THERMAL & MOISTURE PROTECTION

1. GENERAL

1.1 Summary

.1 This Section specifies the thermal and moisture protection systems.

1.2 Standards:

.1 American Society for Testing and Materials (ASTM):

.1 ASTM E779 - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.

.2 ASTM E1186 - Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.

1.3 Submittals

.1 Submit product data in accordance with Section 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Submit with Shop Drawings the certified test reports from approved independent testing laboratories, indicating compliance with Specifications for specified performance characteristics and physical properties.

.3 Submit with Shop Drawings test reports in accordance with CAN/ULC S101 for fire endurance and CAN/ULC S102 for surface burning characteristics.

.4 Submit an air leakage testing report prior to Substantial Completion, including:

.1 All completed testing dates and corresponding test results.

.2 Details of all test procedures and instruments.

.3 Written verification indicating final, as-built conditions meet requirements of Section 07200.

2. PRODUCTS

2.1 Performance Criteria

.1 Prevent the ingress of moisture or water vapour from the exterior through the building envelope and the passage of air through the building envelope from the interior spaces to the exterior and vice versa.

.2 Prevent the ingress of moisture through foundation walls below grade, both subject and not subject to hydrostatic pressure.

.3 Provide protection (such as insulation) of occupied spaces to resist the transfer of heat through exterior walls, floors and roofs to create comfortable, livable interior environments.

.4 Eliminate thermal bridging by ensuring thermally broken structural connections, well-aligned glazing without conductive bypasses, meeting of roof and wall insulation at roof decks or wrapping insulation around parapets and ensuring only minor thermal bridging at corners of steel framed walls and wood-frame to foundation wall interfaces.

.5 Provide resistance to the propagation and spread of fire for exterior walls and interior walls designated as fire-resistance rated separations.

.6 Provide the optimal amount of insulation of the various parts of the building envelope, for each building.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

3.2 Field Testing

.1 Air Leakage Testing:

.1 Perform air leakage testing on completed buildings to demonstrate that the building envelope's air leakage rate does not exceed the requirements set out in Section 07200.

.2 Conduct tests in accordance with ASTM E779 using both pressurization and depressurization testing. Retest after corrective work is completed as necessary to achieve the whole building air leakage rate requirements.

.2 Demonstrate resistance to water penetration by the envelope assembly of completed buildings through the following means:

.1 Conduct field testing of first instances of typical envelope detail construction including, but not limited to, joints between envelope systems, typical glazing details (heads, sills, jambs and corners), typical curtain wall details (slab edges, interior and exterior corners and typical mullions), in conformance with ASTM E1186.

.2 Re-test after corrective work is completed as necessary to achieve a waterproof assembly. Compliant mock-ups may become part of the Work.

.3 Conduct randomized subsequent field testing of installed building envelope systems as recommended and directed by the Commissioning Lead.

.4 Submit a water penetration resistance report.

END OF SECTION

WATERPROOFING

1. GENERAL

1.1 Summary

.1 This Section specifies the provision of waterproofing systems.

1.2 Submittals

.1 Submit product data in accordance with Section 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Provide Manufacturer’s documentation and proposed location for all proposed waterproofing compounds, sheet goods and purpose made products.

2. PRODUCTS

2.1 Performance Criteria

.1 Ensure suspended slabs, decks, and associated walls over habitable spaces where water collection is anticipated are waterproof.

.2 Provide waterproof membranes under slabs on grade and in exterior walls as part of the building envelope and integrate with rain screen or cavity wall assemblies.

.3 Provide damp-proofing to sub-grade foundation walls to non-habitable spaces.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer’s recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

THERMAL PROTECTION

1. GENERAL

1.1 Summary

.1 This Section specifies the provision of thermal protection systems.

1.2 Submittals

.1 Submit product data in accordance with Section 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Provide data on material characteristics, performance criteria and documentation for each type of insulation material proposed to be used.

.3 Provide proof that product to be used provides the required thermal insulating value and fire ratings, the materials and their fabrication are stable under the conditions they are subjected.

2. PRODUCTS

2.1 Performance Criteria

.1 Vapour Barriers

.1 Prevent water vapour transmission and condensation in wall assemblies, roofing assemblies, and floor assemblies within the building perimeter.

.2 Air Barriers

.1 Prevent air leakage caused by air pressure across the wall, floor and roof assembly by means of air barrier assemblies.

.2 Provide air barrier assemblies that:

.1 Limit air exfiltration and infiltration through materials of the assembly, joints in the assembly, joints in components of the wall assembly, and junctions with other building elements including the roof.

.2 Are durable to last the anticipated service life of the facility.

.3 Prevent air leakage caused by air pressure across the assembly, including interruptions to the integrity of wall, floor and roof systems such as junctions with dissimilar construction with maximum air passage limited to 2.0 L/sm^2 of building enclosure area at a pressure differential of 75 Pa.

.3 Thermal Insulation:

.1 Provide thermal insulation as part of the building envelope assembly to reduce the transfer of heat both from the interior to the exterior and vice versa, depending on

seasonal conditions, and to resist the absorption of water. The thermal insulation system for the building envelope is to:

.1 Be of a type and quality that provides consistent environmental quality to regularly occupied, enclosed spaces.

.2 Be chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) free.

.3 Include one-component rigid urethane foam-in-place insulation to insulate hollow metal door frames, aluminum door and window frames and around protrusions through the exterior wall envelope.

2.2 Material

.1 Fibreglass batt insulation is not acceptable for exterior wall assemblies.

.2 Mineral fibre semi-rigid batt insulation is acceptable for exterior wall assemblies.

.3 Extruded polystrene insulation is acceptable for below-grade exterior wall assemblies.

.4 Polyisocyanurate rigid insulation is acceptable for exterior roof assemblies.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

.3 Join and seal the air barrier materials of each assembly to the air barrier materials of adjacent assemblies, allowing for the relative movement of these assemblies and components. Clearly identify air barrier system continuity on the plan and section drawings.

.4 Seal all penetration of the air barrier assembly, including but not limited to electrical, plumbing, HVAC components, windows and doors.

.5 Support the air barrier to be capable of withstanding the maximum positive and negative air pressures to be placed on the building without displacement, or damage, and transfer the load to the structure.

END OF SECTION

METAL SIDING AND SOFFIT PANELS

1. GENERAL

1.1 Summary

.1 This Section specifies the provision of metal siding and soffit panels.

1.2 Standards

.1 American Society for Testing and Materials (ASTM):

.1 ASTM A792/A792M - Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.2 ASTM C297 - Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions.

.3 ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives.

.2 Canadian Sheet Steel Building Institute (CSSBI).

1.3 Submittals

.1 Submit product data in accordance with Sections 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Panel Samples: Minimum 200 mm by 200 mm in specified thickness, including attachment extrusions, clips, subgirts, fasteners, closures, and other panel accessories.

.3 Color Samples: Panel material finished with “REVIEWED” color and finish.

.4 Fabricator Instructions:

.1 Include installation instructions, technical bulletins, and other product data.

.2 Include instructions for substrate requirements, special handling criteria, installation sequence, perimeter conditions, cleaning procedures, and conditions requiring special attention.

.5 Structural Calculations for Panel System: sealed by a Professional Engineer registered in the Province of Manitoba.

.6 Identification: Panels shall be identified on Shop Drawings as to building location to facilitate panel removal and replacement due to construction and/or occupant damage.

2. PRODUCTS

2.1 Performance Criteria

.1 Maximum deflection not to exceed L/180 under system’s own weight plus wind loads (positive and negative) acting normal to the plane in accordance with the local building code climatic data and wind load 1:50 years.

.2 Calculate live load deflections in accordance with CSSBI Lightweight Steel Framing wall stud and floor joist load tables 58-2011.

.3 Provide for movement of components without causing buckling, failure of joint seals and undue stress on fasteners when subject to seasonal temperature range from minus 20°C to plus 50°C, and wind loads noted above.

.4 Include expansion joints to accommodate movement in wall systems and between wall systems and building structure where these movements are caused by deflection of building structure. Accommodate these movements without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.

.5 Provide for positive drainage to the exterior of all water entering or condensation occurring within the wall systems.

.6 Prefinished profiled steel panels are to be aluminum-zinc alloy coated steel sheet (55 percent Al-Zn): to ASTM A792/A792M, commercial quality, grade 33 with AZ150 coating, prefinished coated, minimum base metal thickness of 0.76 mm (22 ga.). Coated steel sheet finish to be factory applied polyvinylidene fluoride with long lasting weathering characteristics.

.7 Composite aluminum panels are to consist of aluminum sheets thermally bonded in continuous process, under tension, to a fire resistive thermoplastic core with no glues or adhesives between dissimilar materials. Bond strength is to be 10.3 MPa minimum tested to ASTM C297. Peel strength is to be 100 N mm/mm minimum tested to ASTM D1781.

.8 Metal sheet soffit panels are to consist of prefinished, preformed aluminum sheet, 0.48 mm (26 ga.) metal core thickness.

2.2 Spare Parts

.1 Provide spare parts and material that are identical to and interchangeable with similar parts installed and in accordance with Schedule 18 Technical Requirements and the following:

.1 Five (5) percent extra siding and soffit materials.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer’s recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

MEMBRANE ROOFING

1. GENERAL

1.1 Summary

.1 This Section specifies the provision of membrane roofing.

1.2 Standards

.1 Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual.

.2 Canadian General Standards Board (CGSB):

.1 CGSB 37-GP-56 - Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.2 CAN/CGSB-51.33 - Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.3 Factory Mutual (FM Global):

.1 FM Approvals - Roofing Products.

1.3 Quality Assurance

.1 Roofing Subcontractor: must be a member in good standing of the Roofing Contractors Association of Manitoba and the CRCA.

1.4 Submittals

.1 Submit product data in accordance with Sections 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Submit Shop Drawing indicating the materials, features, installation details, product sheets, recommended practices for the roofing system proposed.

2. PRODUCTS

2.1 Performance Criteria

.1 Provide roofing assemblies for wind loading occurring in this location.

.2 All roofs are to have a minimum slope of 2 percent (1:50).

.3 Foamed plastic insulation are to be CFC and HCFC free.

.4 Provide sheet metal flashings that divert water away from membrane flashing termination and protect the membrane from deterioration due to the exterior elements and mechanical damage. Provide roofing membrane continuously under the metal.

.5 Metal roofing systems, if used, are to provide clear internal paths of drainage to allow any trapped moisture to drain to the exterior and avoid the staining of architectural finishes, forming of puddles, forming of icicles, and dripping on pedestrians.

.6 Design of roof assemblies to ensure that entrance ways and roof perimeter areas are protected from sliding snow and ice.

2.2 Materials

.1 Flat roofs: 2-ply styrene-butadiene-syrene (SBS) modified bitumen membrane to CGSB 37-GP-56, mopped on base sheet and torch applied cap sheet; R-40 rigid insulation; air vapour barrier membrane; roof deck sheathing; structural decking.

.2 Base sheet or self-adhesive vapour retarder: to CGSB 37-GP-56M, SBS elastomeric polymer, prefabricated sheet, glass or polyester reinforced.

.3 Provide roofing membrane or pavers on pedestals for walkways to all roof top mechanical units.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer’s recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

3.2 Site Conditions

.1 Do not install roofing when temperature remains below Manufacturers’ recommendations. Minimum temperature for solvent-based adhesive is minus 5°C.

.2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

END OF SECTION

FLASHING AND SHEET METAL

1. GENERAL

1.1 Summary

.1 This Section specifies the provision of flashing and sheet metal.

1.2 Standards

.1 Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual.

.2 Aluminum Association - Aluminum Sheet Metal Work in Building Construction.

.3 Canadian Sheet Steel Building Institute (CSSBI).

.4 American Society for Testing and Materials (ASTM):

.1 ASTM A653 - Sheet Steel, Zinc-Coated (Galvanized) by the Hot Dip Process, Structural (Physical) Quality.

.2 ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.5 American National Standards Institute (ANSI):

.1 ANSI H35.1Standard Alloy and Temper Designation Systems for Aluminum.

1.3 Submittals

.1 Submit product data in accordance with Sections 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

2. PRODUCTS

2.1 General

.1 Construct and install roof metal flashings in accordance with CRCA standards.

.2 Pre-finished metal flashing shall be zinc-coated galvanized sheet, type A commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

.3 Formed aluminum flashings shall be tension leveled, aluminum sheet in accordance with ASTM B209 and ANSI H35.1 alloy designation 3003-H14 for prefinished aluminum sheet flashings and 5005-H14 for anodized sheet flashing.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer’s recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

ROOF ACCESSORIES

1. GENERAL

1.1 Summary

.1 This Section specifies roof access, fall restraint systems and roof anchors.

1.2 Standards

.1 American Society for Testing and Materials (ASTM):

.1 ASTM A36-93a: Standard Specification for Carbon Structural Steel.

.2 Canadian Standards Association (CSA):

.1 CAN/CSA-Z91-02 - Health and Safety Code for Suspended Equipment Operations.

.3 Manitoba Workplace Safety and Health Regulation (MWSHR) - Chapter W210 The Workplace Safety and Health Act – Part 14 Fall Protection.

1.3 Submittals

.1 Submit product data in accordance with Sections 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Submit Shop Drawings sealed by the Professional Engineer registered in the Province of Manitoba and experienced in design of this Work for roof hatches, roof anchors and fall restraint systems.

.3 Submit Shop Drawings for personal restraint assembly: posts, steel rope loops, and attachments to resist lateral forces of 22.5 kN at any point and in all directions, without damage, fracture or permanent set.

2. PRODUCTS

2.1 Performance Criteria

.1 Provide roof anchors and fall restraint systems to meet NBC and MWSHAR requirements.

.2 Provide roof access in safe locations that do not impair the operation of the building and reduce overall building water tightness.

.3 Provide roof access doors in accordance with Section 08100.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer’s recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

.3 Supply and install steel items required to be cast into concrete or attached to steel framing as clean uncoated metal, with setting templates to appropriate sections.

END OF SECTION

FIRE AND SMOKE PROTECTION

1. GENERAL

1.1 Summary

.1 This Section specifies fire and smoke protection systems.

1.2 Standards

.1 American Society for Testing and Materials (ASTM):

.1 ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

.2 ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Firestops.

.3 ASTM E 119 - Methods of Fire Tests of Building Construction and Materials.

.4 ASTM E 2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-Story Test Apparatus.

.2 UL 263 - Fire Tests of Building Construction and Materials.

.3 UL 723 - Surface Burning Characteristics of Building Materials.

.4 UL 1479 - Fire Tests of Through-Penetration Fire Stops.

.5 UL 2079 - Tests for Fire Resistance of Building Joint Systems.

.6 UL 101 - Fire Resistance Tests of Building Materials and Construction.

.7 UL Fire Resistance Directory Volume 2:

.1 Through-Penetration Firestop Devices (XHJI).

.2 Fire Resistive Ratings (BXUV).

.3 Through-Penetration Firestop Systems (XHEZ).

.4 Fill, Void, or Cavity Material (XHHW).

1.3 Submittals

.1 Submit product data in accordance with Sections 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Submit a schedule listing locations, surfaces and components to which firestopping and smokeseals are to be applied, indicate the firestopping, smokeseals system, materials required, and detailed installation.

.3 Determine thickness to be applied from tests of assemblies identical to the assembly to be protected, conducted in accordance with ULC S 101.

.4 Determine system from existing available engineering studies, or correspondence with the labelling agency indicating the effect of the differences on the fire separation of the assembly.

.5 Where the assembly includes conditions that do not correspond to those included in any previously tested assembly and for which no relevant engineering information is available use the same system and material as would be required for a tested assembly with similar conditions.

2. PRODUCTS

2.1 Performance Criteria

.1 Exposed, spray-applied, cementitious fireproofing is not permitted as a means to achieve a fire resistance rating in wall, floor and ceiling assemblies.

.2 Integrate fire barriers into vertical and horizontal spatial separations to protect against the spread of fire and smoke. Apply protection to exposed building elements (structural and non-structural) susceptible to fire and subsequent damage.

.3 Apply protection around penetrations through vertical and horizontal fire resistance rated separations.

.4 Fire stopping and smoke seal systems shall be asbestos free and capable of maintaining an effective barrier against flame, smoke and gases.

.5 Fire-stopping shall:

.1 Be compatible with substrates.

.2 Allow for movement caused by thermal cycles.

.3 Prevent the transmission of vibrations from pipe, conduit or duct to structure and structure to pipe, conduit or duct.

.6 When more than one product is required for an assembly, use compatible products from a single manufacturer.

.7 Use silicone-based fire-stopping sealants and coatings guaranteed not to re-emulsify if subject to wetting or standing water. Acrylic-based coatings or sealants are not acceptable.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer’s recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

JOINT PROTECTION

1. GENERAL

1.1 Summary

.1 This Section specifies joint protection sealants.

1.2 Standards

.1 Canadian General Standards Board (CGSB):

.1 CGSB 19-GP-5M, Sealing Compound, One Component, Acrylic Base, Solvent Curing.

.2 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 CGSB 19-GP-14M, Sealing Compound, One Component, Butyl-polyisobutylene Polymer Base, Solvent Curing.

.4 CAN/CGSB-19.17, One-Component Acrylic Emulsion Base Sealing Compound.

.5 CAN/CGSB-19.24, Multi-component, Chemical Curing Sealing Compound.

1.3 Submittals

.1 Submit product data in accordance with Sections 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Manufacturer's product datasheet to describe:

.1 Caulking compound.

.2 Primers.

.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

2. PRODUCTS

2.1 Sealants

.1 Sealants shall be serviceable in the local climate in their fully cured state.

.2 Sealants shall be silicone or one-component elastomeric-type. Acrylic and solvent curing types are not permitted.

.3 Apply sealant materials to achieve:

.1 Seals to the building envelope systems and around openings in the building envelope systems as required to prevent water ingress and/or to ensure airtightness.

.2 Seal joints between dissimilar or similar materials to allow smooth or even transitions.

.3 Seal expansion or controls joints in building envelope systems and structural systems to allow for movement.

.4 For the exterior, use sealants which completely and continuously fill joints.

.5 For the interior, use sealants (at frames such as those at doors and windows), which completely fill joints between dissimilar materials using one-component, paintable type sealant.

.6 In corridors and other traffic areas used by carts, material handling and other equipment, use traffic bearing type sealants suitable to support imposed loads without deformation or failure.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION