

Use chlorinated polyethylene formed into uniform flexible sheets, plain, 0.008-inch thick, compliant to ASTM C171.

3. PART 3 EXECUTION

3.1 PREPARATION AND EXAMINATION

- 3.1.1 Check and comply with manufacturer's instructions on surface preparation requirements.
- 3.1.2 Conduct an on-site pre-conference with installer and manufacturer representatives to check for work details, material selections, and site conditions, whether or not conditions are appropriate for performing work.

3.2 INSTALLATION

- 3.2.1 Check and comply with manufacturer's instructions on installation.
- 3.2.2 Schedule all installation work in the best possible time to optimize a timely construction schedule.
- 3.2.3 When maximum length of the sheet is not enough for the work surface area, overlay a second sheet length. Provide minimum 300mm overlap at edges of polyethylene sheets. Fill overlap with adhesives at the full length.
- 3.2.4 Extend sheets beyond flashings or at perpendicular surfaces, such as walls to provide complete coverage. Seal overlapping edges with adhesive. Bond to both vertical and horizontal surfaces, or as manufacturer shall recommend.
- 3.2.5 Where pipes, and other permanent penetrations and punctures are necessary, seal damp proofing sheets around punctures with adhesives and tapes.

3.3 CLEANING AND PROTECTION

Neatly remove all excess laps, remove masking materials, and clean all stains on exposed surfaces as caused by installation work.

Do not allow any traffic on unprotected installed membranes and stored membrane materials.

END OF SECTION

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07 00 00	DIVISION 7 THERMAL AND MOISTURE PROTECTION
07 55 3	Building Insulation

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1 Technical Architectural Drawings
- 1.1.2 Specifications
- 1.1.3 Requests for Interpretation
- 1.1.4 Product Samples and Brochures
- 1.1.5 Manufacturer's Data Sheets and Certificates
- 1.1.6 Material Safety Data Sheets
- 1.1.7 Work Program and Methodology Submittals

1.2 SUMMARY

This section includes provisions for both thermal and acoustic insulation materials installed in the following areas:

- 1.2.1 Mechanical Equipment areas to disperse excess noise
- 1.2.2 Thermal Insulation under Sheet Metal Roofing

1.3 RELATED SECTIONS

- 1.3.1 Sheet Metal Roofing

1.4 GENERAL PROVISION

- 1.4.1 Refer to Technical Working Drawings to identify areas of application.

1.4.2 For Thermal Insulation Material under Metal Sheet Roofing, install insulation on all surface areas beneath the Sheet Metal Roofing, where specified by the architect. See products in this section for descriptions on insulating material. All insulating materials installed under sheet metal roofing shall be supported with a 10mm square welded wire mesh, primed and painted according to provisions in Division 9 Interior and Exterior Painting Sections. Comply with color and paint finish as specified by the architect.

1.4.3 For Mechanical Equipment areas, use ASTM E-84, Class A, non-combustible, fire retardant wool with aluminum foil on one side, mounted and supported by Metal Furring Assemblies and/or built up steel assemblies using, with facing material 10mm square welded wire mesh, primed and painted. Comply with Division 9 Interior and Exterior Painting Sections. Comply with color and paint finish as specified by the architect.

1.4.4 Test acoustical installations for machine and equipment areas. Ensure that when all acoustical installations in place, no point outside the mechanical equipment room that is subject to work conditions requiring focus shall receive noise levels higher than 80db at a time when all mechanical equipment installed are running.

1.4.5 Do not use Spray-Applied Insulation unless otherwise approved. If approved, do not apply spray insulation until all installation of pipes, ducts, conduits, and other similar openings are completed. Do not seal or obstruct such similar openings with spray-applied insulation.

1.4.6 Do not block necessary openings such as pipes, ducts, conduits, wirings, windows, and similar items.

1.5 MAINTENANCE

- 1.5.1 Upon delivery on site, protect insulation materials from physical damage. Store away from wet areas or areas with high moisture content. Comply with manufacturer's instructions on handling and storing.

1.6 SUBMITTALS

1.6.1 PRODUCT APPROVAL ATTACHMENTS

- 1.6.2 Material and Safety Data Sheets for all Insulating Materials
- 1.6.3 Technical Data Sheets for all Insulating Materials
- 1.6.4 Product Sample 300mm x 300mm for each insulating material
- 1.6.5 Manufacturer's written installation, maintenance, storage, and protection instructions.

1.6.6 EXECUTION APPROVAL ATTACHMENTS

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- 1.6.5.1 Submit detailed work installation methodology.
- 1.6.5.2 Submit scaled and detailed shop drawings for all installation strategies, especially fastening, welding points, spacing of furring, etc.

1.7 QUALITY ASSURANCE

- 1.7.1 Provide insulation materials compliant to UL Testing, or other testing and inspecting agency acceptable to authorities.
- 1.7.2 Surface Burning characteristics of the insulating material shall be compliant with ASTM E 84, such that:
 - 1.7.2.1 Class A Flame Spread shall be at 0-25; smoke-developed 0-450
 - 1.7.2.2 Class B Flame Spread shall be at 26-75; smoke-developed 0-450
 - 1.7.2.3 Class C Flame Spread shall be 76-200; smoke-developed 0-450
- 1.7.3 Fire resistance rating of the material shall comply with ASTM E 119.
- 1.7.4 Combustion characteristics of the material shall comply with ASTM E 136.

1.8 WARRANTIES

Insulation items shall be entitled to at least one (1) year warranty.

2. PART 2 PRODUCTS

2.1 INSULATION MATERIALS

2.1.1 INSULATION FASTENERS

- 2.1.1.1 Use Self Adhesive Aluminum Foil Tapes complying with recommendations by the manufacturer of the approved insulating material. Minimum width of tape shall be 75mm to ensure proper fastening. Holding power shall be 1.50-H/min in compliance to test method PSTC-7. Peel adhesion shall be at 20N/25mm in compliance to PSTC-1 test methods.
- 2.1.1.2 For metal assemblies, comply with metal fasteners as specified in the metal fabrication section.

2.1.2 MINERAL WOOL

- 2.1.2.1 Use ASTM E-84, Class A, non-combustible, fire retardant wool with aluminum foil on one side.
- 2.1.2.2 Encase mineral wool in Metal Furring Assemblies and/or built up steel assemblies with one or two faces using 10mm square welded wire mesh, primed and painted. Comply with metal fabrications division of this specifications.
- 2.1.2.3 Aluminum on foil side shall be foil-scrim-kraft or foil-scrim-polyethylene vapor retarder with maximum flame spread of 25 and smoke development index of 5.

2.1.3 THERMAL INSULATION FOR SHEET METAL ROOFING UNDERSLAB

- 2.1.3.1 Use fire-resistant Aluminum Foil Scrim Kraft Paper with three-way fiberglass scrim; actual thickness 150 microns or 85 gsm, 1200mm X 120,000mm in standard length (one roll); silver color.
- 2.1.3.2 Minimum reflectivity of the surface material shall be 95%.
- 2.1.3.3 Burst strength of insulation material shall at least be 30N/cm2, compliant with ASTM D774.
- 2.1.3.4 Temperature resistance shall be compliant with ASTM C1263.
- 2.1.3.5 Water Vapor Permeability shall be at 5.75/N.s
- 2.1.3.6 Tensile strength of material shall be MD-130N/25mm or XD-50N/25mm compliant with ASTM D828.
- 2.1.3.7 Install using a metal-assembly of angle bars, flat bars, and 10mm square welded wire mesh, primed and painted in dimensions as recommended by the manufacturer and approved by the architect.

3. PART 3 EXECUTION

3.1 PREPARATION AND EXAMINATION

- 3.1.1 Obtain installer's requirements and conditions for installations. Check that area to receive installation is ready to receive insulation work. Together with installer, inspect that all bolts, anchors, and fasteners for sheet metal roofing are stable and ready to receive work.
- 3.1.2 For wool and metal assemblies for thermal and acoustic insulation in mechanical equipment areas, check that the installation schedule shall not disrupt critical schedules of testing and other construction work.

3.2 INSTALLATION

- 3.2.1 Comply with the installation requirements and instructions by the manufacturer of approved material insulation.
- 3.2.2 Do not pierce or cut through insulation material aluminum facing. When faces are accidentally cut, replace damaged sheets.
- 3.2.3 Single-layer installation of insulation sheets is acceptable provided installed work is free of tears and damages.
- 3.2.4 Do not install torn insulation sheets.
- 3.2.5 For mineral wool, ensure that the wool density is sufficient to absorb above level acoustic noise. Comply with ASTM C 1015 and manufacturer's written instructions.
- 3.2.6 Separately prime and paint metal assemblies prior to installation of insulation whether under sheet metal roofing or on horizontal and vertical surfaces of rooms with mechanical equipment. Comply with Division 9 Interior Paints Section of this specifications for painting requirements. Only paint touch ups are allowable upon installation.
- 3.2.7 Do not smear finishing paint on insulation material. Completed insulation installation shall be clean, and free of smears and other unwanted smudges. Restore all affected insulation sheets as needed.
- 3.2.8 All metal assemblies supporting insulation shall be primed with red oxide, and non-gloss painted elastomeric paint, black color unless otherwise indicated on drawings and approved by architect. Comply with paint division of this specifications.
- 3.2.9 All metal assemblies supporting insulation work shall be fabricated according to approved shop drawings.
- 3.2.10 When using mineral wool, do not place insulation assemblies near lighting fixtures and other electrical equipment not fire rated or protected from contact with insulation material.
- 3.2.11 All aluminum facing shall be set placed towards areas of high humidity.
- 3.2.12 Where there are openings such as windows, access panels, duct ends, electrical devices and boxes, ducts, air registers, and any such similar openings, neatly cut the insulation sheets such that these openings are not obstructed and are able to function. Show all opening locations on shop drawings. Neatly seal by manufacturer-approved adhesive tape the cut insulation sheets to ensure adhesion to nearby surfaces. Maintain visual neatness of installation.

3.3 PROTECTION

Protect installed insulation from weather exposure and other construction work that exposes it to damages. Schedule insulation installation work such that no critical construction work conflicts with its installation.

END OF SECTION

07 00 00	DIVISION 7 THERMAL AND MOISTURE PROTECTION
07 60 00	Sheet Metal Roofing

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1 Technical Architectural Drawings
- 1.1.2 Specifications
- 1.1.3 Requests for Interpretation
- 1.1.4 Product Samples and Brochures
- 1.1.5 Manufacturer's Data Sheets and Certificates
- 1.1.6 Material Safety Data Sheets
- 1.1.7 Work Program and Methodology Submittals

1.2 SUMMARY

This section includes provisions on Sheet Metal Roofing, where indicated by the architect as referenced in the technical working drawings.

1.3 RELATED SECTIONS

- 1.3.1 Metal Fabrications
- 1.3.2 Exterior Painting

1.4 GENERAL PROVISION

- 1.4.1 Only use pre-painted metal sheet and roofing accessories fabricated from cold rolled galvanized iron sheets tempered for extra strength and durability; compliant with PNS 67:2014 Hot-dip Metallic-Coated Steel Sheets for Roofing.
- 1.4.2 Coordinate with structural designer to comply with purlin spacing requirements by manufacturer.
- 1.4.3 Comply with ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (Galvalume) by the Hot-Dip Process.
- 1.4.4 Length of sheets shall be long span, cut to lengths approved by the architect. Comply with special lengths for roof span exceeding 18000mm. Sheet metal roofing shall be homogenous when possible.
- 1.4.5 Comply with profiles, thickness, and desired colors as approved by the architect.

Utilize Gauge Designation as follows:

1.4.5.1	BASE METAL THICKNESS, DESIGNATED GAUGE
1.4.5.1.1	0.400 mm thick, Gauge 28
1.4.5.1.2	0.500 mm thick, Gauge 26
1.4.5.1.3	0.600 mm thick, Gauge 24
1.4.5.1.4	0.800 mm thick, Gauge 22
1.4.5.2	PROTECTIVE COATINGS, THICKNESS
1.4.5.2.1	Zinc shall be minimum 14 microns, (100 gm/m ²)
1.4.5.2.2	Paint coatings Top coat shall be 15.20 microns thick
1.4.5.2.3	Paint coatings Bottom coat shall be 6.8 microns thick
1.4.5.3	BASE METAL THICKNESS, OVERALL THICKNESS WITH PROTECTIVE COATS
1.4.5.4	0.400 mm, with thickness 0.427-451 mm
1.4.5.5	0.500 mm, with thickness 0.532-551 mm
1.4.5.6	0.600 mm, with thickness 0.638-651 mm

1.5 MAINTENANCE

Protect paint and galvanized coating of sheets via proper handling.

1.6 SUBMITTALS

1.5 PRODUCT APPROVAL ATTACHMENTS

- 1.5.1.1 Submit all product data sheets, material safety data sheets, and technical specifications.
- 1.5.1.2 Submit all product and manufacturer certificates.
- 1.5.1.3 Submit Product samples at 300mm x 300 mm of each sheet metal material
- 1.5.1.4 Submit Manufacturer's written instructions for handling, installation, and cleaning.

1.6 EXECUTION APPROVAL ATTACHMENTS

- 1.6.3 Detailed work methodology
- 1.6.4 Shop drawings, namely roof plan indicating boundaries and location of finish area and detailed drawings of connections for rolls, ridges, hips and valleys, gutters, and other special connections as required to complete roofing installation and as indicated in technical working drawings. Show purlin distances, riveting details and/or any applicable fastening method. Submit these drawings to both architectural and structural consultants.

1.7 QUALITY ASSURANCE

- 1.7.1 Only engage installers with specific training experience in installing sheet metal roofing works.
- 1.7.2 Installers shall be supervised by the manufacturer's technical representative.
- 1.7.3 Only source material from one manufacturer to ensure uniform application. Coordinate construction schedules properly to ensure timely completion.
- 1.7.4 Only source materials from tried and tested manufacturers with minimum of five year satisfactory performance in the field of roofing systems.
- 1.7.5 Metal roof panel systems shall have no water leakage tested compliant to ASTM E1646.
- 1.7.6 All sheet panels shall be designed such that it is capable of supporting 140kgs temporary concentrated loads at mid-span in installed conditions, unless otherwise specified by the structural designer.

1.8 WARRANTIES

- 1.8.1 Warranty period by manufacturer shall at least be two (2) years from Substantial Date of Completion.

2. PART 2 PRODUCTS

2.1 METAL ROOF PANELS

- 2.1.1 Use Rib-Type, standard nominal dimensions, seam type, and thickness by manufacturer as specified and approved by architect
- 2.1.2 Base metal type shall be Galvalume steel sheet, 690, conforming to ASTM A653. Galvalume steel sheet A250, conforming to ASTM A792 for painted and unpainted panels, Galvalume steel sheet A255, conforming to ASTM A792 for unpainted panels.
- 2.1.3 Texture of surfaces shall be smooth. Follow finish on sample approved by architect.
- 2.1.4 Color Fading shall not be more than 5 Hunter, tested according to ASTM D 2244.
- 2.1.5 Chalking shall not be in excess of a No.8 rating, tested according to ASTM D 4214.
- 2.1.6 Solar Reflectance index shall be calculated according to ASTM E 1980.
- 2.1.7 Fire Classification shall be Class A-90.

2.2 ACCESSORIES AND FASTENERS

- 2.2.1 Color and material of all accessories and fasteners shall be uniform to that of approved sample.
- 2.2.2 Use Rubber-Asphalt sealing compound, compliant to CAN/CGSB-37.29.
- 2.2.3 Cleats shall be of same material and temper sheet metal, minimum 50mm wide with thickness or gauge as approved/indicated by the architect in the technical working drawings.
- 2.2.4 Conceal all fasteners, unless otherwise indicated or approved by the architect.

2.3 LONG SPAN ROOFING (CRIMP LOK SYSTEM)

- This item is specified particularly for continuous roofing with a span beyond 18M, unless otherwise specified by the architect.
- 2.3.1 Base metal type shall be Cold Rolled Steel; 275 MPa or 40,000 psi.
- 2.3.2 Substrates shall be Galvalume 55, Aluminum-Zinc Alloy-coated steel complying with ISO 9364.
- 2.3.3 Paint coating shall be oven-baked epoxy primer and regular polyester finish.

- 2.3.4 Top coating shall be 25 microns thick.
- 2.3.5 Finish coating shall be 20 microns thick.
- 2.3.6 Primer coat shall be 5 microns thick
- 2.3.7 Bottom coat shall be a total of 10 microns, composed of backing coat at 5 microns and primer coat at 5 microns.
- 2.3.8 Total thickness of metal sheet shall be from 0.40mm to 0.50mm, using a seam lock process of 180 degrees.
- 2.3.9 Metal sheet shall withstand Salt Spray Test with a Class 1000 rating as per PNS 201:1990.
- 2.3.10 Texture of surfaces shall be smooth. Follow finish on sample approved by architect.

3. PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- Engage a technical representative from the manufacturer of the approved product to check actual site conditions, whether compliant to manufacturer's prerequisites for installation. Conduct a pre-installation on-site conference and product inspection.

3.2 INSTALLATION

- 3.2.1 Follow approved shop drawings for spacing of cleats, alignment of panels, flashing details, and other drawing indications.
- 3.2.2 No cleat shall be spaced beyond 600mm apart measured on center.
- 3.2.3 Form all seams in direction of the water-flow.
- 3.2.4 Ensure water tightness of all seams.
- 3.2.5 Begin installation of metal panels at the eaves, or at the lowest slope point of the roofing. Loose lock pans to valley flashing and edge strips at eaves and gable rakes.
- 3.2.6 Observe lap requirements by manufacturer.
- 3.2.7 Form valleys of sheets not exceeding 3 m in length. Lap joints 150 mm in direction of flow. Extend valley sheet minimum 150 mm under roofing sheets. At valley line, double fold valley and roofing sheets and secure with cleats spaced 450 mm oc.

END OF SECTION

07 00 00	DIVISION 7 THERMAL AND MOISTURE PROTECTION
07 92 0	Joint Sealants

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1 Technical Architectural Drawings
- 1.1.2 Specifications
- 1.1.3 Requests for Interpretation
- 1.1.4 Product Samples and Brochures
- 1.1.5 Manufacturer's Data Sheets and Certificates
- 1.1.6 Material Safety Data Sheets
- 1.1.7 Work Program and Methodology Submittals

1.2 SUMMARY

- 1.2.1 This section includes provisions on joint work in the following areas:
 - 1.2.1.1 Exterior and interior joints between all fenestration frames, i.e. louvers, doors, windows, skylights, and similar fenestration components and wall masonry.
 - 1.2.1.2 Exterior and interior joints for concrete pavement and flooring.
 - 1.2.1.3 Exterior and interior joints for unit pavers and pre-cast concrete curbs.

1.3 RELATED SECTIONS

- 1.3.1 Architectural Concrete

1.4 GENERAL PROVISION

- 1.4.1 Use airtight and watertight elastomeric joint sealants.
- 1.4.2 Provide joint sealants where indicated on technical working drawings and in standard areas for joint sealing, unless otherwise specified by the architect.
- 1.4.3 Unless otherwise indicated on drawings, joint sealers shall match the color and type of the adjacent finish.
- 1.4.4 Do not install joint sealers in ambient and substrate temperatures not within the recommendations of the manufacturer. Do not install joint sealers when substrates are wet due to rain or other condensation.
- 1.4.5 Remove all contaminants on the substrate that affect the adhesion of joint sealers.
- 1.4.6 Comply with manufacturer's requirements on required width of joints for accepting joint sealers.
- 1.4.7 Install all joint sealers within 21 to 30 days from completion of waterproofing work.
- 1.4.8 Provide fire-resistant joint sealers in areas prone to combustible behavior, namely utility areas, electrical rooms, and service chutes.
- 1.4.9 Where applicable, bond breaker tapes shall be utilized to prevent adhesion to rigid surfaces that can cause sealant failure.
- 1.4.10 Use non-staining absorbent type masking tapes compatible with joint sealant surfaces.

1.5 MAINTENANCE, DELIVERY, STORAGE, AND HANDLING

- 1.5.1 Deliver all joint sealing products in sealed containers, complete with labels and instructions. Containers with tampered seals shall not be accepted.
- 1.5.2 Comply with manufacturer's instructions for proper storage of all joint sealing materials.
- 1.5.3 Ensure that cleaners use chemical cleaners of type and make compatible to the joint sealant used.

1.6 SUBMITTALS

1.6.1 PRODUCT APPROVAL ATTACHMENTS

- 1.6.1.1 Submit samples of all joint sealers in exposed areas. Ensure that the color of the joint sealer is approved by the Architect. Indicate area of application on the sample submittal. Include a list of alternative colors as provided by the manufacturer.
- 1.6.1.2 Submit product data for all joint sealer products required. Include technical data and material safety data sheets, indicating proper methods for storage and application.

1.6.1.3 Copies of product warranties.

1.6.2 EXECUTION APPROVAL ATTACHMENTS

1.6.2.1 Detailed work methodology indicating date and time of application.

1.7 WARRANTIES

Warranties shall not cover damages due to structural movements, such as settlement. However, all joint sealers are expected to be of quality and shall not show any marks of disintegration for at least 5 years from the date of the Substantial Completion of the project.

2. PART 2 PRODUCTS

2.1 GENERAL MATERIALS

2.1.1 Ensure that all joint sealers, fillers, and related materials are compatible with joint substrates and waterproofing materials. Check manufacturer's recommendations and comply with instructions on proper handling of materials.

2.1.2 For liquid-applied Elastomeric Sealants, comply with ASTM C 920.

2.1.3 Elastomeric sealants in areas continually exposed to water shall comply with ASTM C 1247.

2.1.4 Elastomeric sealants in areas continually exposed or in contact with food shall comply with 21 CFR 177.2600.

2.1.5 All sealants shall be IV resistant, non-chalking, non-staining, non-yellowing, self-cleaning, dirt pick resistant, and chemical resistant.

2.1.6 For seals required in toilets and kitchens, i.e. sanitary seals, control and expansion joints, joints between mirrored glass and plywood backing, joints between stone countertops, and other joints required in sanitary areas, use mildew-resistant silicon sealant formulated with fungicide and algicide, and shall be intended for sealing interior joints with non-porous substrates.

2.1.7 For sealing vertical joints on exposed surfaces in interior applications, i.e. interior unit masonry, concrete walls and partitions, joints between glazed aluminum frames and masonry at interior steel door frames, masonry termination, ensure that joint sealers are paintable, with fungicide and algicide. Sealers shall be capable of withstanding movement at $\pm 1/50$ and shall be compliant to ASTM C 719.

2.1.8 Use acoustical sealants for concealed joints where needed. Acoustical sealants shall be non-drying, non-hardening, non-skinning, non-staining, and gunnable.

2.1.9 Where compression seals are necessary, use pre-formed Hollow Neoprene Baskets. Comply with ASTM D 2628.

2.1.10 Fire resistant joint sealers where needed shall be compliant to ASTM E 814, and considered acceptable by the inspecting agency of the locality where the project is located.

3. PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

3.1.1 Examine that indicated areas of application are compliant to the manufacturer's conditions.

3.1.2 Comply with manufacturer's requirements on surface area preparations of areas to receive joint sealers.

3.1.3 Remove all foreign material affecting adhesion of joint sealers to indicated area of application.

3.1.4 Clean receiving areas by brushing, grinding, blast cleaning, and other methods necessary to remove loose particles.

3.1.5 Remove all forms of balance.

3.1.6 Use appropriate chemical cleaners for surfaces such as metal, glass, porcelain enamel, glazed ceramic, and other similar non-porous surfaces. Ensure that chemical cleaners are compatible with both the receiving area and the joint sealers.

3.1.7 Prime joint substrates where recommended by manufacturer.

3.1.8 Use masking tape where needed to prevent unwanted contact of sealant onto adjoining surfaces. Carefully remove making tapes after tooling. Take care to keep applied joint seals undisturbed.

3.2 INSTALLATION OF SEALERS

3.2.1 Comply with manufacturer's instructions to applicable products and areas of application.

3.2.2 Comply with recommendations of ASTM C 962 for use of joint sealants as applicable.

3.2.3 For Acoustical Sealants, comply with recommendations of ASTM C 919 as applicable.

3.2.4 Do not leave gaps between joint fillers.

3.2.5 When handling, do not stretch, puncture, twist, or tear pre-formed joint fillers.

3.2.6 Use bond breaker tapes between sealants and joint fillers, compression seals, or back of joints.

3.2.7 Begin tooling of non-sag sealant immediately before setting and curing begins, unless otherwise instructed by the manufacturer.

3.2.8 When tooling, form smooth, uniform heads to eliminate air pockets. Remove excess sealant from adjacent surfaces.

Do not use tooling agents that damage the sealant or adjacent surfaces. Provide concave and flushed joints, unless otherwise indicated in drawings.

3.2.9 When installing pre-formed foam sealants, install immediately after removal of protective wrapping. Do not stretch, twist, or pull the material. Ensure continuity between ends, turns, and intersections of joints. When applying during low

temperatures, apply heat to sealant as needed following prescriptions by manufacturer.

3.2.10 Install all gaskets within tolerances and conditions allowed by the manufacturer. Use the appropriate

adhesives and when required, always provide watertight joints.

3.2.11 For fire-stopping sealants, comply with installation requirements established by the testing and inspecting

agency.

3.3 CLEANING AND PROTECTION

3.3.1 Remove excess sealant and smears adjacent to joints. Only use appropriate cleaning materials.

3.3.2 Protect accomplished joint sealer work during and after curing period.

3.3.3 In case of damages before the time of Substantial Completion, remove damaged and deteriorated portions but cutting

and immediately replace and resal with new materials such the original work and repair work is indistinguishable.

END OF SECTION

DIVISION 08
DOORS, WINDOWS, and OPENINGS

08 00 00	DIVISION 8 DOORS, WINDOWS, and OPENINGS
08 11 0	Steel Doors and Frames

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1 Technical Architectural Drawings
- 1.1.2 Specifications
- 1.1.3 Requests for Interpretation
- 1.1.4 Product Samples and Brochures
- 1.1.5 Manufacturer's Data Sheets and Certificates
- 1.1.6 Material Safety Data Sheets
- 1.1.7 Work Program and Methodology Submittals
- 1.1.8 Finish Hardware Schedule and Door Schedule
- 1.1.9 Schedule of Doors and Windows

1.2 SUMMARY

- 1.2.1 This section includes provisions on both fire-rated and non-rated Wooden Doors, Steel Doors, Steel Door Frames, Louvers, and Vision panel assemblies.

1.3 RELATED SECTIONS

- 1.3.1 Joint Sealants
- 1.3.2 Door Hardware
- 1.3.3 Glazing

1.4 GENERAL PROVISION

- 1.4.1 Check all door assembly requirements on the technical working drawings. Check quantities according to types of door assemblies. In case of discrepancies, submit a request for interpretation to the Architect. Do not place final orders for door assemblies without approval and verification from the architect.
- 1.4.2 Verify actual dimensions of all openings through field measurements and indicate on shop drawings based on actual conditions. Ensure the door fabrications shall be consistent with actual dimensions. Indicate actual dimensions of pre-installed anchorages and indicate on shop drawings.
- 1.4.3 Manufacturers shall provide complete instructions on anchorage requirements for door assemblies. Contractor to comply with manufacturer's requirements.
- 1.4.4 Provide proper labels on all doors. Indicate fire rating, location, and testing results according to ratings required. Do not paint over door labels. All labels shall be affixed by the manufacturer.

1.5 MAINTENANCE, DELIVERY, STORAGE AND HANDLING

- 1.5.1 All Door Assembly deliveries shall be completely protected by crates, cardboard wrapping, or other means of protection as warranted by the manufacturer.
- 1.5.2 Inspect doors and frames upon delivery. Do not accept damaged deliveries and do not accept deliveries inconsistent with drawing requirements.
- 1.5.3 Storage of delivered door assemblies shall be completely weather protected. Use appropriate wood blockings and take care to store door assemblies according to the manufacturer's requirements. Do not store door assemblies in areas with high humidity and other areas that can affect the quality of the finish.

1.6 SUBMITTALS

1.6.1 PRODUCT APPROVAL ATTACHMENTS

- 1.6.1.1 Detailed Shop drawings of each type of door indicated in the drawings as listed according to the Schedule of Doors. Be sure to indicate door designation, type, location of door installation, model of door, material description, core description, construction details, label compliances, sound and fire resistance ratings and finishes.

- 1.6.1.2 Shop Drawings shall include elevations of each door design, door details, frame details for each frame type, shall be drawn to scale, with proper dimensions, complete with indications for locations of reinforcement and preparations for hardware, anchorages, accessories, joints and connections, glazing frames, and other glazing requirements.

- 1.6.1.3 Submit painted steel swatches from manufacturer's color charts following the color indicated in the drawings. Submit samples for each type of exposed finish not less than 75mm X 125mm in size and must be of the same thickness as the actual material.

- 1.6.1.4 Submit glazing samples with complete description of glazing performance.

- 1.6.1.5 Use the same door designation as indicated in the drawings.

1.6.2 EXECUTION APPROVAL ATTACHMENTS

- 1.6.3 Detailed work methodology indicating manufacturer's instructions for installing anchorages, sleeves, concrete inserts, anchor bolts, and other similar items.

1.7 QUALITY ASSURANCE

- 1.7.1 Engage manufacturers with significant experience in completing projects of the same size and scale as of the project.
- 1.7.2 Ensure material and assembly consistency.
- 1.7.3 Manufacturers shall have good records in on-time delivery, provides support services in installation demonstration, and with good after-sales service records.
- 1.7.4 Only source required metal door assemblies from a single manufacturer unless manufacturer is proven to be a poor performer.
- 1.7.5 No door assembly from two different manufacturers shall be allowed for installation on site unless the door assemblies are proven consistent and similar in make to the approved shop drawings. Submit new shop drawings for every manufacturer.

1.8 WARRANTIES

- Material and installation of door assemblies shall be warranted for two (2) years.

2. PART 2 PRODUCTS

2.1 FINISHES

- 2.1.1 Comply with finish color and texture as indicated and required in the technical working drawings.
- 2.1.2 All steel doors and frames shall have a layer of factory-applied, rust-inhibiting primer. Comply with ANSI A250.3 for performance and acceptance criteria.
- 2.1.3 Final paint finish of the door assembly shall be factory-applied. Comply with ANSI A250.3.
- 2.1.4 In case of damages during handling on site, restore finishes to its original condition as delivered.
- 2.1.5 For fire rated doors, manufacturer shall provide one-coat of baked-on prime coat paint.
- 2.1.6 Primers shall be of rust-inhibitive enamel or paint, applied via air-dry or baking.

2.2 STEEL DOORS

- 2.2.1 For both fire-rated and non-rated fire doors, use GA No.18 Steel for all door faces and use GA. No. 15 Steel for hinge and lock rails, and top and bottom channels.
- 2.2.2 All doors both non-fire rated and fire-rated steel door and access door systems shall comply with ANSI/SOI 100.
- 2.2.3 Hot-rolled steel sheets used as material for door facing shall comply with ASTM 569/A 569M, Commercial Steel (CS), Type B. All sheets shall be free of scale, pitting, and other surface defects.
- 2.2.4 Cold-rolled steel sheets used as material for door facing shall comply with ASTM A 366/A 366M, Commercial Steel (CS), Type B, stretcher-leveled.
- 2.2.5 Metallic-Coated Steel Sheets used as material for door facing shall comply with ASTM A 653/A653M, Commercial Steel (CS), Type B with A40 (ZF120) zinc-iron alloy galvanized coating, stretcher-leveled.
- 2.2.6 Only use electrolytic Zinc-Coated Steel Sheet for unexposed applications. Comply with ASTM A 591/A 591M, Commercial Steel (CS), Class B coating.

2.3 FABRICATION

- 2.3.1 Prepare doors to receive specified hardware, i.e. lock rails, door handles, door sills.
- 2.3.2 Unless otherwise indicated, all doors shall be 44mm thick as measured from finish to finish of top and bottom channels and rails.

2.3.3Comply with ANSI A250.8.
2.3.4Fabricate steel door and frame assemblies to be rigid, neat, and free from warps, buckling, and other defects visually affecting its appearance. Close top and bottom edges of doors such that fabrication is integral.
2.3.5Square off all edges unless otherwise required.

2.3.6For allowable tolerances, comply with SDI 117.
2.3.7Provide for countersunk flat or oval heads for exposed screws and bolts.
2.3.8Comply with ANSI A115 series specifications for door and frame hardware preparation. Prepare doors and frames to receive concealed finish hardware. Provide cutouts, reinforcements, spaces, and other similar provisions as applicable.
2.3.9For frames, fabricated with mitered corners. Continuously weld until face is seamless. Mechanically interlock or continuously weld stops and rabbets. Comply with ANSI/SDI 100.

2.3.10 Allowable clearances shall be as follows:

- 2.3.10.1 Jamb and heads 3.2mm
- 2.3.10.2 Between pairs of doors 6.4mm
- 2.3.10.3 Bottom of door 19mm

2.4 GLAZING, HARDWARE AND ACCESSORIES

2.4.1Provide a minimum of four anchors for each door jamb. Wall to jamb anchors shall be located opposite each other and in same relative position on side jambs.

2.4.2Provide floor anchors drilled for at least 9mm at bottom of each jamb member.

2.4.3For zinc-coated inserts, bolts, and fasteners, refer to manufacturer's standard units and comply with ASTM A 153, Class C or D as applicable.

2.4.4Provide weather-stripping and sound-stripping for jambs, heads, and sills as shown on drawings.

2.4.5All glazing for vision panels shall be of wired, safety glass as indicated in schedules.

2.4.6Provide Astragals as required by NFPA 80 for fire rated spaces.

2.4.7Provide for door louvers where indicated.

2.4.8Provide door silencers where required.

3. PART 3 EXECUTION

3.1 GENERAL INSTALLATION

3.1.1Comply with manufacturer's requirements for general installation procedures

3.1.2Comply with SDI 105.

3.1.3Comply with NFPA 80.

3.1.4Set frames in accurate positions. Plumb, align and brace securely until permanent anchors are set.
3.1.5Remove temporary braces and spreaders upon completion of installation.

restore all damaged surfaces.

3.1.6Provide at least three wall anchors per jamb. Use acceptable masonry wire and T-anchors where needed.

3.1.7Always install additional anchors for door assemblies higher than the standard 2100mm height.

3.1.8For smoke-control doors, comply with NFPA 105.

3.2 CLEANING AND ADJUSTMENTS

3.2.1Restore all surfaces damaged during installation. Smooth any rusted or damaged areas.

3.2.2Remove protective wrappings upon substantial completion of project.

END OF SECTION

08 00 00 DIVISION 8 DOORS, WINDOWS, and OPENINGS

08 21 1 Flush Wood Doors

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1Technical Architectural Drawings

1.1.2Specifications

1.1.3Requests for Interpretation

1.1.4Product Samples and Brochures

1.1.5Manufacturer's Data Sheets and Certificates

1.1.6Material Safety Data Sheets

1.1.7Work Program and Methodology Submittals

1.2 SUMMARY

This section includes provisions on door specifications for the following areas:

1.2.1Solid—core and Hollow—core doors with laminated facing situated in Toilet, Service Areas, and other areas as specified in the technical working drawings.

1.2.2Other wooden doors as needed on the project.

1.3 RELATED SECTIONS

1.3.1Division 6 Wood and Plastics Rough Carpentry

1.3.2Division 6 Interior Architectural Woodwork

1.3.3Division 8 Door Hardware

1.4 GENERAL PROVISION

1.4.1Submit Shop Drawings for approval prior to purchase from manufacturer and production of door assemblies for delivery.

1.4.2For Fire rated doors, comply with NFPA 80.

1.4.3Comply with hardware requirements. Double check door hardware schedule

1.5 MAINTENANCE, DELIVERY, STORAGE

1.5.1All door assemblies delivered shall be properly protected and accurately labeled according to its location and type of handle. Door quantities shall be consistent with requirements on the technical working drawings.

1.5.2Store delivered doors according to standards specified by the manufacturers in their written instructions.

1.5.3Store doors in dry, weather-protected areas. Ensure that storage areas are weather tight.

1.5.4Do not deliver doors during bad weather.

1.6 SUBMITTALS

1.6.1 PRODUCT APPROVAL ATTACHMENTS

1.6.1.1 Submit product data for each type of door. Declare core details, material and construction of edge, factory-finish and colors.

1.6.1.2 Samples at least 200mm X150mm, of actual thickness for each material finish and wood specie. The sample should be a complete assembly using actual glue and wood for use in the project site, reflecting actual laminate to be used for approval. Include brochures for laminate options and other samples for finish choice. Samples shall be cut from the corner portion of the door.

1.6.2 EXECUTION APPROVAL ATTACHMENTS

1.6.2.0Detailed work methodology on installation and restoration instructions.

1.6.4Shop drawings indicating location, size, actual dimensions of openings on site, hand of each door, elevations, construction details, and required hardware blocking. Show location of mortises and holes for hardware, anticipate cut-outs for hardware.

1.7 QUALITY ASSURANCE

- 1.7.1 Only engage the services of qualified manufacturers with punctual delivery records and quality products.
- 1.7.2 Only obtain flush wood doors from a single manufacturer. In case of a change of manufacturers, ensure approval of new samples.
- 1.7.3 Manufacturers shall properly label all doors in accordance to specifications in the technical working drawings.

1.8 WARRANTIES

- 1.8.1 Manufacturer's warranty should include an agreement to repair or replace door assemblies with workmanship and material issues. Material issues include all forms of warping of core and/or face veneers.
- 1.8.2 All doors shall be guaranteed of good quality for at least two (2) years from date of Substantial Completion.

2. PART 2 PRODUCTS

2.1 INTERIOR SOLID-CORE DOORS

- 2.1.1.1 Exposed Vertical and Top Edges shall be of closed-grain hardwood.
- 2.1.1.2 Core shall be glued wood stave or structural composite lumber.
- 2.1.1.3 Stiles and rails shall be bonded to the core, and the entire door face, planed abrasively prior to veneering.
- 2.1.1.4 Performance Grade shall be Heavy-Duty, WDMA I.S. 1-A.
- 2.1.1.5 Door thickness shall be 44mm.
- 2.1.1.6 Fire rating of Interior Solid-Core Doors shall not be less than 45 minutes, unless otherwise required by the architect.

2.2 INTERIOR HOLLOW-CORE DOORS

- 2.2.2.1 Use premium grade facing, with exposed vertical and top edges of any closed-grain hardwood, standard duty. Compliant to WDMA I.S. 1-A.
- 2.2.2.2 Door thickness shall be 44mm.

2.3 HEAVY DUTY FIRE-PROTECTION-RATED DOORS

- 2.3.3.1 Door material shall not contain urea formaldehyde, with mineral core specified according to required fire-protection. Stiles, edges, and astragals where needed shall also be of fire-retardant materials. Complete assemblies with intumescent seals.
- 2.3.3.2 Color and finish of edges and astragals shall be of the same color as the door facing unless otherwise specified.
- 2.3.3.3 Mineral-core doors shall be of non-combustible mineral product with 125mm blocking for top-rail, mid-rail, and bottom-rail.

3. PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- 3.1.1 Check delivered door assemblies and match with appropriate openings. Check swings and handle requirements. Double check plumb jambs. Reject assemblies not fit to project requirements.
- 3.1.2 Ensure that openings are ready to accept door installation.
- 3.1.3 Check finishes of doors to be free from imperfections. Do not install doors that are not finished according to the approved finish.

3.2 INSTALLATION

- 3.2.1 Comply with manufacturer's written instructions and NFPA 80 for installation procedures.
- 3.2.2 Seal edges of doors, cutouts, and mortises after fitting and machining.
- 3.2.3 Ensure alignment and correct fit of doors. All clearances shall be uniform and beveled as indicated on drawings or as specified.
 - 3.2.3.1 Provide 3.2mm clearances at heads, bottom of doors to top of finish jambs, and between pairs of doors.
 - 3.2.3.2 Where a threshold is required, provide 6.4mm clearances between bottom of door and top of threshold.
 - 3.2.3.3 Bevel all doors at 3 1/2 degrees along the lock and hinge edges.

- 3.2.3.4 Test swinging of doors and ensure that operation is free and smooth. Re-hang or replace door assemblies otherwise.

3.2.3.5 Install hardware appropriate hardware. Refer to Division 8 "Door Hardware" for details.

- 3.2.3.6 Clean and restore all door surfaces and finishes damaged during installation back to original conditions.

END OF SECTION

08 00 00	DIVISION 8 DOORS, WINDOWS, and OPENINGS
08 42 00	Entrances

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1 Technical Architectural Drawings
- 1.1.2 Specifications
- 1.1.3 Requests for Interpretation
- 1.1.4 Product Samples and Brochures
- 1.1.5 Manufacturer's Data Sheets and Certificates
- 1.1.6 Material Safety Data Sheets
- 1.1.7 Work Program and Methodology Submittals

1.2 SUMMARY

- 1.2.1 This section includes provisions on aluminum framed doors for entrances as specified on technical working drawings. Verify door specifications on drawings.

1.3 RELATED SECTIONS

- 1.3.1 Hardware
- 1.3.2 Glazing

1.4 GENERAL PROVISION

- 1.4.1 Comply with door specifications as indicated in the technical working drawings. Aluminum-framed doors powder coated aluminum metal. Submit brochures, samples/ shop drawings showing door assemblies drawn to scale for the approval of the architect.
- 1.4.2 Do not install handles on aluminum.
- 1.4.3 All aluminum frame members shall withstand minimum 25psf wind load and shall be provided with internal reinforcing if necessary.
- 1.4.4 Use EPDM Rubber between glazing and framing.
- 1.4.5 Include top and bottom mohair in assembly.
- 1.4.6 Only use H-type handles, installed vertically.
- 1.4.7 Only use lever-type door locks.
- 1.4.8 Comply with manufacturer's standards for the structural attachment of framing members.
- 1.4.9 Use standard pivot hinges.
- 1.4.10 Use heavy-duty soft-closing door closers. Install alongside the top rail.
- 1.4.11 Use heavy-duty deadbolt locksets with keying mechanisms to be installed at the bottom rail only.
- 1.4.12 All exposed areas shall be finished with a Class 1 electrolytically deposited color in clear anodized finish.
- 1.5 MAINTENANCE, DELIVERY, STORAGE, AND HANDLING
- 1.5.1 Protect installed and finished doors with strippable membrane, with proper markings for safety. Keep membrane on glass until substantial completion of project.
- 1.5.2 Upon substantial completion, restore glazing and thoroughly clean glass surface.
- 1.5.3 Comply with manufacturer's lead-time requirements.
- 1.5.4 All materials shall be delivered in protective packaging, sealed, undamaged, and properly labeled. All labels shall indicate precise location and orientation of doors. Handle all deliveries with care.
- 1.5.5 Maintain temperature, humidity, and ventilation on site and storage area within recommended limits by the manufacturer.
- 1.5.6 Adjust all moveable parts until operation is ensured smooth and safe prior to acceptance.
- 1.5.7 Label all keys to match all doors prior to turn-over.

1.6 SUBMITTALS

- 1.6.1 PRODUCT APPROVAL ATTACHMENTS
- 1.6.1.1 Submit data on manufacturing and installation details.

- 1.6.1.2 Submit product data on fasteners and sealants.

- 1.6.1.3 Submit sample section cuts showing final finish and profile of framing material. Do not manufacture and install on site without approval from the architects. Sample profiles shall be cut in 200mm lengths. The sample profile should be submitted as a complete assembly showing the corners of the door. Do not submit disintegrated samples.
- 1.6.1.4 Submit sample cuts of glazing material at least 200mm X 200mm. Show true color and make of glazing. Only approved glazing can proceed with fabrication and site installation.
- 1.6.1.5 Submit shop drawings of all profiles cut at the jamb, head, lock-style. Indicate nominal thickness of all aluminum sections to be used in the assembly. No aluminum section shall be less than 1.2mm thick.

1.6 EXECUTION APPROVAL ATTACHMENTS

- 1.6.2.1 Submit design calculations and shop drawings. Properly label dimensions and material specifications for each part. Indicate location and specification of hardware and fastener. Indicate door assembly labels and areas of installation.
- 1.6.2.2 Submit detailed work methodology indicating order of installation of the assembly.
- 1.6.2.3 Submit restoration procedures upon completion of work.

1.7 QUALITY ASSURANCE

- 1.7.1 Only source door assemblies from experienced manufacturers with good records in the timely delivery and installation of door assemblies. Manufacturer shall be capable of providing field services during and after construction.
- 1.7.2 Only source aluminum door assemblies from one manufacturer/ a single source.
- 1.7.3 Only engage installers with specialized expertise in the installation of door assemblies in a project size and scope similar to the project.
- 1.7.4 Conduct pre-installation walk thru meetings to inspect readiness of installation area.
- 1.7.5 Provide a mock-up installation complete with surface preparation techniques. Have the mock-up approved prior to complete installation.
- 1.7.6 Do not proceed with work when assemblies delivered have defects due to workmanship, color, finish, sheen, and other conditions degrading the quality and appearance of the material.
- 1.7.7 Do not conduct installation works in environmental conditions not recommended by the manufacturer.
- 1.7.8 Comply with manufacturer's prescribed tolerances.

1.8 WARRANTIES

- 1.8.1 Ensure two (2) year warranty beginning after the date of substantial completion. Warranty shall include replacement and repair of defective units or hardware installed.
- 1.8.2 In case of breakage of glass due to improper safety management, the contractor shall replace all breakage.

2. PART 2 PRODUCTS

2.1 ENTRANCE DOORS

- 2.1.1 Use aluminum frames compliant with ASTM B221: 6063-T5 and T6 alloy and temper. Major load-supporting aluminum sections shall be of minimum 3mm nominal thickness. No aluminum section with a supporting function in the assembly shall be less than 1.2mm thick, unless otherwise approved by the architect.
- 2.1.2 All storefront doors shall comply as indicated on technical working drawings.
- 2.1.3 All storefront doors situated along the facility rooms shall be standard pre-assembled storefront system complete with narrow door stiles.
- 2.1.4 All storefront door finish shall be clear anodized finish, finish and color approved by the architects.

2.2 GLAZING

- 2.2.1 All glazing shall be minimum 6mm thick, shall be impact-resistant, and adhered with weatherproof silicone sealants, and weatherproof extruded EPDM glazing gaskets.
- 2.2.2 All glazing shall be free of warp and twist
- 2.2.3 Refer to Section 08810 Glass and Glazing requirements.

2.3 ACCESSORIES

- 2.3.1 DOOR STOPS: Install heavy duty flooring door stops to match all operable door leafs. Use heavy duty floor stops of steel chrome, hairline finish installed at flooring.

- 2.3.20DOOR SWEEPS AND DRIP CAPS: Equip all aluminum storefront doors with door sweeps and drip caps.
- 2.3.21WEATHERSTRIPPERS/ JAMB SEALS: Install weather strippers to seal doors at meeting stiles for pairs of doors, door tubing, and astragals.
- 2.3.22LATCH HANDLES: Only use lever-type door handles with finish matching the storefront finish. Submit samples and brochures of cylinder locks to be used to the architect for approval.
- 2.3.23CYLINDER LOCKS: Only use cylinder locks as locking mechanisms unless otherwise approved by the architect. Submit samples and brochures of cylinder locks to be used to the architect for approval.
- 2.3.24HINGES: Only use offset-pivot hinges installed according to manufacturer's prescriptions.

3. PART 3 EXECUTION

3.1 INSTALLATION AND PREPARATION

- 3.1.1Only uncrate/unpack delivered door assemblies upon commencement of installation. Check labels to match indicated location and orientation.
- 3.1.2Check plumb-ness of receiving door unit. Inspect gaps and allowable tolerances to match manufacturer's requirements.
- 3.1.3Examine and verify all actual field measurements prior to fabrication. Reflect recorded measurements on shop drawings.
- 3.1.4Clean and prepare all substrates prior to installation.
- 3.1.5Follow manufacturers' approved standard installation procedures for aluminum door installation.
- 3.1.6Align all assemblies and ensure smooth operation of all operable windows and adjust accordingly. Door assemblies shall be free of warp and twists of any kind.
- 3.1.7Test doors in locked conditions to withstand static air pressure at 1.57 psf. Test in accordance to ASTM E 283.

3.2 PROTECTION

- 3.2.1Protect all areas adjacent to area of work to avoid damages.
- 3.2.2Protect installed products until completion of project.
- 3.2.3Upon completion of project, remove temporary coverings and protection of adjacent areas.
- 3.2.4Remove all construction debris from the project site in a safe and proper manner. Dispose debris properly.
- 3.2.5Clean all installed products in accordance to manufacturer's prescriptions.
- 3.2.6Touch-up, repair, and replace damaged products prior to Substantial Completion.

END OF SECTION

08 00 00	DIVISION 8 DOORS, WINDOWS, and OPENINGS
08 51 00	Metal Windows

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1Technical Architectural Drawings
- 1.1.2Specifications
- 1.1.3Requests for Interpretation
- 1.1.4Product Samples and Brochures
- 1.1.5Manufacturer's Data Sheets and Certificates
- 1.1.6Material Safety Data Sheets
- 1.1.7Work Program and Methodology Submittals

1.2 SUMMARY

- 1.2.1This section includes provisions on all metal windows as specified on technical working drawings.

1.3 RELATED SECTIONS

- 1.3.1Hardware
- 1.3.2Glazing

1.4 GENERAL PROVISION

- 1.4.1All metal windows of jalousie type, fixed, casement, or awning types shall be aluminum anodized.
- 1.4.2Submit brochures, samples/ shop drawings window door assemblies drawn to scale for the approval of the architect. No material can be installed on site without the approval of the architect. All materials shall be approved prior to mass fabrication.
- 1.4.3Refer to technical working drawings and Division 8 Hardware for details on metal window hardware specifications.
- 1.4.4All aluminum frame members shall withstand minimum 25psf wind load and shall be provided with internal reinforcing if necessary.
- 1.4.5Use EPDM Rubber between glazing and framing.
- 1.4.6Only use lever-type handles and latch type locking mechanisms for casement and awning windows.
- 1.4.7Comply with manufacturer's standards for the structural attachment of framing members.
- 1.4.8Use standard side hung hinges for casement windows opening from 0 to 30 degrees.
- 1.4.9Use standard top hung hinges for awning windows, opening from 0 to 80 degrees.
- 1.4.10 All exposed areas shall be finished with Class 1 electrolytically deposited color in clear anodized finish.
- 1.4.11 Comply with gravity, wind, and earthquake load requirements as per the National Structural Code of the Philippines (NSCP).
- 1.4.12 Consider thermal movements from ambient and surface temperature changes.

1.5 MAINTENANCE, DELIVERY, STORAGE, AND HANDLING

- 1.5.1Protect installed and finished window assemblies with strippable membrane, with proper markings for safety. Keep membrane on glass until substantial completion of project.
- 1.5.2All window assemblies shall be safely stacked horizontally with heavy duty spacers unless otherwise specified by the manufacturer.
- 1.5.3Upon substantial completion, restore glazing and thoroughly clean glass surface.
- 1.5.4Comply with manufacturer's lead-time requirements for fabrication and delivery so as not to disrupt construction schedule.
- 1.5.5All materials shall be delivered in protective packaging, sealed, undamaged, and properly labeled. All labels shall indicate precise location and orientation of window assemblies. Handle all deliveries with care.
- 1.5.6Maintain temperature, humidity, and ventilation on site and storage area within recommended limits by the manufacturer.
- 1.5.7Adjust all moveable parts until operation is ensured smooth and safe prior to acceptance.

1.6 SUBMITTALS

- 2.2.1 All glazing shall be minimum 6mm thick, shall be impact-resistant, and adhered with weatherproof silicone sealants, and weatherproofed extruded EPDM glazing gaskets.
- 2.2.2 All glazing shall be free of warp and twist
- 2.2.3 Refer to Section 08810 Glass and Glazing requirements.
- 2.3 ACCESSORIES**
- 2.3.1 WEATHERSTRIPPERS/ JAMB SEALS: Install weather strippers to seal doors at meeting stiles for pairs of doors, door tubing, and astragals.
- 2.3.2 LATCH HANDLES: Only use lever-type door handles with finish matching the storefront finish. Submit samples and brochures of locks to be used to the architect for approval.
- 2.3.3 HINGES: Use standard friction hinges for top-hung and casement windows. For top-hung windows, hinges shall be unbalanced. Refer to technical working drawings to determine handedness for casement windows. Comply with technical working drawings. Comply with manufacturer's recommendations for maximum allowable weight capacity of hinges. Only use stainless steel grade 430 for all hinges.
- 2.3.4 FASTENERS AND ACCESSORIES: Use fasteners and accessories of the same fastened metal as the aluminum
- 3. PART 3 EXECUTION**
- 3.1 INSTALLATION AND PREPARATION**
- 3.1.1 Only uncrate/unpack delivered window assemblies upon commencement of installation. Check labels to match indicated location and orientation.
- 3.1.2 Check plumb-ness of receiving window units. Inspect gaps and allowable tolerances to match manufacturer's requirements.
- 3.1.3 Examine and verify all actual field measurements prior to fabrication. Reflect recorded measurements on shop drawings for approval.
- 3.1.4 Clean and prepare all substrates prior to installation. Comply with manufacturer's cleanliness requirements.
- 3.1.5 Follow manufacturers' approved standard installation procedures for installation.
- 3.1.6 Align all assemblies and ensure smooth operation of all operable windows and adjust accordingly. All assemblies shall be free of warp and twists of any kind.
- 3.1.7 Test windows in locked conditions to withstand static air pressure at 1.57 psf. Test in accordance to ASTM E 283.
- 3.2 PROTECTION**
- 3.2.1 Protect all areas adjacent to area of work to avoid damages.
- 3.2.2 Protect installed products until completion of project.
- 3.2.3 Upon completion of project, remove temporary coverings and protection of adjacent areas.
- 3.2.4 Remove all construction debris from the project site in a safe and proper manner. Dispose debris properly.
- 3.2.5 Clean all installed products in accordance to manufacturer's prescriptions.
- 3.2.6 Touch-up, repair, and replace damaged products prior to Substantial Completion.

END OF SECTION

- 1.6.1 PRODUCT APPROVAL ATTACHMENTS**
- 1.6.1.1 Submit data on manufacturing and installation details, indicating step by step work methodology and substrate preparation requirements.
- 1.6.1.2 Submit product data on fasteners and sealants.
- 1.6.1.3 Submit sample section cuts showing final finish and profile of framing material. Do not manufacture and install on site without approval from the architects. Sample profiles shall be cut in 200mm lengths. The sample profile should be submitted as a complete assembly showing the corners of the window assembly. Do not submit disintegrated samples.
- 1.6.1.4 Submit sample cuts of glazing material at least 200mm X 200mm. Show true color and make of glazing. Only approved glazing can proceed with fabrication and site installation.
- 1.6.1.5 Submit shop drawings of all profiles cut at the jamb, head, lark-stile. Indicate nominal thickness of all aluminum sections to be used in the assembly. No aluminum section shall be less than 1.2mm thick.
- 1.6.2 EXECUTION APPROVAL ATTACHMENTS**
- 1.6.2.1 Submit design calculations and shop drawings. Properly label dimensions and material specifications for each part. Indicate location and specification of all hardware and fastener. Indicate window assembly labels and areas of installation. Shop drawings must show corrected dimensions of openings to receive the window assembly.
- 1.6.2.2 Submit detailed work methodology indicating order of installation of the assembly.
- 1.6.2.3 Submit restoration procedures upon completion of work.
- 1.7 QUALITY ASSURANCE**
- 1.7.1 Only source assemblies from experienced manufacturers with good records in timely delivery and quality installation. Manufacturer shall be capable of providing field services during and after construction.
- 1.7.2 Only source aluminum window assemblies from one manufacturer/ a single source to ensure uniformity of material as specified on technical working drawings.
- 1.7.3 Only engage installers with specialized expertise in the installation of window assemblies in a project size and scope similar to the project.
- 1.7.4 Conduct pre-installation walk thru meetings to inspect readiness of installation area. Comply with manufacturer's requirements.
- 1.7.5 Provide a mock-up installation complete with surface preparation techniques. Have the mock-up approved prior to complete installation.
- 1.7.6 Do not proceed with work when assemblies delivered have defects due to workmanship, color, finish, sheen, and other conditions degrading the quality and appearance of the material.
- 1.7.7 Do not conduct installation works in environmental conditions not recommended by the manufacturer.
- 1.7.8 Comply with manufacturer's prescribed tolerances.
- 1.8 WARRANTIES**
- 1.8.1 Ensure two (2) year warranty beginning after the date of substantial completion. Warranty shall include replacement and repair of defective units or hardware installed.
- 1.8.2 In case of breakage or glass due to improper safety management, the contractor shall replace all breakage.
- 2. PART 2 PRODUCTS**
- 2.1 FIXED, TOP-HUNG, AND CASEMENT WINDOWS**
- 2.1.1 Use aluminum frames compliant with ASTM B221: 6063-T5 and T6 alloy and temper. Major load-supporting aluminum sections shall be of minimum 3mm nominal thickness. No aluminum section with a supporting function in the assembly shall be lesser than 1.2mm thick, unless otherwise approved by the architect.
- 2.1.2 All window assemblies shall comply with make and design as specified in the technical working drawings. Validate and verify measurements as per actual conditions on site prior to fabrication and installation.
- 2.1.3 All metal windows of jalousie type, fixed, casement, or awning types shall be of anodized aluminum finish, silver-colored, hairline finish aluminum metal in its metal parts, unless otherwise approved by the architects. No material can be installed on site without the approval of the architect.

2.2 GLAZING

08 00 00	DIVISION 8 DOORS, WINDOWS, and OPENINGS
08 70 00	Hardware

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1 Technical Architectural Drawings
- 1.1.2 Specifications
- 1.1.3 Requests for Interpretation
- 1.1.4 Product Samples and Brochures
- 1.1.5 Manufacturer's Data Sheets and Certificates
- 1.1.6 Material Safety Data Sheets
- 1.1.7 Work Program and Methodology Submittals

1.2 SUMMARY

- 1.2.1 This section includes provisions for finish hardware for doors and windows where intended for this project.

1.3 RELATED SECTIONS

- 1.3.1 Section Steel Doors and Frames
- 1.3.2 Flush Wood Doors
- 1.3.3 Interior Architectural Woodwork
- 1.3.4 Rough Carpentry

1.4 GENERAL PROVISION

- 1.4.1 Comply with specifications as indicated in the door hardware schedule.
- 1.4.2 The contractor shall provide a key-cabinet of a hinged-panel type that can be secured by a lockset. The key cabinet shall house all keys to all portions requiring a locking mechanism. Situate the key cabinet in a secure area, not exposed to the public, and accessible only to the owner's administrators.
- 1.4.3 Use appropriate hardware size in proportion to the door/window/panel/any surface requiring the hardware. Check load capacity of hardware, especially hinges to match the load requirements of the door/window/panel/any surface requiring the hardware mechanism.
- 1.4.4 The contractor shall provide and install all necessary hardware intended for the project. This includes the following but not limited to:

- 1.4.4.1 Hinges
- 1.4.4.2 Locks and Dummy Trims
- 1.4.4.3 Cylindrical locks with lever handle
- 1.4.4.4 Tubular locks with lever handle
- 1.4.4.5 Deadbolts
- 1.4.4.6 Fire Exit and Panic Exit Devices
- 1.4.4.7 Door Closers
- 1.4.4.8 Floor Closers
- 1.4.4.9 Door stops
- 1.4.4.10 Door trims
- 1.4.4.11 Silencers
- 1.4.4.12 Door pulls
- 1.4.4.13 Push plates
- 1.4.4.14 Armor Plates
- 1.4.4.15 Kick Plates
- 1.4.4.16 Flush bolts
- 1.4.4.17 Door Viewers
- 1.4.4.18 Door Coordinators
- 1.4.4.19 Flush pull
- 1.4.4.20 Door seals and weather-stripping

- 1.4.4.21 Other required hardware finish

1.5 MAINTENANCE

- 1.5.1 Store all hardware in properly labeled containers, with complete sets to match appropriate installation procedures.
- 1.5.2 Secure all hardware storage and secure all hardware keys.
- 1.5.3 Only deliver the keys directly to the owner and/or bonafide representative of the owner upon substantial completion of the project.
- 1.5.4 Tag each hardware item and its completed set properly for appropriate identification of pieces. Match tags/identifications with related hardware. Include basic installation instructions in all labels.
- 1.5.5 Store hardware in cool and dry areas.

1.6 SUBMITTALS

- 1.6.1 PRODUCT APPROVAL ATTACHMENTS
- 1.6.1.1 Submit product brochures detailing the mechanisms and handedness of hardware to match the doors and windows it is specified for. Brochures should include complete hardware codes and a list/code of areas of installation.

1.6.2 EXECUTION APPROVAL ATTACHMENTS

- 1.6.2.1 Submit detailed work methodology indicating installation requirements and procedures.
- 1.6.2.2 Indicate on shop drawings the proper labels and codes to match the hardware specifications as indicated on technical working drawings.
- 1.6.2.3 Deliver keys directly to Owner complete with proper labels.

1.7 QUALITY ASSURANCE

- 1.7.1 Source all hardware type from a single manufacturer to ensure uniform quality.
- 1.7.2 Suppliers shall be recognized architectural hardware suppliers with manufacturing capability suitable to the quantity and quality required by the project.
- 1.7.3 Tag all hardware with proper identifying labels related to hardware schedule. Include installation requirements

1.8 WARRANTIES

- 1.8.1 Manufacturer/ contractor shall agree to replace all defective hardware within two (2) years from date of substantial completion.

2. PART 2 PRODUCTS

2.1 GENERAL PRODUCTS

- 2.1.1 Provide Panic Exit Devices for Fire Rated applications/means of egress intended for fire.
- 2.1.2 All hardware finishes shall be in satin stainless steel finish. Be sure that all hardware are of consistent finishes.
- 2.1.3 Use hardware that is compliant with UL requirements and conforming to NFPA No. 80 requirements.
- 2.1.4 Use hardware compliant to the following:
 - 2.1.4.1 Mortise Hinges: Mortise Hinges: ANSI / BHMA A156.1.
 - 2.1.4.2 Locks and Latches: ANSI / BHMA A156.2
 - 2.1.4.3 Tubular locks: Grade 3 type tubular locks shall not have less than 5 pin tumblers.
 - 2.1.4.4 Cylindrical locks: Grade 2 cylindrical locks shall not have less than 6 pin tumblers.
 - 2.1.4.5 Deadbolts: ANSI / BHMA A156.5; Grade 2.
 - 2.1.4.6 Door Closers: UL Listed.
 - 2.1.4.7 Fire Exit Devices: BHMA / ANSI A156.3, Grade 1, UL Listed.
 - 2.1.4.8 Door Coordinators: ANSI/BHMA A156.3, Type 21A; UL Listed for installation on labeled frame
 - 2.1.4.9 Seals and Weather stripping: BHMA / ANSI A156.22
 - 2.1.4.10 Aluminum Extrusions: 86060-5.
 - 2.1.4.11 Neoprene with service temperature of 40°C to 70°C.
 - 2.1.4.12 PVC extrusions with service temperature of -5°C to 70°C.
 - 2.1.4.13 Silicone with service temperatures of -60°C to 230°C.
 - 2.1.4.14 EPDM with service temperature of -40°C to 100°C.
 - 2.1.4.15 Threshold: BHMA / ANSI A156.21.

2.2. DOOR HARDWARE FOR METAL/ALUMINUM FRAMED STOREFRONT DOORS

- 2.2.1Coordinate with requirements of manufacturers.
- 2.2.2Comply with required hardware as specified in the technical working drawings.
- 2.2.3Only install cylindrical deadbolts with keying mechanisms on the lower rails of doors.
- 2.2.4Use heavy-duty UL Listed cylindrical deadbolts to be installed on bottom rail of door.
- 2.2.5Install heavy-duty door closers on the top rail.

2.3. DOOR HARDWARE FOR WOOD PANEL DOORS

- 2.3.1Coordinate with requirements of manufacturers.
- 2.3.2Comply with required hardware as specified in the technical working drawings.
- 2.3.3Verify installation and hardware mechanisms and secure fit with door panels.
- 2.3.4Use heavy duty cylindrical locks with lever-type handles. Verify handedness of each lever-type installation.
- 2.3.5Use heavy-duty UL Listed cylindrical deadbolts to be installed on bottom rail of door.
- 2.3.6Install heavy-duty door closers on the top rail.
- 2.3.7Install heavy-duty door closers alongside top rail.

2.4. DOOR HARDWARE FOR TOILETS

- 2.4.1Use heavy-duty privacy locksets, lever-type handles. Verify handedness of each lever-type installation.

2.5. KEYING SYSTEM

- 2.5.1Provide at least three sets of keys for every lock, group, or set of locks. Test all key sets and verify matching locks. Label properly and store all key sets in key cabinet to be provided by contractor.
- 2.5.2Provide a master key for all utility spaces.
- 2.5.3Situat all keys in hinged key cabinet, wall mounted key cabinet. Situate key cabinet in a secure area accessible to administrative staff or security personnel only. Provide extra 50% capacity in the key cabinet on top of all required keysets. Label key sets accordingly.

3. PART 3 EXECUTION

3.1. GENERAL INSTRUCTIONS

- 3.1.1Comply with manufacturer's instructions for lockset installations.

3.2. GENERAL INSTALLATION

- 3.2.1NUMBER OF HINGES REQUIRED:
 - Comply with the following quantities of hinges, unless otherwise specified in the technical working drawings and/or as needed/recommended by the manufacturer to comply with warranties.
 - Provide two (2) pieces hinge for doors with heights up to 1500mm.
 - Provide three (3) pieces hinge for doors with heights over 1500mm but not over 2290mm.
 - Provide four (4) pieces hinge for doors with heights over 2290mm but not over 3000mm.
 - For doors over 3000mm in height, provide additional hinge for each additional 750mm of door height or fraction thereof.

3.2.1.1 LOCATION OF HINGES:

- TOP HINGE: Not over 244mm from inside of frame rabbet at head to center line of hinge.
- BOTTOM HINGE: Not over 254mm above bottom of door frame to center line of hinge
- CENTER HINGE: Located at equal distances between top and bottom hinges.

3.3. CLEANING AND PROTECTION

- 3.3.1Protect hardware from damages by covering.
- 3.3.2Ensure all hardware are working and operating smoothly at the time of substantial turnover.

END OF SECTION

08 00 00 DIVISION 8 DOORS, WINDOWS, and OPENINGS

08 80 00 Glazing

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1Technical Architectural Drawings
- 1.1.2Specifications
- 1.1.3Requests for Interpretation
- 1.1.4Product Samples and Brochures
- 1.1.5Manufacturer's Data Sheets and Certificates
- 1.1.6Material Safety Data Sheets
- 1.1.7Work Program and Methodology Submittals

1.2 SUMMARY

This section includes provisions on glazing requirements as specified above the ring beam of the project, central to the atrium/entrance lobby. Also included in this section are glazing requirements in all other areas of the project as indicated, i.e. wall partitions, clerestory windows, specialized glazing as instruction boards, or as indicated on drawings.

1.3 RELATED SECTIONS

- 1.3.1Metal Windows
- 1.3.2Closures and Screens
- 1.3.3Metal Fabrications

1.4 GENERAL PROVISION

- 1.4.1Only use tempered/heat-treated glass on all portions of the project site.
- 1.4.2Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

1.5 MAINTENANCE, DELIVERY, STORAGE AND HANDLING

- 1.5.1Protect glazing materials from damage. Wrap delivered glazing in protective film to protect it from scratches and breakage.
- 1.5.2Use wood blocks to separate glass panes and avoid breakage.
- 1.5.3Protect glass from edge damage during handling and installation. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.
- 1.5.4Apply primers to joint surfaces where required for adhesion of sealants, as determined by pre-construction sealant-substrate testing.

1.6 SUBMITTALS

- 1.6.1PRODUCT APPROVAL ATTACHMENTS
 - 1.6.1.1 SAMPLE: Submit 300mm X 300mm sample glazing with sealant samples showing actual thickness and color of glaze and sealant.
- 1.6.1.2 PRODUCT DATA OF SEALANT: Include manufacturer's standard curing procedures, installation requirements, Type, Grade, and Class.

1.6.2EXECUTION APPROVAL ATTACHMENTS

- 1.6.2.1 Complete shop drawings, i.e. elevations, sections, and key plans showing exact area of installation.

1.7 QUALITY ASSURANCE

Source all glazing from a single manufacturer to ensure uniformity.

1.8 WARRANTIES

Comply with manufacturer's requirements for warranties. Warrant glazing for at least two (2) years from substantial completion of project.

2. PART 2 PRODUCTS

2.1 GENERAL PRODUCTS

- 2.1.1 FLAT GLASS: Compliant to ASTM C 1036 "Standard Specification for Flat Glass".
- 2.1.2 HEAT-TREATED GLASS STANDARD: Compliant to ASTM C 1048 requirements.
- 2.1.3 CLEAR FLOAT GLASS: Type

2.2 SILICON SEALANT, AND OTHER GLAZING ACCESSORIES

- 2.2.1 Only use clear sealants.
- 2.2.2 Select glazing compatibility of sealant with other materials on the assembly, namely frames and glass and other parts of the system.
- 2.2.3 GASKETS: Neoprene extrusions of size and shape as needed by the assembly. Use color intended for the project. Comply with ASTM C 542.
- 2.2.4 SETTING BLOCKS: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
- 2.2.5 SPACERS: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.
- 2.2.6 EDGE BLOCKS: Neoprene, EPDM or silicone blocks, as required for compatibility with glazing sealants, of size and hardness required to limit lateral movement (side-walking) of glass.
- 2.2.7 COMPRESSIBLE FILLER RODS: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25 percent deflection.

3. PART 3 EXECUTION

3.1 GENERAL EXECUTION

- 3.1.1 Do not proceed with glazing works when glazing is wet due to rain and/or subject to condensation due to ambient weather conditions.
- 3.1.2 Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 150mm (6") from corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.
- 3.1.3 Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 United inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 3.175mm (1/8") minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- 3.1.4 Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- 3.1.5 Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- 3.1.6 Tempered Glass: Glass shall have clean-cut, factory fabricated edges. Field cutting will not be permitted.
- 3.1.7 Provide compressible filler rods of equivalent back-up material, as recommended by sealant and glass manufacturers.
- 3.1.8 Force sealant into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- 3.1.9 Tool exposed surfaces of sealant to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
- 3.1.10 Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.
- 3.1.11 Miter cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
- 3.1.12 Lock-Strip Glazing: Comply with ASTM C 716 and gasket manufacturer's printed recommendations. Provide supplementary wet seal and weep system unless otherwise indicated.

3.2 EXAMINATION

- 3.2.1 Conduct pre-fabrication on-site meetings to inspect actual site conditions prior to fabrication. Inspections shall be in the presence of manufacturing.
- 3.2.2 Check installation tolerances, including size, squareness, and offsets at corners. Check if functionality of weep systems will not be impeded.
- 3.2.3 Do not commence glazing works until unacceptable conditions are corrected.

3.3 FABRICATION

- 3.3.1 Verify actual dimensions of frames and receiving areas on site prior to fabrication of glazing.
- 3.3.2 Fabricate glass according to exact measurements needed on site. FIELD CUTTING IS NOT ALLOWED.

3.4 PROJECT CONDITIONS

- 3.4.1 Do not proceed with glazing works when glazing is wet due to rain and/or subject to condensation due to ambient weather conditions.

3.5 PROTECTION & CLEANING

- 3.5.1 Affix non-permanent labels on installed glass surfaces for safety purposes. Use DO NOT CROSS streamers. DO NOT PAINT or use permanent markers on the glass. Ensure safety labels are non-permanent.
- 3.5.2 Remove non-permanent labels and clean surfaces upon substantial turnover.
- 3.5.3 Examine installed glazing at every key point of construction. Remove and replace broken, chipped, abraded, or any form of damages on glass, including vandalism and damages caused by natural conditions.
- 3.5.4 Wash glass on both surfaces prior to date of inspection for turnover.
- 3.5.5 Comply with manufacturer's methods for glass cleaning.

END OF SECTION

08 00 00	DIVISION 8 DOORS, WINDOWS, and OPENINGS
08 81 4	Mirrors

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1 Technical Architectural Drawings
- 1.1.2 Specifications
- 1.1.3 Requests for Interpretation
- 1.1.4 Product Samples and Brochures
- 1.1.5 Manufacturer's Data Sheets and Certificates
- 1.1.6 Material Safety Data Sheets
- 1.1.7 Work Program and Methodology Submittals

1.2 SUMMARY

This section includes provisions on mirrors as installed in toilet areas and other areas as indicated on the drawings.

1.3 RELATED SECTIONS

- 1.3.1 Rough Carpentry
- 1.3.2 Toilet and Bath Accessories

1.4 GENERAL PROVISION

- 1.4.1 Mirrors installed in Toilets and Baths shall be adhered to the backing material using prescribed adhesives. No bolts and screws shall protrude or be reflected on the mirror.
- 1.4.2 Unless otherwise indicated on the technical working drawings, all mirrors in toilet areas shall be mounted 150mm above the top of the lavatory.
- 1.4.3 Align and flush all mirrors with the wall tile layout. Indicate in shop drawings and secure mounting height approvals from the architect.

1.5 SUBMITTALS

1.5.1 PRODUCT APPROVAL ATTACHMENTS

- 1.5.1.1 Sample showing final finish edges of the material. Sample size shall be 300mm x 300mm, adhered to backing material. Samples shall be properly labeled indicating thickness and grade/quality of mirror.

1.5.2 EXECUTION APPROVAL ATTACHMENTS

- 1.5.2.1 Submit shop drawings showing mounting height of mirrors. Reflect actual heights of lavatory, and neighboring finishes as seen on site. Reflect distances from existing finishing grooves such as tiles and similar items.

1.6 QUALITY ASSURANCE

Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and National Association of Mirror Manufacturers (NMM) in its publication "MIRRORS, Handle with Extreme Care, Tips for the Professional on the Care and Handling of Mirrors", unless more stringent requirements are indicated.

1.7 WARRANTIES

- 1.7.1 Warranties shall include replacement of item in case of cracks or defects in mirror silver coatings and other damages occurring due to undue cause, i.e. changes in ambient temperature, that damage the final quality of the mirror.
- 1.7.2 Warranties shall be in effect after installation, during construction and one (1) year from substantial completion of project.

2. PART 2 PRODUCTS

2.1 GLASS

- 2.1.1 Compliant to ASTM C 1503, must be low in lead content and shall be copper free.

- 2.1.2 Glazing quality shall be low-iron, ultra-clear with 91% visible light transmission.

- 2.1.3 Minimum nominal thickness shall be 6.0mm

- 2.1.4 Mirror Edges: Flat and slightly rounded or buffed on corners. Seal edges with edge sealer

- 2.1.5 Fabricate mirror sizes according to sizes indicated on approved shop drawings.

- 2.1.6 Only install mirrors whose grade and quality does not decline upon exposure to areas with heavy moisture.

2.2 MISCELLANEOUS HARDWARE

- 2.2.1 Unless otherwise approved by the architect, no extra accessories will be allowed on mirrors other than anchors and inserts that have no impact on the exposed side of the mirror.

- 2.2.2 Use compatible mirror mastic as prescribed by manufacturers.

3. PART 3 EXECUTION

3.1 EXAMINATION

- 3.1.1 Examine substrates or surface areas on which mirrors are to be mounted. Check for compliance with installer's requirements on tolerances, substrate preparations, and other conditions affecting work.
- 3.1.2 Proceed with installations once substrate conditions are acceptable.
- 3.1.3 Check installation requirements of approved manufacturer's prescribed mastic. Comply with written installation instructions.

3.2 INSTALLATION

- 3.2.1 Provide 3mm air space between back of mirrors and mounting surface for air circulation to avoid undue damages on silver coating of mirror.
- 3.2.2 Use pressure sensitive adhesive tapes and appropriate mirror hardware that do not affect the exposed side of the mirrors. Comply with manufacturer's written instructions on adhesives.
- 3.2.3 Mirror installation shall appear seamless.

3.3 CLEANING AND PROTECTION

- 3.3.1 Protect mirrors from breakage and contamination during construction. Cover surfaces with protective films.
- 3.3.2 Do not expose edges of mirrors to standing water.
- 3.3.3 Keep installed mirrors clean. Wash exposed surfaces of mirrors clean and dry, free of visual damages prior to substantial completion.
- 3.3.4 Do not use chemicals that damage the quality of the mirror film and the glass surface.

END OF SECTION

DIVISION 09 FINISHES

09 00 00	FINISHES
09 30 0	Tile

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1 Technical Architectural Drawings
- 1.1.2 Specifications
- 1.1.3 Requests for Interpretation
- 1.1.4 Product Samples and Brochures
- 1.1.5 Manufacturer's Data Sheets and Certificates
- 1.1.6 Material Safety Data Sheets
- 1.1.7 Work Program and Methodology Submittals

1.2 SUMMARY

This section includes provisions on tile installations as specified for the toilet, and other areas as indicated on the schedule of finishes.

1.3 RELATED SECTIONS

- 1.3.1 Concrete Finishes

1.4 GENERAL PROVISION

- 1.4.1 Comply with ASTM C207, Specifications for Hydrated Lime for Masonry.
- 1.4.2 Maintain air temperature and structural base temperature at ceramic tile installation area above 12°C for 48 h before, during, and 48 h after installation.
- 1.4.3 Do not install tiles at temperatures less than 12°C or above 38°C.
- 1.4.4 Do not apply epoxy mortar and grouts at temperatures below 15°C or above 25°C.
- 1.4.5 Provide minimum 2% of each type and color of tile required for project for maintenance use. Store where directed.
- 1.4.6 Maintenance material to be of same production run as installed material.
- 1.4.7 Turn over product, item code, and other pertinent information to owner for product maintenance.
- 1.4.8 Set mock-ups for the approval of the architect prior to complete installation. Do not proceed with installation until approved. Mock-up installations can be retained once accepted and taken down until acceptable.
- 1.4.9 Consider extra tile quantities for mock-up installations.
- 1.4.10 Do not use tile trims.

1.5 DELIVERY, STORAGE, AND HANDLING

- 1.5.1 Deliver, store and handle products in a manner to avoid damage or contamination.
- 1.5.2 Have materials delivered to job site prior to installation.
- 1.5.3 Deliver all products to job site in manufacturer's unopened cartons with all labels intact and legible.
- 1.5.4 Keep cartons dry and protect from vandalism and away from heavy traffic area.
- 1.5.5 Store cartons in upright position.

1.6 SUBMITTALS

1.6.1 PRODUCT APPROVAL ATTACHMENTS

- 1.6.1.1 Sample ceramic tile 150mm x 150mm cut from the actual material for approval. Mark each sample to show type, size, product code, and brand. Sample shall show actual texture and pattern of the material.
- 1.6.1.2 Technical data on dry-set Portland cement mortar and grout. Indicate brand, color, and product code.
- 1.6.1.3 Sample divider strips and tile spacers.

1.6.2 EXECUTION APPROVAL ATTACHMENTS

- 1.6.2.1 Shop drawings, i.e. floor plans and wall elevations highlighting area of application and tile setting layout. Indicate start of tile, end of tile, grout distances, tolerances, dimensions of cuts for drains, and similar utility holes. Show dimensions of tiles cut from original tile dimensions.

1.7 QUALITY ASSURANCE

- 1.7.1 Employ tile setters with minimum experience from projects of the same size and scale as the project.
- 1.7.2 Only install approved tiles sourced from the same manufacturer.
- 1.7.3 Observe standard tolerances for slopes and drains.
- 1.7.4 Do not install tiles with visible defects such as chipped edges.
- 1.7.5 Ensure maximum bonding of tiles to substrates. When tapped, no more than 20% of the tile surface area shall emanate a hollow sound.

1.8 WARRANTIES

- Two (2) years.

2. PART 2 PRODUCTS

2.1 FLOOR TILES

- 2.1.1.1 Refer to Technical Working drawings for coverage of area of application
- 2.1.1.2 600 x 600 non-slip porcelain tiles (laser cut) for Pwd Room, Dark Grey color for Architect's Approval.

2.2 WALL TILES

- 2.2.1.1 Refer to Technical Working drawings for coverage of area of application.
- 2.2.1.2 use 600 cm. x 600cm. white glazed porcelain wall tiles flushed against concrete, spaced at minimum tile grout distance in white for Restrooms.

2.3 MORTARS AND ADHESIVES

- 2.3.1 Portland cement: to CSA-A5, type 10.
- 2.3.2 Sand: to ASTM C144, passing 15 mesh.
- 2.3.3 Hydrated lime: to ASTM C207, Type N. Latex additive: formulated for use in portland cement mortar and thin set bond coat.
- 2.3.4 Mortar bed for floors: 1 part Portland cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included. Mortar bed for walls 1 part portland cement, 1/5 Dry set mortar: mix to manufacturer's instructions.
- 2.3.5 Organic adhesive: pre-mixed.
- 2.3.6 Mix bond and levelling coats, and grout to manufacturer's instructions.
- 2.3.7 Adjust water volumes to suit water content of sand.
- 2.3.8 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.
- 2.3.9 Dry set mortar: to ANSI A118.1.

2.4 GROUT

- 2.4.1 COLOR: dark grey, brand and type compliant to manufacturer's prescriptions of the approved tile.
- 2.4.2 Portland cement grout: as recommended by tile manufacturer.
- 2.4.3 Dry curing wall grout: as recommended by tile manufacturer.
- 2.4.4 Grout preparation: to manufacturer's instructions.

2.5 CLEANING COMPOUNDS

- 2.5.1 Use materials compatible to the approved material. Cleaning materials shall not impede bonding of tile setting materials.
- 2.5.2 Do not use caustic and acidic cleaning materials.

09 00 00	FINISHES
09 67 0	Fluid-Applied Flooring

3. PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- 3.1.1 Check conditions and quality of substrates to be ready to accept finish. Apply tile to clean and sound surfaces.

3.2 INSTALLATION

- 3.2.1 Fit tile around corners of fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles unevenly. Refer to approved shop drawings for approved tile layout.
- 3.2.2 Ensure joints between tiles are uniform, 0.00mm wide, plumb, straight, true, and even and flush with adjacent tile.
- 3.2.3 Sound tiles after setting by tapping. Replace hollow sounding tiles.
- 3.2.4 Allow minimum 24 hours setting time after installation before grouting.
- 3.2.5 Clean installed tile surfaces immediately after installation before grout is cured. Remove excess grouts immediately.

3.3 MAXIMUM ALLOWABLE TOLERANCES

- 3.3.1 SURFACE TOLERANCE
1-800
- 3.3.2 LIPPAGE, MAXIMUM ALLOWABLE DEVIATION:
 ± 1.0 % of the total thickness of the approved tile
- 3.3.3 STRAIGHTNESS OF SIDES, MAXIMUM ALLOWABLE DEVIATION:
 ± 0.1 % of true plumb and horizontal level
- 3.3.4 RECTANGULARITY, MAXIMUM ALLOWABLE DEVIATION:
 ± 0.1 % of true plumb and horizontal level

3.4 CLEANING AND PROTECTION

- 3.4.1 Clean installed tile surfaces regularly. Ensure surfaces are free from dust, stains, and other materials affecting its visible appearance upon substantial completion.
- 3.4.2 Replace tiles damaged tiles.

END OF SECTION

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

- 1.1.1 Technical Architectural Drawings
- 1.1.2 Specifications
- 1.1.3 Requests for Interpretation
- 1.1.4 Product Samples and Brochures
- 1.1.5 Manufacturer's Data Sheets and Certificates
- 1.1.6 Material Safety Data Sheets
- 1.1.7 Work Program and Methodology Submittals

1.2 SUMMARY

This section includes standard performance and high performance fluid-applied flooring systems. Comply with areas of application as indicated in the drawings.

1.3 RELATED SECTIONS

- 1.3.1 Concrete Finishes

1.4 GENERAL PROVISION

- 1.4.1 Secure approval from architect for final finish style and application. Submit finish samples. Refer to the Submittal portion of this section for details.
- 1.4.2 Coordinate work of this Section with work of other trades for proper time and sequence to avoid construction delays.
- 1.4.3 Conduct pre-installation meeting months prior to commencing work of this Section to verify project on-site installations and project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's installation instructions and manufacturer's warranty requirements.

- 1.4.3.1 MOCK-UPS: Mock-Up: Construct mock-up where in obscure areas. Mock-up areas shall be 2m x 2m in dimensions, using proposed procedures, colors, textures, finishes and quality of work to judge quality of work, substrate preparation, operation of equipment and material application.

- 1.4.3.2 Do not proceed with work completion prior to written acceptance of mock-up. When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain part of finished work.

- 1.4.3.3 Assemble and install components only when temperatures are suitable to the requirements of the manufacturer. Maintain materials, substrates, and surrounding temperature suitable to manufacturer's required conditions.

1.5 MAINTENANCE, DELIVERY, STORAGE & HANDLING

- 1.5.1 Deliver materials in manufacturer's original packaging with identification labels intact and in sizes suitable to the project.
- 1.5.2 Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
- 1.5.3 Comply with local codes in the proper disposal of waste materials.

1.6 SUBMITTALS

1.6.1 PRODUCT APPROVAL ATTACHMENTS

- 1.6.1.1 Manufacturer's product data, including manufacturer's SPEC-DATA product sheet.
- 1.6.1.2 Manufacturer's installation instructions.
- 1.6.1.3 Catalog pages illustrating products to be incorporated into project.
- 1.6.1.4 Material Safety Data Sheets (MSDS) of manufacturer - required products.

1.6.2 EXECUTION APPROVAL ATTACHMENTS

- 1.6.2.1 Submit 300 x 300 mm samples of each fluid-applied flooring system specified to show color and texture with specified coats cascaded.

- 1.6.2.2 Submit shop drawings/ plans indicating extents of area to receive application
- 1.6.2.3 Submit detailed work methodology complying with manufacturer's requirements.

1.7 QUALITY ASSURANCE

- 1.7.1 Source manufacturers with experience in manufacturing components similar to or exceeding requirements of the project. Manufacturers shall have sufficient capacity to produce and deliver required materials without causing delay in work. Manufacturers shall be capable of providing field service inspection.
- 1.7.2

1.8 WARRANTIES

- 1.8.1 Warrant applications and installations from manufacturers able to provide five (5) year warranty.
- 1.8.2 Comply with manufacturer's requirements for warranty.

2. PART 2 PRODUCTS

2.1 GENERAL MATERIALS

- 2.1.1 Unless otherwise indicated, provide factory-mixed coatings.
- 2.1.2 When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application.
- 2.1.3 Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- 2.1.4 VOCs need to be confirmed by using the products SDS sheets.
- 2.1.5 Submit all pertinent product data as needed to complete project. Facilitate submittals in one set.

2.2 GENERAL PROPERTIES OF FLOORING ONE CURED:

- 2.2.1 COMPRESSIVE STRENGTH: 8,580psi, comply with ASTM C579
- 2.2.2 TEN-SILE STRENGTH: 2,500psi, comply with ASTM D 638
- 2.2.3 FLEXURAL STRENGTH: 5,100psi, comply with ASTM D 790
- 2.2.4 HARDNESS, SHORE: 85, comply with ASTM D 2240
- 2.2.5 BOND STRENGTH: >400, comply with ASTM D 4541
- 2.2.6 ABRASION RESISTANCE: 5mg loss, comply with ASTM D 4060
- 2.2.7 WATER ABSORPTION: <0.1%, comply with ASTM C 413
- 2.2.8 RESISTANCE TO FUNGI GROWTH: comply with ASTM 621

2.3 PRIMERS

- 2.3.1 Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the approved manufacturer.

2.4 POLYURETHANE CONCRETE SEALER

- 2.4.1 Use clear, water based matte finish, with two-component urethane resin. Part A component shall be thoroughly mixed with part B component, or as instructed and warranted by manufacturer. Initial appearance of product shall be milky white when wet and clear when dry.
- 2.4.2 Comply with substrate preparation requirements by manufacturer.
- 2.4.3 Material shall be resistant to oil, gasoline, water, salt, and chlorine. Compliant to ASTM D-1308
- 2.4.4 Material shall be resistant to tire-marks.
- 2.4.5 LOSS: 25 for 1 coat
- 2.4.6 PRACTICAL COVERAGE: 14 to 28 sqm per 4 liters/coat, depending on substrate porosity
- 2.4.7 SURFACE DRY: 1 hour, allow for 2 hours in between recoats.
- 2.4.8 DRY THROUGH: 24 hours for foot traffic, 72 hours for vehicular traffic
- 2.4.9 THINNING: as required by manufacturer and as certified compatible
- 2.4.10 Application by roller or spray gun

2.5 ACCESSORIES:

- 2.5.1 COATING APPLICATION ACCESSORIES: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and cleanup materials required, per manufacturer's specifications.

3. PART 3 EXECUTION

3.1 GENERAL EXAMINATION AND PREPARATION

- 3.1.1 Verify that conditions of substrates previously installed under other sections or contracts are acceptable for product installation in accordance with manufacturer's instructions prior to fluid-applied flooring installation.
- 3.1.2 Remedy all unacceptable conditions. Remove all items not necessary that affects quality of work. Coordinate schedules with construction manager.
- 3.1.3 Do not proceed with work completion until all substrates and preparations are acceptable.
- 3.1.4 If substrate is concrete, ensure that the surfaces have been properly cured in accordance to requirements by the manufacturer. Follow manufacturer procedures.
- 3.1.5 Test moisture content of concrete. Match manufacturer's requirements.

3.2 GENERAL APPLICATION

- 3.2.1 Comply with OSHA and other safety requirements as specified by manufacturer.
- 3.2.2 Comply with Exterior painting section of this specification for detailed application requirements.
- 3.2.3 Apply components in accordance with manufacturer's written instructions.
- 3.2.4 Remove oil and grease by detergent cleaning. Dry surface areas prior to application.
- 3.2.5 Unless otherwise advised by manufacturer, acid etch smooth surfaces for improved adhesion. Use acids compliant to manufacturer's product.
- 3.2.6 Finished texture of acid wash smooth concrete shall be similar to 40-60 grit sandpaper.

3.3 CLEANING AND PROTECTION

- 3.3.1 Remove surplus materials, rubbish, tools and equipment from project site. Dispose properly in accordance to local codes.
- 3.3.2 Protect installed product from any damages during construction. In case of damages, repair any damaged surface prior to substantial turnover.
- 3.3.3 Repair any damages incurred to adjacent materials during installation of material. Verify that conditions of substrates previously installed under other sections or contracts are acceptable for product installation in accordance with manufacturer's instructions prior to fluid-applied flooring installation.

END OF SECTION