly in accordance with Section 017700 - Closeout Procedures.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. All drapery items at stage.
2. Rigging system at stage.
3. Track assemblies and related equipment, engineering and fabrication at platform.
Provision of any additional support or mounting work not shown on drawings which is required to complete installation of the systems.
4. Miscellaneous Hardware.
5. Bidder designed under stage storage system.
6. Cyclorama Curtain bid as Alternate 9.

B. Related Sections:

1. Section 052100 - Steel Joist Framing.
2. Section 053123 - Steel Roof Decking.
3. Section 055000 - Metal Fabrications: Slotted channel framing, tracks and runners.
4. Section 062000 - Finish Carpentry: Storage cart.
5. Section 092116 - Gypsum Board Assemblies.
6. Section 092216 - Non-Structural Metal Framing.

1.2 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product data: Submit manufacturer's specifications indicating drapery track systems, accessories, and attachment devices.
- C. Shop Drawings: Provide shop drawings including plans, elevations, detailing curtain panel sizes and construction details, track systems and mounting details.
- D. Samples: 1-square-foot sample of each fabric type prior to fabrication. Work shall not commence on fabrication until approval of samples has been transmitted to the Contractor.

1.3 QUALITY ASSURANCE

- A. Flame Resistance Requirements:

1. Provide stage curtains, which are certified to be flame resistant in accordance with requirements of NFPA 701.
2. Permanently attach code compliant label to each curtain indicating curtain is permanently and inherently flame resistant.
- B. Acceptable Firms: Subject to compliance with the requirements of these specifications, the following are considered acceptable manufacturers/installers:
 1. Stagecraft Industries, Portland, OR.
 2. Janson Industries, Canton, OH.
 3. LVH Entertainment Systems, Oxnard, CA.
 4. Substitutions: Under provisions of Section 012500.
- C. Qualifications: The Curtain and Rigging Contractors shall have completed at least ten satisfactory installations in the past three years similar to, or larger than, this project and shall submit the names of these installations to the Architect on request. The installation work shall be done only by craftsmen skilled and experienced in the type of work required.
- D. The Rigging Contractor shall visit the site and verify all dimensions and existing conditions, and shall be responsible for his equipment fitting the space intended. He shall also be familiar with the work of adjoining trades, particularly HVAC (ductwork), sprinklers, and electrical, and coordinate his work with theirs.
- E. The rigging shall incorporate a safety factor of eight times design live load of all components to ultimate failure.
- F. Pre-Installation Conference
 1. Convene one week prior to commencing work of this Section, under provisions of Section 013119.

1.4 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. Each drapery item shall be carefully wrapped and sealed for shipment in rigid and completely waterproof wrapping material, to insure against impact and water damage during shipment and storage.

1.5 COORDINATION

- A. Coordinate work under provisions of Section 013100.
- B. Field Measurements: Verify field measurements at job site and indicate on shop drawings.
- C. Consult and coordinate with electrical and HVAC contractors to locate hanging hardware, attachment points and access in ceiling area.

1.6 EXTRA MATERIALS

- A. Provide following packaged and clearly labeled spare parts:
 - 1. Spare operating cord of longest length used in the installation.

1.7 WARRANTY

- A. The supplier agrees to make all repairs, including replacement of material when necessary due to defects in workmanship and materials, without additional cost to the Owner, for a period of one year from the date of substantial completion of the installation.
- B. Deferred Work
 - 1. During the last 30 days of the warranty period, at a time agreeable to the Owner, the Contractor is to perform services as listed below, as part of this contract.
 - a. Inspect all work performed under this contract.
 - b. Repair and replace items found unsuitable due to defects in materials or workmanship.
 - c. Trim and adjust pipes, tracks and other items having vertical trim adjustment.
 - d. Re-trim all draperies, inspect and repair grommets and ties, adjust operating lines.

PART 2 PRODUCTS

2.1 FABRICS

- A. Acceptable Manufacturers:
 - 1. KM Fabrics, Inc.
 - 2. JB Martin Company.
 - 3. Dazian.
 - 4. Stagecraft Industries, Inc.
 - 5. Substitutions under provisions of Section 012500.
- B. Front Setting Curtain Fabric:
 - 1. Synthetic Velour: Napped fabric of 100% IFR filament polyester; 54" width minimum; not less than 48 backing ends per inch, 51 pile ends per inch, and 46 picks per inch; 1173 pile tufts per square inch; other characteristics as follows:
 - 2. Heavy Weight: Fabric weighing not less than 23 ounces per linear yard, with pile height of approximately 120 mils.

3. Color: To be selected.

C. Cyclorama Setting Fabric/Rear Wrap Around Curtains/Backdrop Curtains:

1. Synthetic Velour: Napped fabric of 100% IFR filament polyester; 54" width minimum, weighing not less than 13 oz per running yard before. not less than 51 backing ends per inch, 51 pile ends per inch, and 105 picks per inch; 1767 pile tufts per square inch; other characteristics as follows:
2. Light Weight: Fabric weighing not less than 13 ounces per linear yard, with pile height of approximately 110 mils.
3. Color: Black.

2.2 METAL

- A. Steel Tube: 16 gage, 1 ½ inch unless otherwise indicated.
- B. Steel Pipe: Schedule 40 1 ½ inch unless otherwise indicated.
- C. Supports, clamps, and anchors: Steel in manufacturer's standard gages, of adequate size to support loads. Painted after fabrication.
- D. Hardware: Connections, including shackles, sling links, turnbuckles, chain repair links, and the like, shall be of forged steel.
- E. Hangers: Provide hangers as required to support track between structural beam locations.
- F. Bolts and nuts SAE grade 5 or better.
- G. Miscellaneous Items: As required for a complete and operating installation.
- H. Support Chain/Aircraft Cable: Chain or aircraft cable of adequate size to support loads. Provide means for adjustment on all suspension points.
- I. Inserts, Bolts and fasteners: Manufacturer's standard units, unless otherwise indicated.

2.3 FABRICATION

- A. Curtains: Provide not less than 50% additional fullness for curtains, unless otherwise indicated. Horizontal seams and fabric less than half-width are not permitted.
 1. Vertical Hems: Provide vertical hems not less than 2" wide, double-stitched and machine-sewn with no salvage material visible from front of curtain.
 2. Turnbacks: Where specified, provide turnbacks, formed by folding 12" of face fabric back at leading edge of panels and securing by sewing across top hem and grommeting through both layers of fabric.
 3. Top hems: Reinforce top hems by double-stitching 3-1/2" wide heavy jute webbing to top edge with minimum 1" of face fabric turned under.

4. Pleats: Provide fullness in curtains by sewing 6" of additional material into box pleats spaced at 12" centers along top hem reinforcing. Provide not less than #2 brass grommets spaced at 12" and centered on box pleats, for tie lines or "S" hooks.
5. Bottom Hems: Except for curtains which hang to floor, provide bottom hems not less than 3" deep. For floor-length curtains, provide 5" hems with separate interior heavy canvas chain pockets equipped No. 8 jack chain. Stitch chain pocket so chain rides 2" above bottom edge of curtain.
6. Lining: Where specifically indicated, provide lining in same fullness as face fabric, and finished 2" shorter than face fabric. Unless otherwise specified, provide lining constructed of same fiber type as face fabric. Attach lining to face fabric along bottom line at seams with 4" long strips of heavy woven cotton tape.
7. Front Setting:
 - a. Valance: Fabricate valance of heavy weight synthetic velour. Fully lined.
 - b. Front Curtain: Fabricate front curtain of heavy weight synthetic velour, with 12" turnbacks at leading edge. Fully lined.

B. Curtain Track/Rigging

1. Tracks: Equip tracks of adequate size with live end double pulley and single pulleys of min. 4" dia. Provide curtain carriers of molded nylon bodies with wheels parallel to body.
2. Provide carriers with neoprene or rubber bumper, heavy-duty swivel eye and trim chain for attachment of curtain snap or "S" hook. Provide end stops for track and adjustable floor block designed to maintain proper tension on 3/8" operating line.
3. Acceptable Manufacturers:
 - a. Atlas Silk: Model No. 401 and No. 6 (batten) or 40 (track)
 - b. Silent Steel: Model No.280 and No. 28 Rotodrapier.
 - c. Stagecraft Model No. 400
 - d. Substitutions under provisions of Section 012500.
4. Battens: Fabricate battens from 1 1/2" diameter 16 gauge or Sch. 40 pipe with minimum number of joints as necessary for required lengths. Connect pipe by means of steel pipe sleeve inserts not less than 18 inches long, and secure with four bolts, or other equally secure method. Shop paint completed pipe battens with good quality paint and primer in black color.
5. Pivotal Fixtures: Gear operated for 360 degree rotation. Equip with U-bolts for batten attachment or Carriers for track attachment.

C. Under stage storage system:

1. Provide complete system including track and cart per section 055000 and 061000.

2.4 FINISH

- A. Steel Tube and Pipe: Paint with a flat, rust-inhibitive primer and finish coat paint.
- B. Supports, clamps, and anchors: Painted after fabrication.
- C. Shop paint completed pipe battens with good quality paint and primer in black color.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for supporting members, blocking, clearances, and other conditions affecting performance of stage curtain work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Furnish layouts for inserts, clips and other supports required to be installed for support of tracks.

3.3 INSTALLATION

- A. General: Install materials in accordance with manufacturer's printed instructions and recommendations, and to comply with governing regulations.
- B. Battens:
 1. Install battens by suspending at proper heights with steel chains or cables spaced at not than recommended spacing.
 2. Secure chains either directly to structures or to inserts, unistrut bolts, or other devices which are secure and appropriate to substrate, and which will not deteriorate or fail with age or elevated temperatures.
- C. Track:
 1. Drill track at intervals not greater than manufacturer's recommended spacing and fasten either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate to substrate, and which will not deteriorate or fail with age or elevated temperatures.
 2. Install track for center parting curtains with not less than 2'-0" overlap of track sections at center, supported by special lap clamps.
- D. Curtains:

1. Track-Hung: Secure curtains to track carries with track manufacturers special heavy-duty "S" hooks or snap hooks, insuring smooth operation.
 2. Batten Hung: Secure curtains to pipe battens with minimum 5/8 inch wide and 36 inch long braided cotton tie lines.
 3. Hang all curtains where shown on the drawings.
 4. Adjust curtains for level trim.
- E. Under Stage Storage System:
1. Install complete system.
- F. After installation, broom or vacuum curtains to remove dust and soil. Leave curtains in clean condition, with the nap laying evenly.
- G. Remove from the jobsite all debris caused by this work. Touch up any damage caused by the work. Leave areas of work broom clean.

3.4 FIELD QUALITY CONTROL

- A. Tune and test all work of this section.
- B. Rigging Contractor shall arrange for the Architect to conduct an observation visit to the site for verifying conformance to the contract documents after the installation is complete and the Contractor has determined that specified performance has been achieved.
1. Demonstrate to Architect that all work of this section operates smoothly and quietly. In presence of Owner and Architect, perform the following demonstrations:
 - a. Move all curtains from fully retracted position to fully extended position five times.
 - b. Remove and reinstall one carrier from track.

3.5 PROTECTION AND CLEANING

- A. After installation, broom or vacuum curtains to remove dust and soil. Leave curtains in clean condition, with the nap laying evenly.
- B. Remove from the jobsite all debris caused by this work. Touch up any damage caused by the work. Leave areas of work broom clean.
- C. Protect curtains after installation from damage during construction.

END OF SECTION

GENERAL

1.1 SUMMARY

A. Section Includes:

1. Basketball Equipment.
2. Gym Control Center.
3. Volleyball Equipment.
4. Wall Padding.
5. Mat storage.
6. Overhead Gym Divider Curtain.

B. Related Sections:

1. Section 055000 - Metal Fabrications: Structural steel supports.
2. Section 096466 - Wood Athletic Flooring.

1.2 SUBMITTALS

- A. Submit under provisions of Section 013300 - Submittal Procedures.
- B. Shop Drawings: Show layout, sizes, dimensions, installation details, fasteners, finishes, and colors. Include mounting details to structural framing and masonry walls.
- C. Submit product data indicating material characteristics, dimensions and specifics for proper installation and maintenance.
- D. Section 017700 - Closeout Procedures: Operations and Maintenance Manual.

1.3 COORDINATION

- A. Coordinate the work under provisions of Section 013100 - Project Management and Coordination.
- B. Coordinate with cushioned wood flooring installer for location of floor sleeves and flooring construction at these locations.

1.4 WARRANTY

- A. Provide manufacturer's standard warranty on all athletic equipment under provisions of Section 017700 - Closeout Procedures.
- B. Special Warranties:
1. Electric backstop winches: 5 year replacement warranty.

2. Glass backboard: Limited Lifetime warranty.

PART 2 PRODUCTS

2.1 GENERAL

- A. Supplier shall be responsible for furnishing all components required for complete installation of products including additional supports, framing, anchors, other necessary accessories/fasteners for anchorage as required for particular conditions of installation in each case.

2.2 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Porter Athletic Equipment Co, Barclay Dean Architectural Products, 425.368.2020. (<http://www.porterathletic.com/>)
 1. Local Representative: Todd Wylie, toddw@bdap.com, 206.355.9276.
- B. Draper, Inc. (<http://www.draperinc.com>)
 1. Local Representative: Shane McCorkle, shane.mccorkle@draperinc.com, 765.856.1225.
- C. Performance Sports Systems, , 503.650.8025. (<http://www.perfsports.com/>)
 1. Local Representative: Tim Marshall, Northwest School Equipment, tim@northwest-school-eq.com, 206.650.8025.
- D. Substitutions accepted under Section 012500.

2.3 BASKETBALL BACKSTOPS

- A. Components, ceiling mounted backstop assemblies:
 1. No. 950 electric operated ceiling mounted forward folding backstop with No. 10797 "SAF-Strap" backstop safety lock.
 2. No. 208-000 center strut-mount 72" x 42" x 1/2" rectangular fully tempered glass backboard with unitized steel or aluminum frame and prostyle center strut.
 3. No. 326 Pro Pad Bolton backboard padding.
 4. No. 245-500 Ultra-Flex Goal with mounting hardware and anti-whip net.
 5. No. 712 remote control UL listed electric winches with 3/4 hp. motors.
 6. Control by means of Powr-Touch 2.5 System.
- B. Components, wall mounted, side folding assemblies:
 1. No. 220 wall mounted side folding backstop.

2. No. 208-000 center strut-mount 72" x 42" x 1/2" rectangular fully tempered glass backboard with unitized steel or aluminum frame and prostyle center strut.
3. No. 326 Pro Pad Bolton backboard padding.
4. No. 245-500 Ultra-Flex Goal with mounting hardware and anti-whip net.
- C. Provide manual height adjusters at all backstop locations.
- D. All units to use saddle cut die welds. Pinch welds not permitted.
- E. Provide cross framing members to attach backstop assemblies to roof structure. Color: Black.

2.4 GYM CONTROL CENTER

- A. Total Gymnasium Control Center, No. 2550 Powr-Touch 2.5 Control System.
- B. Wall mounted Touch Pad control system.
- C. System to eight pieces of equipment to move simultaneously.
- D. Relay panel #12555-200 for up to eight pieces of equipment. Include correct number of relay panels for all functions specified.
- E. Custom Equipment Legend #92555-100.

2.5 VOLLEYBALL EQUIPMENT

- A. Volleyball System:
 1. Model 1991 Powr-line System.
 - a. Standards: 3 1/2" diameter extruded aluminum with winch, clear anodized finish, No. 01971-000 pair.
 - b. Net with pulley tensioner, international style with antenna, No. 02295-640, one per pair of standards.
 - c. Safety Padding: Polyethylene foam padding covered with nylon-reinforced vinyl. Color: Grey.
 - d. Quantity: Match gamelines.
- B. Floor Sleeves with brass floor plate: No. 00872-200.

2.6 OVERHEAD GYM DIVIDER CURTAIN

- A. Center Roll Curtain: Porter, 2080 - Ceiling suspended, power operated with system for storage at ceiling. Curtain shall be center roll-up type, storing to a height not to exceed 14" below structural attachment support without the use of hoist cables or belts.

1. Provide solid vinyl, polyester reinforced 19 oz vinyl coated fabric. Color: Gray. ASTM E-84 Class A Rating and NFPA-701 large scale, ULC S-109 large and small scale.
2. Begin upper section of open polyester type interlocking grid weave coated polyvinyl chloride with an approximate 45 to 50% open area at 4'-0" above floor. Color: Gray. Flame resistant.
3. Seams: Electronically welded.
4. Bottom Pad: Bottom support tube encased in closed cell shock absorbing type protective foam rubber padding.
5. Line Shaft Safety Lock: Internal centrifugal force type lock mechanism into the line shaft to automatically lock equipment if lowering speed surpasses expected and safe velocity.
6. Hoist Mechanism: by means of tubular-type motors (110 volt, 3.8 amp, single phase), gear reducer, brake type limit switches and an automat reset, thermal overload protection. Power to each motor shall be accomplished by means of a self-retracting cable reel system.
7. Control by means of Powr-Touch 2.5 System.

2.7 WALL PADS

- A. Wall Padding: 00575-015 - Meets the requirements of NFPA 101 Life Safety for Class A rating, 2 inch thick fire retardant foam filler and OSB or plywood backing, 5.5 lb density, and covered with vinyl coated polyester cover including fabric covered nailing margin at top and bottom for security to wall. Attach with 00347-100 and 00347-300 "Z" clips.
 1. Basis of Design: Porter, FireSafe.
 2. Color: To be selected. (WP-1)
 3. Size: Custom heights. See drawings for heights and locations.
 4. Provide molded inserts at all outlets.

2.8 MAT STORAGE

- A. Ceiling Mounted Stationary, Mat Mover; Dual Mats - Model 911070002
 1. Design Load:
 - a. Dead Load: 1008 lbs.
 - b. Live load: 4809 lbs.

2. Ceiling suspended, stationary unit. Motor drive unit and at least two lifting drum units connected by 2- 3/8 inch OD line shaft. Hoist capable of lifting and supporting two standard 45 x 45 ft wrestling mats weighing one pound per square foot. Safety strap.
 3. 3 HP motor operating on 208V or 460V 3 phase power with integrated brake and automatic overload protection. Operate motor in conjunction with a 187.5:1 ratio gearbox assembly. Under no load conditions, RPM of motor is 1725; RPM of drum is 9.2. 4.5 ft/min approximate hoist speed.
 4. Special dual keyed, flush wall mounted momentary key switch with stainless steel cover plate.
 - a. Steel enclosure.
 - b. Cover mounted main disconnect switch.
 - c. Control circuit transformer with primary and secondary protection.
 - d. Audible motion alarm that activates when unit is raising or lowering.
 5. Steel cables: Two 5/16 inch diameter, 6 strand, 37 wires per strand, fiber core, 4.26 ton breaking strength.
 6. Double 24 ft length sling. 19 oz vinyl. Sling color: Black. Attach to load bar by 2 inch wide nylon straps, encompassing the full sling perimeter, terminating at the load bar with a load rated (5,000 lb breaking strength) ring at each end.
 - a. Load bar: 2 x 6 inch heavy wall tube with welded hooks at regular spacing intervals.
- B. Ceiling Mounted Stationary Mini Mat Mover - Model 91105100
1. Design Load: 3160 lbs.
 2. One fully welded steel ladder frame construction carriage comprised of two 4 inch continuous C channel side-rails, with fully assembled drive and lifting mechanism. Carriage suspended by two heavy duty steel hangers positioned 7'-9" OC. Hoist, load bar and sling capable of lifting and supporting up to three 14 x 42 ft wrestling mats, weight one pound per square foot.
 3. Frame Assembly: Fully enclosed control panel factory wired. Provide 230 volt control panel, 3 phase, including a cover mounted main disconnect switch, control circuit transformer with primary and secondary protection and two full voltage reversing contactors with motor circuit protection. Audible motion alarm activated when unit is in vertical travel cycle. Redundant UP limit switch pre-wired parallel with standard UP limit switch for fail safe operation.

4. One heavy duty 1.5 HP C-face electric motor with integral 6 ft lb. brake mechanism and automatic overload protection, attached to a 200:1 ratio gearbox assembly. Under no-load conditions, RPM of motor is 1725; RPM of drum is 4.5. Approximate hoist speed 4.5 feet per minute in both up and down travel cycles.
5. Controlled by special dual key, flush wall mounted momentary key switch, stainless steel cover plate mounted into a recessed two gang masonry wall box.
6. Two steel cables: 5/16 inch; 6 strand 37 wires per stand fiber core, 4.26 ton breaking strength. Each secured to a 4 inch diameter drum and terminating at a heavy wall 2 inch x 6 inch x 13 ft long steel load bar.
7. 19 oz vinyl sling. Meet requirements of ASTM E84 Class A Rating. Attach to load bar by means of a 2 inch wide nylon strap, encompassing the full sling perimeter, terminating at the load bar with a load rated (5,000 lb breaking strength) ring.
8. Saf-Strap for Mat Mover.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that installation locations are ready to receive equipment, substrate surfaces are finished and anchorages are adequate to support loads.
- B. Beginning of installation means that the installer accepts the existing conditions.

3.2 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions, drawings, and approved shop drawings.
- B. Install anchor fasteners, test anchors to verify that they will support equipment securely without unwanted movement or deflection.
- C. Adjust and lubricate moving parts to operate smoothly, quietly, without binding.

3.3 CLEANING

- A. Prior to Final Acceptance, clean equipment items thoroughly.
- B. Install goals and nets on basketball backstops.

3.4 DEMONSTRATION

- A. Provide demonstration to Owner personnel as to the proper use and operation of athletic equipment.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Scorekeeper and timer system.
2. Shotclocks.
3. Controller.
4. Replacement of existing gym scoreboard and shot clock bid as Alternate 6.

B. Related Sections

1. Section 055000 - Metal Fabrications: Structural steel supports.
2. Division 26: Electrical.

1.2 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Submit product data indicating material characteristics, dimensions and specifics for proper installation and maintenance.
- C. Section 017700 - Closeout Procedures.

1.3 COORDINATION

- A. Coordinate the work under provisions of Section 013100.

1.4 WARRANTY

- A. Provide manufacturer's standard warranty on all equipment under provisions of Section 017700.

PART 2 PRODUCTS

2.1 GENERAL

- A. Supplier shall be responsible for furnishing all components required for complete installation of products including additional supports, framing, anchors, other necessary accessories/fasteners for anchorage as required for particular conditions of installation in each case.

2.2 SCOREBOARDS AND TIMER SYSTEM

A. Acceptable Manufacturers:

1. Basis of Design: Daktronics, Inc.

2. Nevco.
 3. Substitutions accepted under Section 012500.
- B. Electronic Basketball Scoreboard:
1. Daktronics, Inc. Model BB-2103.
 2. Dimensions: 6'-0"H x 8'-0"W x 6" deep.
 3. Construction: All aluminum.
 4. LED digit Technology, PanaView. LED color: Amber clock/colon, PERIOD and PLAYER/FOUL digits and bonus indicators with Red score and FOULS digits and possession indicators.
 - a. Digits: Clock and score digits 13" high; PERIOD, FOULS and PLAYER/FOUL digits 10" high; bonus indicators 4" high; possession arrows 3" high and 7 bar segments per digit.
 5. Home and Guest Captions: 6" high all others 4" high.
 6. Maximum Power Demand: 200 watts at 120v.
 7. Provide custom team name in place of home.
 8. Horn: Vibrating horn mounted inside the scoreboard cabinet behind the face.
 9. Power cord.
 10. Non-backlit ID Panel: 17" tall x 21" side log in upper right corner.
 11. Control Console: Operate from scoreboard control console below.
 12. Protective screen.
 13. Quantity: 1 Base Bid and 1 Alternate.
 14. Color: To be selected.
- C. Shot Clocks:
1. Daktronics, Inc. No. BB 2114.
 2. Dimensions: 1'-7"H x 1'-10"W x 6"D.
 3. Construction: All aluminum.
 4. LED digit Technology, PanaView.
 - a. Digits: 13" high, red LEDs with 7 bar segments.
 5. Control Console: Operate from scoreboard control console below.

6. Horn: Vibrating type mounted on scoreboard face.
7. Power cord.
8. Quantity: 1 Base Bid and 1 Alternate.
9. Color: Black.
10. Hinged metal mesh protective screen painted to match scoreboard.

2.3 ACCESSORIES

- A. Controllers: Daktronics, All Sport 5000 Scoreboard Controller.
 1. Provide hand-held start/stop switch for game clock control.
 2. Provide hand-held reset switch for shot clock control to support two independent reset times.
 3. Provide 2.4GHz Radio transmitters and receivers for scoreboard and shot timer communication.
 4. Provide one control console for each scoreboard.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that installation locations are ready to receive equipment, substrate surfaces are finished and anchorages are adequate to support loads.
- B. Beginning of installation means that the installer accepts the existing conditions.

3.2 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions, drawings, and approved shop drawings.
- B. Install anchor fasteners, test anchors to verify that they will support equipment securely without unwanted movement or deflection.

3.3 CLEANING

- A. Prior to Final Acceptance, clean equipment items thoroughly.

3.4 DEMONSTRATION

- A. Provide demonstration to Owner personnel as to the proper use and operation of scoreboard equipment.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Top loading electric kiln and accessories.
- B. Related Sections
 - 1. Division 23 - Mechanical.
 - 2. Division 26 - Electrical.

1.2 COORDINATION

- A. Coordinate the work under provisions of Section 013113.
- B. Coordinate with mechanical and electrical contractors for installation of kiln hood and kiln exhaust system.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver kilns and accessories in manufacturer's original packaging with protective covering intact.
- B. Do not stack other items on top of packaged kilns during transportation and storage. Stack kilns with top end up.
- C. Protect from damage due to weather, excessive temperature, and construction operations.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Olympic Kilns.
- B. Substitutions: Under provisions of Section 012500.

2.2 KILN

- A. Model: 2327HE.
 - 1. Volume – Cu. ft.: 7.
 - 2. Inside Dimension – Inches: 23 3/8 x 27
 - 3. Outside Dimension: 36 x 46.5 x 47 inches
 - 4. Brick Thickness: 3"
 - 5. Instrumentation: Genesis Touchscreen Controller
 - 6. Maximum Temperature – Cone 10 – 2350 °F
 - 7. Average Firing Time – cone 10: 8-10 hours.
 - 8. Approximate Shipping Weight: 350 lbs.

2.3 ACCESSORIES

- A. Lid Assist.
- B. Additional ducting: Vent Master, Flexible, heavy gage aluminum duct and clamps.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that installation locations are ready to receive equipment.
- B. Beginning of installation means that the installer accepts the existing conditions.

3.2 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions. Coordinate installation with adjacent work to ensure proper clearances.
- B. Install units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- C. Set units level, plumb, properly aligned, and securely in place.
- D. Test for correct operation of equipment prior to Final Acceptance. Make necessary adjustments.
- E. Verify that accessories required have been furnished and installed.

3.3 CLEANING

- A. Prior to Final Acceptance, remove packing material and clean equipment items thoroughly.

END OF SECTION

DIVISION 12
FURNISHINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Room darkening roller shades for windows, manual and motor operated.
- B. Related Sections:
 - 1. Section 061000 - Rough Carpentry: Blocking for attachment of shade brackets.
 - 2. Division 26 - Electrical.

1.2 SUBMITTALS

- A. Section 013300 - Submittal Procedures.
- B. Drawings: Submit fabrication details and erection drawings including field measured dimensions.
- C. Product Data: Submit data indicating physical and dimensional characteristics and operating features.
- D. Samples: Submit one sample, 3 inch x 5 inch illustrating shade materials and colors.
- E. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.
- F. Section 017700 - Closeout Procedures.
- G. Materials and Finishes Manual: Submit methods for maintaining roller shades, precautions regarding cleaning materials and methods, and instructions for operating hardware and controls.

1.3 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Minimum 3 years documented experience, approved by window shade manufacturer.

1.4 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.5 COORDINATION

- A. Section 013100 - Project Management and Coordination.

- B. Coordinate the Work with window installation and placement of concealed blocking to support shades.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver prefabricated shades to site in manufacturer's original, labeled and unopened protective packaging. Labels to be intact and legible; identifying manufacturer and contents; uniquely identified for each intended location.
- B. Store products off ground, under cover, protected from elements and construction activities. Schedule delivery to prevent delays, but minimize on-site storage.

1.7 WARRANTY

- A. Operating Components: Provide 10 year warranty from Date of Substantial Completion. Warranty shall contain provisions that installation shall remain operational, without fault, for the warranty period. Warranty shall include all operating parts.
- B. Motor and Electrical Components: Provide 2 year warranty from Date of Substantial Completion. Warranty shall contain provisions that installation shall remain operational, without fault, for the warranty period; including coverage of motor, electrical controls and override circuits.
- C. Shadecloth: Provide Warranty for a minimum period of 10 years from Date of Substantial Completion. Warranty shall contain provisions that the shadecloth will not deteriorate, sag or warp and will not be unfit for the use intended for the warranty period.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Draper, Flex Shade (Motorized) and FlexShade XD (Manual). Spiceland, Indiana, 800.238.7999. <http://www.draperinc.com/index.asp>.
 - 1. Local Rep: Ron Wathen, 415.744.4952.
- B. MechoSystems, Long Island City, NY, 718.729.2020. <http://www.mechoshade.com/>
 - 1. Local Rep: Don Myrick, 206.842.1846.
- C. Atrium Shade, Seattle, WA, 206.783.6725. <http://atriumshade.com>
- D. Solarfective Products Limited, Toronto, Ontario, Canada 800.421.5578. <http://www.solarfective.com>
 - 1. Local rep: Bill Littler, 206.619-3446.
- E. Substitutions: Under provisions of Section 012500 - Substitution Procedures.

2.2 MOTORIZED ROLLER SHADES

- A. Motorized vertical roll-up, fabric, window shade with motors, controls, mounting brackets, and other components necessary for complete installation.
 - 1. Endcaps and headbox. Mechanically attach.
- B. Shade Motor and Control System.
 - 1. Intelligent Technology Motor - 110 VAC motor with built-in low voltage controller with 3-wire pig tail and data cable. No external motor controls are required. Available with optional three prong plug. Tubular motor concealed inside each shade roller tube.
 - a. Individual Control, Group Control & Individual and Group Control:
 - 1) 6 button RS 485 switch- for 2 groups up/stop/down or 1 group up/stop/down and 3 presets.
- C. Roller: Fabricated from extruded aluminum or steel. Diameter, wall thickness, and material selected by manufacturer to accommodate shade size. Provide with roller idler assembly of molded nylon and zinc-plated steel pin. Sliding pin to allow easy installation and removal of roller. Fabric connected to the roller tube with LSE (low surface energy) double sided adhesive specifically developed to attach coated textiles to metal. Adhesive attachment to eliminate horizontal impressions in fabric.
- D. Endcaps: Stamped steel with universal design suitable for mounting to ceiling, wall, and jamb. Provide size compatible with roller size.
 - 1. Endcap covers to match fascia/headbox finish.
- E. Shade slat: Slat encased in heat-seamed hem.

2.3 MANUAL ROLLER SHADES

- A. Manually Operated Window Shades with Independent Control: Vertical roll-up, fabric window shade with components necessary for complete installation.
 - 1. Operation: Bead chain and clutch operating mechanism allowing shade to stop when chain is released. Designed never to need adjustment or lubrication. Provide limit stops to prevent shade from being raised or lowered too far.
 - a. Clutch mechanism: Fabricated from POM thermoplastic with welded 0.354 inch primary steel post with rotational bearing, overrunning design, and positive mechanical engagement of drive mechanism to tube. Black color. Center bead chain placement for right or left hand operation and accommodates side channel with no adjustment of chain location.
- B. Shade slat: Slat encased in heat sealed hem.
- C. Mounting:

1. Headbox: Aluminum fabrication with removable closure, endcaps and back and top cover piece. Mechanically attach.
 2. Endcaps: Stamped steel with universal design suitable for mounting to ceiling, wall and jamb. Provide size compatible with roller size. Endcap covers to match fascia or headbox color.
- D. Rollers: Extruded aluminum roller tube of appropriate diameter to support shade fabric with minimal deflection.
1. Minimum Roller Tube Diameter: 1.56 inches.
 2. Fabric Connection to Roller Tube: Spline fabric/roller attachment system to allow shade fabric to be removed from roller without having to remove roller from brackets.
 3. Fabric Length: 6 inches greater than window height minimum.
 4. Bottom Slat: 13/16 inch aluminum dowel, encased in bottom hem with heat sealed ends.
- E. Crank handles: Heavy duty detachable anodized aluminum and chrome plated steel handle. Provide 3 piece assembly where necessary to meet height requirements.

2.4 SHADECLOTH

- A. Draper, SheerWeave 2700 series. Duplex twill fabric. Two-sided fabric. 36% Fiberglass, 64% Vinyl on Fiberglass.
1. Location: Exterior Windows.
 2. NFPA 710-10 TM#1.
 3. California U.S. Title 19.
 4. NFPA 101 Class A Rating.
 5. ASTM G21 Fungal Resistance.
 6. ASTM E2180 Bacteria Resistance rated.
 7. Greenguard Gold.
 8. 1% Opening:
 - a. Mesh Weight: 14.6 oz./sq. yd.
 - b. Average Thickness: 0.027 inch.
 9. Color: Refer to Finish and Color Schedule (RS-1).
- B. Draper, SheerWeave Style SW7500 Blackout. 100% Polyester with Acrylic Coating.

1. Location: Between interior spaces and relites.
2. ASTM G21 Fungal Resistance.
3. ASTM E2180 Bacteria Resistance rated.
4. Greenguard Gold.
5. Mesh Weight: 11.14oz./sq. yd.
6. Average Thickness: 0.016 inch.
7. Color: Refer to Finish and Color Schedule (RS-2).

2.5 FINISH

- A. Headbox, fascia and side channels: Clear anodized aluminum.

2.6 FABRICATION

- A. Prior to fabrication, verify actual opening dimensions by accurate site measurements. Adjust shade sizes for proper fit at each window.
- B. Cut shade cloth to suit window size by means of edge sealing hot knife system. Top of shade cloth to be attached to SnapLoc spline. Bottom of shade cloth to include smooth, concealed hembar; hotsealed on all four sides.
- C. Furnish shade cloth in lengths not less than 12 inches longer than actual window dimensions permit shade to be operated full length without tearing from roller.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine conditions under which shades are to be installed.
- B. Report unsatisfactory conditions to architect in writing.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install shades in accordance with recommended manufacturer's installation instructions.

3.3 ADJUST AND CLEAN

- A. Adjust shade operating assemblies for smooth and proper operation.
- B. Clean soiled shade surfaces and components with a mild soap and water solution only. Do not use steam, hot water, bleach or any abrasive or solvent-based cleaners for cleaning.

3.4 SCHEDULE

- A. Note: All dimensions nominal. Verify in field.
- B. Motorized:
 - 1. Auxilliary Gymnasium: Surface mounted within frames; 6 motors and 1 zone.
 - 2. Music: Surface mounted within frames; 4 motors and 1 zone.
 - 3. Library: Surface mounted within frames; 6 motors and 1 zone.
- C. Manual:
 - 1. Door Frames: Provide manual roller shades at all glazing sections per drawings.
 - 2. At doors with cut -out area, provide manual roller shades at opening frame.
 - 3. Relites: Provide manual roller shades at all glazing sections.
 - 4. At all exterior windows not receiving motorized roller shades.
 - 5. Do not provide at exterior windows in corridors.
 - 6. Do not provide at exterior windows at interior stairs.
 - 7. Do not provide at Vestibule 060.
 - 8. Provide headbox at exposed locations.
 - 9. Provide spring loaded chain tension device at window heads above 8 foot.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Through ventilating instrument storage casework with acoustical backing.
2. Cello rack.

B. Related Sections:

1. Section 061000 - Rough Carpentry: Blocking as required.

1.2 SUBMITTALS

A. Submit under Section 013300 - Submittal Procedures.

B. Product Data: Submit applicable performance data, and application recommendations and limitations.

C. Shop Drawings: Submit design and installation drawings showing product components in assembly with adjacent materials and products.

D. Maintenance recommendations.

1.3 PROJECT CONDITIONS

A. Environmental Requirements: Do not install music library system until all mortar, wet and dust producing work is completed.

B. Field Measurements: Obtain required field measurements from the Contractor and indicate on Shop Drawings.

1.4 WARRANTY

A. Provide manufacturer's written warranty indicating manufacturer's intent to repair or replace components of music education storage casework that fail in materials or workmanship within 10 years from date of Substantial Completion. Failures are defined to include, but are not limited to, the following:

1. Delamination or other failures of glue bond of components.
2. Warping of components not resulting from leaks, flooding, or other uncontrolled moisture or humidity.
3. Failure of operating hardware.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Design system of storage cabinets for musical instruments which will be chip and abrasion resistant under normal usage and will protect instruments and cases from damage under normal use.
- B. Design shelving to withstand continuous use without surface or front edge breakdown.
- C. Seismic Performance: Comply with ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads" based upon seismic design criteria indicated.

2.2 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Wenger Corporation, 555 Park Drive, Owatonna, MN 55060, 507/455-4100.
 - 1. Music Casework: AcoustiCabinets.
 - 2. Cello rack.
 - 3. Local Contact: Jeff Kirkpatrick, 503.648.2463.
- B. TMI System Design Corp., Dickinson, ND 800.456.6716.
 - 1. Local Contact: ISEC, 425.488.1333.
- C. Substitutions: Under provisions of Section 012500.

2.3 MATERIALS

- A. Side Panels and Divider Panels: Minimum 3/4 inch thick industrial (cabinet) grade particleboard average 45 pound density; ANSI A208.1 with thermoset polyester laminate on both sides for balanced construction.
- B. Cabinet Shelving and Bottom Panels:
 - 1. Cabinets Up to 27 Inches Wide: One-piece high density polyethylene with 1-3/8 inch radius front edge (Patented) or textured high density polyethylene 3/32 inch thick laminated to 1 inch industrial grade medium density particleboard.
 - 2. Cabinets Over 27 Inches Wide: One-piece high density polyethylene with radius front edge and 3/16 inch wall thickness supported by tube frame or textured high density polyethylene 3/32 inch thick laminated to 1 inch industrial grade medium density particleboard.
- C. Acoustically Absorptive Material.
- D. Doors and Hardware:

1. Grille Doors: Welded steel grille construction with powder coat finish. Welds at T-joints must be 360°.
 - a. Hinges, 5-knuckle institutional type hinge. .095 inch thick. Hinge will support 315 lbs. dynamic vertical load. 2¾ inch long. Fastened to cabinet with through-bolt construction; attachment by wood screws not acceptable. Two hinges on compartment doors, four on full height doors.
 - b. Locking Slide-Bolt: All doors shall be factory provided with locking slide-bolt designed for padlocks, with formed steel strike plate through-bolt connected to cabinet end panel; 12 gauge steel. Provide clear plastic label holder for identification card insert. Finish: Powder paint coating.
 - E. Back Panels: ½ inch thick particleboard core finished with thermally fused melamine laminate or 7/32 inch reinforced with ¾ inch stretchers panels held in a dado groove and lag screwed in place.
 - F. Edging: Heat bonded 3mm beveled PVC edge-banding to match laminate.
 - G. Finish Hardware:
 1. Joinery Hardware: Two inch, 1/4-20 panel connectors with 15mm head diameter, and steel thread inserts. Finish: Powder paint coating, color - oyster.
 2. Cabinet Levelers: Four leveling glides within minimum 3/8 inch diameter threaded rod in steel corner brackets, six glides for cabinets with divider panels.
 - H. Cabinet Back Panel:
 1. Standard cabinet back to be 1/4" thick prefinished hardboard, to match interior of side and top panels.
 - I. Factory applied plywood base.
- 2.4 ACCESSORIES
- A. Vertical Closure Kit: Provide visual closure between wall and cabinet. Constructed of .750 inch thick thermoset composite wood to match cabinet side panels. Will fit 3/4" to 30" wide opening.
 - B. Top Back Filler Kit: Provide visual closure between back wall and top panel of cabinet. Constructed of .750 inch thick thermoset composite wood to match cabinet top panels. Will fit 10" and 20" deep openings.
- 2.5 FINISH
- A. Oyster.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Installation in accordance with manufacturer's instructions.

3.2 ADJUSTING

- A. Adjust all hardware for smooth operation.

3.3 CLEANING

- A. Clean all surfaces of soil.
- B. Remove all packaging materials and construction debris.

3.4 SCHEDULES

- A. Provide in Room 148.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Telescoping Bleachers: Operable systems of multiple-tiered benches on interconnected, folding supports which permit closing, without requiring dismantlement, into nested relationship for purposes of storing or moving.

B. Related Sections:

1. Section 033000 - Cast-in-Place Concrete: Floor levelness.
2. Section 096466 - Wood Athletic Flooring.

1.2 REFERENCES

A. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
3. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
5. ASTM A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
6. ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.

B. American Welding Society:

1. AWS D1.1 - Structural Welding Code- Steel.

C. National Fire Protection Association:

1. NFPA Standards for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures.

D. National Institute of Standards and Technology:

1. NIST PS 1 - Structural Plywood.

2. NIST PS 20 - American Softwood Lumber Standard.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product literature and installation instructions for each type of telescoping bleacher and accessory indicated.
- B. Shop Drawings: Submit in accordance with Section 013300 indicating layout of telescoping bleacher units coordinated with field measurements and including seat heights, row spacing and rise, aisle widths and locations, overall dimensions in closed and open position, connections and relationships to adjoining work, accessories, types of materials, and finishes.
- C. Samples: Submit sample of seat materials, fabrics, colors and finishes as selected by Architect from manufacturer's standard lines.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017700 - Closeout Procedures.
- B. Operation and Maintenance Manual: Submit detailed instructions for operation and maintenance of each type of bleacher unit specified.

1.5 QUALITY ASSURANCE

- A. NFPA Standard: Comply with applicable requirements of NFPA 102, "Standard for Assembly Seating, Tents, and Air-Supported Structures" and specifically with Chapter 9, "Folding and Telescopic Seating," except where more stringent requirements are indicated or imposed by authorities having jurisdiction.
- B. Installer Qualifications: Engage experienced installer to perform work of this section who has specialized in installation of types of telescoping bleachers similar to that required for this project and who is acceptable to, or certified by, manufacturer of telescoping bleachers.

1.6 WARRANTY

- A. Manufacturer's Product Warranty: Submit manufacturer's standard warranty form for telescoping bleachers. This warranty is in addition to, and not a limitation of other rights Owner may have under Contract Documents.

- 1. Warranty Period: Five years from Date of Substantial Completion.

1.7 MAINTENANCE

- A. Extra Materials: 5 extra seat modules.

PART 2 PRODUCTS

2.1 SYSTEM PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design, engineer, fabricate, and install telescoping bleachers to withstand structural design loads specified in NFPA 102, Chapter 5, except where more stringent requirements are indicated or imposed by authorities having jurisdiction without exceeding allowable design working stresses of materials involved, including anchors and connections. Apply each load to produce maximum stress in each respective component of each bleacher unit.
 - 1. Gymnasium seat assembly: Design to support and resist, in addition to its own weight the following forces:
 - a. Live load of 120 lbs per linear foot on seats and decking.
 - b. Uniformly distributed live load of not less than 100 lbs per sq. ft. of gross horizontal projection.
 - c. Parallel sway load of 24 lbs per linear foot of row combined with (b.) above.
 - d. Perpendicular sway load of 10 lbs per linear foot of row combined with (b.) above.
 - 2. Hand Railings, Posts and Supports: Engineered to withstand the following forces applied separately:
 - a. Concentrated load of 200 lbs applied at any point and in any direction.
 - b. Uniform load of 50 lbs per foot applied in any direction.
 - 3. Guard Railings, Post and Supports: Engineered to withstand the following forces applied separately:
 - a. Concentrated load of 200 lbs applied at any point and in any direction along top rail.
 - b. Uniform load of 50 lbs per foot applied horizontally at top rail and a simultaneous uniform load of 100 lbs per foot applied vertically downward.
- B. Operation: Provide telescoping bleacher units incorporating manufacturer's standard telescoping system of seating and understructure members that permit opening and closing with respect to adjacent rows, that allow any or all rows to be locked open for use, and that close with vertical faces of upper skirts in same vertical plane.

2.2 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Hussey Telescoping Gym Seat System, Maxam 26.
 - 1. Contact: Troy Barrows, tbarrows@nor-pacseating.com

- B. Interkal Telescopic Bleachers.
 - 1. Contact: Tim Marshall, Tim@northwest-school-eq.com
- C. Substitutions: Section 012500 - Product Substitutions.

2.3 COMPONENTS

- A. Telescopic Gym Seats, forward folding, wall attached, rise to be 9 5/8".
 - 1. Seating capacity: 100.
- B. Aisle Type: Foot level aisles.
- C. Seat Types: 18" long assembled, gas assisted injection-molded, high density, 100% recyclable HDPE (high density polyethylene) modules in monochromatic colors providing, dual textured scuff resistant 10" wide seat surface with ½ minimum interlock on seat and face. Unit structural tested to 600 lbs occupant load.
- D. Rail Type: Self-storing rails as required per bank.

2.4 MATERIALS

- A. Lumber: ANSI/Voluntary Product 20.
- B. Plywood: ANSI/Voluntary Product PSI, APA A-C Exterior Grade.
- C. Structural Steel Shapes, Plates and Bars: ASTM A36.
- D. Uncoated Steel Sheet: ASTM A1008, Class 1, Commercial quality, cold rolled sheet.
- E. Uncoated Steel sheet: ASTM A1011, Structural quality, hot rolled steel.
- F. Galvanized Steel Sheet: ASTM A653 Zinc Coated by the hot dipped process.
- G. Structural Tubing: ASTM A501, hot rolled.
- H. Polyethylene Plastic: ASTM D1248, Type III, Class B; molded, color-pigmented, textured, impact resistant, structural formulation; in color indicated below.
- I. Fasteners: Vibration-proof, of size and material standard with manufacturer.

2.5 FABRICATION

- A. General: Provide manufacturer's standard telescopic bleacher system fabricated to comply with requirements indicated. Smoothly round corners, edges and exposed fasteners, if any, to eliminate snagging and pinching hazards. Form exposed sheet metal with flat, flush surfaces, true to line and level, and without cracking and grain separation. Perform welding by operators and processes complying with AWS requirements.

- B. Bench Seats and Upper Risers: Fabricate from following materials to form seats with uniform heights per bleacher unit of not less than 16 inches nor more than 18 inches, as standard with manufacturer.
 - 1. Material: Polyethylene plastic contoured to form individual seats with recesses for number plates.
 - 2. Colors: Refer to Finish and Color Schedule (BLCR-1).
- C. Lower Risers and Foot Rests: Provide recessed lower riser and fully closed foot rest construction. Fabricate riser from steel sheet with baked enamel, vinyl-cladding or galvanized finish as standard with manufacturer. Fabricate foot rest from plywood as standard with manufacturer.
- D. Understructure: Fabricate understructure from structural steel members of size, spacing and form required to support design loads with cantilevered bench seat supports to produce toe space uninterrupted by vertical bracing.
- E. Support Column Wheels: Provide manufacturer's standard wheel assembly under each support column. Include wheels of size, number and design required to support bleacher units and to achieve smooth operation without damage to flooring surface, but not less than 4 per column nor less than 3½ inches in diameter and 1 inch wide.
- F. Aisles: Fabricate bleacher units with aisles and seating. Provide intermediate aisle steps and center aisle handrails as required. Aisle sizes handrails, guardrails and handicap seating to meet all applicable codes.
 - 1. Footrest Level Type: Interrupt bench seats to provide aisle walking surfaces at foot rest level.
 - 2. Provide manufacturer's standard metal nosing for aisles with wood walking surfaces.
- G. Type of Bleacher Units: Provide assemblies of following type fabricated in lengths and number of rows as indicated.
 - 1. Wall-Attached Type: Provide units with rear of understructure permanently attached to wall/floor construction.

2.6 ACCESSORIES

- A. Rear fillers including supports for closing openings between top row and rear wall of adjoining construction.
- B. Vinyl End Closure Curtains permanently attached to wall or rear closure panel and secured to individual rows of seating. Curtain to open with seating unit into taught secure configuration and fold automatically as seating unit closes.
 - 1. Color: Black.
- C. End railings of telescoping, self-storing type and required perimeter guardrails.

- D. Intermediate Automatic Rotating Aisle Handrails: Fully automatic, self-storing aisle rail with no open rail ends. Aisle rail will require no labor to deploy on opening or closing of the bleachers. Permanently fix aisle rails to the bleacher.
 - 1. Center and line up aisle rails with subsequent rails for the full length of the aisle.
 - 2. Fully close aisle rails on both ends. The top primary rail and lower secondary rail shall be continuous tubing, joined with smooth radii and transitions on either end.
 - 3. Fully automatic, self-storing aisle rails in the stored position shall extend no further than 5 inches beyond the leading face of the bleacher seating in the closed position.
 - 4. Aisle rails may be fixed, non-rotating and permanently mounted in the fully used position with the bleacher closed if said fixed aisle rail is located at a distance of 11 feet or greater from the gymnasium floor. Fixed aisle rails shall require no setup labor at these locations.
 - 5. Rails having openings to avoid interference with closed decks are not acceptable.
 - 6. Aisle rails with discontinuous open-ended "Fangs" on the top primary rail or lower secondary rail even if radiussed, shall not be allowed.
 - 7. Aisle rails with staggered side-to-side offsets up the aisle from one rail to the next shall not be allowed
- E. Provide a minimum of one removable 8 x 15 scorer's table, and required mounting hardware. Coordinate power, telephone, and scoreboard controls with a flexible wiring system.
- F. Handicap Seating Provisions: Provide first tier recoverable truncations on wall attached bleachers to provide for seating per requirements of the Americans with Disability Act (ADA) .

2.7 FINISHES

- A. Painted Ferrous Metal Surfaces: Apply manufacturer's standard baked enamel finish over shop-cleaned ferrous metal surfaces. Apply to exposed and concealed metal surfaces including understructure, except where other types of finishes are indicated.
- B. Vinyl-Clad Steel Finish: Apply manufacturer's standard flow-coated vinyl plastisol finish over shop-cleaned steel sheet to produce vinyl-coating with cured thickness of not less than 8 mils and in manufacturer's standard, uniform color.
- C. Galvanized Finish: Manufacturer's standard G60 galvanized finish with matte finish, complying with ASTM A653.
- D. Clear Anodized Aluminum Finish: AA-CC33A42 (medium matte etched finish with 0.7 mil min. thick anodic coating).

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install telescoping bleacher units to comply with manufacturer's instructions and final shop drawings. Provide accessories indicated and anchors, inserts, and other items required for installation of units and attachment of adjoining construction. Modify bleachers as required for any wall obstructions.

3.2 ADJUSTMENT AND CLEANING

- A. Upon completion of installation, including work of other trades, lubricate, test and adjust telescoping bleachers to operate easily and in compliance with manufacturer's specifications.
- B. Clean installed bleacher units on exposed and semi-exposed surfaces. Touch-up shop applied finishes to restore damaged or soiled areas.

3.3 DEMONSTRATION

- A. Provide demonstration to Owner personnel as to the proper use and operation of bleacher equipment.

END OF SECTION

