DIVISION 8 – OPENINGS

08 11 13 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

A. Summary - Section includes:
   1. Hollow metal door and frames.
   2. Hollow metal sidelights, windows, borrowed lights, and transom frames.
   3. Stainless steel doors and frames.

B. Referenced Standards/Minimum Criteria:
   1. Door and Hardware Preparation ANSI 115
   2. Life Safety Codes NFPA-1 (latest edition).
   3. Fire Doors and Windows NFPA-80 (latest edition)
   4. Steel Door Institute ANSI/SDI-100 (latest edition)
   5. Design Requirements: Exterior hollow metal frames shall be designed by a professional engineer registered in the State of Colorado to withstand ground wind speed in accordance with IBC. Provide reinforcing as required to meet the requirements.
   6. Materials used for stainless steel doors and frames shall be Type 304 stainless steel with #4 Satin finish in accordance with ASTM A480-19a "Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip" and A666 -15 "Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar".
      a. These doors and frames are typically used in swimming pool areas.
   7. Materials utilized for hollow metal doors and frames shall be cold-rolled steel conforming to ASTM A1008 / A1008M-18 "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". Exterior doors and frames shall receive hot-dip galvanized coating conforming to ASTM A924-19 "Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process".
   8. Galvanized steel shall be treated to ensure proper paint adhesion.
   9. Supports and Anchors: Fabricated from not less than 0.0478-inch-thick steel sheet; 0.0516- inch-thick galvanized steel where used with galvanized steel frames.
   10. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153-16 "Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware", Class C or D as applicable.

C. Submittals Required:
   1. Product data: Include all types of doors and frames, sound ratings, hardware preparation, label compliance and finishes.
   2. Shop drawings: Include all details with reinforcement and anchorage.
   3. Colors and finishes for factory finished doors and frames.
   4. Oversized construction certification for fire door assemblies that exceed limitations of labeled assemblies, if required.

D. Restrictions/Critical Criteria:

1. Frames:

a. Fabricate metal frames for doors, transoms, sidelights, borrowed lights, and other openings, according to ANSI/SDI 100. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 0.0478-inch-thick cold-rolled steel sheet.

1) Fabricate 16 gage interior frames with mitered or coped and continuously welded corners.
2) Fabricate 14 gage exterior frames with mitered or coped corners, continuously welded corners.
3) Fabricate frames for interior openings over 48-inches wide from 14 gage, 0.0747-inch thick steel sheet.
4) Fabricate exterior frames for openings from 14 gage, 0.0747-inch-thick galvanized steel sheet.

b. Where specified, fabricate metal frames with "high frequency'' hinge reinforcements. Furnish top hinge reinforcements for doors up to 36-inches in width; furnish top, middle and bottom reinforcements for doors over 36-inches in width.

c. Door Silencers: Except on weather-stripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.

d. Plaster Guards: Provide minimum 0.0179-inch thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

e. Grout: When required in masonry construction, contractor shall field apply a bituminous coating to backs of frames that are filled with mortar, grout, and plaster containing anti-freezing agents.

2. Doors:

a. Steel Doors: Provide 1-3/4-inch-thick doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on Drawings or schedules:

1) Interior 16 gage doors: Grade III, heavy-duty, Model 1, full flush, minimum 0.0598-inch thick cold-rolled steel sheet faces.
2) Exterior 14 gage doors: Grade III, heavy-duty, Model 1, full flush, minimum 0.06-inch thick galvanized steel sheet faces.
3) Doors shall have continuous vertical mechanical interlocking joints at lock and hinge edges with visible edge seams or with edge seam filled and ground smooth. The internal portion of the seam shall be sealed with epoxy. An intermittent fastening along the seam is not permitted.
4) Reinforcements as per ANSI A25.8.
5) Doors shall be beveled 1/8-inch in 2-inch hinge and lock edges.
6) Top and bottom steel reinforcement channels shall be 14-gage and spot welded to both panels.

7) Hinge reinforcements shall be 7 gauge for 1-3/4-inch doors. Lock reinforcements shall be 16 gage and closer reinforcements 14 gage box minimum 20-inches long. Hinge and lock reinforcements shall be projection welded to the edge of the door. Galvanized doors shall have galvanized hardware reinforcements. Adequate reinforcements shall be provided for other hardware as required. Where specified, furnish "high frequency'' hinge reinforcements.
8) Glass trim for doors with cutouts shall be 24 gage steel conforming to ASTM A 366 cold rolled steel. The trim shall be installed into the door as a four-sided welded assembly. The trim shall fit into a formed area of the door face, shall not extend beyond the door face and shall interlock into the recessed area cap of the cutout but shall not extend more than1/16" from the door face. The corners of the assembly shall be mitered, all be reinforced and welded. The trim shall be the same on both sides of the door. Exposed fasteners shall not be permitted. Label and non-label doors shall use the same trim.
9) Exterior out-swinging doors shall have tops closed to eliminate moisture penetration. Door tops shall have no holes or openings. Top caps are permitted.

3. Fabrication:
   a. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ASNI/SDI 100 requirements.
      1) Internal Construction: Follow manufacturer's standard core materials according to SDI standards:
      2) Steel stiffened Temperature rise
      3) Clearances: Not more than 1/8-inch at jambs and heads, except not more than 1/4-inch between non-fire rated pairs of doors. Not more than 3/4-inch at bottom.
         a) Fire Doors: Provide clearances according to NFPA 80.

   b. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel sheet.
   c. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and frames."
   d. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold-or hot-rolled steel sheet.
   e. Fabricate the door with steel stiffeners and deadened with fiberglass. The stiffeners shall be fabricated from 20 gauge steel located 6-inches on center and shall be welded to the inside of the face sheet 4-inches on center. The stiffeners shall be welded together at the top and bottom. The areas between the stiffeners shall be filled with fiberglass.
   f. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

g. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ASNI A115 Series specifications for door and frame preparation for hardware.
h. Reinforce doors and frames to receive surface applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.
i. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
j. Glazing Stops: Minimum 0.0359-inch-thick steel or 0.040-inch-thick aluminum.
    1) Provide nonremovable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.
    2) Provide screw-applied, removable, glazing beads on inside of glass, louvers, and other panels in doors.

4. Finishes, General:
    a. Doors and frames components shall be cleaned, phosphatized and finished as standard with one coat of baked-on rust inhibiting prime paint in accordance with the ANSI A224.1 ''Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."
    b. Finished painted doors and frames shall be cleaned, phosphatized and finished with baked-on rust inhibiting paint capable of passing a 200-hour salt spray and 500-hour humidity test in accordance with ASTM test method B117 and 01735. Finished paint shall be in accordance with ANSI/SDIA250.3, "Test Procedure and Acceptance Criteria for factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames."

5. Galvanized Steel Sheet Finishes:
    a. Surface Preparation: Clean surfaces with nonpetroleum solvent so that surfaces are free of oil or other contaminants. After cleaning, apply a conversion coating of the type suited to the organic coating applied over it.
    b. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply air-dried primer specified below immediately after cleaning and pretreatment.
    c. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat. Comply with paint manufacturer's instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
        1) Color and Gloss: As selected by Architect from manufacturer's color and gloss designations.

6. Installation:
   a. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.
   b. Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
      1) Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.
      2) In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.
      3) In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.
      4) In in-place gypsum board partitions, install knock-down, slip-on, drywall frames.
      5) Install fire-rated frames according to NFPA 80.

   c. Door Installation: Fit hollow-meal doors accurately in frames within clearances specified in ANSI/SDI 100.
      1) Fire Rated Doors: Install with clearances specified in NFPA 80.
      2) Smoke-Control Doors: Comply with NFPA 105.

PART 2 - PRODUCTS

A. Acceptable Manufacturers – Hollow Metal Doors and Frames:
   1. Steelcraft Manufacturing Co. www.steelcraft.com.
   2. Southwestern Hollow Metal, Raton NM.
   3. Gateway Metal Products, Raton NM.
   4. Curries Manufacturing: www.curries.com.
   5. North Central Supply, Inc. www.northcentralsupply.com.
   6. CECO Door: www.cecodoor.com.
   7. Approved substitute.

08 14 16 – FLUSH WOOD DOORS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Prefinished solid core wood doors.
   2. Prefinished fire-rated wood doors.
   3. Metal glazing stops.

B. Referenced Standards/Minimum Criteria:
   1. "Architectural Woodwork Standards", latest edition, as published by the Architectural Woodwork Institute (AWI).
   2. National Fire Protection Association (NFPA) 80 and (NFPA) 252 Standard for Fire Doors.
   3. National Wood Window and Door Association (NWWDA) Industry Standards IS-1A Series.
   4. Fire-rated doors shall meet requirements of ASTM E152 and shall bear UL label or other certifying label acceptable to local building official. Metal glazing frames shall also have UL label (i.e., "B" label for 90 min. fire protection).
   5. Wood doors shall be Custom Grade per AWI "Architectural Woodwork Standards", Section 9.
   6. Installation of doors and tolerances per AWI Section 9.

C. Submittals Required:
   1. Shop drawings indicating size, hand of door, elevation of each door, extent of hardware blocking.
   2. Product data/finishing instructions for factory finished doors and available finishes.
   3. Sample corner of door with face veneer, edge and core construction of door.

D. Restrictions/Critical Criteria:
   1. Minimum door size: 36-inches wide x 7'-0" high.
   2. Provide vision panels in all doors of classrooms and offices.
   3. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form, signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4-inch in a 42-by-84-inch section or that show telegraphing of core construction in face veneers exceeding 0.01-inch in a 3-inch span, or do not comply with tolerances in referenced quality standard for the life of the installation. Doors which are replaced during the one (1) year warranty period shall be rehung and finished by the Contractor. After one (1) year warranty, replacement door shall be furnished and installed by the door manufacturer.
   4. Door veneer to be either plain sliced, premium grade AA birch or red oak. Provide running book, book matched, and hardwood edges.
   5. Solid-Core Doors:
      a. Particleboard Cores: Comply with the following requirements:
         1) Particleboard: ANSI A208.1, Grade LD-2 Type 1, Density C (28-30 pounds per cubic foot), Class 1 commercial standard 236-66.
         2) Blocking: Provide wood blocking at particleboard doors as follows:

3) 5-inch top rail locking, at doors indicated to have closers.
4) 5-inch bottom rail blocking, at doors indicated to have kick, mop or armor plates.
5) 5-inch mid-rail blocking, at doors indicated to have exit devices.
6) Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

b. Interior Veneer-Faced Doors: Comply with the following requirements:
1) Core: Particleboard core.
2) Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

c. Fire-rated Doors: Comply with the following requirements.
1) Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as required to provide fire rating indicated.
2) Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated and as follows:

Provide fire rated pairs with fire retardant stiles that are labeled and listed for kinds of applications indicated without formed steel edges and astragals.

When the above is unable to be implemented, furnish formed steel edges and astragals.

d. Positive Pressure, "S" rated fire doors requiring labeling for IBC (current edition) compliance: Provide doors that have been tested and approved for positive pressure labeling. Special sealing system, if required for "S" labeling, to be supplied by door supplier.

6. Louvers and Light Frames:
a. Wood Frames for Light Openings: As follows:
1) Wood Species: Same species as door faces.
2) Profile: Flush rectangular beads, W-6 or W-7 profiles.
3) Frames for Openings in Fire Doors: Wood frames and metal glazing clips approved for use in 20-minute fire-rated wood-core doors.

b. Wood-Veneered Beads for light Openings in Fire Doors: Manufacturer's standard wood veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include concealed metal glazing clips where required for opening size and fire rating indicated.

c. Metal Frames for Light Openings: As follows:
   1) Cold rolled 20-gage steel with gray or beige primer as selected by Architect.
      a) Profile: Tapered, low profile, beveled glass stop with tight mitered corners similar to "LoPro" metal vision frame by Anemostat: www.anemostat.com, or equivalent.
      b) Fasteners: standard #8 sheet metal screws.

   2) Cold rolled 18-gage steel with gray or beige primer as selected by Architect.
      a) Profile: Tight mitered corners, 90-degree angle on glass stop for maximum visible lite area, similar to "FGS-75 Metal Vision Frame" by Anemostat: www.anemostat.com, or equivalent.
      b) Fasteners: Through bolted at top, bottom and both sides with #8-32 Phillips head, machine screw with blank head on end.

7. Fabrication:
   a. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-rated doors.
   b. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
   c. Metal Astragals: Pre-machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
   d. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
      1) Fixed Transom Panels: Fabricate fixed panels with solid lumber transom bottom rail and door top rail, both rabbeted as indicated. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

   e. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
      1) Light Openings: Trim openings with moldings of material and profile indicated.
      2) Louvers: Factory install louvers in prepared openings.

8. Shop Priming:
   a. Transparent Finish: Shop seal faces and edges of doors for transparent finish with stain, other required pretreatments, and factory finish.

9. Installation:
   a. Install wood doors to comply with manufacturer's written instructions, reference quality standard, and as indicated.
      1) Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

b. Factory Machined Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Reseal cut surfaces after fitting and machining.

c. Align doors to frame for uniform clearances as follows:
   1) Head and jambs: 1/8-inch
   2) Bottom: 3/8-inch to finished floor, 1/8-inch
   3) Meeting Stile: 1/8-inch
   4) Fire rated assemblies: per NFPA Bulletin 80
   5) Bevel non-fire-rated doors: 1/8 inch in 2 inches at lock and hinge edges
   6) Bevel fire-rated doors: 1/8-inch in 2-inches on lock edge; trim stiles and rails only to extent permitted by labeling agency.

PART 2 - PRODUCTS

A. Acceptable Door Manufacturers:
   1. Graham Wood Doors: https://architectural.masonite.com/graham-maiman/flush-wood-doors/.
   2. Masonite: www.masonite.com.
   3. Marshfield Doors: www.marshfielddoors.com.
   4. Oshkosh Architectural Door Co: www.oshkoshdoor.com.
   5. V.T. Industries, Inc. www.vtindustries.com.
   6. Approved substitute.

08 31 00 – ACCESS DOORS AND PANELS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Access doors for access to mechanical valves, plumbing chases, and electrical equipment.
   2. Floor doors.
   3. Floor doors with cover to accept carpet covering.

B. Referenced Standards/Minimum Criteria:
   1. None.

C. Submittals Required:
   1. Product data including UL labeling data for rated doors.

D. Restrictions/Critical Criteria:
   1. Provide non-rated or fire-rated access doors to match fire-resistive rating of surface which access door is to be installed within, complete with key-operated cam locks.

PART 2 - PRODUCTS

A. Acceptable Manufacturers – Access Doors:
   1. Milcor: www.milcorinc.com.
   2. Karp Associates, Inc. www.karpinc.com.
   3. J.L. Industries: http://www.activarcpg.com/jl-industries
   4. Larsen's Manufacturing Co. www.larsensmfg.com.
   5. Nystrom: www.nystrom.com.
   6. Williams Brothers Corp. www.wbdoors.com.
   7. Approved substitute.

B. Acceptable Manufacturers – Floor Doors:
   1. Babcock-Davis: www.babcockdavis.com.
   2. Bilco: www.bilco.com.
   3. Nystrom: www.nystrom.com.
   4. Williams Brothers Corp. www.wbdoors.com.
   5. Approved substitute.

C. Acceptable Products - Floor Doors:
   1. Concrete Floors without Floor Finishes: Bilco Type Q-4, 3' x 3' single leaf steel (1/4-inch diamond pattern), automatic hold open arm, and steel frame or equivalent of other acceptable manufacturer.
   2. Concrete Floors with Floor Finishes: Bilco Type T-4, 3' x 3' single leaf aluminum (1/4-inch smooth aluminum plate), automatic hold open arm, molding to receive carpet or resilient flooring.

08 32 23 – SLIDING / FOLDING GLAZED DOORS AND WALLS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Factory fabricated sliding/folding glazed door/wall with frames and operating hardware.
   2. Aluminum panel frame system.

B. Referenced Standards/Minimum Criteria:
   1. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
   2. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014.

C. Submittals Required:
   1. Product data.
   2. Shop drawings.
   3. Color samples for selection.

D. Restrictions/Critical Criteria:
   1. Construction: Sliding doors of mid-range HC- 40 construction.
   2. Support System: Floor mounted.
   3. Aluminum Frames: Factory finished; manufacturer's standard corner construction; non-thermally broken.
   4. Glass Stops: Same material and color as frame.
   5. Aluminum Frame Finish: Anodized coating in accordance with AAMA 611.
      a. Color: Clear anodized

   6. Factory assemble sliding/folding operable panel frames as single unit, including head, jambs, and bottom sections; provide concealed fasteners.
   7. Sizes: Allow for tolerances of rough framed openings, clearances, and shims at perimeter of assemblies.
   8. Joints and Corners: Flush, hairline and waterproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   9. Glazing: Factory installed.
   10. Glazing: Single glazed, clear, fully tempered, with glass thickness 1/4-inch.
   11. Door Hardware: Provide standard hardware including stainless steel track and roller, extruded aluminum pull, and keyed hook bolt lock (MS1850A-505) on exterior and thumbturn on interior. Cylinder lock by Finish Hardware supplier.

PART 2 - PRODUCTS

A. Acceptable Manufacturers/Products:
   1. "1010 Sliding Mall Front" by Kawneer Company: www.kawneer.com.
      a. Substitutions: Not permitted.

08 33 13 – COILING COUNTER DOORS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Non-fire-rated coiling counter doors and operating hardware.
   2. Fire-rated coiling counter doors and operating hardware.
   3. Electric motor operation; wiring from electric circuit disconnect to operator to control station.

B. Referenced Standards/Minimum Criteria:
   1. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. ITS (DIR) - Directory of Listed Products (current edition).
   3. NEMA MG 1 - Motors and Generators (current edition).
   4. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
   5. UL (DIR) - Online Certifications Directory; current listings at www.database.ul.com.

C. Submittals Required:
   1. Product data.
   2. Shop drawings.

D. Restrictions/Critical Criteria:
   1. Overhead rolling counter fire doors are typically used at bookkeeper or attendance office and smaller openings in rated corridor walls where the width is 4'-0" ± and the height of the opening is not more than 6'-0" ±. Manual push-up operation is not acceptable. Provide doors with a slide bolt latch on room side. The face panels shall be constructed of 22-gauge steel flat interlocking slats, factory galvanized and primed for field application of final paint. Door to close at governed speed of approximately 6- to 9-inches per second when released by fusible link or by factory supplied electro-mechanical solenoid releasing device normally de-energized and activated by 24 volt DC smoke detection system only. Door shall not close in case of power failure unless required to do so by local building official.
   2. Coiling counter doors required to be fire-rated shall carry label of Underwriters Laboratories, Inc. (UL) or other acceptable independent testing laboratory indicating that product achieves fire-rating required.
   3. Locate fusible links above ceiling for fire-rated doors immediately above ceiling louvers. Coordinate with fire alarm system installation.
   4. Doors activated by smoke detectors and fire alarms shall be tested in the presence of the School District, Architect, and local Fire Official prior to acceptance.
   5. Provide adequate size access to door/opening directly below fusible links and motors for maintenance.
   6. Coiling Counter Doors, Non-Fire-Rated: Galvanized steel slat curtain.
      a. Mounting: Interior face mounted or between jambs per design.
      b. Nominal Slat Size: 1-1/4 inches wide.
      c. Slat Profile: Flat.
      d. Finish: Factory primed for field painting.
      e. Guides: Formed track; same material and finish unless otherwise indicated.
      f. Motor-operated. Manual operation not permitted.
      g. Locking Devices: Slide bolt on inside.

   7. Coiling Counter Doors, Fire-Rated: Galvanized steel slat curtain.
      a. Mounting: Interior face mounted.
      b. Fire Rating: As indicated on the drawings; comply with NFPA 80.
         1) Provide product listed and labeled by ITS (DIR) or UL (DIR) as suitable for the purpose specified and indicated.

      c. Nominal Slat Size: 1-1/4 inches wide.
      d. Slat Profile: Flat.
      e. Finish: Factory primed for field painting.
      f. Guides: Formed track; same material and finish unless otherwise indicated.
      g. Coiling Door Release Mechanism: Fusible link activated with automatically governed closing speed.
      h. Motor-operated. Manual operation not permitted.
      i. Locking Devices: Slide bolt on inside.

8. Electric Operators:
   a. Mounting: Side mounted.
   b. Motor Enclosure: NEMA MG 1.
   c. Motor Rating: As recommended by manufacturer; continuous duty.
   d. Motor Voltage: 24 volt, single phase, 60 Hz.
   e. Opening Speed: 6 inches per second.
   f. Manual override in case of power failure.

9. Control Station: Standard three button (OPEN-STOP-CLOSE) momentary control for each operator.
   a. Key switch operated
   b. 24 volt circuit.
   c. Surface mounted.
   d. Locate on wall adjacent to opening inside of room.

10. Safety Edge: Located at bottom of curtain, full width, electro-mechanical sensitized type, wired to stop operator upon striking object, hollow neoprene covered.

PART 2 - PRODUCTS

A. Acceptable Manufacturers/Products:
   1. Coiling Counter Doors: "DuraShutter – Standard" by Raynor: www.raynor.com, or comparable product by one of the following:
      a. The Cookson Company: www.cooksondoor.com.
      b. Cornell Iron Works, Inc. www.cornelliron.com.
      c. Approved substitute.

   2. Coiling Counter Fire Doors: "FireCurtain" by Raynor: www.raynor.com, or comparable product by one of the following:
      a. The Cookson Company: www.cooksondoor.com.
      b. Cornell Iron Works, Inc. www.cornelliron.com.
      c. Approved substitute.

08 33 23 – OVERHEAD COILING DOORS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Fire-rated and non-fire-rated service doors.
   2. Insulated service doors.

B. Referenced Standards/Minimum Criteria:
   1. Fire-Rated Door Assemblies: Complying with NFPA 80; listed and labeled by qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252 or UL 10B.
   2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   3. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design".

C. Submittals Required:
   1. Product data.
   2. Shop drawings.
   3. Finish samples for verification.

D. Restrictions/Critical Criteria:
   1. Insulated overhead rolling service doors are typically used on the field building of a middle school or high school. The doors shall be motor operated with manual chain back-up, and lockable by means of padlock provided by the Owner. The face panels are interlocking 24 gauge steel flat front slat and back with foamed-in-place polyurethane insulation and are factory galvanized and primed for field application of final paint or factory finish.
   2. Structural Performance, Exterior Doors: Capable of withstanding the wind loads as indicated on Drawings.
      a. Testing: According to ASTM E 330/E 330M.
      b. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
      c. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.
   3. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
      a. Component Importance Factor: 1.5.
   4. Operation Cycles: Door components and operators capable of operating for not less than 20,000, and not less than 10 cycles per day.

5. Insulated Door Assembly:
   a. Insulated Service Door: Heavy duty overhead coiling door, formed with curtain of interlocking metal slats.
   b. Air Infiltration: Provide manufacturer's standard air infiltration package, including guide cover and cap, dual brush guide seal, lintel seal, and bottom astragal.
   c. Curtain R-Value: not less than 6.0 deg F x h x sq. ft./Btu.
   d. Door Curtain Material: Galvanized steel.
   e. Door Curtain Slats: Flat profile slats of 2-5/8-inch center-to-center height.
      1) Vision Panels: Glazed openings approximately 1-inch by 10-inches.
      2) Insulated-Slat Interior Facing: Metal, matching exterior face.
      3) Gasket Seal. Manufacturer's standard continuous gaskets between slats.

   f. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.

6. Door Curtain Materials and Construction:
   a. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
      1) Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A 653/A 653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
      2) Vision-Panel Glazing: Manufacturer's standard clear glazing, fabricated from transparent acrylic sheet; set in glazing channel secured to curtain slats.
      3) Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84 or UL 723. Enclose insulation completely within slat faces.
      4) Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face.

   b. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats. Provide removable stops on guides to prevent overtravel of curtain.
   c. Door Curtain Finish: Baked-Enamel or Powder-Coated Finish: Color selected by Architect from manufacturer's full range of not less than 200 colors.

7. Hoods: Manufacturer's standard.
8. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
   a. Lock Cylinders: As specified in Division 08 Section "Door Hardware".
   b. Keys: Two for each cylinder.

9. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

10. Electric Door Operators:
    a. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
        1) Comply with NFPA 70.
        2) Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

    b. Motors: Reversible-type motor for motor exposure indicated for each door assembly.
    c. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
    d. Control Station: Three-button control station in fixed location with momentary-contact pushbutton controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
        1) Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general purpose NEMA ICS 6, Type 1 enclosure.

11. Curtain Accessories:
    a. Smoke Seals: Equip each fire-rated door with replaceable smoke-seal perimeter gaskets or brushes for smoke and draft control as required for door listing and labeling by a qualified testing agency.
    b. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
    c. Push/Pull Handles: Equip emergency-operated door with lifting handles on each side of door, finished to match door.
    d. Automatic-Closing Device: Equip each fire-rated door with an automatic-closing device or holder-release mechanism and governor unit complying with NFPA 80 and an easily tested and reset release mechanism. Release mechanism for motor-operated doors shall allow testing without mechanical release of the door. Automatic-closing device shall be designed for activation by the following:
        1) Building fire-detection, smoke-detection, and -alarm systems.

12. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 30 lbf.
13. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

14. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.
15. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with the accessibility standard.
16. Electric Door Operator:
    a. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use.
    b. Motor Exposure: Interior.
    c. Obstruction-Detection Device: Automatic manufacturer's standard sensor edge on bottom bar.
        1) Sensor Edge Bulb Color: Black.

    d. Control Station(s): Interior mounted.
    e. Other Equipment: Audible and visual signals.

PART 2 - PRODUCTS

A. Acceptable Manufacturers/Products:
    1. "Stormtite Model 625" by Overhead Door Corp. www.overheaddoor.com, or comparable product by one of the following:
        a. Clopay Building Products: www.clopaydoor.com.
        b. Cornell Iron Works, Inc. www.cornelliron.com.
        c. Approved substitute.

08 33 26 – OVERHEAD COILING GRILLES

PART 1 - GENERAL

A. Summary - Section includes:
    1. Overhead coiling metal grilles and operating hardware, manual and electric operation.

B. Referenced Standards/Minimum Criteria:
    1. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
    2. ITS (DIR) - Directory of Listed Products (current edition).
    3. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
    4. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2000 (R2005), with errata.
    5. NEMA MG 1 - Motors and Generators (current edition).
    6. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
    7. UL (DIR) - Online Certifications Directory; current listings at www.database.ul.com.

C. Submittals Required:
    1. Product data.
    2. Shop drawings.

D. Restrictions/Critical Criteria:

1. The overhead coiling grilles are typically used to close off any area of the building where the size of the grille is approximately 8'-0" wide x 8'-0" high. The operation is manual push-up/pull down (provide pull down pole). Rolling grille is constructed of mill finished aluminum horizontal rods and vertical chain curtain with extruded aluminum tubular bottom bar. Finish to be anodized aluminum.
2. Grille and Components:
   a. Grille: Aluminum; horizontal bar curtain, coiling on overhead counterbalanced shaft.
      1) Finish: Anodized, clear color.
      2) Electric operation.
      3) Mounting: Surface mounted.

   b. Curtain: Round horizontal bars connected with vertical links.
      1) Horizontal bars: 5/-inch diameter.
      2) Bar spacing: 1-1/2-inch on center.
      3) Tube spacers: 1/2-inch diameter.
      4) Spacer spacing: 3-1/4-inches on center.
      5) Link spacing: 6-inches on center.
      6) Bar Ends: Provide with nylon runners for quiet operation.
      7) Bottom Bar: Back-to-back angles with tubular resilient cushion.

   c. Guides: Extruded aluminum angles, of profile to retain grille in place with snap-on trim, mounting brackets of same metal.
   d. Hood Enclosure: Sheet metal; completely covering operating mechanisms; internally reinforced to maintain rigidity and shape.
      1) Material: Same metal as grille.
      2) Finish: Anodized, color as selected.

   e. Lock Hardware:
      1) Latchset Lock Cylinders: Standard mortise cylinder master keyed to building.
      2) For motor operated units, additional lock or latching mechanisms are not required.
      3) Latch Handle: Manufacturer's standard.
      4) Slide Bolt: Provide on single-jamb side, extending into slot in guides, with padlock on one side.

   f. 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; requiring 25 lb nominal force to operate.
   g. Provide pull down poles.

3. Electric Motor Operation:
   a. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
      1) Provide interlock switches on motor operated units.

b. Electric Operators:
   1) Mounting: Side mounted.
   2) Motor Enclosure:
      a) Motor Rating: 1/3 hp (250 W); continuous duty.
      b) Motor Voltage: 230 volt, single phase, 60 Hz.
      c) Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
   3) Controller Enclosure: NEMA 250 Type 1.
   4) Opening Speed: 12 inches per second (300 mm/s).
   5) Brake: Adjustable friction clutch type, activated by motor controller.
   6) Manual override in case of power failure.

4. Control Station: Standard three button (OPEN-STOP-CLOSE) constant pressure control for each operator.
   a. Key switch operated
   b. 24 volt circuit.
   c. Recessed.
   d. Locate on wall adjacent to opening inside of room.

5. Safety Edge: Located at bottom of curtain, full width, electro-mechanical sensitized type, wired to stop operator upon striking object, hollow neoprene covered.

PART 2 - PRODUCTS

A. Acceptable Manufacturers/Products:
   1. Overhead Coiling Grilles: "DuraGrille" by Raynor: www.raynor.com, or comparable product by one of the following:
      a. The Cookson Company: www.cooksondoor.com.
      b. Cornell Iron Works, Inc. www.cornelliron.com.
      c. Approved substitute.

08 36 13 – SECTIONAL DOORS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Overhead sectional doors, electrically operated.
   2. Operating hardware and supports.
   3. Electrical controls.

B. Referenced Standards/Minimum Criteria:
   1. ASTM E330/E330M – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

2. DASMA 102 – American National Standard Specifications for Sectional Overhead Type Doors.
3. NEMA MG 1 – Motors and Generators; 2014.
4. NFPA 70 – National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction; including all applicable amendments and supplements.

C. Submittals Required:
1. Product data.
2. Shop drawings.

D. Restrictions/Critical Criteria:
1. Steel Door Components:
a. Steel Doors: Flush steel, insulated; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.
1) Performance: Withstand positive and negative wind loads as calculated in accordance with applicable code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using prescribed duration of maximum load.
2) Thermal Values: R-value of 16.22; U-value of 0.0616.
3) Air Infiltration: 0.07 cfm at 15 mph.
4) Sound transmission class 20 when tested in accordance with ASTM E 413.
5) Outdoor-indoor transmission class 20 when tested in accordance with ASTM E 1332.
6) Door Nominal Thickness: 2 inches thick.
7) Exterior Finish: Hot dipped galvanized for field finishing.
8) Interior Finish: Factory finished with acrylic baked enamel; color as selected from manufacturers standard line.
9) Ends: 16-gauge hot-dipped galvanized steel, full height with end caps.
10) Operation: Electric.
a) Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3-foot nor more than 1 foot per second.
b) Entrapment Protection: Required for momentary contact, includes radio control operation.
c) Photoelectric sensors monitored to meet UL 325/2010.

11) Operator Controls:
a) Flush mounted control station with open, close and stop buttons.
b) Locate inside crawlspace adjacent to opening.

12) Hardware: Provide interior slide locks with exterior keyed access

b. Door Panels: Steel construction; outer steel sheet of 20 gage, 0.0359 inch minimum thickness, flush profile; inner steel sheet of 20 gage, 0.0359 inch minimum thickness, flat profile; core reinforcement sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; polyurethane insulation.

c. Doors to have 2-inch normal head room track, angle-mounted to structure above, with electric operator.
d. Provide 2 slide locks. Padlocks provided by Owner.

2. Aluminum Door Components:
   a. Aluminum Doors: Stile and rail aluminum with glazed panels; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.
      1) Door Nominal Thickness: 2-inches.
      2) Finish: Factory anodized; clear anodized.
      3) Glazed Lights: Full panel width, one row; set in place with resilient glazing channel.
      4) Operation: Electric.
         a) Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3-foot nor more than 1 foot per second.
         b) Jack Shaft Type - Standard Duty - 1/2 HP

      5) Entrapment Protection: Required for momentary contact, includes radio control operation.
      6) Photoelectric sensors monitored to meet UL 325/2010.
      7) Operator Controls: Locate inside of room.
         a) Key operated control stations with open, close, and stop buttons.

   b. Window Frame: To match door panels, finish to match.
   c. Glazing: Fully tempered glass; single pane; clear; 1/4-inch thick.
   d. Hardware: Provide interior slide locks and galvanized hanger angles and tracks
   e. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
      1) Size: 2-inch.
      2) Type: Standard lift.

   f. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.
   g. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables.
   h. Weatherstripping (Exterior Door applications):
      1) Flexible bulb-type strip at bottom section.
      2) Flexible Jamb seals.
      3) Flexible Header seal.

   i. Panel Joint Weatherstripping: Neoprene foam seal, one-piece full length.
   j. Lock: Keyed lock with interlock switch for automatic operator.

3. Electrical Operation:
   a. Electrical Characteristics: 1/2 hp (375 W); manually operable in case of power failure, transit speed of 12 inches per second.
   b. Motor: NEMA MG 1, Type 1.
   c. Disconnect Switch: Factory mount disconnect switch in control panel.
   d. Electric Operator: Side mounted on cross head shaft, adjustable safety friction clutch; brake system actuated by independent voltage solenoid controlled by motor starter; enclosed gear driven limit switch; enclosed magnetic cross line reversing starter; mounting brackets and hardware.
   e. Safety Edge: At bottom of door panel, full width; electro-mechanical sensitized type, wired to reverse door upon striking object; hollow neoprene covered to provide weatherstrip seal.
   f. Control Station: Standard three button (Open-Close-Stop) momentary type control for each electric operator.
      1) 24-volt circuit.
      2) Surface mounted.
      3) Locate at inside door jamb.

   g. Hand-Held Transmitter: Digital control, resettable.

PART 2 - PRODUCTS

A. Acceptable Manufacturers/Products:
   1. Steel Doors:
      a. "SteelForm S20" by Raynor: www.raynor.com, or comparable product by one of the following:.
         1) Clopay Building Products: www.clopaydoor.com.
         2) The Cookson Company: www.cooksondoor.com.
         3) Approved substitute.

   2. Aluminum Doors:
      a. "AlumaView AV200" by Raynor: www.raynor.com, or comparable product by one of the following:
         1) Clopay Building Products: www.clopaydoor.com.
         2) The Cookson Company: www.cooksondoor.com.
         3) Approved substitute.

08 41 13 – ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

and

08 44 13 – GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Aluminum storefront window units/accessories, including aluminum fixed windows.
   2. Glazed aluminum curtain walls.

B. Referenced Standards/Minimum Criteria:
   1. Windows and component structural tests shall conform to the "Voluntary Guide Specification for Aluminum Architectural Windows" as published by AAMA for air infiltration, water infiltration, structural performance, thermal movements and thermal performance.
   2. Design per wind loading requirements of IBC.

C. Submittals Required:
   1. Product data.
   2. Shop drawings.
   3. Samples of aluminum finish and storefront cross section.
   4. Test Reports.
   5. Design Engineering Calculations: Submit structural calculations prepared by registered engineer in the State of Colorado for review purposes. Calculations shall indicate adequacy of curtain wall system to meet the wind loading and structural load requirements of the IBC. Design engineer shall size and locate any internal steel reinforcing required within framing members to meet system design criteria.

D. Restrictions/Critical Criteria:
   1. Provide framing members and components with joints neatly made, free of burrs, and tight fitting to provide hairline joints with ends coped, mitered, milled or machined as appropriate. Members shall be securely fastened or joined to develop full structural value of framing system and to provide permanent watertight joints.
   2. Drainage System: Provide weep holes and drainage slots within glazing pockets to drain any condensation or accumulating water within the system to exterior.
   3. Reinforcements: Reinforce framing members as necessary to meet structural performance for loading criteria.
   4. Aluminum Window Sills and Trim: Extruded aluminum having same finish and thickness of frames.
   5. Finish: Color anodized finish of exposed areas of aluminum members and components in accordance with AAMA Voluntary Guide Specifications AA-M12C22A42/44.
   6. Comply with manufacturer's instructions for installation of components to achieve weathertight installation.

7. Apply coat of bituminous paint or zinc chromate on concealed aluminum surfaces in contact with cementitious or dissimilar materials.
8. Uses of sealant materials, both at the factory and at the project site shall be in strict accordance with ASTM Specifications for such materials. Contractor shall ensure that joints, gaps, buttered surfaces, and other surfaces are made weathertight.
9. On site tests shall be conducted for both air and water infiltration with the wall manufacturer's representative present. Architect will select unit(s) to be tested. Testing shall be conducted by qualified testing personnel selected by the Architect and window manufacturer (if required).
    a. Air infiltration tests on wall units and insert windows shall be in accordance with ASTM E783.
    b. Water infiltration tests shall be in accordance with AAMA 501.3: No uncontrolled water to appear on interior surface.

10. Manufacturer shall provide a ten (10) year warranty on materials and workmanship.

PART 2 - PRODUCTS

A. Acceptable Manufacturers:
    1. Kawneer Company, Inc. www.kawneer.com.
    2. Vistawall (Oldcastle Building Envelope): www.obe.com.
    3. Tubelite, Inc. www.tubeliteinc.com.
    4. Approved substitute.

B. Acceptable Aluminum Curtain Wall Framing System: Kawneer "1600 Wall System" or equal system of other approved manufacturer. Outside glazed extruded 6063-T5 aluminum framing system. Framing members shall be 2-1/2-inch x depth required for wind loading.

C. Acceptable Manufacturer and Type for Storefront and Fixed Windows: Kawneer "451T Storefront Framing System" or equal of other acceptable manufacturer. Extruded aluminum shall be 6063-T5 alloy and temper. Frames shall have integral structural thermal barrier. Mechanically fasten for flush, tight, and weatherproof joints. Frame dimensions shall be minimum 2- x 4-1/2-inches nominal.

08 45 00 – TRANSLUCENT WALL AND ROOF ASSEMBLIES

PART 1 - GENERAL

A. Summary - Section includes:
   1. Translucent insulated skylight system, including all related trim, sills, closures, and flashings.

B. Referenced Standards/Minimum Criteria:
   1. Structural design shall be in compliance with the provisions of Chapter 16 of the 2015 International Building Code (IBC). Design, engineer, fabricate, and install System to withstand the applicable loads and load combinations described therein.
   2. Design wind load shall be based on a 3-second gust wind velocity (V_{ULT}) of 120 mph, Exposure C, or per site conditions.
   3. Exterior face sheet of panels shall withstand a 60 foot pound impact.

C. Submittals Required:
   1. Product data.
   2. Shop drawings.
   3. Samples.
   4. Certifications.

D. Restrictions/Critical Criteria:
   1. Framing System:
      a. Standard Thermal Break Framing System with panel joint connectors, battens, and perimeter frame. Furnish all required and detailed sections.
      b. Extruded 6063-T6 and 6063-T5 aluminum screw "clamp-tite" closure system.
      c. Exposed Aluminum: Class I clear anodized finish conforming to AAM12C22A41.
      d. Architectural corrosion resistant finish which meets the performance requirements of AAMA 2604, color to be selected from manufacturer's standard colors.

   2. Panels: Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking thermally broken (aluminum) I-beams.
      a. 2-3/4-inch thick factory prefabricated sandwich panels.
      b. Exterior face sheet shall be 0.070-inch thick "crystal" with interior face sheet of 0.045-inch thick "crystal".
      c. Panels shall have "U" Factor of 0.23, light transmission of 30%, and solar heat gain coefficient of 0.33.
      d. Pattern shall be standard "Shoji" with 12- x 24-inch grids.

   3. Sealing Tape: Manufacturer's standard pre-applied to closure system at the factory under controlled conditions.
   4. Accessories: Furnish all hardware, anchors, and related items necessary for complete and weathertight installation.

PART 2 - PRODUCTS

A. Acceptable Manufacturers/Products:
   1. Skylight Types:
      a. Kalwall "Supported Ridge" Translucent Skylight by Kalwall Corporation: www.kalwall.com.
      b. Kalwall "Self-Supported Ridge" Translucent Skylight by Kalwall Corporation: www.kalwall.com.

   2. Other Manufacturers:
      a. Skywall Translucent Systems: www.vistawall.com.
      b. Major Industries: www.majorskylights.com.
      c. Approved substitute.

08 51 00 – ALUMINUM WINDOWS (Factory Assembled)

PART 1 - GENERAL

A. Summary - Section includes:
   1. Fixed aluminum windows.
   2. Operable aluminum windows.

B. Referenced Standards/Minimum Criteria:
   1. National Fenestration Rating Council NFRC).
   2. American National Standards Institute/American Architectural Manufacturers Association (ANSI/AAMA) Aluminum Prime Window Voluntary Specification.

C. Submittals Required:
   1. Product data.
   2. Shop drawings.
   3. Test reports for air infiltration, water resistance, wind loading, and thermal performance.

D. Restrictions/Critical Criteria:
   1. Window manufacturer to provide minimum five (5) year warrantee covering defects in materials and workmanship.
   2. Window to be ANSI/AAMA rating or better (minimum wall thickness 0.062-inch) with thermal break design, internal to exterior drainage, weather stripping per AAMA 701.2, and extruded aluminum sills and trim, no break metal allowed.
   3. Apply coat of bituminous or zinc chromate paint on aluminum surfaces in contact with cementitious or dissimilar materials.
   4. Windows to have cam handle locks and 4-bar hinges with 15-degree limit stops.
   5. The color of the anodized frames shall be approved by the School District.
   6. Confirm with Owner if glass is to be provided by window manufacturer or glazing contractor.

PART 2 - PRODUCTS

A. Acceptable Manufacturers/Products
   1. Awning or fixed window with no screens "Series 8225TL Thermal Windows" by Kawneer: www.kawneer.com, or comparable products by one of the following:
      a. Win-Vent: www.winventwindows.com.
      b. Winco Windows: www.wincowindow.com.
      c. Manko: www.mankowindows.com.
      d. Approved substitute

08 63 00 – METAL FRAMED SKYLIGHTS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Metal framed skylights.
   2. Glazing and accessories.

B. Referenced Standards/Minimum Criteria:
   1. Engineered by manufacturer to prevent wind blow-off and live/dead loads per IBC with minimum air filtration per ASTM E283 and no uncontrolled water leakage per ASTM E331 testing.
   2. Manufacturer and installer shall warrant that the framing system and completed installation shall be free of defects in workmanship and materials and system shall remain watertight for a period of five (5) years from date of substantial completion.
   3. Insulated glazing units shall be warranted by manufacturer for a period of five (5) years from date of manufacture against seal failure.
   4. Glazing gaskets shall be flexible EPDM extrusions conforming to ASTM C864 or ASTM C509 at entire perimeter of glazing materials. At no place shall direct contact exist between glazing and metal.

C. Submittals Required:
   1. Product Data.
   2. Shop drawings.
   3. Structural calculations per AAMA Structural Design Guidelines for Aluminum Framed Skylights by engineer licensed in the State of Colorado.
   4. Color Options.
   5. Sample of warranty.

D. Restrictions/Critical Criteria:
   1. Water test skylights upon completion. Thoroughly wet the entire skylight area in accordance with referenced test and check for uncontrolled water leakage.

PART 2 - PRODUCTS

A. Acceptable Manufacturers/Products:
   1. Vistawall (Oldcastle Building Envelope): www.obe.com, "HP-1175 Sloped Glazing" with integral condensation gutters and 1-inch double sealed insulating glass with tempered outside glass and laminated glass inside face. Finish of aluminum as approved by the School District.
   2. Dalyte (AIA Industries): www.dalyte.com.
   3. Skyline Skylights: www.skylites.com.
   4. Kawneer: www.kawneer.com.

08 64 00 – PLASTIC SKYLIGHTS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Double-dome plastic skylights.

B. Referenced Standards/Minimum Criteria:
   1. Skylights shall be engineered by the manufacturer to prevent wind blow off and to provide a minimum carrying capacity of 40 lb. live load per square foot of skylight.

C. Submittals Required:
   1. Product data.
   2. Shop drawings.
   3. Color options.

D. Restrictions/Critical Criteria:
   1. Glazing shall be one piece continuous cast acrylic resin plastic, with tinted outside dome and clear inside dome. Mounted on thermal barrier extruded aluminum frame with integral condensate gutter.
   2. Water test skylights upon completion. Conduct test using a hose without nozzle and thoroughly wet the entire skylight area.

PART 2 - PRODUCTS

A. Acceptable Manufacturers:
   1. Plasteco: www.plasteco.com.
   2. Dalyte (AIA Industries): www.dalyte.com.
   3. Skyline Skylights: www.skylites.com.
   4. Solatube: www.solatube.com.
   5. Velux: www.veluxusa.com.
   6. Approved substitute.

08 70 10 – DOOR HARDWARE

PART 1 - GENERAL

A. Summary - Section includes:
   1. Finish hardware.
   2. Cylinders for overhead, coiling, and sliding doors and key switches for ADA actuators and mag holder furnished under this section but not installed.

B. Referenced Standards/Minimum Criteria:
   1. Builders Hardware Manufacturers Association (BHMA).
   2. American National Standards Association (ANSI).
   3. ANSI A117.1 - Specifications for making buildings and facilities usable by physically handicapped people.
   4. ADA - Americans with Disabilities Act.
   5. DHI - Door and Hardware Institute.
   6. NFPA- National Fire Protection Association.
      a. NFPA 80 - Fire Doors and Windows.
      b. NFPA 101 - Life Safety Code.
      c. NFPA 105- Smoke and Draft Control Door Assemblies.
      d. NFPA 252 - Fire Tests of Door Assemblies.
   7. UL- Underwriters Laboratories:
      a. UL10C - Fire Tests of Door Assemblies (Positive Pressure).
      b. UL 305 - Panic Hardware.
   8. WHI - Warnock Hersey Incorporated.
   9. SDI - Steel Door Institute.
   10. WDMA Industry Standard I.S. 1-A-97 (Window & Door Manufacturers Association).
   11. AWI Quality Standards, current edition.
   12. ANSI A115. W Series, Wood Door Hardware Standards. (American National Standard Institute).
   13. NAAMM - National Association of Architectural Metal Manufacturers.

C. Submittals Required:
   1. Product data / Shop drawings:
      a. Type, style, function, size, quantity and finish of hardware items. Use BHMA Finish codes per ANSI A156.18.
      b. Name, part number and manufacturer of each item.
      c. Fastenings and other pertinent information
      d. Location of hardware set coordinated with floor plans and door schedule
      e. Explanation of abbreviations, symbols, and codes contained in schedule.
      f. Mounting locations for hardware.
      g. Door and frame sizes, materials and maximum degrees of swing.
      h. List of manufacturers used and their nearest representative with address and phone numbers.

i. Catalog cuts.
j. Manufacturer's technical data and installation instructions for electronic hardware.
k. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring/riser diagrams, manufacturers' installation, adjustment and maintenance information, and hardware consultant's final inspection report.

2. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware. Present special tools and maintenance instructions to Owner at time of testing and demonstration interval.
3. Operating and maintenance manuals at closeout.
   a. Bound in 3-ring, three (3) inch black binders, indexed by the following:
      1) Project Record Documents and Shop Drawings (hard copy) with one electronic data file, Microsoft Word, CD or 3.5" disc. Format to Owner's operating systems.
      2) Manufacturer listing with name, address and phone number and catalog cut sheets of each item supplied.
      3) Installation instructions, maintenance manuals including operating and maintenance
      4) instructions.
      5) Parts listing with IR sources and IR Distribution Purchasing and Service Program participants.
      6) Warranties.

   b. Submit directly to, return receipt requested:

      Cherry Creek School District No. 5 Facilities Management
      9301 East Union Ave.
      Greenwood Village, Colorado 80111
      Attention: Steve Skene

4. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
5. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
6. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable time during the course of the Work, for consultation. The supplier shall be an approved factory direct supplier and maintain the following hardware and is currently stocking replacement parts.

7. Shop Drawings: Details of electrified door hardware, indicating the following.
   a. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
   b. Wiring Diagrams: power, signal, and control wiring. Including the following:
      1) System schematic.
      2) Point-to-point wiring diagram.
      3) Riser diagram.
      4) Elevation of each door.

   c. Operating Narrative: Describe the operation of doors controlled by electrified door hardware.
      1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter, authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

   d. Scheduling Responsibility: Preparation of door hardware and keying schedules.
   e. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
   f. Electrified Door Hardware Consultant Qualifications: A qualified Architectural Hardware Consultant who is experiences in providing consulting services for electrified door hardware installations.
   g. Wiring and Riser Diagrams: Supplier shall furnish, electrical wiring and riser diagrams for low voltage security hardware equipment specified in this Section. Provide elevation drawings indicating door numbers, associated electronic security equipment such as power supplies and interconnections between door system components, control wiring for electric locks, indicator signal lights and sounding devices which are contained in the approved hardware Submittals. Elevations shall indicate standard electrical enclosures detailing the manufacturer's space and attaching requirements.

D. Restrictions/Critical Criteria:
   1. Scheduled Hardware
      a. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in Article 3.05. Products are identified by using hardware designation numbers of the following:
         1) Manufacturer's Product Designations: The product designation and name of one manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product designated or, where more than one manufacturer is specified for each hardware type, the equivalent product of one of the other manufacturers that complies with requirements.

2. Materials and Fabrication
   a. Manufacturer's Name Plate: Do not use products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.
      1) Manufacturer's name will not be permitted on cylinders or keys.

   b. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
   c. Fasteners: Provide hardware manufactured to conform to published templates generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
   d. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
   e. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru bolt or use sex screw fasteners.
   f. Fire-Rated Openings: In compliance with NFPA 80. Hardware UL10C (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, plus resilient and required intumescent seals. Furnish openings complete.
   g. Where exit devices are required on fire rated doors, (with supplementary marking on door label indicating "Fire Door to be Equipped with "Fire Exit Hardware"), provide label on exit device indicating "Fire Exit Hardware".

3. Hinges and Spring Hinges:
   a. Hinges shall be 3-knuckle, concealed, Nylatron self-lubricating, vertical and lateral thrust bearings and shall be certified to exceed two million, five hundred thousand (2,500,000) full load-operating cycles by a recognized independent testing laboratory. Templates: Except for hinges to be installed entirely (both leaves) into wood doors and frames provide only template produced units.
   b. Screws: Provide Phillips flat-head screws complying with the following requirements:
      1) For metal doors and frames install machine screws into drilled and tapped holes.
      2) For wood doors and frames install wood screws.

3) For fire-rated wood doors install #12 x 1-1/4-inch, threaded-to-the-head steel wood screws.
4) Finish screw heads to match surface of hinges or pivots.

c. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
1) Out-Swing Doors with Locks: Non-removable pins (NRP).
2) Interior Doors: Non-rising pins.
3) Tips: Flat button and matching plug, finished to match leaves.
4) Number of Hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90 inches or less in height and one additional hinge for each 30-inches of additional height. Unless otherwise specified, hinge size for doors through 3'-0" shall be 4-1/2-inches x 4-1/2-inches.
5) Hinges for doors over 3'-0" wide shall be four ball bearing, heavy weight, 0.190-inch, 5-inches x 4-1/2 inches.
6) Option: Doors over 3'-0" wide shall receive four (4) heavy weight, 0.190-inch, 4-1/2 inches x 4-1/2 inches.
7) Fire-Rated Doors: Not less than 3 hinges per door leaf for doors 86 inches or less in height with same rule for additional hinges.

4. Maintenance:
a. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware. Present special tools and maintenance instructions to Owner at time of testing and demonstration interval.

5. General Warranty: Warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
a. Hardware Manufacturers Warranty: All hardware shall be free of defects and imperfections in manufacture and finish. Hardware shall be guaranteed by the manufacturer to perform all the various functions required for, twenty-four, (24) months from date of Substantial Completion.
b. Provide the following special warranties for the following items:
1) Everest/Primus keys: Life of Building.
2) Locksets, cylinders and latchsets: 7 years.
3) Door Closers: 10 years.
4) Exit devices: 3 years.
5) Automatic Operators: 2 years.

6. Keying Systems:
   a. Meet with Architect and Owner to finalize keying requirements and obtain keying instructions in writing. Integrate locks and cylinders with Owner's existing Everest D patent protected keying system with specifically assigned milled side bar. Cylinders must allow for applications of multiplex keying capabilities and multiple keyways. Key bittings shall be registered by the lock manufacturer. Keying services shall be performed by Owner's authorized keying services, where permanent records are maintained. Owner shall provide key bittings.
   b. Furnish cylinders with temporary interchangeable core construction keying system during construction period. Temporary cores and keys remain property of hardware supplier.
      1) Furnish permanent cores zero (0) bitted, Everest/Primus D245 keyway. Deliver permanent cores direct to Owner for keying.
      2) Furnish temporary construction cylinders at exterior doors. Medeco cylinders shall be sub-assembled for Owner assembly and keying. Permanent Medeco cylinders shall be installed by General Contractor after substantial completion.
      3) Owner's authorized keying service shall remove temporary construction cores and install permanent keyed cores into locksets and cylinders. Return temporary construction cores to hardware supplier.

   c. Keys and Key Blanks: Furnish of nickel silver to maintain security and safety of keying system and accuracy in keys and long cylinder wear.
      1) Key blanks shall be available only from factory-direct sources, not available from after market key blank manufacturers.
      2) All keys shall be embossed "Do Not Duplicate." Keys and cylinders shall be stamped with the applicable key mark for identification. Stamp all keys in sequence. Visual stamped key control on keys, indelible marking on cylinder bodies.
      3) Architect and Owner shall approve stampings and markings prior to ordering of locksets and cylinders, furnish Owner's written approval of the system.

   d. Do not package permanent keys with locks. Package key separately from locksets and cores. Deliver all keys, key blanks and other security keys direct to Owner from lock manufacturer by secure courier, return receipt requested.
   e. Failure to properly comply with these requirements may be cause to require replacement of all or any part of the keying system, cores, cylinders and keys involved as deemed necessary at no additional cost to the Owner.
   f. Key Quantity: Furnish keys in the following quantities (verify quantities for size of job with school district):
      1) 25 each - Temporary construction keys to General Contractor
      2) 6 each - Temporary construction control keys to Owner
      3) 10 each - Permanent Core Control keys to Owner
      4) 3 each - Change keys per cylinder to Owner
      5) 10 each - Emergency keys per cylinder to Owner
      6) 500 each - Key blanks, each type used, to Owner
      7) 1 each - Lock service kit to Owner

7. Locksets and Latchsets:
   a. An approved (BHMA) Builder's Hardware Manufacturers Association testing laboratory shall certify locksets to exceed three million (3,000,000) full load operating cycles.
   b. Locksets and latchsets shall be non-handed, heavy-duty cylindrical type, with 2-3/4-inch backset or greater, as specified, with 1/2-inch throw latchbolt. Manufacturer lock chassis from cold rolled steel, with locking spindles of deep drawn cold rolled steel. Spindles to resist deforming under sever torque.
   c. Lever trim shall be designed to increase resistance against vandalism and forced entry by over torquing of lock chassis. Disablement of secured levers shall not permit latchbolt retraction from secure side while allowing emergency egress.
   d. Furnish units with concealed through-bolts and threaded chassis hubs to prevent lever torque from rotating lock chassis and maintain correct alignment. Equip units with cast auxiliary spring cages with studs to prevent rotation attached directly to the lock chassis to assist in support of levers. Spring cage units shall contain coil compression springs to maintain life safety and provide extended service.
   e. Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
   f. Interface Owner's existing keying system with specified locksets. Furnish complete and fully operational locksets and cylinders.

8. Exit Devices and Mullions:
   a. Provide exit devices of single manufacturer with specified functions, which can accept exterior and interior cylinders of specified cylinders. Exit devices shall be certified to exceed three million, 3,000,000, full load-operating cycles by a recognized independent testing laboratory.
   b. Provide exit devices with specified functions, which can accept specified cylinders. Exit devices shall have ribbed interior body to discourage vandalism and graffiti. Releasable with 15 lb. maximum pressure under 250-lb. load to the door. Where specified furnish special cylinder (SD) dogging to replace standard hex key dogging.
   c. Equip devices with dead locking latchbolts. Furnish through bolted fasteners for all devices. Where required, provide projecting glass bead stop kits to provide clearance when used with projecting glass stops. Furnish glass bead stop kits at locations using both exit devices and electric strikes.
   d. Lever handle trim shall have a mechanism to disengage lever from operating should excessive force be applied, and allow lever to be re-set to its operating position. Lever design to match lock manufacturer's lever design. Provide keyed security removable mullions, which will accept security cylinders of specified cylinder manufacturer, to allow removal by use of the cylinder. Mullions to be furnished with a self-locking mechanism for re-installation without the use of the cylinder. Equip each mullion with mullion stabilizers to maintain integrity between door and mullion to prevent vandalism.
   e. Electrically actuated devices shall retract latchbolts instantly without delay for momentary unlocking or for extended periods of time. Solenoids shall be continuous duty, 24 volt, direct current, and 16.0-amp inrush. Devices shall be UL approved for Class II circuit applications.

9. Closers:
   a. Closers shall be certified to exceed ten million (10,000,000) full load-operating cycles by a recognized independent testing laboratory.
   b. Where manual closers are indicated for doors required to be accessible to the physically challenged, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing. Except as specifically indicated, comply with manufacturer's recommendations for size of door control units, depending upon size of door, exposure to weather, and anticipated frequency of use.
   c. Closers shall be cast iron construction with forged lever arms, independent adjusting valves for closing, latching and back check. Hydraulic regulation controlled by tamper-proof, non critical screw valves. All closer adjustments shall be shielded by metal cover plate after installation.
   d. Furnish extra duty arms, EDA, to protect against excessive force. Provide special templated arms to allow clearance and applications of overhead stops and holders. Closers installed on exterior doors and interior doors in high traffic areas, shall be equipped with advanced variable backcheck, AVB, function.
   e. Provide combination door closer and electromagnetic holder designed to hold door in open position. Under normal usage and to release and automatically close door under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts. Provide integral smoke detector device in combination door closers and holders complying with UL 228.
   f. Install closers to allow maximum degree of opening, position back check to activate well in advance of the stop position to cushion the opening swing and prevent door and frame damage. Unless specified, install closers with through bolt mounting method on metal and wood doors.
      1) Template and install door closers for maximum degree of door swing.

   g. Operating Voltages: Coordinate operating power requirements with Fire/Life Safety control systems.

10. Pneumatic-Hydraulic Power Door Operators:
   a. Closer body shall be certified to exceed ten million (10,000,000) full load-operating cycles by a recognized independent testing laboratory. Shall conform to ANSI A156.19; ADA law, section 4.13.12; ANSI A117.1.
   b. System shall be a pneumatically and electrically powered, surface; door mounted overhead operator to provide easy access for physically handicapped persons. Opening force and time to close standards shall be in compliance with ADA requirements. Full closing force shall be provided when power cycle ends.
   c. Power door operator system shall include features and functions as follows:
      1) Cylinder operated key switch to enable/disable power to actuators.
      2) Provisions for separate conduits to carry high and low voltage wiring in compliance with applicable National Electrical Code requirements.

3) Provide building emergency electrical operating power to control box. Operator shall be designed to prevent damage to mechanism if system is actuated while door is latched or if door is forced closed during opening cycle.
4) Provisions in control box or module shall provide control (inputs and outputs) for electric strike delay, auxiliary contacts, sequential operation, fire alarm systems, actuators, swing side sensors, and stop side sensors. Coordinate installation of control box and hardwired actuators with Electrical Contractor.
5) Door operator (closer) shall be fabricated using high strength cast iron cylinder and one piece forged steel piston with forged steel main arm. Units shall be sealed and filled with all-weather fluid. Furnish fully concealed tamper proof, pneumatic power transfers, LCN 460. Units shall provide continuous protection for the enclosed pneumatic tube, when doors are in the open position.

d. Furnish and provide complete system with components necessary for proper installation, including door closer (operator), actuators at each side of door, connectors, wiring, compressors, tubing and other components as needed.
e. Actuators shall be as indicated on drawings. Provide two actuators per opening one on each side of door for access from either direction.
f. Activation and safety devices: Wall push-plate switch: Manufacturer's standard semi-flush, wall mounted, door control switch; consisting of round or square, flat push plate; of material indicated; and actuator mounted in recessed junction box. Provide engraved message as indicated.

11. Magnetic Holder:
a. Openings requiring electrically controlled door holding magnets shall be equipped with units, which are fail-safe and hold until current is interrupted. Provide holders with through bolt attachment for door-mounted armatures.
b. Openings where vertical rod exit devices are used, furnish Rixson FM993 wall mounted magnetic holder. Holder is to be furnished "less release button" and furnished with a recessed, key cylinder operated wall mounted key switch similar to Locknetics 653. Keyed cylinder shall be interfaced with school master key system. Magnetic holders shall be interfaced with Fire/Life Safety Systems.

12. Overhead Stops and Holders:
a. Overhead stops and holders shall be certified to exceed six million (6,000,000) full load operating cycles by a recognized independent testing laboratory. Provide non-handed overhead stops and holders as listed in the hardware sets. Coordinate overhead holder and stop mounting with door closer to facilitate the optimum degree of door opening.
b. Manufacture all major metal components from brass, bronze or stainless steel to deter corrosion and to prevent stress related failures. Equip units with adjustable jamb bracket to allow adjustment after installation. Where required, furnish special templating application to prevent closer and overhead stop or holder from interfering with operation.

c. Install overhead stops and holders with one-piece sex bolts and machine screws. Do not install hold open devices on fire rated openings. Unless otherwise noted in hardware sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.

13. Protective Plates:
    a. Provide manufacturers standard exposed fasteners for door trim units, kick plates, edge trim, push/pull plates and similar units; either machine screws of self-tapping screws.
    b. Fabricate protection plates, armor, kick or mop, not more than 2 inches less than door width on stop side and not more than 1 inch less than door width on pull side, and 1 inch less than the door width on double doors, by the height indicated. Size plates to provide clearance for bottom rail, grills, louvers and door lites.
        1) Protective plates shall be nominal 10-inches in height.
        2) Metal Plates: Stainless steel plates 0.050, US 18 Ga.

14. Door Stops:
    a. Furnish heavy duty wrought stainless steel base material, concave or convex wall stops, coincide with lock function, wherever door strikes wall unless otherwise noted in hardware sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
        1) Floor Stops: (Place at maximum swing and out of traffic flow, avoid trip hazards).

    b. Provide gray resilient rubber bumpers.

15. Electronic Security Hardware:
    a. Electric Power Transfer: Provide fully concealed, tamper proof, when door is in closed position. Units shall provide continuous protection for the enclosed wires, when doors are in the open position. Provide UL rated units for use in fire door and frame applications. Power transfers to be UL listed, rated Class 1, low voltage, at 24VDC, 2 amperes, 16/20 amperes maximum surge, two 18 gauge wire or ten 24 gauge wire leads, as required. Coordinate where openings exceed 180-degree door swing with other hardware items. Units shall be approximately 9 inches x 1-7/16 inches x 1-1/2 inches, with housings and fittings pressure cast, zinc dichromate steel. Exposed door loop and electric power hinge transfers will not be permitted.
    b. Electrical Exit Devices: Manufacturer units in accordance with U.S. domestic and international standards for NFPA 101, Special Locking Arrangement. Provide only UL listed "A" Controlled Exit Panic Device for use on Accident Hazard or Fire Exit Hardware applications. Electrically actuated devices shall retract latchbolts instantly without delay for momentary unlocking or for extended periods of time. Solenoids shall be continuous duty, 24 volt, direct current, and 16.0-amp inrush. Devices shall be UL approved for Class II circuit applications.
        1) Door and frame manufacturer shall provide a concealed channel within the door between the electrified hinge and the locking mechanism.

c. Electric exit devices shall be operated by solenoid-activated latchbolts, which can be opened momentary, or for prolonged periods of time. Fail safe design, interruption of power, device returns latch bolt to the locked position. Devices to be connected direct to security consoles or may be used as a stand-alone alarm station. Devices shall be equipped with a request to exit switch (RX), to detect attempts to exit.

d. Fire Alarm Input: Building fire/life safety alarm system upon activation shall immediately disable alarmed devices permitting unrestricted emergency egress from area.

e. Proximity Card Reader: Furnish S5395 series, universal compatibility with all HID cards. Readers made with Polycarbonate UL 94 enclosure and shall mount directly to a single gang electrical box. Read ranges up to 5.5-inches and shall have over 137 billion unique codes.

f. Reader Controller: Model SRCNX shall be capable of configuring communication through networked, dial-up modem and communicate via RS485 to locking systems. Controller shall be furnished with flashable firmware, to keep board memory intact in case of power failure.

g. Enclosure shall be approximately 20-inches high x 20-inches wide x 4-inches deep with key lockable door. Power requirements shall be 16 VAC at 4 Amps or 24 volts at 4 Amps.
   1) Furnish one each Lantronix model UDS-1100 external device with AL175UL power supply and NP712FR battery back up system.
   2) Deliver proximity card reader, reader controller and accessories to Cherry Creek Operations & Maintenance Department.

h. Regulated Power Supply: Provide only UL listed, class 2-power supply, regulated and rectified to meet electrical security hardware current requirements. Install in a secured location adjacent to the security device. Equip with hinged panel and keyed lock. Enclosure shall be constructed of 19 gauge, prime coat gray steel, approximately 10 inches high, 12-1/2 inches wide, 5 inches deep, with (5) 1/2-inch by 3/4-inch knockout holes for conduit connection. Provide units with terminal blocks to accept up to 14-gauge wire. Regulated power output to be field selectable for either 24VDC at 2-ampere continuous, 16.0 amperes surge for 300 milliseconds or 12VDC at 4 ampere with power input 240VAC at 0.5 ampere, capable of providing power to two security devices.
   1) Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

i. Key Switches: Provide keyed cylinder switch, capable of accepting specified security cylinders, to provide means of arming, disarming or resetting devices. Switches shall allow key removal when either in the armed or disarmed position. Provide indicator lamps to allow visual status of security device. Security key switch shall be equipped with 24VDC solid state (SCA) alarm circuit containing a monitored NO contact input and NO alarm output, reset by activation of the key switch. Furnish 2-3/4-inches x 4-1/2-inches; tamper resistant back box with 1/2-inch knockouts for access to switch assemblies.

j. Door position indicator switches (DPIS) shall be recessed, UL approved for wood or metal fire door applications. Switches shall be recessed types for wood or metal door applications. Furnish magnetic housings, which can accommodate a variety of doors with channel widths.

k. Junction box: Provide surface mounted, hinged door with twist turn lock, junction box with 20 position terminal strip to accept 12 to 24 gauge wire. Units are to be approximately 10-inches high, 10-inches wide and 6-inches deep, with 6 heavy gauge steel, 3/4-inch knock outs, top, bottom, right and left side panels and back.
   1) Key locks for power supplies and junction boxes shall be keyed alike.

l. Wiring and Riser Diagrams: Supplier shall furnish to the General Contractor, electrical wiring and riser diagrams for low voltage security equipment specified in this Section. Provide elevation drawings indicating door numbers, associated electronic security equipment such as power supplies and interconnections between door system components, control wiring for electric locks, indicator signal lights and sounding devices which are contained in the approved hardware Submittals. Elevations shall indicate standard electrical enclosures detailing the manufacturer's space and attaching requirements.

m. Testing and Acceptance: General Contractor shall provide as part of the system start-up responsibilities, a complete data base with respect to electro-mechanical security hardware items functions and features. Testing shall include, but is not necessarily limited to, demonstration in the operational use of all electronic security hardware. Electrical circuits for each locking system opening shall be tested by the representative of the security hardware supplier and shall be certified as having compatible voltage, protection against overload and duty cycle capability consistent with the operation and installation.

n. Emergency Electrical Power Support: Refer to Electrical

o. Wire and Cable: Refer to Electrical.

p. Fire Alarm Systems: Refer to Electrical.

16. Thresholds, Weatherstripping and Seals:

a. Provide continuous seal at jambs and heads and at door bottom. Where specified, provide threshold type with silicone gasket. Smoke, or sound seals shall be rated in accordance with surrounding wall rating respective to sound or fire rating or as required by code. Unless otherwise indicated, provide metal threshold units of type, size and profile as shown or scheduled. Provide noncorrosive fasteners for exterior and interior applications.

b. Extruded aluminum with color anodized finish as selected by Architect from manufacturers standard color range; 0.062-inch minimum thickness of main walls and flanges. Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.

c. Nylon brush filament weather stripping, shall be wrapped around a core wire, locked in a metal spline and encased in an anodized aluminum flange for attachment. Nylon shall remain pliable within a temperature range of 400 degrees F to minimum -40 degrees F below zero. Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.

d. Fire-rated Doors, Resilient Seals: UL10C/UBC-7-2 compliant. Coordinate with selected door manufacturers and selected frame manufacturer's requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal and the adhesive applied seal if necessary to fulfill door manufacturer's requirement. Adhesive applied seal alone is deemed insufficient for this project where rigid housed seals are scheduled.

e. Fire-rated Doors, lntumescent Seals: Furnish fire-labeled opening assembly complete and in full compliance with UL10C/UBC-7-2. Furnished by selected door manufacturer, these seals vary in requirement by door type and door manufacture.
   1) Adhesive applied intumescent strips are not acceptable, use concealed-in-door-edge type or kerfed-in-frame type. Careful coordination required.

f. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.

17. Hardware Finishes:
   a. Match items to the manufacturer's standard color and texture finish for the latch and locksets (or push-pull units if no latch or locksets).
   b. Provide quality of finish, including thickness of plating or coating (if any}, composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
   c. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
   d. The designations used in schedules and elsewhere to indicate hardware finishes are the industry-recognized standard commercial finishes, except as otherwise noted.
      1) Satin Chromium Plated, Clear Powder Coated: US26D/ANSI 626, ANSI 652.
      2) Brushed Stainless Steel, no coating: US32D/ANSI 630.
      3) Powder Coated Aluminum finish: ANSI 689.
      4) Thresholds and Weatherseal: Thresholds, mill aluminum finish. Weatherseal, clear anodized aluminum finish.

18. Installation:
   a. Preinstallation conference shall be conducted prior to installation of hardware at Project site. Meet with the, Owner, Contractor, installer, and manufacturer's representatives. A separate preinstallation conference shall be conducted prior to the installation of electronic security hardware with the electrical contractor Review catalogs, brochures, templates, installation instructions, and the approved hardware schedule. Survey installation procedures and workmanship, with special emphasis on unusual conditions, as to ensure correct technique of installation, and coordination with other work. Notify participants at least ten, 10 working days before conference.

b. Pneumatic Operator Installation:
   1) Install pneumatic operated low energy automatic operators, pneumatic tubing, electro/pneumatic control boxes and electronic or radio frequency activated actuators in accordance with manufacturers suggested installation instructions. Interface with Division 28 Sections "Fire Alarm System" and "Access Control System".

c. Electronic Security Hardware Installation:
   1) Install electromechanical security exit devices, electric strikes, magnetic locks, key switches, power transfers, power supplies, junction boxes, door position switches, request for exit and motion detectors in accordance with manufacturers suggested installation instructions and practices. Interface with Division 28 Sections "Fire Alarm System" and "Access Control System".

d. Builder's Hardware Installation:
   1) Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

e. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
   1) Exit device touch bar height, center line to finished floor: 39-13/16-inches at center. Center exit devices on mid-rail of doors.
   2) Lever locksets height to, centerline to finished floor: 38-inches at center.
   3) ICC/ANSI A117. 1 – Accessible and Usable Buildings and Facilities.

19. Field Quality Control:
   a. Architectural Hardware Consultant: Architect will engage a qualified Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
   b. Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

20. Adjusting, Cleaning, and Demonstrating:
    a. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
        1) Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

    b. Clean adjacent surfaces soiled by hardware installation.
    c. Manufacturer's representatives shall Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes. Allow 3 eight-hour training classes for mechanical locksets, exit devices and door closer. Allow 3 eight-hour training classes for electronic locksets and electronic security products.
    d. Six-Month Adjustment: Architectural Hardware Consultant to provide letter of certification to Architect that approximately 6 months after substantial completion, Consultant and installer will visit Project with representatives of the manufacturers of the locking devices and door closers to accomplish following:
        1) Re-adjust hardware.
        2) Evaluate maintenance procedures and recommend changes or additions. Instruct Owner's personnel in operation and maintenance or hardware and systems.
        3) Identify items that have deteriorated or failed.
        4) Architectural Hardware Consultant shall submit written report identifying problems and likely future problems.

PART 2 - PRODUCTS

A. Acceptable Manufacturers/Products - Finish Hardware:
    1. Butts and Hinges:
        a. Ives Hinges 3CB1 3CB1HW
        b. McKinney Hinge: TA714 TA786
        c. Stanley Hinge: CB1900 CB1901

    2. Key Control System:
        a. Schlage Lock: Patent Protected Everest/Primus D Series
        b. Medeco Lock: Patent Protected Biaxial System

    3. Locksets, Latchsets and Deadbolts:
        a. Schlage Lock: ND Series Rhodes (RHO) Lever Design

4. Exit Devices:
   a. Von Duprin: 99 Series with 992L lever Trim

5. Door Closers:
   a. LCN: 4110-MC-EDA-AVB 4010-MC.

6. Low Energy Automatic Operators:
   a. LCN: 4840 Series

7. Magnetic Holders:
   a. Rixson: Model 993 (Thru-Bolted)
   b. LCN: SEM 7890 Series (Thru-Bolted)

8. Overhead Stops and Holders:
   a. Glynn Johnson 90 100 ADJ Series

9. Protective Plates:
   a. Ives 8400 (0.050-inches)
   b. Rockwood K1050 18 Gauge (0.050-inches)
   c. Triangle Brass K0050 18 Gauge (0.050-inches)

10. Door Stops:

a.	Ives:	WS406	FS495	470	436/438
b.	Rockwood:	407/408	494	455	440/441
c.	Triangle Brass:	W1274CCS	1254	1245	1210/1212

11. Door Stripping, Seals and Threshold:

a.	Pemko	272A	45041CNB	18041CNB	3452CNB	S88D
b.	National Guard	613A	A626A	600A	C627A	5050B

12. Miscellaneous Hardware Items:

a.	Site Master CD	SM01-287 (Network Version)		SCH
b.	Key Cabinet	AWC350	TEL	
c.	Knox Box	R3200	BLK	KNO
d.	Extra Cards (25) Cards	SCE		

Confirm with local authority Knox Box type and function.

B. Acceptable Public Safety Key Box:
   1. Provide one (1) Model 3200R Public Safety Key Box, fully recessed type, as manufactured by Knox-Box Company: www.knoxbox.com.

08 80 00 – GLAZING

PART 1 - GENERAL

A. Summary - Section includes:
   1. Glass and glazing.
   2. Glazing materials.
   3. Display case sliding window system, shelves, and shelf hardware.
   4. Unframed mirrors.

B. Referenced Standards/Minimum Criteria:
   1. Comply with published standards of Flat Glass Marketing Association, latest edition, and all applicable manufacturer's recommendations.
   2. Regulatory Requirements: UL Classification is required for glass in rated doors/frames.
   3. Insulated Glass: Units shall be double sealed, single seal is not acceptable. Insulated glass units shall meet performance requirements of ASTM E774 (Class CBA). Insulating glass units shall be manufactured by member of Insulating Glass Certification Council (IGCC) or Sealed Insulating Glass Manufacturing Association (SIGMA).
   4. Insulated glass units in vertical application shall have ten (10) year written warranty against seal failure. Insulated glass units in sloped glazing shall have five (5) year written warranty against seal failure.

C. Submittals Required:
   1. Product data.
   2. Samples of each glass type (12- x 12-inches) and 12-inch long samples of glazing gaskets
   3. Samples of warranty.

D. Restrictions/Critical Criteria:
   1. Architect shall size glazing to facilitate replacement (5' x 7' maximum size). Larger sizes to be approved by the School District.
   2. Insulating glass is mandatory for exterior applications and tinted or low "E" glass (higher shading coefficient) is preferred over clear glass or reflective glass.
   3. Provide tempered or laminated safety glass in areas as required by the IBC. The School District prefers to use laminated safety glass.
   4. Insulating glass shall be factory double sealed units with 1/2-inch minimum air space.
   5. Wire glass: Not permitted.
   6. Allowable Tolerances: Maintain minimum glazing tolerance between glass faces and frame or metal stops as recommended by the Flat Glass Marketing Association. For 1/4-inch thick glass, maintain 1/8-inch clearance between glass face and metal stops.
   7. Labels: Every individual piece of glass shall bear a label designating type, thickness and quality. Do not remove labels until inspected by Architect.
   8. Glazing Tape: Closed cell, self-adhering, non-extruded PVC foam per glass manufacturer's recommendations.

PART 2 - PRODUCTS

A. Acceptable Manufacturers - Insulated Glass Units:
   1. PPG Industries, Inc. (now Vitro Glass): www.vitroglazings.com.
   2. Oldcastle Building Envelope: www.obe.com.
   3. Guardian Industries Corp. www.guardianglass.com.
   4. General Glass Corporation: www.generalglasscorp.com.
   5. Viracon: www.viracon.com.
   6. HPG -Hyperformance Glass Products: www.hyperformanceglass.com
   7. AGC Glass North America: www.agcglass.com.
   8. Approved substitute.

B. Acceptable Manufacturers - Spandrel Glass:
   1. Virginia Glass Products: www.va-glass.com.
   2. PPG Industries, Inc. (now Vitro Glass): www.vitroglazings.com.
   3. General Glass Corporation: www.generalglasscorp.com.
   4. Viracon: www.viracon.com.
   5. Guardian Industries Corp. www.guardianglass.com.
   6. HPG Hyperformance Glass Products: www.hyperformanceglass.com
   7. Approved substitute.

C. Acceptable Manufacturers - Tempered Glass:
   1. General Glass Corporation: www.generalglasscorp.com.
   2. Guardian Industries Corp. www.guardianglass.com.
   3. PPG Industries, Inc. (now Vitro Glass): www.vitroglazings.com.
   4. AGC Glass North America: www.agcglass.com.
   5. HPG Hyperformance Glass Products: www.hyperformanceglass.com.
   6. Viracon: www.viracon.com.
   7. Approved substitute.

D. Acceptable Manufacturers - Ceramic Laminated Glass:
   1. Viracon: www.viracon.com.
   2. Northwestern Industries, Inc. www.nwiglass.com.
   3. Guardian Industries Corp. www.guardianglass.com.
   4. PPG Industries (now Vitro Glass): www.vitroglazings.com.
   5. AGC Glass North America: www.agcglass.com.
   6. HPG - Hyperformance Glass Products: www.hyperformanceglass.com.
   7. Approved substitute.

E. Acceptable Manufacturers – Fire-Rated Glass:
   1. Technical Glass Products: www.fireglass.com.
   2. Vetrotech Division of Saint-Gobain: www.vetrotech.com
   3. Approved substitute

F. Acceptable Manufacturers - Polycarbonate Plastic:
   1. GE Plastics: www.ge.com.
   2. Makrolon Plastics: www.professionalplastics.com.
   3. Approved substitute.

G. Acceptable Display Cases and Sliding Glass Window System (middle schools and high schools):
   1. Shelves: 1/4– inch thickness clear tempered glass. Grind all edges smooth.
   2. Shelf Hardware: Knape & Vogt (K&V) No. 87 standards and No. 187LL brackets with No. 210, 211, 212 rests and No. 129 RUB cushions.
   3. Sliding Glass Window System (Large Opening): Kawneer 1010 Sliding Mall Front or approved substitute. Aluminum extrusions shall be 6063-T5 alloy and temper. System shall be complete with ball bearing casters, hook bolt lock, flush face pull, track, and frame components. Provide master keyable cylinder. For smaller openings use K&V complete system assembly.

H. Acceptable Mirrors:
   1. Toilet Rooms and Home Economics: 1/4-inch thickness mirror glazing quality polished plate with polished edges.
   2. Weight Room: 1/4-inch thickness tempered glass or Rohn & Haas Pexiglass Mirror. Provide safety backing as manufactured by C.R. Lawrence Co. or approved substitute between the mirror and the plywood substrate.

08 84 00 – DECORATIVE RESIN PANELS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Plastic glazing panels used for the following:
      a. Partitions.
      b. Wall Cladding.

B. Referenced Standards/Minimum Criteria:
   1. Sheet minimum performance attributes:
      a. Flame spread and Smoke developed testing (ASTM E 84): Material must be able to meet a level of Class A (Flame spread less than 25 and smoke less than 450) at thickness of 1-inch.
      b. Room Corner Burn Test (NFPA 286): Material must meet Class A criteria at 1/4-inch thickness as described by the International Building Code.
      c. Impact strength: Minimum impact strength test as measured by ASTM D 3763 of 20 ft. lbs. (for durability, shipping, installation, and use).

C. Submittals Required:
   1. Product data.
      a. Include ASTM R84 test data for flame spread and smoke developed.
   2. Shop drawings.
   3. Samples for selection.
   4. Maintenance Data: Manufacturer's care and maintenance data, including care, repair, and cleaning instructions.

D. Restrictions/Critical Criteria:
   1. Engineered polyester resin:
      a. Sheet Size: Per design, maximum 4-feet x 10-feet.
      b. Thickness: As indicated.
      c. Interlayer Materials: As indicated compatible with polyesters and bonding process to create a monolithic sheet of material when complete.

PART 2 - PRODUCTS

A. Acceptable Manufacturers:
   1. 3Form: www.3form.com.
   2. Approved substitute.

B. Hardware and Accessories:
   1. Provide manufacturer's hardware indicated, suitable for attaching materials indicated.
      a. Partition mount: Partition top and bottom channels.
      b. Wall mount: Directly adhered to wall with adhesive as recommended by manufacturer.

08 90 00 – LOUVERS AND VENTS

PART 1 - GENERAL

A. Summary - Section includes:
   1. Exterior wall louvers not supplied by mechanical.

B. Referenced Standards/Minimum Criteria:
   1. None.

C. Submittals Required:
   1. Product data.
   2. Shop drawings.
   3. Color options.

D. Restrictions/Critical Criteria:
   1. Louvers and vents should be tool-adjustable only. Manually adjustable units are not recommended.

PART 2 - PRODUCTS

A. Acceptable Manufacturers / Louvers and Dampers:
   1. Ruskin: www.ruskin.com.
   2. American Warming and Ventilating: www.awv.com.
   3. Greenheck: www.greenheck.com.
   4. Safe-Air Dowco: www.safeair-dowco.com.
   5. Arrow United Industries: www.arrowunited.com.
   6. United Enertech Louvers: www.unitedenertech.com.
   7. Approved substitute.

B. Acceptable Wall Louvers:
   1. Manufacturer and Type: American Warming and Ventilating or equal of other acceptable manufacturer. Louver shall be 16 gauge galvanized steel, formed stationary non-drainable louver, 4-inch deep frame with Kynar Resin Fluoropolymer finish. Provide all necessary accessories, braces, and supports. Provide galvanized steel bird screens finished to match louver at interior side of louvers.

END OF SECTION