

PART 1 - GENERAL

1.1 Section Includes

- .1 Provide all labour, materials, methods, equipment, accessories to complete general insulation.
 - .1 Rigid insulation, furring, insulation fasteners.
- .2 Cement insulation coating.

1.2 Related Sections

- .1 Section 06100: Rough carpentry.

1.3 Material Delivery, Storage, Handling

- .1 Store insulating materials in weathertight structure, above ground.
- .2 Protect insulation from exposure to sun light, during storage, after application.

PART 2 - PRODUCTS

2.1 Materials

- .1 Self-adhesive air barrier membrane: modified bitumen on high-density polyethylene film, with silicone release paper on adhesive side, minimum 1.0 mm thick.
- .2 Rigid insulation on wall: to CGSB 51-GP-20-M87, thickness indicated, required, 2'-0" x 8'-0" board size, extruded, expanded, high density skins, square edges, R5/inch thickness, Dow Chemical manufacture "Styrofoam SM".
- .3 Insulation board fasteners: screw type, truss head, corrosion resistant finish, 26 gauge galvanized steel 2" x 2" hexagon washers.
 - .1 To concrete: pre-drilled, length through insulation, penetrate concrete minimum 1 1/2", Construction Fasteners Inc. manufacture "Confas" system.
 - .2 To wood: power driven, length through insulation, penetrate wood minimum 1 1/2".

PART 3 - EXECUTION

3.1 Workmanship

- .1 Examine surfaces, areas to receive insulation. Report defective, deleterious conditions. Proceed when unsatisfactory conditions corrected.
- .2 Ensure building substantially weathertight, work of other Sections, mechanical, electrical work completed, tested, approved as required prior to installation.
- .3 Install insulation to maintain continuity of thermal protection to building elements, where indicated, required.
- .4 Cut, trim insulation neatly to fit spaces, protrusions, corners, edges, butt joints tightly, offset vertical joints. Cross-lap sheets of insulation on roof at each layer.

3.2 Rigid Insulation Application

- .1 Ensure complete, firm attachment of insulations to substrate. Provide 1x4" wood furring let into cross lapped roofing insulation boards at 24" o/c.
- .2 Co-operate fully with Section 06100 for wood framing, blocking, plywood installation, etc., other Sections as required.
- .3 Apply insulation over membrane vapour retarder where indicated, required, starting from level point. Fit boards tight together.

- .4 Tape, seal joints, edges, terminations, etc. to prevent moisture intrusion.
- .5 Fasten insulation boards through membrane, plywood substrate to wood stud furring with specified insulation fasteners, washers minimum two fasteners vertically each board, 24" o.c.
- .6 Fasten insulation boards through membrane to concrete substrate with specified insulation fasteners, washers 24" o.c., both ways, minimum six fasteners each insulation board.
- .7 Ensure complete, firm attachment of rigid insulation to substrate for application of finishes. Co-operate fully with other applicable Sections.
- .8 Protect insulation below grade with protection board prior to cement insulation coating application.

3.3 Cleaning

- .1 Clean up debris minimum daily, remove from site or to container provided by Contractor.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

- .1 Insulation
 - .1 The supply and installation of insulation shall be considered incidental to the Contract Lump Sum Price for "Thermal and Moisture Protection"

~End~

PART 1 - GENERAL

1.1 Quality Assurance

- .1 Coordinate installation of air barrier materials with work of other trades to minimize exposure of membrane to elements or damage, and to
- .2 Overlap and seal air barrier with air and vapour barrier membranes installed by other trades to ensure continuity of building air/vapour barrier system over entire building.

1.2 Environmental Conditions

- .1 Apply primers and membranes in dry weather and only when air and surface temperature are within manufacturer's recommended limits.
- .2 For applications below recommended temperature consult manufacturer and do not proceed until approved by manufacturer or his representative.

PART 2 - PRODUCTS

2.1 Materials

- .1 Self-adhesive air barrier membrane: modified bitumen on high-density polyethylene film, with silicone release paper on adhesive side, minimum 1.0 mm thick.
 - .1 Acceptable material – exterior walls: Soprema Sopraseal Stick 1100, Bakor Blueskin SA, WR Grace Perm-A-Barrier, IKO Aquabarrier AVB.
 - .2 Acceptable material – roof deck: IKO Armour Gard Ice and Water Protector, W.R. Grace Ice and Water Shield; Domtar Eavesshield; Nordshield Water Stopper; Bakor Eave Guard; BPCO ProGard; EMCO Gripgard.
- .2 Primers: as recommended by manufacturer and suitable for substrate.
- .3 Mastics and sealants: as recommended by manufacturer, suitable for substrate.
- .4 Flashing and stripping membranes: as recommended by air barrier membrane manufacturer.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that surfaces and conditions are cured, dry and acceptable for installation of air barrier membranes.
- .2 Notify Contract Administrator in writing of unsuitable surfaces or working conditions and await remedial measures. Commencement of Work shall imply acceptance of surfaces and working conditions.

3.2 Preparation

- .1 Clean substrates of all snow, ice, loose particles, oil, grease, dirt, curing compounds, or other foreign matter detrimental to installation and bonding of air barrier membrane.

- .2 Repair defects in concrete and masonry surfaces such as mortar droppings spalled or poorly consolidated areas, honeycombing. Patch rough areas with a well-adhered parge coat to provide smooth surface. Allow to fully cure and dry.
- .3 Remove sharp protrusions, form lines and rough edges.

3.3 Priming

- .1 Prime all surfaces and substrates to receive self-adhesive air barrier membranes.
- .2 Apply primers in accordance with manufacturer's instructions, at recommended rate of application.
- .3 Do not apply to frozen or damp surfaces. Apply in dry weather when air and surface temperatures are within manufacturer's recommended limits.
- .4 Avoid pooling of primer and allow to cure until tack-free.
- .5 Prime only an area that can be covered in a working day. Re-prime areas which over dry or become soiled or dusty.

3.4 Workmanship

- .1 Install materials in accordance with manufacturer's instructions using only materials approved for use with their products.
- .2 Apply with good construction practice to maintain continuity of air barrier membrane over building elements.
- .3 Do not commence Work until all other work penetrating substrates has been completed, and reviewed by Contract Administrator.
- .4 Use largest lengths possible to minimize joints. Overlap side and end laps minimum 50 mm. Stagger end laps minimum 300 mm in adjacent rows.
- .5 Locate end joints minimum 300 mm from internal and external corners.
- .6 Masonry cavity walls:
 - .1 Install sheets horizontally between masonry ties penetrating membrane.
 - .2 Overlap horizontal joints minimum 50 mm. Slit membrane at each tie and seal making air tight.
- .7 Roof deck:
 - .1 Install sheets starting at low point parallel to roof eave. Overlap succeeding sheets minimum 50 mm to shed water.
- .8 Place membrane in position without stretching, taking care to avoid trapped air, creases or fishmouths. As installation progresses roll membrane with hand roller to ensure full contact and bond to substrates.
- .9 Flash and seal around all penetrations and protrusions such as pipes, conduits, steel angle supports, masonry ties, anchors. Cut and fit membrane neatly and snug fitting, leave no gaps. Seal and make airtight.
- .10 Seal with mastic all difficult detail areas that do not allow easy installation of membrane. Make airtight.

- .11 At rough openings cut air barrier membrane to form opening. Return membrane into opening and seal to rough bucks. Reinforce corners with additional piece of membrane cut and formed to seal corners.
- .12 Overlap and seal air barrier membrane to air and vapour barriers installed by other trades. Maintain continuity of building air/vapour barrier system over entire building.

3.5 Installation Self-Adhesive Air Barrier

- .1 Apply membrane in accordance with manufacturer's instructions.
- .2 Roll out sheets and press firmly to substrate. As installation progresses roll with hand roller to ensure positive bond.
- .3 At all internal corners, both vertical and horizontal, provide a fillet strip formed of liquid mastic. Do not use fibre or wood cants.
- .4 Flash and seal around all penetrations and protrusions such as pipes, conduits, steel angle supports, masonry ties and anchors. Cut and fit membrane neatly and snug fitting, leave no gaps. Seal around all protrusions with mastic sealant. Make airtight.

3.6 Patching and Repairing

- .1 Inspect membrane for defects and poor workmanship before covering and make corrections immediately.
- .2 Ensure full contact and bond to substrates. Patch and repair loose or poorly bonded areas.
- .3 Patch and repair misaligned or inadequately lapped seams, tears, punctures or fishmouths to the satisfaction of the Contract Administrator.
- .4 Patch cuts, tears, and punctures by bonding an additional layer of air barrier membrane over damaged area. Patch shall extend minimum 150 mm in all directions from fault. Seal and make airtight.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

- .1 Air Barriers
 - .1 The supply and installation of air barriers will be considered incidental to the Contract Lump Sum Price for "Thermal and Moisture Protection".

~End~

PART 1 - GENERAL

1.1 References

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 653/A 653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A 792/A 792M, Standard Specification for Steel Sheet, 55% Aluminum- Zinc Alloy-Coated by the Hot-Dip Process.
 - .3 ASTM C 1177, Specification for Glass Mat Gypsum Substrate Used as Sheathing.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32, Sheathing, Membrane, Breather Type.
- .3 Underwriters Laboratory Canada (ULC).
 - .1 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
- .4 National Building Code (NBC)

1.2 Design Criteria

- .1 Design metal panel roof and wall systems to provide for thermal movement of component materials caused by ambient temperature range of -35°C to 75°C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.
- .2 Include expansion joints to accommodate movement in panel systems and between panel systems and building structure, caused by structural movements, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.
- .3 Design members to withstand dead load, snow loads and build-up, wind loads including uplift, calculated in accordance with NBC and applicable local regulations, to maximum allowable deflection of 1/180th of span.
- .4 Provide for positive drainage of condensation occurring behind panels and water entering at joints, to exterior face of panels.

1.3 Shop Drawings

- .1 Submit shop drawings to Contract Administrator.
- .2 Indicate sizes and dimensions of components, panel types, materials and finish, subframing components, anchor details, compliance with design criteria and requirements of related work. Indicate details and flashings at wall and roof openings.

1.4 Samples

- .1 Submit colour samples of prefinished steel sheet on actual base metal in specified finishes and colours to Contract Administrator.

PART 2 - PRODUCTS

2.1 Materials

- .1 Z275 galvanized sheet steel conforming to ASTM A653 m Grade 230.
- .2 Sheathing paper: to CAN/CGSB-51.32, spunbound olefin type. Tyvek Commercial Wrap.
- .3 Fasteners:
 - .1 Deck covering to steel deck: No. 10 flat head, self tapping, Type A or AB, zinc plated screws to CSA B35.3. Drywall screws not acceptable.
 - .2 Sub-girts to steel deck, sub-girt to sub-girt, and roof clips to roof deck: type, size and spacing as recommended by roof system manufacturer, self-drilling, corrosion-resistant fasteners.
 - .3 Roof system components: stainless steel exposed fasteners, designed to accommodate full thermal expansion and contraction of materials, and as recommended by panel system manufacturer, complete with neoprene washer under head of fastener. Head colour to match materials being fastened.

- .4 Sealants: as specified in Section 07900 – Joint Sealants.
- .5 Closures and gaskets: closed cell polyurethane foam, adhesive on two sides, release paper protected.
- .6 Touch-up paint: as recommended by panel manufacturer.
- .7 Isolation coating: alkali resistant, bituminous paint or epoxy resin solution.

2.2 Components

- .1 Roof Panels:
 - .1 Factory preformed of galvanized sheet steel.
 - .2 Base metal thickness: 0.79 mm (22 gauge).
 - .3 Finish: prefinished.
 - .4 Acceptable material: Vicwest Marquis 450 (VW-6079 Heron Blue) with interlocking batten ribs.
- .2 Exposed joint (perpendicular to profile): ends of siding sheet shop cut clean and square, backed with tight fitting filler lapping back of joint, exposed components colour matched to siding.
- .3 Cap flashings, drip flashings, internal corner flashings, copings and closures for head, jamb, sill and corners, of same material, base metal thickness and finish as adjacent panels, brake formed to shape.
- .4 Sub-girts and alignment bars: galvanized steel sheet to ASTM A 653/A 653M with Z275 zinc coating, profile to accept preformed panels with structural attachment to building frame. Base metal thickness as recommended by manufacturer to meet design requirements.

PART 3 - EXECUTION

3.1 Installation

- .1 Protect metal surfaces in contact with concrete, masonry mortar, plaster or other cementitious surface with isolation coating.
- .2 Mechanically fasten deck covering to deck with screws spaced 400 mm on centre each way. Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.
- .3 Install sheathing paper between roof deck and roof panels. Overlap sheets to shed water. Overlap ends.
- .4 Install roof and wall panel support systems and components using fasteners of type and size recommended by manufacturer to resist uplift forces and thermal expansion and contraction. Exposed fasteners head colour to match panels.
- .5 Install components true to line and plane, free of dents.
- .6 Provide alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten wall and roof systems to building structure.
- .7 Install head, jamb and sill flashings, closures, and trims pieces as required for complete installation.
- .8 Install wall panels over sill flashings, install cap flashings and ensure completed installation is continuously sealed at perimeter.
- .9 Provide formed top closures, and flashing sealed against weather penetration, at ridges, changes in pitch, and vertical walls.
- .10 Flash roof penetrations with material matching roof panels, and make watertight.
- .11 Form seams in direction of water-flow and make watertight.
- .12 Clean exposed exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

.1 Metal Roof

- .1 The supply and installation of metal roofing will be measured and paid for at the Contract Lump Sum Price for "Thermal and Moisture Protection", which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

PART 1 - GENERAL

1.1 References

- .1 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing.

1.2 Environmental and Safety Requirements

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

PART 2 - PRODUCTS

2.1 Sealant Materials

- .1 Urethanes, One Part, Self-Leveling.
 - .1 To CAN/CGSB-19.13, Type 1.
 - .2 Acceptable material: Sikaflex 1cSL, Bostik Chem-Calk 950.
- .2 Urethanes, One Part, Non-Sag.
 - .1 To CAN/CGSB-19.13, Type 2.
 - .2 Acceptable products: Sikaflex 1a, Tremco DyMonic, Bostik Chem-Calk 900.
- .3 Sealant colours: selected by Contact Administrator from manufacturer's standard colour selection.
- .4 Foam backer rods: extruded polyethylene foam, compressible, oversized 30 to 50%.
 - .1 Acceptable material: Tremco Tundra Foam.
- .5 Bond breaker tape: polyethylene bond breaker tape that will not bond to sealants.
- .6 Expanding foam sealant: high-density open cell polyurethane foam, pre-compressed, impregnated with water-based, stabilized acrylic, self-adhesive. Secondary seal requiring primary seal of wet sealant.
 - .1 Acceptable material: Emseal Greyflex.
- .7 Adhesives: type recommended by expanding foam sealant manufacturer.
- .8 Primers: type recommended by sealant manufacturer, for appropriate sealant and corresponding substrate.
- .9 Joint cleaner: non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

2.2 Sealant Selection

- .1 Perimeters of exterior openings where frames meet exterior facade of building: Urethanes One Part, Non-Sag.
- .2 Expansion and control joints in exterior surfaces of precast, architectural wall panels: Urethanes One Part, Non-Sag.
- .3 Expansion and control joints in exterior surfaces of unit masonry walls: Urethanes One Part, Non-Sag.
- .4 Coping joints and coping-to-facade joints: Sealant type: Urethanes One Part, Non-Sag.
- .5 Cornice and wash (or horizontal surface joints): Sealant type: Urethanes One Part, Selfleveling.
- .6 Exterior joints in horizontal wearing surfaces (as itemized): Sealant type: Urethanes One Part, Self-leveling.

- .7 Perimeters of interior frames where frames meet interior finishes: Urethanes One Part, Non-Sag.
- .8 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant type: Urethanes One Part, Non-Sag.
- .9 Under thresholds at exterior doors. Sealant type: Urethanes, One Part, Non-Sag.
- .10 As itemized in other sections.

PART 3 - EXECUTION

3.1 Protection

- .1 Protect installed Work of other trades from staining or contamination.

3.2 Preparation of Joint Surfaces

- .1 Before commencing application of sealants test materials for indications of staining or poor adhesion.
- .2 Ascertain that sealers and coatings applied to sealant substrates are compatible with sealant used and that full bond between the sealant and substrate is attained. Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and bond, if necessary.
- .3 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .4 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter that may impair Work.
- .5 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .6 Ensure joint surfaces are dry and frost free.
- .7 Prepare surfaces in accordance with manufacturer's directions.

3.3 Priming

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 Backup Material

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install foam backer rod to achieve correct joint depth and shape, with approximately 30% compression.

3.5 Expanding Foam Sealants

- .1 Install expanding foam sealants in accordance with manufacturer's instructions.
- .2 Coordinate installation with Work of other trades to ensure foam sealants are installed before building joints are covered.
- .3 For expansion and control joints above grade in exterior walls install as secondary seal with wet caulking as primary seal.
- .4 Where used as a secondary seal together with field applied wet caulking provide bond breaker tape or backer rod between foam sealant and caulking.
- .5 Size preformed foam sealant to suit joint depth and width allowing for proper compression of the material.
- .6 Use adhesives recommended by manufacturer, suitable for substrate and application.

- .7 Install in longest possible lengths. Keep number of joints to a minimum. Join individual strips by means of scarf joint, cut at approximately 30°.

3.6 Application

- .1 Sealant:
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as Work progresses and upon completion.
- .2 Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup:
 - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as Work progresses.
 - .3 Remove masking tape after initial set of sealant.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

- .1 Joint Sealers
 - .1 The supply and installation of joint sealers shall be considered incidental to the Contract Lump Sum Price for "Thermal & Moisture Protection".

~End~