SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Water and Electric Power: Available from Owner's existing system without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

B. Accessible Temporary Egress if required: Comply with applicable provisions in ICC/ANSI A117.1.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Provide field offices, storage and fabrication sheds, and other support facilities as necessary for construction operations. Store combustible materials apart from building.

2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. Protect Permanent HVAC System:
   1. Permanent HVAC System: Protect permanent HVAC system for temporary use during construction, provide filter at each return-air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

A. Sanitary Facilities: Contractor may use one toilet room as coordinated with the school staff. Contractor to maintain and leave clean.

B. Cooling or de-humidification: Provide temporary cooling or de-humidification required for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

C. Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

3.2 SUPPORT FACILITIES INSTALLATION

A. Install project identification and other signs in locations approved by Owner if required to inform the public and persons seeking entrance to Project.

B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

C. Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

D. Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

3.4 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion.

END OF SECTION 01500

SECTION 01701 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 CLOSEOUT PROCEDURES

A. Substantial Completion: Before requesting Substantial Completion inspection, complete the following:

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
3. Deliver tools, spare parts, extra materials, and similar items.
4. Make final changeover of permanent locks and deliver keys to Owner.
5. Remove temporary facilities and controls.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
7. Complete final cleaning requirements, including touchup painting.
8. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will proceed with inspection or advise Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will advise Contractor of items that must be completed or corrected before certificate will be issued.

C. Request inspection for Final Completion, once the following are complete:

1. Submit a copy of Substantial Completion inspection list stating that each item has been completed or otherwise resolved for acceptance.
2. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

D. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

E. Submit a written request for final inspection for acceptance. On receipt of request, Architect will proceed with inspection or advise Contractor of unfulfilled requirements. Architect will prepare final Certificate for Payment after inspection or will advise Contractor of items that must be completed or corrected before certificate will be issued.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Verify compatibility with and suitability of substrates.
2. Examine roughing-in for mechanical and electrical systems.
3. Examine walls, floors, and roofs for suitable conditions.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Take field measurements as required to fit the Work properly. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication.

D. Verify space requirements and dimensions of items shown diagrammatically on Drawings.

E. Surface and Substrate Preparation: Comply with manufacturer's written recommendations for preparation of substrates to receive subsequent work.

3.2 CONSTRUCTION LAYOUT AND FIELD ENGINEERING

A. Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks.

3.3 INSTALLATION

A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated. Make vertical work plumb and make horizontal work level.

1. Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections to form hairline joints.
2. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
3. Maintain minimum headroom clearance of 8’-4”in occupied spaces.

B. Comply with manufacturer's written instructions and recommendations.

C. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

D. Use products, cleaners, and installation materials that are not considered hazardous.

E. Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place. Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed.

3.4 CUTTING AND PATCHING

A. Provide temporary support of work to be cut. Do not cut structural members or operational elements without prior written approval of Architect.

B. Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

C. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction in a manner that will minimize evidence of patching and refinishing.
2. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

3.5 CLEANING

A. Clean Project site and work areas daily, including common areas. Dispose of materials lawfully.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
3. Remove debris from concealed spaces before enclosing the space.

B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion:

1. Remove labels that are not permanent.
2. Clean transparent materials, including mirrors. Remove excess glazing compounds. Replace chipped or broken glass.
3. Clean exposed finishes to a dust-free condition, free of stains, films, and foreign substances. Sweep concrete floors broom clean.
4. Vacuum carpeted surfaces and wax resilient flooring.
5. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication. Clean light fixtures, lamps, globes, and reflectors.

6. Clean Project site, yard, and grounds, in areas disturbed by construction activities. Sweep paved areas; remove stains, spills, and foreign deposits. Rake grounds to a smooth, even-textured surface.

END OF SECTION 01701

SECTION 084413 GLAZED ALUMINUM CURTAIN WALL

PART 1 GENERAL

1.01 Work Included

A. Furnish and install architectural aluminum curtain wall complete with related components as shown on drawings and specified in this section.
B. Curtain Wall System shall be EFCO® Series 5900 Outside Glazed. Other manufacturers requesting approval to bid their product as an equal must submit the following information fifteen days prior to close of bidding.
   1. A proposal drawing showing full size details of all curtain wall components including all anchors and building attachments.
   2. Test reports documenting compliance with requirements of Section 1.05.
C. Glass
   1. Reference Section 08800 for Glass and Glazing.
D. Single Source Requirement
   1. All products listed in Section 1.02 shall be by the same manufacturer.

1.02 Related Work

1.03 Items Furnished but Not Installed

1.04 Items Installed but Not Furnished

1.05 Laboratory Testing and Performance Requirements

A. Test Units
   1. Air, water, and structural test unit size shall be a minimum of two (2) stories high and three (3) lites wide.
   2. Thermal test unit sizes shall be 80" (2032 mm) wide x 80" (2032 mm) high with one (1) intermediate vertical mullion and two (2) lites of glass.
B. Test Procedures and Performance
   1. Air Infiltration Test
      a. Test unit in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf (300 Pa).
      b. Air infiltration shall not exceed .06 cfm/SF (.31 l/s•m^2) of fixed wall area.
   2. Water Resistance Test
      a. Test unit in accordance with ASTM E 331.
      b. The test for static water penetration (ASTM E 331) shall be conducted at an air pressure difference of 15.0 psf (720 Pa) (or 20% of the positive design wind pressure). There shall be no water leakage as defined by AAMA 501.1, paragraph 5.5.
   3. Wind Loads: Provide glazed aluminum curtain wall system, including anchorage , capable of withstanding wind-load design pressures calculated to meet requriements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE-7whichever is more stringent.
      a. Test in accordance with ASTM E 330.
      b. Deflection under design load shall not exceed L/175 for spans less than 162" (4114 mm) or ¾", whichever is smaller.
      c. Duration: As required by design wind velocity; fastest 1 mile of wind for relevant exposure category.

e. Test in accordance with ASTM E 330 at a pressure 1.5 times the design wind pressure in 1.05.B.3.b.

f. At conclusion of the test there shall be no glass breakage, permanent damage to fasteners, curtain wall parts, or any other damage that would cause the curtain wall to be defective.

4. Seismic Loads: Provide glazed aluminum curtain wall system, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of authorities having jurisdiction or ASCE 7 whichever are more stringent.
5. Dead Loads: Do not deflect greater than an amount which will reduce the glazing bite below 75 percent of design dimension when carrying full dead load. Provide a minimum 1/8 inch clearance belween members and top of fixed panels, glazing or other fixed part immediately below. Provide a minimum 1/16 inch cleaance between members and operable windows and doors.
6. Live Loads: Curtain wall system to accommodate supporting structure"s deflection from uniformly distributed and concentrated live loads indicated without failure of materials or permanent deformation. The system shall withstand 90 mph wind loads and account for positive and negative loads.
7. Dynamic Water Resistance Test
   a. Test unit in accordance with AAMA 501.
   b. There shall be no water leakage at a dynamic test pressure of 15.0 psf (720 Pa).
8. Condensation Resistance Test (CRF)
   a. Test unit in accordance with AAMA 1503.1.
   b. Condensation Resistance Factor (CRF) shall not be less than 68 (frame) and 64 (glass) when glazed with 1" (25 mm) insulated – 1/4" (6 mm) clear low emissivity, 1/2" (12 mm) air, 1/4" (6 mm) clear glass.
9. Thermal Transmittance Test (Conductive U-Value)
   a. Test in accordance with AAMA 1503.1.
   b. Conductive thermal transmittance (U-Value) shall not be more than 0.27 BTU/hr•ft²•ºF
10. Thermal Transmittance Test (Conductive U-Value)
   a. Test in accordance with NFRC-102.
   b. Conductive thermal transmittance (U-Value) shall not be more than 0.27 BTU/hr•ft²•ºF
   (1.55 W/m²•K) when glazed with 1" (25 mm) insulated – 1/4" (6 mm) clear low emissivity, 1/2" (12 mm) air, 1/4" (6 mm) clear glass. **Basis for design: ppg Solarban R100 second surface coating on clear glass complying with ASTM E 774.**
   c. **At AC Reynolds High and WD Williams locations apply Solarban R100 to earth tone tinted glass. Provide color selection to Owner from PPG Earth and Sky collection.**

Glass Types	**Center of Glass**		**EFCO S-5900 CW**
	U-Value	**SHGC**	**U-Value**
1" IG: ¼" CLEAR ANNEALED ½" AIR SPACE ¼" CLEAR ANNEALED	0.27	0.23	0.62 BTU/hr•ft²•ºF (3.52 W/m²•K)

*U-Values are based on a nominal size of 80" (2032 mm) x 80" (2032 mm) with two lights of glass using AAMA 507-03 and NFRC-102.

11. Sound Transmission Loss
    a. Test unit in accordance with ASTM E 90-02.
    b. Sound Transmission Class (STC) shall not be less than 30.

1.06 Field Testing and Performance Requirements

1.07 Quality Assurance

A. Provide test reports from AAMA accredited laboratories certifying the performance as specified in 1.05.
B. Test reports shall be accompanied by the curtain wall manufacturer's letter of certification stating that the tested curtain wall meets or exceeds the referenced criteria for the appropriate curtain wall type.

1.08 References

1.09 Submittals

A. Contractor shall submit 3 copies of all shop drawings to the architect for his approval. Drawings shall show scale elevations and sections. Full size sections shall be shown only when needed for clarity. Drawings shall show construction of all parts of the work, including metal and glass thickness, methods of joining, details of all field connections and anchorage, fastening and sealing methods, metal finishes, and all pertinent information. Relationship to other work should be clearly indicated. No work shall be fabricated until shop drawings for that work have been finally approved for fabrication.
B. Shop drawings shall include structural analysis data including design pressures based on ASCE 7 with Exposure Category "B" and occupancy Category III. Provide steel reinforcement as necessary and as documented by engineered calculations and drawings. If calculations and esign loads are not fully detailed in the shop drawings, the contractor may submit sealed N.C. engineered drawings in their place.
C. Contractor shall submit finish samples, test reports, and warranties.
    1. Samples of materials as may be requested without cost to owner, i.e., metal, glass, fasteners, anchors, frame sections, mullion section, corner section, etc.

1.10 Warranties

A. Total Curtain Wall System
    1. The responsible contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total curtain wall installation. This includes the glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc. as it relates to air, water, and structural adequacy and the specifications and approved shop drawings.
    2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at their expense during the warranty period.
B. Material and Workmanship
    1. Per AAMA standard 601, provide written guarantee against defects in material and workmanship.
    2. Warranty period shall be for **5** years from the date of final shipment.

C. Glass
   1. Provide written warranty for insulated glass units, that they will be free from obstruction of vision as a result of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal due to defects in material and workmanship.
   2. Warranty period shall be for 10 (ten) years.

D. Insulated Panels
   1" total thickness, with exterior Kynar 500 finish Warm Gray (CAEHS) and Dark Bronze Kynar (ACRHS) on .016 smooth aluminum and two layers 1/8" high density tempered hardboard sandwiched over polyisocyanurate rigid insulation. Interior panel to be to match the exterior on smooth aluminum. Approved manufacturers are Mapes, High Standard or approved equal.

E. Organic Finish
   1. Provide organic finish and warranty based on AAMA standard 2605

PART 2 PRODUCTS

2.01 Materials

A. Aluminum
   1. Extruded aluminum shall be 6063-T6 alloy and temper.

B. Glass
   1. Insulated glass shall be 1" (25 mm) consisting of (¼") exterior, (½") air spacer, and
      (¼") interior.

C. Dissimilar Metals
   1. All dissimilar metals must be properly insulated to prevent galvanic action.

D. Fasteners
   1. All fasteners shall be aluminum, stainless steel, or zinc plated steel.

E. Anchors
   1. Perimeter and floor line anchors shall be aluminum or steel. All steel anchors shall be properly insulated from the aluminum.

F. Thermal Barrier
   1. The thermal barrier shall be extruded EPDM used as an applied thermal isolator.

2.02 Fabrication

A. General
   1. All aluminum vertical and horizontal main frame extrusions shall have a minimum wall thickness of .125" (3 mm).

B. Frame
   1. Frame components shall be mechanically fastened by means of extruded aluminum shear blocks attached to vertical mullions.
   2. Curtain wall system is able to accommodate separate interior and exterior finishes and colors.

C. Glazing
   1. Outside glazed curtain wall system shall be dry glazed with **Duracast Fiberglass pressure plate** and snap cover with interior and exterior dense EPDM preset gasket.

D. Finish

1. Organic
   a. Finish all exposed areas of aluminum curtain wall and components, interior and exterior shall be:

      1) AC Reynolds High: Dark Bronze Anodized Aluminum

      2) CA Erwin High: Warm Grey Kynar and interior color shall be Warm Grey Kynar.

AA Description	Description	AAMA Guide Spec.
AA-M12-C42-R1X	50% PVDF Ultraflur™	2604-98

      3) WD Williams Elementary: Dark Bronze Anodized Aluminum

PART 3 EXECUTION

3.01 Inspection

A. Job Conditions
   1. All openings shall be prepared by others to the proper size and shall be plumb, level, and in the proper location and alignment as shown on the architect's drawings.

3.02 Installation

A. Use only skilled tradesmen with work done in accordance with approved shop drawings and established specifications, and erect all curtain wall components to all building bench marks and column centerlines.
B. Plumb and align curtain wall faces in a single plane for each wall plane, and erect curtain wall materials square and true. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, building movement, and specified wind loads.
C. Adjust windows in curtain wall for proper operation after installation.
D. Furnish and apply sealants to provide a weather tight installation at all joints and intersections and at opening perimeters. Wipe off excess material, leave all exposed surfaces and joints clean and smooth.

3.03 Anchorage

A. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.

3.04 Protection and Cleaning

A. The general contractor shall protect the aluminum materials and finish against damage from construction activities and harmful substances. The general contractor shall remove any protective coatings as directed by the architect, and shall clean the aluminum surfaces as recommended for the type of finish applied.

SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data, Shop Drawings, and color Samples.

B. Provide AAMA- or WDMA-certified aluminum windows with an attached label.

C. Field Measurements: Check window openings by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

Provide window sizes and accessories as required to meet jurisdictional code requirements.

D. Warranties: Total Window System
1. The responsible contractor shall assume full responsibility and warrant for two years the satisfactory performance of the total window installation which includes that of the windows, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water, and structural adequacy as called for in the specifications and approved shop drawings.
2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at his expense during the warranty period.

E. Glass and Glazing:
1. All units shall be factory glazed.
2. Reference Section 084413 for Glass and Glazing.

F. Single Source Responsibility: All products listed shall be by the same manufacturer.

PART 2 - PRODUCTS

2.1 ALUMINUM WINDOWS

A. Products:

1. EFCO Corporation, Series 3500 Heavy Commerical (HS-HC60), Thermally Broken

B. Window Types: The following types, as indicated on Drawings:
1. Horizontal sliding.
2. Fixed.

C. Performance Requirements:

1. Performance Class: The actual design pressure in pounds force per square foot used to determine structural test pressure and water test pressure.
   a. Structural test pressure: Wind load test, is equivalent to 150 percent of the design pressure

b. Water leakage resistance test pressure: is equivalent to 15 percent of the design pressure with 2.86 lbf/sq.ft. as a minimum for Heavy Commercial Windows.

2. Performance Grade: 60.
3. Condensation-Resistance Factor: 58 per AAMA 1503.
4. Thermal Transmittance: Whole-window U-factor not more than [0.60 Btu/sq. ft. x h x deg F at 15-mph wind velocity and winter temperatures per AAMA 1503.

D. Construction and Hardware: Provide manufacturer's hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended.

1. Aluminum Extrusions: Provide alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi ultimate tensile strength and not less than .062-inch thick at any location for main frame and sash members.

2. Sash Rollers: Provide stainless-steel, ball-bearing sash rollers with nylon tires for sliding windows.

3. Sash Lock: Cam-action sweep sash lock and keeper at meeting rails.

4. Removable Lift-out Sash: Design windows and provide with tamperproof, key-operated hardware to permit removal of sash from inside for cleaning.

E. Thermally Improved Construction:

1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.

2. Sills are thermally broken with 2 thermal struts, consisting of glass reinforced polyamide nylon, mechanically crimped in raceways extruded in the exterior and interior extrusions. All other frames and sash are thermally broken using the latest technology in two part, high density polyurethane. A nonstructural thermal barrier is unacceptable.

3. Weep holes: Provide weep holes and internal passages to conduct infiltration water to exterior.

4. Provide accessories required for installation in curtainwall system specified.

F. Insect Screens: Design windows and hardware to accommodate screens in a tight-fitting arrangement, with a minimum of exposed fasteners and latches. Locate screens on outside of window and provide for each operable exterior sash or ventilator.

Comply with SM, 1004 "Specifications for Aluminum Tubular Frame Screens for Windows", for minimum standards of appearance, fabrication, attachment of screen fabric, hardware, and accessories unless more stringent requirements are indicated.

1. Aluminum Insect Screen frames and cross braces: Manufacturer's standard aluminum alloy in wall thickness as required for class indicated. Fabricate frames with mitered or coped joints, concealed fasteners, adjustable rollers and removable PVC spine/anchor concealing edge of frame.

2. Finish: Match aluminum window members.

3. Glass-Fiber Mesh Fabric: 18 x 14 mesh of PVC coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and water deterioration in the following color. Comply with ASTM D 3656.

4. Mesh Color: Charcoal gray.

5. Weather stripping: Provide sliding-type weather stripping where sash rails slide horizontally or vertically align unit frame. Provide weather stripping locked into extruded grooves in sash.

6. Provide two additional screens and mounting hardware for each size and configuration operable window panel as specified.

G. Glazing: All units shall be glazed with the manufacturer's standard sealant process provided the glass is held in place by a removable, extruded aluminum, glazing bead. The glazing bead must be isolated from the glazing material by a gasket.
1. All lites (both sash and fixed) of the horizontal sliding window shall be inside glazed.

2. Glazing to be as noted in 084413 of the Specifications.

3. All glazing to be tempered.

4. All glazing to be 3/16" thick glass with a 5/8" space.

H. Finish: Dark Bronze Anodized Aluminum.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set units level, plumb, and true to line, without warp or rack of frames and panels. Provide proper support and anchor securely in place.

B. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.

C. Adjust operating panels, screens, and hardware to provide a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

D. Clean aluminum surfaces and glass immediately after installing windows. Remove nonpermanent labels from glass surfaces.

END OF SECTION 085113