

DIVISION 07

**THERMAL AND MOISTURE
PROTECTION**

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 07 21 14 - Concrete Faced Board Insulation: insulation on perimeter grade beams.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D41, Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - .2 ASTM D1227, Emulsified Asphalt Used as a Protective Coating for Roofing.
 - .3 ASTM D4479, Asphalt Roof Coatings - Asbestos-Free.
 - .4 ASTM D4586, Asphalt Roof Cement, Asbestos Free.
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S706, Insulated Fiberboard

1.3 SUBMITTALS

- .1 Submit accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data: submit product data sheets for bituminous dampproofing products. Include manufacturer and product name, product characteristics, performance criteria, application methods, product limitations.

1.4 DELIVERY, STORAGE, HANDLING

- .1 Deliver, handle, store and protect materials of this section in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Provide and maintain dry, off-ground weatherproof storage.
- .3 Store materials on supports to prevent deformation.
- .4 Remove only in quantities required for same day use.
- .5 Store materials in accordance with manufacturer's written instructions.

1.5 PROJECT/SITE ENVIRONMENTAL REQUIREMENTS

- .1 Temperature, relative humidity, moisture content:
 - .1 Apply dampproofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.
 - .2 Do not proceed with work when wind chill effect would tend to set bitumen before proper curing takes place.
 - .3 Maintain air temperature and substrate temperature at dampproofing installation area above 5 °C for 24 hours before, during and 24 hours after installation.
 - .4 Do not apply dampproofing in wet weather.

Part 2 Products

2.1 ASPHALTIC MATERIALS

- .1 Bituminous dampproofing for application temperatures above 5° C:

- .1 To ASTM D1227 Type II, cold applied, asbestos free, clay emulsified asphalt compound, fibred.
- .2 Acceptable material: WR Meadows Sealmastic Emulsion 520; Bakor 700-01; Henry HE789; Euclid Dehydratine 75.
- .2 Bituminous dampproofing for application temperatures below 5°C:
 - .1 To ASTM D4479 Type I, cold-applied, asbestos-free, solvent-based asphalt compound, brush on grade fibred.
 - .2 Acceptable material: WR Meadows Sealmastic Solvent 501; Bakor 710-11; Henry HE794.
- .3 Asphalt primer: to ASTM D41 Type I.
- .4 Sealing Mastic: ASTM 4586 Type I.

2.2 ACCESSORIES

- .1 Protection board: board insulation specified in Section 072113 - Board Insulation.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- .2 Ensure concrete and masonry surfaces are fully cured and dry, clean and free from scale, frost, dirt, dust, oil, grease and other foreign matter.
- .3 Verify items which penetrate surfaces to receive dampproofing are securely installed.

3.2 PREPARATION

- .1 Protect adjacent surfaces not designated to receive dampproofing.
- .2 Seal exterior joints between foundation walls and footings, joints between concrete floor slab and foundation, and around penetrations through dampproofing with sealing compound. Make watertight.

3.3 APPLICATION

- .1 Prime surfaces and apply bituminous dampproofing in accordance with manufacturer's instructions.
- .2 Apply asphalt in one coat, continuous and uniform, at manufacturer's recommended rate of application as applicable for porous or dense substrates.
- .3 Apply additional coats of dampproofing to vertical corners and construction joints for a minimum width of 10" on each side, and all around and for 10" along pipes passing through walls.

3.4 INSPECTION AND REPAIR

- .1 Inspect membrane thoroughly before covering and make corrections immediately.
- .2 Ensure full coverage of substrate and membrane is if fully bonded and free of voids, sags, air pockets or un-bonded sections. Remove damaged sections and repair with additional coats of dampproofing.

3.5 INSTALLATION: PROTECTION BOARD

- .1 Provide protection board over dampproofing membrane not covered by board insulation, to protect dampproofing from backfill materials.
- .2 Place boards directly against dampproofing. Adhere protection boards with mastic or tacky dampproofing surface.
- .3 Install boards vertically with joints butted tight. Scribe, cut, and fit boards tight to projections, penetrations, and other interruptions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 05 19 - Masonry Anchorage and Reinforcing: insulation clips for masonry ties in cavity walls.

1.2 REFERENCES

- .1 Abbreviations and Acronyms used in this section:
 - .1 XPS - Extruded Polystyrene Board Insulation.
 - .2 EPS - Expanded Polystyrene Board Insulation.
 - .3 ISO - Rigid Cellular Polyisocyanurate Board Insulation.
 - .4 MFB - Mineral Fibre Board Insulation.
- .2 Reference Standards:
 - .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - .2 ASTM C 612, Mineral Fiber Block and Board Thermal Insulation.
 - .2 Canadian Gas Association (CGA)
 - .1 CAN/CGA-B149.1, Natural Gas Installation Code.
 - .2 CAN/CGA-B149.2, Propane Installation Code.
 - .3 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies.
 - .2 CAN/ULC-S604, Type A Chimneys.
 - .3 CAN/ULC-S702, Thermal Insulation, Mineral Fibre, for Buildings.

1.3 SUBMITTALS

- .1 Submit in accordance with Section 013300 - Submittal Procedures.
- .2 Product data: submit manufacturer's product data for each product used on project. Include product characteristic, performance criteria, compliance with standards and regulations, and application instructions.

1.4 POLYSTYRENE BOARD INSULATION

- .1 Extruded polystyrene (XPS): to CAN/ULC-S701:
 - .1 Type 3 and Type 4.
 - .2 Compressive strength: Type 3 and Type 4 - 210 kPa (30 psi).
 - .3 Thickness: indicated.
 - .4 Edges: square or shiplapped.

1.5 MINERAL FIBRE BOARD INSULATION

- .1 Mineral fibre board (MFB):
 - .1 To CAN/ULC-S702, Type 1 no facing.
 - .2 Density: 70 kg/m³ (4.4 lbs/ft³).
 - .3 Fire performance to CAN/ULC S102: flame spread 0, smoke developed 0.
 - .4 Thermal resistance to ASTM C518: RSI 0.74 per 25 mm] (R4.2 per 1").
 - .5 Thickness: indicated.
 - .6 Acceptable material: Roxul CavityRock.

1.6 PROTECTION BOARD

- .1 Protection board: insulated fiberboard to CAN/ULC-S706, Type II-Sheathing, single-ply, surface coated, panel edge square, 12 mm thick.

1.7 ACCESSORIES

- .1 Screw fasteners:
 - .1 For wood: wood screws, steel, plated/coated for corrosion protection, of length to penetrate minimum 38 mm into stud.
- .2 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal or fibre, formed to prevent dishing. Bell or cup shapes not acceptable.

Part 2 Execution

2.1 EXAMINATION

- .1 Examine substrates and immediately inform the Contract Administrator in writing of defects.
- .2 Prior to commencement of work ensure substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust, debris, oil, grease, or foreign materials.

2.2 INSTALLATION

- .1 Install insulation after building substrate materials are cured and dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Coordinate installation with work of other trades.
- .4 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.
- .6 Cut and trim insulation neatly to fit spaces.
- .7 Install insulation boards in parallel rows. Butt joints tightly, offset vertical joints.
- .8 Offset both vertical and horizontal joints in multiple layer applications.
- .9 Interlock boards at corners.
- .10 Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .11 Fasteners application:
 - .1 Install fasteners in accordance with manufacturer's instructions.
 - .2 Provide additional anchors spaced at 300 mm on centre around perimeter of openings, corners and abutments.
 - .3 Ensure fasteners are solidly set with discs and washer heads flush with insulation.
 - .4 Replace loose or improperly seated anchors.

2.3 FROST BARRIER

- .1 Install frost barrier where indicated using same insulation as applied to foundation. Set on leveling bed of sand or fine gravel, straight and aligned with tight joints.
- .2 Cover with protection board to protect insulation from damage.
- .3 Ensure insulation and protection board is not displaced or damaged by backfilling operations.

2.4 PROTECTION BOARD

- .1 Install protection board over board insulation where indicated. Provide tight butt joints.
- .2 Install boards located below finish grade without fasteners or adhesives. Install during backfilling operations to allow backfill to hold boards tight against insulation.

2.5 SCHEDULE

- .1 Exterior walls above grade
 - .1 Insulation: MFB.
 - .2 Installation:
 - .1 Masonry cavity walls: plastic insulation supports over masonry ties and fasteners with nailing discs.
- .2 Frost barrier:
 - .1 Insulation: XPS.
 - .2 Installation: install boards over sand leveling bed with tight butt joints. Cover with protection board.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 11 13 - Bituminous Dampproofing: dampproofing applied to foundation walls and grade beams.

1.2 REFERENCES

- .1 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Coverings.

1.3 STORAGE AND HANDLING

- .1 Store panels on pallets placed over flat, level surface. Protect panels from weather by storing in indoor dry area or with tarps until required for installation.
- .2 Protect panels from damage during transportation, storage, and handling.

Part 2 Products

2.1 MATERIALS

- .1 Extruded polystyrene insulation: to CAN/ULC-S701, Type 4.
- .2 Concrete faced insulated (CFI) panels: extruded polystyrene board insulation, Type 4, faced with factory applied 8 mm thick latex modified concrete facing. Panel size 610 x 1229 mm with tongue-and-groove edge along 1229 mm edge. Insulation thickness 102mm.
 - .1 Acceptable material: Concrete Faced Insulated (CFI) Wall Panels as manufactured by T. Clear Corporation, www.tclear.com or Tech-Crete www.tech-crete.com or approved alternate.
- .3 Mounting clips: purpose made of galvanized sheet steel, for concealed fastening of panels. As supplied by panel manufacturer.
- .4 Ledger: galvanized steel angle, of sufficient width and thickness to support panels. As supplied by panel manufacturer.
- .5 Sheet metal flashings: fabricated of galvanized sheet steel, manufacturer's standard profiles.
- .6 Prefinished metal inside and outside corner trims to match concrete facing colour.
- .7 Screw fasteners: type recommended by panel manufacturer, corrosion resistant.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrates and immediately inform the Contract Administrator in writing of defects.
- .2 Prior to commencement of work ensure substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust, debris, oil, grease, or foreign materials.
- .3 Remove irregularities or jagged surfaces.

3.2 INSTALLATION

- .1 Install panel after building substrate materials are cured and dry.
- .2 Install panels to maintain continuity of thermal protection to building elements and spaces.
- .3 Coordinate installation with work of other trades.
- .4 Install CFI panels in accordance with manufacturer's instructions using only manufacturer recommended mounting clips, fasteners, flashings and other accessories.
- .5 Use only sound undamaged panels free from cracks, chips, soiling or other damage detrimental to appearance or performance.
- .6 Perimeter foundations:
 - .1 Install CFI panels horizontally.
 - .2 Trim concrete from face of panel where concrete conflicts with steel masonry shelf angles. Slide CFI panel behind steel masonry shelf angles.
 - .3 Install CFI panels with concealed mounting clips, spaced to manufacturer's specifications, at top and bottom of CFI panels.
- .7 Install panels plumb, level, straight and aligned. Fit panel joints snug and flush.
- .8 Mitre all corners.
- .9 Use full sized panels as much as possible.
- .10 Where partial panels are required cut panels with masonry saw providing neat, clean edge.
- .11 Secure partial panels with surface fasteners. Keep fasteners minimum 50 - 75 mm from panel edges.
- .12 Fit panels tight to electrical boxes, pipes, other penetrations, and around openings. Caulk or flash to seal.
- .13 Interlock boards at corners. Install metal flashing at outside corners to conceal exposed core.
- .14 Install cap flashing where panels terminate. Ensure positive drainage of moisture.
- .15 Use only panels free from chipped or broken edges.
- .16 Do not continue panels over building expansion joints. Terminate panels both sides of joint and flash or caulk to seal panel edges.

3.3 INSPECTION AND REPAIR

- .1 Inspect completed installation to ensure panels have been properly installed and solidly secured to building structure.
- .2 Replace panels that show cracks, chips, soiling or other damage with new undamaged panels.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This section specifies requirements for building insulation batts and blanket insulation.

1.2 RELATED WORK

- .1 Section 06 10 00 – Rough Carpentry
- .2 Section 07 26 00 - Vapour Barrier
- .3 Section 07 92 00 – Joint Sealing

1.3 REFERENCE STANDARDS

- .1 Materials shall conform to specified CSA Standards.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Store insulation on raised platforms and cover with waterproof covers.
- .2 Store accessories and adhesives in a heated dry storage area.

1.5 JOB CONDITIONS

- .1 Install insulation when building substrate materials are dry.

Part 2 Products

2.1 INSULATION

- .1 Batt and blanket mineral fibre insulation: to ASTM C665, CAN/ULC-S702.
 - .1 Type 1 (no membrane)
 - .2 Thickness indicated
 - .3 Formaldehyde free.
- .2 Friction fit batts, dimensions as shown on drawings.
- .3 Blown-in type (roof insulation), thermal resistance values as shown on drawings.
- .4 Rated non-combustible in accordance with ULC CAN4-S114.

2.2 TAPE

- .1 Use sheathing tape equal to 3M Y-8086 or approved equivalent alternative in accordance with B7.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 WORKMANSHIP

- .1 Install insulation to maintain continuity of insulation.
- .2 Fit insulation tight to electrical boxes and around all openings.
- .3 Do not compress insulation into spaces.
- .4 In attics install attic rafter vents to maintain airflow from soffits to attic space. Provide one vent at each rafter space. Nail in place.
- .5 Install in accordance with the manufacturer's recommendations.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Attic: Loose insulation pneumatically placed through access holes.

1.2 REFERENCES

- .1 ASTM C739-11 - Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation.
- .2 ASTM C764-11- Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation.
- .3 CAN/ULC-S101-07 - Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .4 CAN/ULC-S102-10 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .5 CAN/ULC-S703-09 - Standard for Cellulose Fibre Insulation (CFI) for Buildings.

1.3 SYSTEM DESCRIPTION

- .1 Assembly of components includes providing continuity of thermal barrier at building enclosure elements, in conjunction with Section 07 21 13 and 07 21 16.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Coordinate the work with Section 07 21 13 and 07 21 16 for placement of insulation materials.

1.5 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission Procedures.
- .2 Product Data: Provide data on product characteristics, performance criteria and limitations.

1.6 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submission Procedures.
- .2 Installation Data: Manufacturer's special installation requirements and perimeter conditions requiring special attention.
- .3 Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.7 CLOSEOUT SUBMITTALS

- .1 Section 01 78 10: Submission Procedures.

Part 2 Products

2.1 MATERIALS

- .1 Mineral Fibre Insulation: ASTM C764; mineral fibre loose-fill thermal insulation, nodulated for pneumatic placement, thermal resistance RSI-50.
- .2 Insulation Stop/Ventilation Baffles: Plastic, profiled and sized to suit rafter spacing and wall/sloped roof configuration.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 70 00: Verify existing conditions before starting work.
- .2 Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.
- .3 Verify that light fixtures have thermal cut-out device to restrict over-heating in soffit or ceiling spaces.
- .4 Verify spaces are unobstructed to allow placement of insulation.

3.2 INSTALLATION

- .1 Install insulation and ventilation baffle to manufacturer's instructions.
- .2 Place insulation pneumatically, tight in rafter spaces. Place insulation against baffles. Do not impede natural attic ventilation to soffit.
- .3 Place against and behind mechanical and electrical services within the plane of insulation.
- .4 Completely fill intended spaces. Leave no gaps or voids.

3.3 CLEANING

- .1 Section 01 74 00: Cleaning installed work.
- .2 Remove loose insulation residue.

3.4 SCHEDULES

- .1 Attic Spaces: Pour insulation between ceiling joists to achieve R-50 thermal resistance value.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This section specifies requirements for polyethylene sheet vapour barriers for use in buildings and below ground.

1.2 RELATED WORK

- .1 Division 3 - Concrete.
- .2 Section 07 21 16 - Blanket Insulation
- .3 Section 06 10 00 – Rough Carpentry

1.3 SUBMITTALS

- .1 Submit complete details regarding vapour barrier joints, corner details and electrical box details.

Part 2 Products

2.1 SHEET VAPOUR BARRIER

- .1 Polyethylene film to CGSB-51.34, Type 1, CCMC listed.
- .2 Thickness as shown on drawing.
- .3 Joint sealing tape: air resistant pressure sensitive adhesive tape, Polypropylene with acrylic adhesive type as recommended by vapour retarder manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.
 - .1 3M-Y8086 or approved equal alternative in accordance with B7.
- .4 Sealant: acoustical sealant Tremco Tremflex 834 or equal alternative in accordance with B7.
- .5 Staples: minimum 6 mm leg.
- .6 Moulded box vapour retarder: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

Part 3 Execution

3.1 INSTALLATION

- .1 Place vapour barrier on the warm side of insulation and tight to insulation.
- .2 Place in locations shown on the drawings.
- .3 Cap joints minimum 150 mm and tape seal joints.
- .4 Joints in vapour barriers in buildings shall be over framing members.
- .5 Staple vapour barrier to framing members.
- .6 Tape seal where nails or staples penetrate the vapour barrier.

- .7 Tape seal to perimeter of doors and windows and at floor track.
- .8 Tape seal at all penetrations of vapour barrier.

3.2 EXTERIOR SURFACE OPENINGS

- .1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.3 PERIMETER SEALS

- .1 Seal perimeter of sheet vapour retarder as follows:
 - .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
 - .2 Lap sheet over sealant and press into sealant bead.
 - .3 Install staples through lapped sheets at sealant bead into wood substrate.
 - .4 Bond sheets to solid backing such as metal or concrete with continuous bead of sealant.
 - .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 LAP JOINT SEALS

- .1 Seal lap joints of sheet vapour retarder as follows:
 - .1 Attach first sheet to substrate.
 - .2 Apply continuous bead of sealant over solid backing at joint.
 - .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
 - .4 Install staples through lapped sheets at sealant bead into wood substrate.
 - .5 Bond sheets to solid backing such as metal or concrete with continuous bead of sealant.
 - .6 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 ELECTRICAL BOXES

- .1 Seal electrical switch and outlet device boxes that penetrate vapour retarder as follows:
 - .1 Install moulded box vapour retarder complete with perimeter lap flange.
 - .2 Apply sealant to seal edges of flange to main vapour retarder and seal wiring penetrations.

3.6 INSPECTION AND REPAIRING

- .1 Inspect sheet vapour retarders for defects and poor workmanship before covering and make corrections immediately.
- .2 Patch and repair misaligned or inadequately lapped seams, tears, punctures or fishmouths and other defects.
- .3 Patch cuts, tears and punctures with sealing tape. For large holes replace entire sheet or patch with an additional layer of sheet vapour retarder fully sealed at all edges and stapled or bonded to solid backing. Extend minimum one stud width from fault.
- .4 Ensure continuity of vapour retarder over building envelope.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Metal roofing shall be installed on the Pumping Station.

1.2 RELATED WORK

- .1 Section 06 10 00 - Rough Carpentry
- .2 Section 07 26 00 - Vapour Barrier
- .3 Section 07 62 00 - Metal Flashing and Trim

1.3 GUARANTEE

- .1 Provide a written guarantee, signed and issued in the name of the City stating that the entire roofing system is guaranteed against leaking for a period of five (5) years from the date of Substantial Performance.

1.4 STANDARDS

- .1 The materials and installation shall meet the applicable standards of the Manitoba Building Code, Underwriters Laboratories of Canada (ULC), the Canadian Standards Association (CSA) and any other applicable codes, standards and by-laws.
- .2 Written confirmation of conformance with these standards shall be provided to the City.

1.5 SUBMITTALS

- .1 Submit shop drawings to the Contract Administrator for review prior to order of materials or commencement of site work in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Indicate arrangement of prefinished roof sheets, including joints, types and location of supports, fasteners, and any special shapes.
 - .1 Include details of standing seams, supports, gutters and downspouts, snow/ice guards, and all other system components.

1.6 WORKMANSHIP

- .1 Roofing Contractor must be a member in good standing with the Roofing Contractors Association of Manitoba. Provide written confirmation prior to commencement of work.
- .2 The contractor is responsible for ensuring that the design, supply and total installation of this project are supervised and executed by fully trained and qualified personnel.
- .3 Installer shall demonstrate at least five years experience in projects similar in scope.

1.7 ROOF SYSTEM DESIGN

- .1 Prefinished roof deck supplier to design connections to substructure for minimum 40 psf uplift, based on connections as required. Contractor to submit to the Contract Administrator sealed shop drawings of anchorage details to the Contract Administrator for review prior to fabrication and installation.

1.8 FIELD QUALITY CONTROL

- .1 Inspection of roof application will be carried out by an independent agency selected by the Contract Administrator.
- .2 Notify the Contract Administrator a minimum 48 hours prior to commencing roofing operations to arrange inspections. Permit agency full access to all portions of work.
- .3 Note that the last inspection is to be a "final inspection" carried out after all roofing is complete, including installation of equipment and openings, and shall be in the presence of the Contract Administrator and the Contractor.

1.9 PROTECTION

- .1 Protect prefinished steel during fabrication, transportation, site storage and erections. Replace any scratched or otherwise damaged materials.
- .2 During storage stack panels tilted to provide water run-off. Cover materials to protect from weathering.

Part 2 Products

2.1 SHEET METAL MATERIALS

- .1 Zinc coated steel sheet: to ASTM A653/A653M, commercial quality, with Z275 designation coating, regular spangle surface, prefinished as specified, base metal thickness as specified by item.

2.2 PREFINISHED STEEL SHEET

- .1 Zinc coated steel sheet with factory applied silicone modified polyester (SMP) coil coating, minimum base metal thickness specified by item. Colour selected by Contract Administrator.
 - .1 Acceptable material: Baycoat 8000+ Series Coil Coating; Valspar WeatherX.
 - .1 Colour to be 56072 - Charcoal.

2.3 METAL ROOFING

- .1 Roofing panels shall be:
 - .1 TSR roof panels as manufactured by VicWest Steel, or approved alternative in accordance with B7.
 - .1 610mm panel width, mechanically seamed with no exposed fasteners.
- .2 Roof panels shall be manufactured 0.76 mm (22 MSG) prefinished steel sheet:
 - .1 Grade A steel, minimum yield strength of 345 MPa, conforming to ASTM A-446.

- .1 Colour to be 56072 - Charcoal.
 - .3 Hold-down thermal clips: movable (2 piece) hold down clips, 0.76 mm galvanized steel, as per VicWest roof system.
 - .4 Deck closures: gauge and profile as recommended by manufacturer.
- 2.4 FABRICATION**
- .1 Form individual pieces in maximum lengths to reduce number of joints. Make allowances for expansion at joints.
 - .2 Fabricate roof panels in single full-length piece running from soffit to ridge or peak.
 - .3 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- 2.5 PLYWOOD SHEATHING**
- .1 Refer to Section 06 10 00 – Rough Carpentry.
- 2.6 WATERPROOF MEMBRANE**
- .1 Ice And Water Shield as manufactured by Grace, Soprema or Bakelite, or approved equal in accordance with B7.
 - .2 Membrane to be self-adhesive installed on plywood sheathing.
- 2.7 CONTINUOUS RIDGE VENT**
- .1 Continuous ridge vent as per VicWest roof system. 0.76 mm (22 MSG) prefinished steel sheet.
 - .1 Colour to be 56072 - Charcoal.
- 2.8 ICE/SNOW GUARD**
- .1 Galvanized steel ice/snow guard as indicated on drawings as per VicWest roof system. Cover galvanized steel with 0.76 mm (22 MSG) prefinished steel sheet.
 - .1 Colour to be 56072 - Charcoal.
- Part 3 Execution**
- 3.1 WORKMANSHIP**
- .1 Protect surrounding surfaces against damage from roofing work.
 - .2 Ensure all debris, standing water, dust, dirt, etc. is cleaned off prior to accepting the surfaces.
 - .3 Ensure items projecting through roof are solidly set.
- 3.2 PLYWOOD SHEATHING**
- .1 Plywood sheathing shall be nailed in place as shown on the Drawings.

3.3 METAL ROOFING

- .1 Install metal roofing system in strict accordance with reviewed shop drawings and manufacturer's instructions.
- .2 Inspect or watershed installation and correct any deficiencies prior to proceeding. Install metal roof system and completely patch and seal any damage to the membrane(s) in accordance with the manufacturer's instructions.
- .3 Install factory manufactured panels in longest practical lengths with special panels to suit valleys and penetrations.
- .4 Provide a continuous double standard seam, mechanically locking the hold down clips into the seam.
- .5 Provide notched and formed closures, to shed water, at changes in pitch and at peaks, ridges and eaves.
- .6 Provide sloped roof "crickets" to shed water from behind large roof projections such as chimneys and mechanical units.
- .7 Hold-Down Thermal Clips: Movable (2 piece) hold-down clips, 24 gauge (0.625 mm) galvanized steel, as per VicWest roof system.
- .8 Screws anchors: ensure anchor into top truss cord under roof sheathing. Use galvanized anchors, with length and size to meet roof system design, Section 07 61 00.
- .9 Deck closures: gauge and profile as recommended by manufacturer.
- .10 Mount mechanical equipment on structural supports designed by a structural Contract Administrator registered in the Province of Manitoba. Submit shop drawings prior to fabrication. Ensure the complete integrity of the roof system and the continuity of the building envelope at all roof penetrations.

3.4 FLASHINGS, TRIM AND RAINWEAR

- .1 Provide and install in accordance with Section 07 62 00.
- .2 Provide pre-finished metal eaves troughs and downspouts, size as shown on drawings. Slope eaves troughs to drain at 0.5% minimum.

3.5 TOUCH-UP AND CLEANING

- .1 Touch up minor paint abrasions with touch-up paint.
- .2 Clean roof by dry-wiping.
- .3 Leave job site completely clean.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This section specifies the requirements for the supply and installation of flashing and trim in connection with roofing, and other areas of the Work.

1.2 RELATED WORK

- .1 Section 07 61 00 – Sheet Metal Roofing

1.3 REFERENCE STANDARDS

- .1 Carry out work in accordance with the ARCA Manual on Good Roofing Practice and Accepted Roofing Systems.

1.4 SUBMITTALS

- .1 Submit samples for all pre-finished, coloured materials.
- .2 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.

Part 2 Products

2.1 GALVANIZED STEEL SHEET

- .1 Commercial quality sheet to ASTM-A653 and A924 with Z275 designation zinc coating to ASTM-A653. Thickness 0.50-0.56 mm, minimum.
- .2 Soffit: to CGSB 93-GP-2MA, Type B, Class 1
 - .1 Color: 56072 - Charcoal
 - .2 Gloss: medium
 - .3 Profile: flat sheet “V” crimped for stiffness, vented 0.1m² of opening
 - .4 Pattern: plain surface.
- .3 Fascia and exposed trim: to CGSB 93-GP-2MA, Type C, Class 1
 - .1 Color: 56072 - Charcoal
 - .2 Gloss: medium
 - .3 Profile: custom and manufacturer’s standard as indicated
 - .4 Pattern: plain surface

2.2 PREFINISHED STEEL SHEET

- .1 Zinc or Aluminum-zinc alloy coated steel sheet with factory applied silicone modified polyester (SMP) coil coating , minimum base metal thickness specified by item. Colour selected by Contract Administrator from manufacturer's standard range.
 - .1 Acceptable material: Baycoat 8000+ Series Coil Coating; Valspar WeatherX.
 - .1 Colour to be 56072 - Charcoal.

2.3 ACCESSORIES

- .1 Underlay for metal flashing - dry sheathing to CGSB-51.32; No. 15 perforated asphalt felt to CSA-A123.3.
- .2 Sealants in accordance with Section 07 92 00 – Joint Sealing.

- .3 Fasteners: of same material as sheet metal, to CSA-B111.
- .4 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .5 Touch-up paint as recommended by manufacturer.

2.4 FABRICATION

- .1 Fabricate aluminum flashings and other sheet aluminum work to Aluminum Association "Aluminum Sheet Metal Work in Building Construction".
- .2 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' Series specifications.
- .3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .4 Hem exposed edges on underside 12 mm and seal corners with sealant.
- .5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .6 Apply isolation coatings to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

- .1 Form parapet flashings, cap flashings, copings and fascias to profile from prefinished steel sheet, minimum base metal thickness 22 MSG.
- .2 Form counter flashings, curb flashings to profile from prefinished steel sheet, minimum base metal thickness 24 MSG.
- .3 Form air/vapour barrier transition flashing at roof/wall junction to profile from zinc coated or aluminum-zinc alloy coated steel sheet, minimum base metal thickness 26 MSG.

2.6 EAVES TROUGHS AND DOWN PIPES

- .1 Form from 22MSG thick prefinished steel sheet metal.
- .2 Size and profile as shown on drawings.
- .3 Provide goosenecks, strainer basket and fastenings.

Part 3 Execution

3.1 GENERAL

- .1 Install sheet metal work in accordance with CRCA specifications and as detailed.
- .2 Protect all membrane flashings with base flashings.
- .3 Join flashings by means of S-locks with an insert of approximately 25 mm.
- .4 Fasten sheet metal to suitable backing.
- .5 Use concealed fastening except where approved prior to installation.

3.2 BASE AND COUNTER FLASHING

- .1 Use base and counter flashings at horizontal to vertical junctions, where one piece wall flashing is not practical.
- .2 Extend base flashing up vertical walls 200 mm above membrane, cover cant strip and extend over horizontal surfaces.
- .3 Overlap counter flashing a minimum of 50 mm.
- .4 Mechanically fasten base flashing at intervals of 1200 mm and approximately 200 mm above the roof surface.
- .5 Fasten counter flashing into reglets or extend as cap flashing. Fasten at 600 mm intervals.

3.3 ROOF EDGES FLASHINGS

- .1 Extend minimum 50 mm down fascia.
- .2 Fasten at 1200 mm intervals.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This section specifies the requirements for sealants and back up materials for all locations indicated on drawings where required to prevent a direct weather penetration and where required to effect a seal.

1.2 RELATED WORK

- .1 Section 07 62 00 – Flashing and Trim
- .2 Caulking for concrete - Division 3

1.3 REFERENCE STANDARDS

- .1 Products shall be in conformance with CGSB and CSA Standards which are referenced in this section.

1.4 QUALITY ASSURANCE

- .1 Materials and workmanship shall be in accordance with the manufacturer's recommendations.
- .2 The manufacturer's representative shall be consulted and the intended product use shall be confirmed.
- .3 Sealant applicators shall be experienced in the application of the specified products.
- .4 Sealant applicators shall be approved by the sealant manufacturer for the application of the specified products.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Ship, store and handle compounds and components in accordance with the manufacturer's recommendations.
- .2 Do not use materials after the storage period (shelf life) has been exceeded.
- .3 Maintain containers and labels on all products.
- .4 Protect from freezing, moisture and water.

1.6 JOB CONDITIONS

- .1 Sealant and substrate materials shall be suitable for application temperatures from 5°C to 35°C.
- .2 For installation of sealants below 5°C, consult the manufacturer and follow his/her recommendations.

1.7 WARRANTY

- .1 The Contractor shall warrant that the applied sealants will not leak, crack, crumble, melt, shrink, run, lose adhesion or stain adjacent surfaces.
- .2 The warranty shall be in effect for 1 year from the Construction Completion Date.

Part 2 Products

2.1 CLEANERS

- .1 Use non-corrosive solvent recommended by sealant manufacturer for applicable substrate materials.

2.2 PRIMERS

- .1 Use non-staining type primers compatible with the sealant, as recommended by the manufacturer.

2.3 BACKER ROD

- .1 Compatible with primers and sealants, oversized 30% to 50%.
- .2 Extruded closed cell foam - polyethylene - chemically inert and resistant to oils, gasoline and solvents.

2.4 BOND BREAKER

- .1 Pressure sensitive polyethylene tape that will not bond to sealants.

2.5 JOINT FILLER

- .1 Use PVC foam expansion joint filler capable of compression to 50%.
- .2 Use semi-rigid grade for cast-in-place concrete.
- .3 Use adhesive that is compatible with joint filler.
- .4 Do not use asphalt impregnated board where sealants are used.
- .5 Joint filler may be Neoprene or Butyl Rubber round solid red, Shore A hardness.

2.6 SEALANTS

- .1 Use primer and sealant type to meet the requirements of various applications, as recommended by the manufacturer and as specified.
- .2 Two component polysulphide base structural sealant for non-sag applications. Suitable for:
 - .1 Joints in precast concrete
 - .2 Expansion and control joints in concrete and masonry walls
 - .3 Joints in glass and metal curtain wall
 - .4 Joints in metal siding
 - .5 Perimeter of aluminum window frames and metal panels
 - .6 Application temperature range 4°C to 40°C
 - .7 Movement range to 25%
 - .8 To CGSB-19.24
 - .9 Shore A hardness 25-30
 - .10 Primer necessary for most substrates
 - .11 Primer necessary for submerged service
 - .12 Sternson Duoflex NS or approved equivalent alternative in accordance with B7.

- .3 Expoxidized polyurethane terpolymer sealant to weatherproof building joints for non-sag applications. Suitable for:
 - .1 Joints in precast concrete
 - .2 Expansion and control joints in concrete and masonry walls
 - .3 Curtain walls
 - .4 Perimeter joints of doors and sash
 - .5 Movement range to 25%
 - .6 to CGSB-19.24
 - .7 Shore A hardness 25
 - .8 Resistant to weathering - 20 years
 - .9 Tremco Dymeric or approved equivalent alternative in accordance with B7Not suitable for submerged joints or areas subject to chemical spillage.

- .4 One component acrylic latex base for use as interior caulking. Tremco-Tremflex 834 or approved equal in accordance with B7.

Suitable for:

- .1 Glazing, metal to metal, metal to glass, ceramics and porcelain, wood to wood, wood to metal
- .2 Movement range to 25%
- .3 To CGSB-19.18
- .4 Primer is required for some applications
- .5 Primer use and type to be Tremco Proglaze or approved equivalent alternative in accordance with B7 and as recommended by the manufacturer of sealant
- .6 For plumbing applications where mildew resistance is necessary, use primer and mildew resistant sealant

Part 3 Execution

3.1 PREPARATION

- .1 Prepare surfaces in accordance with the recommendations of the manufacturer.
- .2 Surfaces shall be clean, dry and free from contaminants. Remove dust, paint, loose mortar and other foreign matter.
- .3 In concrete and masonry, ensure that there is no contamination from form release agents, curing components and water repellants. To effectively remove contaminants, sand blast surfaces or grind surfaces.
- .4 Remove oil, grease, mill scale and coatings from metals by wire brush, grinding or sand blasting; or by approved solvents.

3.2 JOINT DIMENSION

- .1 Examine joint sizes and correct as necessary to achieve joint width to depth ratio 1:1 for joints up to 13 mm width. Minimum width to be 6 mm. When joint width exceeds 13 mm, joint depth shall be 13 mm. Maximum joint width 50 mm.

3.3 JOINT BACK-UP

- .1 To restrict joint depth, use approved backing rod; sized to allow a minimum of 25% compression of the backing when it is placed in the joint.
- .2 Use bond breaker to manufacturer's recommendations where joint backing cannot be used.
- .3 Mask adjacent surfaces where necessary to prevent staining.

3.4 PRIMING

- .1 Prime joint sides immediately prior to caulking, to the manufacturer's recommendations.
- .2 Primers are a necessity in immersion conditions, and may be required in heavy traffic areas, depending upon the manufacturer's recommendations.

3.5 APPLICATION OF SEALANT

- .1 Mix sealants in accordance with the recommendations of the manufacturer. Observe mixing times and work life times.
- .2 Apply sealants in accordance with the manufacturer's instructions using approved gun, with proper sized nozzles.
- .3 Use sufficient pressure to fill voids and joints solid.
- .4 Neatly tool surface to a slightly concave joint.
- .5 Apply sealant to joints between window or door frames to adjacent building components, around perimeter of every external opening, to control joints in masonry walls, concrete slabs and where indicated.
- .6 In masonry cavity construction, vent caulked joints from cavity to 3 mm beyond external face of wall by inserting vent tubing at bottom of each joint and maximum of 1500 mm OC vertically. Position tube to drain to exterior.
- .7 In precast concrete panel facing, vent space behind panels by inserting vent tubing at bottom of each vertical caulked joint and at every second intersection of horizontal and vertical joints. Position tube to drain to exterior.
- .8 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints.
- .9 Sealants shall be applied after cast-in-place concrete has cured a minimum of 28 days. If it is necessary to apply sealants before 28 days, obtain product and application advice from the manufacturer and obtain the approval of the Contract Administrator.

END OF SECTION