SECTION  – explosion vents

1. General
   1. SUMMARY
      1. This Section includes requirements for supply and installation of pressure relief panels, frames, and attachment hardware necessary to complete the Work as indicated on the Drawings, and as described in the specifications.
      2. Related Requirements:
         1. Section 04 20 00 – Unit Masonry.
         2. Section 05 40 00 – Cold-Formed Metal Framing.
         3. Section 05 50 00 – Metal Fabrications.
         4. Section 06 10 00 – Rough Carpentry.
         5. Section 07 42 16 – Composite Aluminum Panels.
         6. Section 07 92 00 – Joint Sealants.
         7. Section 08 11 13 – Steel Doors and Frames.
         8. Section 08 41 13 – Aluminum Framed Entrances and Storefronts.
         9. Section 08 44 13 – Glazed Aluminum Curtain Wall.
         10. Section 09 90 00 – Painting.
   2. REFERENCE STANDARDS
      1. American Society for Testing and Materials (ASTM):
         1. ASTM B209-14, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
         2. ASTM B211-12e1, Standard Specification for Aluminum and Aluminum Alloy Rolled or Cold Finished Bar, Rod, and Wire.
         3. ASTM B221-14, Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
      2. Canadian Standards Association (CSA):
         1. CAN/CSA-S157-05/S157.1-05 (R2010), Strength Design in Aluminum / Commentary on CSA S157-05, Strength Design in Aluminum.
         2. CAN/CSA-S136-07, North American Specification for the Design of Cold-Formed Steel Structural Members.
      3. Architectural Aluminum Manufacturers Association (AAMA):
         1. AAMA 605.2-95, Voluntary Specification for High Performance Organic Coatings on Aluminum Extrusions and Panels.
         2. AAMA 800-10, Voluntary Specifications and Test Methods for Sealants.
         3. AAMA 2605-11 Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
   3. ADMINISTRATIVE REQUIREMENTS
      1. Pre-Construction Conference: Arrange a site meeting attended by the Contractor, the Subcontractor, the Consultant, materials supplier(s), and other relevant personal before commencement of Work for this Section as indicated in Section 01 31 13 – Project Coordination.
         1. Review methods and procedures related to installation, including manufacturer's written instructions.
         2. Examine substrate conditions for compliance with manufacturer's installation requirements.
         3. Review temporary protection measures required during and after installation.
   4. SYSTEM DESCRIPTION
      1. Pressure relief panel system shall be designed, and shop calibrated to release at a static pressure differential between interior and exterior of 20lb/ft2 ± 10%, unless otherwise indicated on the Drawings.
      2. Design panels and structure supports to withstand a maximum wind load of 30 lb/ft2 (1436 pascals).
      3. Equip each panel with a restraint/hold open mechanism designed to cushion the panel's deceleration as the fully open position is reached; and to minimize the development of a vacuum in the enclosure when the heated gases cool.
      4. Panels shall have been tested by third party certifier, capable of testing explosion vents. Dynamic test data shall demonstrate that the panel release, restraint, and hold open mechanisms performed properly, the panels were not structurally damaged, and the panels could be reset. In addition, the test data shall include all pertinent operating conditions under which the test was conducted including static release pressure and the additional pressure rise within the chamber.
      5. System design shall allow for non-destructive testing in the field to verify that the panel's release at the specified static design pressure.
      6. The panel pressure relief system shall allow for manual (or semi-automatic) retrieval after release.
      7. The weight of the fabricated panel shall not exceed 2.5 lb/ft2 (12.2 kg/m2).
   5. SUBMITTALS
      1. Provide requested information in accordance with Section 01 33 00 – Submittal Procedures.
      2. Action Submittals: Provide the following submittals before starting any Work of this Section:
         1. Shop Drawings:
            1. Submit shop drawings showing the location, finished appearance, fabrication details, specified static release loads, and static release forces.
            2. Show all construction and anchorage of explosion vents, including fastenings.
            3. Related items shown on shop drawings which are not intended to be supplied as part of the Work of this Section, shall be so identified. All dimensions shall be clearly noted and methods of fastening and anchoring detailed. Show accurately and identify all adjacent materials.
            4. Shop drawings shall bear the seal and signature of a professional Engineer registered in the place of the Work and experienced in the design and fabrication methods used.
            5. Do no fabrication work until shop drawings are approved by the Consultant.
         2. Coating Samples: Submit samples of factory applied coatings and finishes for Consultant's initial selection.
         3. Samples: Submit for approval 305mm (12") long sample lengths of each type of vent and frame extrusion prior to full scale production, showing finish colour.
      3. Information Submittals:
         1. Certification: Submit product test reports based on evaluation of comprehensive tests performed by a qualified testing agency for each type of explosion vent required for this Project.
         2. Structural Requirements: Design all materials to withstand wind load and snow loads as required by the applicable building code and recommended by the explosion vent manufacturer.
            1. Ensure explosion vent members deflect no more than L/180 of span between supports when subjected to wind load applied horizontally to explosion vent face.
         3. Delegated Design Submittals: Furnish complete design calculations and details, fabrication and erection shop drawings and site review for explosion vent, bearing the seal of a Professional Engineer registered in the Province of the Work, in accordance with applicable Building Code and Contract Documents.
   6. CLOSEOUT SUBMITTALS
      1. Operation and Maintenance Data: Submit manufacturer's written instructions for cleaning solutions, materials, and procedures, include name of original installer and contact information in accordance with Section 01 33 00 – Submittal Procedures.
         1. Provide specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.
   7. QUALITY ASSURANCE
      1. Qualifications: Provide proof of qualifications when requested by Consultant:
         1. Manufacturer / Supplier: Obtain materials from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties.
         2. Installers: Execute Work of this Section using qualified personnel skilled in installation of Work of this Section, having a minimum of three (3) years proven experience of installations similar in material, design, and extent to that indicated for this Project.
   8. DELIVERY, STORAGE AND HANDLING
      1. Delivery: At the time of delivery, visually inspect all materials for damage. Note any damaged boxes, crates, or vent panels sections on the receiving ticket and immediately report to the shipping company and the material manufacturer.
      2. Storage: Store vent panels raised off the ground and cover with a weatherproof flame-resistant sheeting or tarpaulin.
      3. Handling:
         1. Material shall be handled in accordance with sound material handling practices and in such a way as to minimize racking.
         2. Vent panel sections may be hoisted by attaching straps to the jambs and lifting the section while it is in a vertical position.
         3. Vent panel sections should only be lifted and carried by the jambs. Heads, sills, and blades are not to be used for lifting or hoisting louver sections.
   9. SITE CONDITIONS
      1. Site Measurements: Verify locations of structural members and opening dimensions by site measurements before fabrication and indicate measurements on shop drawings for explosion vent assemblies that are indicated to fit other construction; coordinate fabrication schedule with construction progress to avoid delaying the Work.
      2. Established Dimensions: Establish dimensions and proceed with fabricating explosion vent panels without site measurements where site measurements cannot be made without delaying the Work; coordinate construction to ensure that actual site dimensions correspond to established dimensions; allow for trimming and fitting.
   10. WARRANTY
       1. Warrant the Work of this Section in accordance with General Conditions but for a period of two (2) years and agree to repair or replace faulty materials or work which becomes evident during the warranty period without cost to the Owner and at the Owner's convenience.
       2. Special Finish Warranty: Submit a written warranty, signed by manufacturer, covering failure of the factory-applied exterior finish on explosion vent panels within the specified warranty period and agreeing to repair finish or replace panels that show evidence of finish deterioration. Deterioration of finish includes, but is not limited to, colour fade, chalking, cracking, peeling, and loss of film integrity for a period of twenty (20) years from date of Substantial Performance.
2. PRODUCTS
   1. MANUFACTURER
      1. Basis-of-Design products are named in this Section; additional manufacturers offering similar glazed aluminum curtain wall systems may be incorporated into the work provided they meet the performance requirements established by the named products.
      2. Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis of Design Materials, manufacturers offering products that may be incorporated into the Work include but are not limited to, the following:
         1. Explovent Pressure Relief Panel Systems by C/S Construction Specialties
   2. MATERIALS
      1. Panels shall be .63" (16mm) thick translucent solar grade polycarbonate extruded structured sheet. Material shall be classified as CC-2 per ASTM-D635. Colour: Clear.
      2. Panel framing components shall be .063" (1.6mm) 6063-T52 alloy extruded aluminum.
      3. All fasteners shall be aluminum or stainless steel.
      4. Exterior panel gaskets shall be a pile fiber type with a continuous polypropylene center fin.
      5. Interior gaskets shall consist of open cell compression foam and clad with a polyethylene liner.
   3. FABRICATION
      1. Fabricate the pressure relief panels to the sizes shown on the approved shop drawings.
      2. Panels shall be top or bottom hinged as detailed on the Drawings.
      3. Fabricate and assemble all panels, frames, and release mechanisms in factory and shipped to the site.
      4. Head, sill, jamb, and mullion frame members to be one piece extruded aluminum structural members as detailed, and to have integral caulking slots. Mullions to be two-piece interlocking assemblies, which allow for expansion and contraction, and for individual panel removability.
      5. All panels shall have exterior pile gaskets and interior compression (or magnet) gaskets to minimize air leakage and water entrainment when closed.
      6. Mount release mechanism to the panel frame and shall be shop calibrated and tested for the design loads specified on approved Drawings.
   4. FINISHES
      1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
      2. Protect finish with strippable protective film.
      3. Concealed Aluminum: As Fabricated Finish (Mill Finish); AA-M10 fabricated mechanical finish.

SPEC NOTE: Select class 1 finish for highly corrosive exterior environments (sea salt). Select class 2 finish for standard exposure.

* + 1. Clear Anodized Finish:
       1. Class II Finish: Architectural Class II, clear coating 0.010 mm or thicker in accordance with AAMA 611.
    2. **[Light Bronze] [Medium Bronze] [Dark Bronze] [Black]** Coloured Anodized Finish:
       1. Class II Finish: Architectural Class II, integrally coloured or electrolytically deposited colour coating 0.010 mm or thicker in accordance with AAMA 611.

SPEC NOTE: Select 2 coat for standard exterior projects; 3 coat for high end finish, corrosive exterior environments; acrylic enamel for interior projects.

* + 1. High Performance Organic Finish:
       1. Two (2) Coat PVDF or FEVE Coating:
          1. Manufacturer's standard 2 coat, thermo-cured system consisting of specially formulated inhibitive primer and colour topcoat and apply coating to exposed metal surfaces in accordance with AAMA 2605 and with coating and resin manufacturers' written instructions.
          2. Colour: **[As indicated in Section 09 06 05 Product and Finish Schedule.] [As selected by Consultant from manufacturer's full product range.]**
          3. Basis of Design Materials: PPG Duranar.
       2. Three (3) Coat Fluoropolymer Thermo-setting Enamel:
          1. All aluminum entrance and storefront framing exposed in the finished work shall have three coat fluoropolymer thermo-setting enamel conforming to AAMA 605.2-90, minimum 1.6 mils dry film thickness.
          2. Pre-treat aluminum after fabrication and apply primer and finish coats in strict accordance with manufacturer's written instructions.
          3. Colour: **[As indicated in Section 09 06 05 Product and Finish Schedule.] [As selected by Consultant from manufacturer's full product range.]**
          4. Basis of Design Materials: PPG 'Duranar XL.
    2. Acrylic Enamel Finish:
       1. One (1) Coat Acrylic Extrusion Coating:
          1. AA C12 Chemical Finish, cleaned with inhibited chemicals; C40 Chemical Finish, conversion coating; Rx Acrylic Coating, manufacturer's standard single coat factory spray applied acrylic coating; prepare, pre-treat, and apply coating to exposed metal surfaces to 0.020 mm or thicker in accordance with AAMA 2603 and with coating manufacturer's written instructions.
          2. Colour: **[As indicated in Section 09 06 05 Product and Finish Schedule.] [As selected by Consultant from manufacturer's full product range.]**
          3. Basis of Design Materials: PPG Duracron.
    3. Steel (Concealed):
       1. Hot-dip galvanized in accordance with CAN/CSA-G164, with minimum coating of 2 oz./sq.ft., or zinc rich paint.
    4. Isolate where necessary to prevent electrolysis due to dissimilar metal-to-metal contact or metal-to-masonry and concrete contact. Use bituminous paint, butyl tape or other approved divorcing material.

1. EXECUTION
   1. EXAMINATION
      1. Verification of Conditions:
         1. Examine openings to receive work and surrounding adjacent surfaces for conditions affecting installation. Coordinate with related sections providing openings to ensure proper dimensions are maintained.
         2. Verify dimensions of supporting structure by accurate field measurements so that work will be accurately designed, fabricated and fitted to the structure.
      2. Notify Contractor in writing of any conditions that are not acceptable.
      3. Proceed with installation after verification and correction of surface conditions acceptable to manufacturer.
   2. INSTALLATION
      1. Comply with manufacturer's instructions and recommendations for installation of the work, as shown on approved Shop Drawings.
      2. Anchor explosion vent panels to the building substructure as indicated on Shop Drawings and architectural drawings.
      3. Erection Tolerances:
         1. Maximum variation from plane or location shown on the approved shop drawings 3mm in 3048mm (1/8" in 10').
         2. Maximum offset from true alignment between two members abutting end to end, edge-to-edge in line: 1.6mm (1/16").
         3. Erection tolerances shall prevail under both load and no-load conditions.
      4. Set units' level, plumb and true to line, with uniform, tight joints to adjacent work.
      5. Provide necessary fastenings, anchors, clip angles, sills and sill flashings required to complete the installation.
   3. PROTECTION
      1. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.
   4. CLEANING
      1. Progress Cleaning: Leave work area clean at the end of each work day, ensuring safe movement of passing pedestrians.
      2. Final Cleaning: At completion of installation, clean all surfaces so they are free of foreign matter using cleaners recommended by material manufacturer.
      3. Remove and replace vent panels damaged during installation and construction with new at no additional cost to the Owner.
      4. Waste Management: Co-ordinate recycling of waste materials and packaging at appropriate facility, diverting waste from landfill. Certified installer shall be responsible for ensuring waste management efforts are practiced.

END OF SECTION