

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C665-06, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - .2 ASTM C1320-10, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S702-09, Standard for Mineral Fibre Insulation for Buildings.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with submittal procedures of Section 01 00 10.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

Part 2 Products

2.1 INSULATION

- .1 Fiberglass thermal insulation: thermoset resin bonded glass fibre insulation batts and blanket to CAN/ULC-S702 Type 1:
 - .1 Minimum RSI for 152 mm thickness: 3.5
 - .2 smoke developed: less than or equal to 50.
 - .3 flame spread: less than or equal to 25.
 - .4 thickness: as necessary to fill cavity or as indicated.

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 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C1320.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 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 vents.
- .5 Do not enclose insulation until it has been inspected and approved by Consultant.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 06 10 11 Rough Carpentry: Parapet and curb framing, blocking, plywood sheathing, scupper.
- .2 Section 06 61 43 Gypsum Sheathing: Sheathing products and installation.
- .3 Section 07 62 00 Sheet Metal Flashing and Trim: Metal flashings and copings.
- .4 Division 22 - Plumbing: Roof drains, sumps and hoppers; DWV vents, flashing components of mechanical penetrations

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C726-12 Standard Specification for Mineral Wool Roof Insulation Board
 - .2 ASTM D41/D41M-11 Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
 - .3 ASTM D6162-00a(2008), Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements
 - .4 ASTM D6163-00(2008), Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements
 - .5 ASTM D6164/D6164M-11 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements
- .2 Canadian General Standards Board (CGSB).
 - .1 CGSB 37-GP-56M-80b(A1985) Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing
 - .1 Includes Appendix "Guidelines for Application of Modified Bituminous Prefabricated and Reinforced Membrane for Roofing.
- .3 Canadian Roofing Contractors Association (CRCA)
 - .1 CRCA Roofing Specifications Manual – current edition.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA A123.21-10 Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane-Roofing Systems
 - .2 CSA A231.1-99, Precast Concrete Paving Slabs
- .5 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC-S107-03 Fire Tests of Roof Coverings

1.3 PERFORMANCE REQUIREMENTS

- .1 Complete re-roofing assembly shall be Class A rated in accordance with CAN/ULC-S107 and shall be listed as part of Fire-Classified roof deck construction in UL Online Certification Directory TGFU.R14138.

- .2 Compatibility between components of roofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.
 - .1 Do not introduce components into roofing system that are not compatible with specified materials.
- .3 Submit in accordance with submittal procedures of Section 01 00 10.

1.4 SUBMITTALS

- .1 Submit in accordance with submittal procedures of Section 01 00 10.
- .2 Submit two copies of most recent technical roofing components data sheets describing materials' physical properties.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets.
 - .1 Indicate VOC content for:
 - .1 Primers.
 - .2 Asphalt.
 - .3 Sealers.

1.5 PRODUCT DATA

- .1 Submit complete product data in duplicate for all components of roofing assembly in accordance with requirements of Division 01 and as requested by Departmental Representative.
- .2 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .3 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .4 Manufacturer's field report: in accordance with submittal procedures of Section 01 00 10.
 - .1 Indicate materials on site, installation procedures actually followed, ambient temperatures and wind velocity during application.

1.6 SAMPLES

- .1 Submit full range of colour samples of specified cap sheet materials for selection by Departmental Representative.
- .2 At request of Departmental Representative submit duplicate samples of each requested component of roofing assembly in accordance with requirements of Division 01.

1.7 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with submittal procedures of Section 01 00 10.
- .2 Indicate tapered insulation details.
- .3 Provide layout for tapered insulation.

1.8 QUALITY ASSURANCE - PRODUCTS

- .1 Submit laboratory test reports in accordance with submittal procedures of Section 01 00 10.
- .2 Submit laboratory test reports certifying compliance of bituminous products and membrane with specification requirements.
- .3 Use products of single manufacturer for all components of membrane, including primers, adhesives, membranes, and flashings.
- .4 Retain purchase orders, invoices and other documents necessary to demonstrate that all materials utilized in this Contract meet requirements of specifications. Produce documents when requested by Departmental Representative.

1.9 QUALITY ASSURANCE – INSTALLATION

- .1 Convene pre-installation meeting one week prior to beginning waterproofing Work, with roofing contractor's representative, Consultant and Departmental Representative in accordance with accepted and updated construction progress schedule to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building trades.
 - .4 Review safety and fire protection equipment and procedures.
 - .5 Review manufacturer's installation instructions and warranty requirements.
- .2 Arrange for roofing membrane manufacturer's technical representative to visit the site before the commencement of the installation to review the site conditions and the application procedures.
- .3 Applicator shall be acceptable to manufacturer of roofing materials.
- .4 Perform the Work of this Section in accordance with printed requirements of the roofing membrane manufacturer and this specification.
- .5 Maintain one copy of manufacturer's technical literature on site throughout the Work.
- .6 Cooperate with the Departmental Representative and inspection agencies and provide all facilities necessary to permit full inspection of the roofing materials and work.

1.10 HEALTH AND SAFETY

- .1 Do construction occupational health and safety in accordance with Section 01 35 30 - Health and Safety Requirements.

1.11 STORAGE AND HANDLING

- .1 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.
- .2 Deliver materials in original unopened packages and containers, with manufacturer's labels and seals intact.
- .3 Provide and maintain dry, off-ground weatherproof storage.

- .4 Store rolls of felt and membrane in upright position. Store membrane rolls with selvage edge up.
- .5 Handle insulation in strict accordance with manufacturer's printed instructions.
 - .1 Remove shipping wrapping and cover stacked insulation with weatherproof tarpaulins.
 - .2 Inspect insulation boards for edge cavities, warping, dimension tolerances and remove material that does not conform to the standard.
- .6 Stack gypsum sheathing, insulation and protection board flat and off the ground. Prevent sagging and damage to edges, ends and surfaces.
- .7 Remove only in quantities required for same day use.
- .8 Place plywood runways over completed Work to enable movement of material and other traffic.
- .9 Store sealants at +5 degrees C minimum.
- .10 Store insulation protected from daylight and weather and deleterious materials.
- .11 Remove all damaged and deteriorated materials and products from the site.

1.12 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install roofing when temperature remains below -18 degrees C for torch application, to manufacturers' recommendations.
- .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
- .3 Account for wind chill and other environmental factors in evaluating suitability of temperature for roofing.
- .4 Verify adhesion of components regularly during cold weather applications.
- .5 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.

1.13 WARRANTY

- .1 For the Work of this Section, the 12 months warranty period is extended to 24 months.

Part 2 Products

2.1 ROOF MEMBRANE COMPONENTS

- .1 Provide all roof membrane products as the products of the same single manufacturer.
- .2 Deck Covering: Mineral fortified asphalt core with saturated fiberglass felts top and bottom, minimum 3.0 mm thick and having the following properties.
 - .1 Weight: 4.4 kg/m².
 - .2 Puncture resistance: 500 N when tested to ASTM E154
 - .3 Water absorption: 0.25% when tested to ASTM D994.

- .4 Compressive strength: minimum 1,640 kPa when tested to ASTM C472.
- .5 Shore hardness: Pass when tested to ASTM C1278.
- .3 Air Barrier and Vapour Retarder: to CGSB 37-GP-56M Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated self-adhesive sheet, 2.5 mm thick, glass mat reinforcement in accordance with ASTM D6163.
 - .1 Bottom surface adhesive with silicone release film
 - .2 Top surface: Sanded.
- .4 Base sheet membrane: to ASTM D6162 Type 1, SBS modified bituminous membrane with composite glass and polyester fiber reinforcement, 2.5 mm thick, top and bottom surfaces sanded, complete with manufacturer's recommended adhesive in brush and flashing grades to suit application.
- .5 Cap sheet membrane: Fire rated cap sheet to ASTM D6162 Type 1, SBS modified bituminous membrane with composite glass and polyester fiber reinforcement, 3.5 mm thick top surface coloured granules, bottom surface sanded, complete with manufacturer's recommended adhesive in brush and flashing grades to suit application.

2.2 INSULATION

- .1 Provide all insulation products, including flat boards, tapered insulation, and depressed sumps as the products of the same single manufacturer.
- .2 Insulation, Base Layer: Rigid mineral fiberboard panel, density 200 kg/m³, complying with ASTM C726, and Class A fire performance when tested to CAN/ULCS107, 25 mm thick, flat.
- .3 Insulation, Top Layer: Rigid mineral fiberboard panel complying with ASTM C726, and Class A fire performance when tested to CAN/ULCS107, double density with rigid upper layer density of 220 kg/m³ and base density of 10 kg/m³, flat boards 50 mm thick, tapered boards and cant strips as indicated, top surface impregnated with bitumen layer to receive adhesive.

2.3 SEALERS

- .1 Sealing compound: to CAN/CGSB-37.29, modified rubber asphalt type as recommended by membrane manufacturer.

2.4 SPLASH PAD

- .1 Paving slabs: to CSA A231.1, 610 x 610, 30 mm thick air entrained precast concrete paving slabs having non-slip finish with 51 mm plain margin around perimeter, complete with 25 mm thick Type IV polystyrene support pads at each corner.

2.5 FASTENERS

- .1 Re-cover Board: coated insulation fasteners and galvanized plates as recommended by re-cover board manufacturer.
- .2 Insulation Board: coated insulation fasteners and galvanized plates as recommended by re-cover board manufacturer.

2.6 REINFORCED WATERPROOF COATING

- .1 Fully reinforced polymeric liquid-applied waterproofing flashing and coating system, complete with manufacturer's recommended reinforcement, and having the following characteristics:
 - .1 UV resistant;
 - .2 Low temperature flexibility;
 - .3 Crack bridging capability.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Do examination, preparation and roofing Work in accordance with roofing manufacturer's specification manual and CRCA Roofing Specification Manual.
- .2 Do priming for asphalt roofing in accordance with CGSB 37-GP-15M and membrane manufacturer's printed instructions.

3.2 EXAMINATION OF ROOF DECKS

- .1 Inspect with Departmental Representative deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.
- .2 Prior to beginning of work ensure:
 - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.
 - .2 Curbs have been built.
 - .3 Roof drains have been installed at proper elevations relative to finished roof surface.
 - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
- .3 Do not install roofing materials during rain or snowfall.

3.3 PROTECTION

- .1 Cover walls, walks and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of Work.
- .3 Clean off drips and smears of bituminous material immediately.
- .4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.
- .5 Protect roof from traffic and damage. Comply with precautions deemed necessary by Departmental Representative.
- .6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.
- .7 Metal connectors and decking will be treated with rust proofing or galvanization.

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3.4 DECK COVERING

- .1 Mechanically fasten to deck with screws to wood deck, spaced 400 mm on centre each way, with minimum penetration 40 mm into and through deck.
- .2 Place with end joints staggered and fully supported.

3.5 VAPOUR RETARDER

- .1 Unroll self-adhesive modified bituminous vapour retarder sheet. and let relax prior to installation.
- .2 Apply primer to cover boards and apply self-adhesive membrane in accordance with manufacturer's instructions and as detailed.

3.6 EXPOSED MEMBRANE ROOFING APPLICATION

- .1 Insulation: fully adhered, adhesive application:
 - .1 Adhere insulation to vapour barrier using specified adhesive.
 - .2 Place boards in parallel rows with ends and sides staggered, and in firm contact with one another.
 - .3 Cut end pieces to suit.
 - .4 Apply adhesive in continuous ribbons at 300 mm on centre.
 - .5 In addition to adhesive, provide mechanical fasteners as necessary to ensure continuous contact between layers of re-cover board and insulation panels where discontinuity resulting deck roughness requires mechanical fasteners.
- .2 Tapered insulation application:
 - .1 Install tapered insulation as top insulation layer, in accordance with shop drawings. Stagger joints between layers 150 mm minimum.
 - .2 Apply adhesive in continuous ribbons at 300 mm on centre.
- .3 Base sheet application:
 - .1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.
 - .2 Unroll and embed base sheet in uniform coating of adhesive applied at manufacturer's recommended rate using manufacturer's recommended spreading tool.
 - .3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
 - .4 Application to be free of blisters, wrinkles and fishmouths.
- .4 Cap sheet application:
 - .1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
 - .2 Unroll and embed cap sheet in uniform coating of adhesive applied at manufacturer's recommended rate using manufacturer's recommended spreading tool.
 - .3 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
 - .4 Application to be free of blisters, fishmouths and wrinkles.
 - .5 Do membrane application in accordance with manufacturer's recommendations.
- .5 Membrane Flashings:

- .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
 - .2 Nail base sheet onto substrate in 1 metre wide strips.
 - .3 Lap flashing base sheet to membrane base sheet minimum 150 mm and embed in adhesive.
 - .4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and embed in adhesive.
 - .5 Provide 75 mm minimum side lap and seal.
 - .6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
 - .7 Do work in accordance with manufacturer's recommendations.
 - .8 Coordinate membrane flashing installation with sheet metal flashing installation.
- .6 Roof penetrations:
- .1 Install roof drains, vent stack covers and other roof penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details.

3.7 PAVER WALKWAYS

- .1 Install paving slabs over membrane on paver neoprene levelling pads.

3.8 CANTS

- .1 Install preservative pressure treated wood cants over existing decking and to face of wood perimeter blocking as indicated. Ensure top of cant is flush and smooth with top of wood blocking.
- .2 Angle cut cants to fit tightly on back and bottom where roof to wall angle varies from 90 degrees.

3.9 SCUPPER

- .1 Install coated scupper block prior to application of gravel stop fascia and cap sheet.
- .2 Prior to installation completely envelope scupper fabricated by Section 06 10 11 in reinforced waterproof coating consisting of a base layer of coating, embedded reinforcing mesh and a second layer of coating, for a total minimum dry film thickness of 1.5 mm.
- .3 Securely anchor scupper block to adjacent structure with flush screw fasteners as specified in Section 06 10 11.
- .4 Apply one additional coat of reinforced waterproof coating to scupper blocking and adjacent base sheet flashing to ensure continuity of waterproof protection for structure. Lap coating onto base sheet minimum 150 mm on all sides.
- .5 Ensure reinforcing mesh is completely embedded in continuous layer of coating.
- .6 Install gravel stop fascia and cap sheet as indicated and seal to scupper.

3.10 MANUFACTURER'S FIELD SERVICES

- .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its products, and submit written reports in acceptable format to verify compliance of Work with Contract.

- .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Schedule site visits for manufacturer to review Work at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - .2 During progress of Work at 25% complete.
- .4 Obtain reports from manufacturer within three days of review and submit.

3.11 FIELD QUALITY CONTROL

- .1 Inspection and testing of roofing application will be carried out by inspection and testing agency designated by Departmental Representative.
- .2 Costs of tests will be paid by Owner.

3.12 CLEANING

- .1 Remove bituminous markings from finished surfaces.
- .2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their instructions.
- .3 Repair or replace defaced or disfigured finishes caused by work of this section.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 06 10 11 Rough Carpentry: Blocking, curbs, and nailing strips
- .2 Section 07 52 00 Modified Bituminous Membrane Roofing: Membrane flashings.
- .3 Section 07 92 10 Joint Sealing: Sealant material and installation for flashings and sheet metal work.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A653/A653M-11 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian Roofing Contractors Association (CRCA)
 - .1 Roofing Specifications Manual (current edition).
- .3 Sheet Metal and Air Conditioning Contractors National Association:
 - .1 Architectural Sheet Metal Manual

1.3 SAMPLES

- .1 Submit shop drawings in accordance with submittal procedures of Section 01 00 10.
- .2 Submit duplicate 50 x 50 mm samples of each type and gauge of sheet metal material, finish specified.
- .3 Submit full range of manufacturer's colours for selection by Consultant.

Part 2 Products

2.1 SHEET METAL MATERIALS

- .1 Aluminum-zinc alloy coated steel sheet: to ASTM A792, commercial quality, with AZM 180 coating, regular spangle surface, prefinished as specified in 2.2, 0.53 mm (26 gauge, 0.021") base metal thickness.

2.2 PREFINISHED STEEL SHEET

- .1 Prefinished steel with factory applied polyvinylidene fluoride 10000 Series finish.
 - .1 Class F2S.
 - .1 Exposed Surface Coating Thickness: not less than 18 micrometers when tested to ASTM D5796.
 - .2 Unexposed (reverse) Surface Coating Thickness: backer coating not less than 5 micrometers when tested to ASTM D5796.
 - .2 Colour of exposed side selected by Consultant from manufacturer's standard range.
 - .3 Specular gloss: 25 units +/- 5 in accordance with ASTM D523.
 - .4 Film Hardness: HB-2H when tested in accordance with ASTM D3363.
 - .5 Resistance to accelerated weathering:
 - .1 Chalk rating of 8 when tested to ASTM D4214 Method A;

- .2 Colour fade 5 units or less when tested to ASTM D2244;
- .3 Film Integrity: No evidence of cracking, flaking or checking after 40 years under ordinary visual observation.

2.3 ACCESSORIES

- .1 Exposed Fasteners:
 - .1 Screws: Purpose made steel complete with neoprene washers, suitable for self-drilling penetration through plywood and fastening to steel studs.
 - .1 300 Series stainless steel or capped stainless steel washer combination.
 - .2 Aluminum-zinc alloy cast or capped head with neoprene coated aluminum or Type 303 stainless washer.
 - .3 Nylon capped head over zinc coated carbon steel shank.
 - .2 Concealed fasteners: 1.6 mil zinc coated steel with additional organic or inorganic coating.
 - .1 Nails: ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
 - .3 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
 - .4 Isolation coating: alkali resistant bituminous paint.
 - .5 Plastic cement: to CAN/CGSB 37.5.
 - .6 Underlay for metal flashing: Rubberized asphalt bonded to high density cross laminated polyethylene film, 1 mm thick, self-adhesive.
 - .7 Sealants: in accordance with Section 07 92 10.
 - .8 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
 - .9 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details, SMACNA details and recommendations, and as indicated.
- .2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of 0.53 mm base metal thickness prefinished steel.
- .2 Form flashings, copings and fascias to profiles indicated of prefinished steel.

2.6 REGLETS AND CAP FLASHINGS

- .1 Form surface mounted reglets and metal cap flashings for base flashings as detailed.

Part 3 Execution

3.1 INSTALLATION

- .1 Install sheet steel flashings and trim in accordance with CRCA FL series details and SMACNA details and specifications.
- .2 Lap joints minimum 150 mm and provide double bead of sealant between laps.
- .3 Form joints to allow for thermal movement.
- .4 Use concealed fastenings except where approved before installation.
- .5 Provide cleats to secure flashings at maximum 600 mm OC.
- .6 Turn up ends to form end dams where ends flashings abut vertical surfaces.
- .7 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
- .8 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips, as detailed.
- .9 Lock end joints and caulk with sealant.
- .10 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .11 Install pans, where shown around items projecting through roof membrane.

END OF SECTION

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Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-12 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-coated, Welded and Seamless

1.2 SYSTEM DESCRIPTION

- .1 Provide pre-engineered modular freestanding non-penetrating roof edge guardrail system including top and mid-level pipe railings, uprights, outrigger extensions for projecting ends, weighted bases and all necessary fittings and fasteners.
- .2 The anchoring of posts and framing of members for railings shall be such that the completed structure of the roof guardrail shall withstand, without damage, and with no effect on stability of guardrail assembly a load of at least 200 pounds applied in any direction.
- .3 Performance Requirements:
 - .1 Height: 1 067 mm.
 - .2 Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.

1.3 SUBMITTALS

- .1 Product data: Submit manufacturer's printed product literature, specifications and data sheet in accordance with submittal procedures of Section 01 00 10.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with submittal procedures of Section 01 00 10.
 - .2 Verify field measurements prior to ordering and prior to assembling.
 - .3 Indicate size and description of components, materials, attachment devices, description of frame and finish, construction details for each typical and special rooftop condition.
 - .4 Shop drawing: Indicate profiles, sizes, connections, size and type of fasteners and accessories.
 - .5 Indicate location of outriggers and terminations.
 - .6 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for guardrails complete with pertinent details, spare parts lists and warnings against harmful maintenance materials and practices for incorporation into manual specified in Section 01 00 10.

1.6 DELIVERY, HANDLING AND STORAGE

- .1 All materials shall be delivered in manufacturer's original packaging.
- .2 Store materials in a dry, protected, well-vented area.

- .3 The contractor shall thoroughly inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.
- .4 Remove protective wrapping immediately after installation if applicable.

Part 2 Products

2.1 MODULAR GUARDRAIL SYSTEM

- .1 Custom pre-engineered free-standing, modular roof guardrail system and components of galvanized steel pipe, non-penetrating self-anchoring weighted bases, minimum 1 067 mm high, anchored into rubber protected mat base, meeting all requirements of authority having jurisdiction, OBC and OSHA.

2.2 COMPONENTS

- .1 Pipe: ASTM A53 38 mm diameter steel pipe, galvanized.
- .2 Rails and Posts: ASTM A53 38 mm diameter steel pipe, galvanized.
- .3 Clamp fittings: Elbows, Crossovers, Wall flanges, Tees, Couplings, galvanized, cast metal.
- .4 Weighted Bases: Steel base plates, supplied with powder-coat finish, upright receivers and a rubber protection mat on underside of the component.
- .5 Fasteners: All Fasteners shall be 304 or 305 stainless steel.

2.3 ASSEMBLY

- .1 Guardrail height: 1 067 mm above roof walking surface.
- .2 Space uprights no further than 2 440 mm apart.
- .3 Provide outriggers consisting of one extra base and an outrigger assembly properly fitted at all terminations to provide continuous protection.
- .4 Fit and shop-assembled components in largest practical sizes for delivery to site.
- .5 Upright tops shall be plugged with weather and light resistant material.
- .6 Assemble components with joints tightly fitted and secured with set screws tightened to 29 foot pounds of torque.
- .7 Accurately form components to suit installation.

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 EXAMINATION

- .1 Ensure that roofing work is complete and that roof is clear of debris, snow, ice or any other deleterious substances.

3.3 INSTALLATION

- .1 Erect components plumb, level and in proper alignment.
- .2 Ensure top rail is no lower than 1 067 mm above walking surface.
- .3 For all connections with clamp fittings, each set screw is to be tightened to 30 foot pounds of torque.
- .4 Place weighted bases and uprights to meet manufacturer specifications.

3.4 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

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Part 1 General

1.1 RELATED WORK

- .1 Section 07 62 00 Sheet Metal Flashing and Trim

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C920-11 Standard Specification for Elastomeric Joint Sealants
 - .2 ASTM C1193-IIa Standard Guide for Use of Joint Sealants.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

- .1 Submit product data in accordance with submittal procedures of Section 01 00 10 General Instructions.
- .2 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit manufacturer's instructions in accordance with submittal procedures of Section 01 00 10 General Instructions.
 - .1 Instructions to include installation instructions for each product used.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact.
 - .1 Labels shall indicate product life expiry date.
- .2 Protect from freezing, moisture, water and contact with ground or floor.

1.5 PROJECT CONDITIONS

- .1 Environmental Limitations:
 - .1 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
 - .2 When joint substrates are wet.
- .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:

- .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) 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.

1.7 QUALITY ASSURANCE

- .1 Installation of sealants shall be performed by a firm having minimum 5 years experience in the installation of the specified sealant materials on projects similar in scale and complexity to this the Work.

Part 2 Products

2.1 SEALANT MATERIALS

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 Where sealants are qualified with primers use only these primers.

2.2 ELASTOMERIC SEALANT MATERIALS

- .1 One part modified polyurethane sealant: to CAN/CGSB-19.24, type 2, class B.
- .2 Provide elastomeric sealant materials that will not bleed into or otherwise stain adjacent materials.
- .3 Provide sealants in colours selected by Consultant from manufacturer's complete range.
- .4 Use self-leveling compounds for horizontal joints in paving and non-sag compounds for all other areas, except where shown or specified otherwise.

2.3 BACK-UP MATERIALS

- .1 Use backup materials compatible with sealant materials and suitable for application.
- .2 Polyethylene, Urethane, Neoprene or Vinyl Foam
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50%.
 - .3 Oversize backer as recommended by manufacturer
- .3 Bond Breaker Tape
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.4 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer for each substrate.

Part 3 Execution

3.1 PROTECTION

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

3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 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.
- .4 Ensure joint surfaces are dry and frost free.
- .5 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 Select joint filler to be compatible with sealant and installation conditions.
- .3 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

- .1 Sealant.
 - .1 Apply sealant in accordance with manufacturer's written instructions.

- .2 Apply sealant in continuous beads.
- .3 Apply sealant using gun with proper size nozzle.
- .4 Use sufficient pressure to fill voids and joints solid.
- .5 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .6 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .7 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.

3.7 SCHEDULE - EXTERIOR SEALANTS

- .1 Elastomeric sealant:
 - .1 Perimeters of exterior openings where frames meet exterior facade of building.
 - .2 Coping joints and joints between coping and facade.
 - .3 Horizontal surface joints.
 - .4 Flashing joints.
 - .5 Cap flashing birdsmouth joint at vertical surfaces.

END OF SECTION