SECTION  – fixed louvers

1. General
   1. SUMMARY
      1. This Section includes requirements for supply and installation of fixed louvers, bird screens, blank-off panels and attachment brackets as shown on drawings, as specified, and as required for complete and proper installation.
      2. Fixed louvers to be furnished include the following:
         1. Storm Resistant Louver.
         2. Drainable Louver.
         3. Stormproof Louver.
         4. Straight Blade Louver.
         5. Sight Proof Louver.
      3. 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 44 13 – Glazed Aluminum Curtain Wall.
         8. Section 09 90 00 – Painting.
   2. REFERENCE STANDARDS
      1. American Society for Testing and Materials (ASTM):
         1. ASTM B209-10, 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 B221-12, Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
         4. ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
      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.
         4. AAMA TIR Metal Curtain Wall Fasteners (2000 Addendum).
      4. Air Movement and Control Association International Inc. (AMCA):
         1. AMCA Standard 500-L-12, Laboratory Methods of Testing Louvers for Rating.
         2. AMCA Publication 501-09, Application Manual for Louvers.
         3. AMCA Publication 511-10 (Rev. 8/12), Certified Ratings Program - Product Rating Manual for Air Control Devices.
   3. ADMINISTRATIVE REQUIREMENTS
      1. Coordination: Coordinate the Work of this Section with the installation of ductwork; Sequence work so that installation of louvers coincides with installation of HVAC materials without causing delay to the Work.
      2. 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 19 – Project Meetings.
         1. Review methods and procedures related to installation, including manufacturer's written instructions.
         2. Examine substrate conditions for compliance with manufacturers installation requirements.
         3. Review temporary protection measures required during and after installation.
   4. 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. Product Data:
            1. Air flow and water entrainment performance test results.
            2. Material types and thickness.
         2. Shop Drawings: Submit shop drawings showing the location, finished appearance and dimensions of each type of louver. Show all material, thicknesses, connections, fastenings, shapes and finishes.
         3. Coating Samples: Submit samples of factory applied coatings and finishes for Consultant's initial selection.
         4. Samples: Submit for approval 305mm (12") long sample lengths of each type of louver blade 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 louver required for this project.
         2. Performance Requirements: Provide AMCA test data as required to confirm that the louvers have the specified air and water performance characteristics.
         3. Acoustical Performance: Where applicable, submit test reports to confirm that the louvers meet the specified STC and Noise Reduction requirements.
         4. Structural Requirements: Design all materials to withstand wind load of 20 psf (955 Pa) and snow loads as required by the applicable building code and recommended by the louver manufacturer.
            1. Ensure louver members deflect no more than L/180 of span between supports when subjected to wind load applied horizontally to louver face.
         5. Delegated Design Submittals: Furnish complete design calculations and details, fabrication and erection shop drawings and site review for fixed louvers, bearing the seal of a Professional Engineer registered in the Province of the Work, in accordance with applicable Building Code and Contract Documents.
   5. 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.
   6. 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.
   7. DELIVERY, STORAGE AND HANDLING
      1. Delivery: At the time of delivery, visually inspect all materials for damage. Note any damaged boxes, crates, or louver sections on the receiving ticket and immediately report to the shipping company and the material manufacturer.
      2. Storage: Store louver 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. Louver sections may be hoisted by attaching straps to the jambs and lifting the section while it is in a vertical position.
         3. Louver 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.
   8. SITE CONDITIONS
      1. Verify dimensions of actual opening by field measurements before fabrication and indicate measurements on Shop Drawings where fixed louvers are indicated to fit walls and other construction.
      2. Establish dimensions and proceed with fabricating fixed louvers where field measurements cannot be made without delaying the work; allow for trimming and fitting.
   9. WARRANTY
      1. Warrant the Work of this Section in accordance with General Conditions but for a period of one (1) year 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 aluminum louvers within the specified warranty period and agreeing to repair finish or replace louvers 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 ten (10) years from date of Substantial Performance.
2. PRODUCTS
   1. MANUFACTURER
      1. Basis-of-Design products are named in this Section; additional manufacturers offering similar fixed metal louvers 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. McGill Architectural Products.
         2. TenPlus Architectural Products Ltd.
         3. Construction Specialties.
   2. MATERIALS
      1. Aluminum Extrusions: ASTM B211, Aluminum Alloy 6063-T52.
      2. Aluminum Sheet: ASTM B209, Aluminum Alloy 6063-T52.
      3. Fastenings: Provide zinc plated steel or AISI Type 304 stainless steel for screws and fasteners.
      4. Structural Support: Designed and furnished by louver manufacturer to support wind load of 955 Pa (20 psf), unless otherwise specified.
   3. FIXED LOUVER SYSTEMS

SPEC NOTE: Select one or more of the following louver systems depending on Project requirements. Consult with manufacturer for systems which best suit design requirements.

SPEC NOTE: Consult with the Mechanical Engineer to ensure that system and model selected below provides enough free area of air circulation to allow mechanical equipment to perform efficiently.

SPEC NOTE: Storm Resistant Louvers are designed to reduce the amount of water entry into the building, obtain a 99.8% effectiveness ratio (Class "A" Rating) when tested with a 29 mph wind velocity with a 3 in./hr. rainfall rate.

* + 1. Storm Resistant Louvers:
       1. 178mm (7") deep fixed type, storm resistant aluminum louver, with 6063-T52 aluminum alloy extrusion, and as described in the following performance criteria:
          1. Certification: Louver AMCA tested, certified, and licensed to bear the AMCA seal for the following:

Air performance.

Water penetration.

Wind driven rain.

* + - * 1. Extrusion Thickness:

Head, Sill, Jambs and Mullions: Minimum 2mm (0.080") thick.

Blades: Minimum 2mm (0.080") thick.

* + - * 1. Louver Type: Mullion or continuous line construction.
        2. Blade Angle: 35 degrees.
        3. Free Area - 1220mm x 1220mm (4' x 4') unit: 0.75m² (8.03 sq.ft.).
        4. Percentage of Free Area: 50.3%.
        5. Wind Driven Rainwater Penetration Data:

Effectiveness Ratio: 99.8% Class "A" Rating).

* + - * 1. Basis of Design Product: Model R7355 Storm Resistant Drainable Louver by TenPlus Architectural Products Ltd.
      1. 127mm (5") deep fixed type, storm resistant aluminum louver, with 6063-T52 aluminum alloy extrusion, and as described in the following performance criteria:
         1. Certification: Louver AMCA tested, certified, and licensed to bear the AMCA seal for the following:

Air performance.

Water penetration.

Wind driven rain.

* + - * 1. Extrusion Thickness:

Head, Sill, Jambs and Mullions: Minimum 2mm (0.080") thick.

Blades: Minimum 1.77mm (0.070") thick.

Louver Type: Mullion construction.

Blade Angle: 45 degrees.

Free Area - 1220mm x 1220mm (4' x 4') unit: 0.70m² (7.54 sq.ft.).

Percentage of Free Area: 47.1%.

Wind Driven Rainwater Penetration Data:

Effectiveness Ratio: 99.8% (Class "A" Rating).

Basis of Design Product: Model R5455 Storm Resistant Drainable Louver by TenPlus Architectural Products Ltd.

SPEC NOTE: Drainable Louvers are designed to eliminate cascading of water on the blades of tall louvers, therefore reducing the potential of water penetration.

SPEC NOTE: Drainable Louvers are designed to be used with vertical mullions which divert water collected in the horizontal gutters down and away from the louver system. Without vertical mullions water may pool in the gutters and will increase the risk of water penetration. Consult with the manufacturer prior to selecting a Drainable Louver if vertical mullions are not included in the design.

* + 1. Drainable Louvers:
       1. 152mm (6") deep fixed type, drainable aluminum louver, with 6063-T52 aluminum alloy extrusion, and as described in the following performance criteria:
          1. Performance Rating Standard: AMCA Standard 500L.
          2. Certification: Louver AMCA tested, certified, and licensed to bear the AMCA seal for the following:

Air performance.

Water penetration.

* + - * 1. Extrusion Thickness:

Head, Sill, Jambs and Mullions: Minimum 2mm (0.080") thick.

Blades: Minimum 2.3mm (0.090") thick.

* + - * 1. Louver Type: Mullion or continuous line construction.
        2. Blade Angle: 40 degrees.
        3. Free Area - 1220mm x 1220mm (4' x 4') unit: 0.81m² (8.72 sq.ft.).
        4. Percentage of Free Area: 54.5%.
        5. Basis of Design Product: Model D6403 Drainable Louver by TenPlus Architectural Products Ltd.
      1. 102mm (4") deep fixed type, drainable aluminum louver, with 6063-T52 aluminum alloy extrusion, and as described in the following performance criteria:
         1. Performance Rating Standard: AMCA Standard 500L.
         2. Certification: Louver AMCA tested, certified, and licensed to bear the AMCA seal for the following:

Air performance.

Water penetration.

* + - * 1. Extrusion Thickness:

Head, Sill, Jambs and Mullions: Minimum 2mm (0.080") thick.

Blades: Minimum 2mm (0.080") thick.

* + - * 1. Louver Type: Mullion or continuous line construction.
        2. Blade Angle: 49 degrees.
        3. Free Area - 1220mm x 1220mm (4' x 4') unit: 0.714m² (7.68 sq.ft.).
        4. Percentage of Free Area: 48.5%.
        5. Basis of Design Product: Model D4493 Drainable Louver by TenPlus Architectural Products Ltd.

SPEC NOTE: Stormproof Louvers are designed for all purpose general project applications. Minimal water penetration is expected and considered in the mechanical system design.

SPEC NOTE: Consult with the Mechanical Engineer prior to selecting this louver system to ensure that measures have been taken to drain water which enters through the louver during heavy rainfall and high wind events.

* + 1. Stormproof Louvers:
       1. 152mm (6") deep fixed type, stormproof aluminum louver, with 6063-T52 aluminum alloy extrusion, and as described in the following performance criteria:
          1. Performance Rating Standard: AMCA Standard 500L.
          2. Certification: Louver AMCA tested, certified, and licensed to bear the AMCA seal for the following:

Air performance.

Water penetration.

* + - * 1. Extrusion Thickness:

Head, Sill, Jambs and Mullions: Minimum 2mm (0.080") thick.

Blades: Minimum 2.3mm (0.090") thick.

* + - * 1. Louver Type: Mullion or continuous line construction.
        2. Blade Angle: 45 degrees.
        3. Free Area - 1220mm x 1220mm (4' x 4') unit: 0.70m² (7.53 sq.ft.).
        4. Percentage of Free Area: 47.1%.
        5. Basis of Design Product: Model H6451 Stormproof Louver by TenPlus Architectural Products Ltd.
      1. 102mm (4") deep fixed type, stormproof aluminum louver, with 6063-T52 aluminum alloy extrusion, and as described in the following performance criteria:
         1. Performance Rating Standard: AMCA Standard 500L.
         2. Certification: Louver AMCA tested, certified, and licensed to bear the AMCA seal for the following:

Air performance.

Water penetration.

* + - * 1. Extrusion Thickness:

Head, Sill, Jambs and Mullions: Minimum 2mm (0.080") thick.

Blades: Minimum 2mm (0.080") thick.

* + - * 1. Louver Type: Mullion or continuous line construction.
        2. Blade Angle: 45 degrees.
        3. Free Area - 1220mm x 1220mm (4' x 4') unit: 0.755m² (8.12 sq.ft.).
        4. Percentage of Free Area: 51.0%.
        5. Basis of Design Product: Model H4451 Stormproof Louver by TenPlus Architectural Products Ltd.
      1. 51mm (2") deep fixed type, stormproof aluminum louver, with 6063-T52 aluminum alloy extrusion, and as described in the following performance criteria:
         1. Extrusion Thickness:

Head, Sill, Jambs and Mullions: Minimum 1.57mm (0.062") thick.

Blades: Minimum 1.57mm (0.062") thick.

* + - * 1. Louver Type: Mullion or continuous line construction.
        2. Blade Angle: 45 degrees.
        3. Free Area - 1220mm x 1220mm (4' x 4') unit: 0.639m² (6.78 sq.ft.).
        4. Percentage of Free Area: 43.0%.
        5. Basis of Design Product: Model H2451 Stormproof Louver by TenPlus Architectural Products Ltd.

SPEC NOTE: Straight Blade Louvers are designed for appearance characteristics of the blades. Minimal water penetration is expected and considered in the mechanical system design.

SPEC NOTE: Consult with the Mechanical Engineer prior to selecting this louver system to ensure that measures have been taken to drain water which enters through the louver during heavy rainfall and high wind events.

* + 1. Straight Blade Louvers:
       1. 152mm (6") deep fixed type, straight blade aluminum louver, with 6063-T52 aluminum alloy extrusion, and as described in the following performance criteria:
          1. Extrusion Thickness:

Head, Sill, Jambs and Mullions: Minimum 2mm (0.080") thick.

Blades: Minimum 2mm (0.080") thick.

* + - * 1. Louver Type: Mullion or continuous line construction.
        2. Blade Angle: 45 degrees.
        3. Free Area - 1220mm x 1220mm (4' x 4') unit: 0.692m² (7.44 sq.ft.).
        4. Percentage of Free Area: 46.5%.
        5. Basis of Design Product: Model S6452 Straight Blade Louver by TenPlus Architectural Products Ltd.

SPEC NOTE: Sight Proof Louvers are designed for applications where the requirement is to eliminate sight lines beyond the face of the louver.

SPEC NOTE: Sight Proof Louvers are commonly used in transformer vaults or other applications where the louvers are required to be tamperproof.

* + 1. Sight Proof Louvers:
       1. 102mm (4") deep fixed type, storm resistant aluminum louver, with 6063-T52 aluminum alloy extrusion, and as described in the following performance criteria:
          1. Extrusion Thickness:

Head, Sill, Jambs and Mullions: Minimum 2mm (0.080") thick.

Blades: Minimum 2mm (0.080") thick.

* + - * 1. Louver Type: Mullion or continuous line construction.
        2. Blade Angle: 45 degrees.
        3. Free Area - 1220mm x 1220mm (4' x 4') unit: 0.372m² (4.00 sq.ft.).
        4. Percentage of Free Area: 25.0%.
        5. Basis of Design Product: Model V4454 Sight Proof Blade by TenPlus Architectural Products Ltd.
  1. ACCESSORIES
     1. Sill Flashing: Provide sill flashing of same material and finish as adjacent louver, as approved by the Consultant.
     2. Structural Support:
        1. Louver Support: Designed and furnished by louver manufacturer to support wind load of 955 Pa (20 psf) unless others specified.
        2. Support Angle: Louvers openings greater then 3m (10') high require horizontal girt at mid span, as indicated in Section 05 50 00 "Metal Fabrications."
     3. Bird Screens:

SPEC NOTE: Select one of the following options below and delete the remaining options not required on the project. The following options have been placed in order from inexpensive to more expensive.

SPEC NOTE: Option 1 is the standard option bird screen, offering durability at an inexpensive budget cost. Select Option 2 or Option 3 if that is the design preference.

* + - 1. 12mm (1/2") opening, 1.13mm (0.044") re-galvanized steel wire mesh, in an extruded aluminum frame. Removable screen frame to be independent to louver assembly, attaching to the interior face of the louver, providing continuous coverage.
      2. 12mm (1/2") opening, 1mm (0.050") thick aluminum expanded metal mesh in an extruded aluminum frame. Removable screen frame to be independent to louver assembly, attaching to the interior face of the louver, providing continuous coverage.
      3. 12mm (1/2") opening, 1.6mm (0.063") diameter aluminum wire intercrimp screen in an extruded aluminum frame. Removable screen frame to be independent to louver assembly, attaching to the interior face of the louver, providing continuous coverage.
    1. Insect Screens:
       1. Supply manufacturer's standard aluminum mesh insect screen, welded to aluminum frame. Removable screen frame to be independent to louver assembly, attaching to the interior face of the louver, providing continuous coverage.
    2. Blank-Off Panels:

SPEC NOTE: Select one of the following options below and delete the option not required on the project.

SPEC NOTE: Select Option 1 if insulated blank-off panels are required on the project. It is common practice to use insulated blank-off panels when installing blank-off panels into exterior walls. Select Option 2 if insulated blank-off panels are not required on the project.

* + - 1. Insulated Blank-off Panels:
         1. Aluminum faced prefinished insulated blank-off panels, consisting of 51mm (2") thick semi rigid, mineral wool core insulation, having an R value of R-4.2/1". Ensure insulation is continuous and applied around all penetrations and building elements including structural supports.
         2. Facing Panels: 1mm (0.040") thick aluminum sheets, formed and mitered at the corners, with edges overlapped. Seal all perimeters and joints between insulated panels with a neoprene gasket or caulked with an approved material to prevent air infiltration.
         3. Finish:

Exterior face sheet: Finished to match adjacent louver.

Interior face sheet: Mill finish.

* + - 1. Non-Insulated Blank-off Panels:
         1. Facing Panels: 1mm (0.040") thick aluminum sheet blank-off panel.
         2. Finish:

Exterior face sheet: Finished to match adjacent louver.

Interior face sheet: Mill finish.

* 1. FABRICATION
     1. Fabricate as required for optimum performance with respect to water penetration, strength, durability and uniform appearance.
     2. Fabricate louvers to outside dimensions indicated, with allowance of 10mm (3/8") on each side for sealant joints. Coordinate size, location, and placement of units, with installer, prior to fabrication.
     3. Fabricate louvers to minimize field adjustments, splicing, mechanical joints, and field assembly of units. Assemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling.
     4. Clearly mark units for assembly and coordinated installation. Include vertical structural supports, where required.
     5. Provide vertical mullions of type and spacing indicated but not greater than 1524mm (5') o/c. Mechanically assemble louvers using stainless steel or zinc plated steel fasteners recommended by manufacturer.
     6. Provide supports, anchors and accessories required for a complete assembly.
  2. 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 I Finish: Architectural Class I, clear coating 0.018 mm or thicker in accordance with AAMA 611.
       2. 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, pretreat 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 louvers 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. Cut and trim component parts during erection only with the approval of the manufacturer, and in accordance with the manufacturer' recommendations. Restore finish completely.
      5. Remove and replace members where cutting and trimming has impaired the strength or appearance of the assembly.
      6. Set units level, plumb and true to line, with uniform, tight joints to adjacent work.
      7. 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 workday, 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. Restore louvers and accessory components damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by the Consultant, remove, and replace damaged systems 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