Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.2 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S604-M1991, Type A Chimneys.

.2 CAN/ULC-S702-1997, Standard for Mineral Fibre Insulation.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.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.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 INSULATION

.1 Batt and blanket mineral fibre: to CAN/ULC S702.

.1 Type: rock mineral wool.

.2 Thickness: friction fit.

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.

.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 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

3.3 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International Inc.

- .1 ASTM D41-05, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- .2 ASTM D312-00(2006), Standard Specification for Asphalt Used in Roofing.
- .3 ASTM D2178-04, Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
- .4 ASTM D6163-00e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.

.2 Canadian General Standards Board (CGSB)

- .1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .2 CGSB 37-GP-56M-[80b(A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .3 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.3 Canadian Roofing Contractors Association (CRCA)

- .1 CRCA Roofing Specifications Manual.

.4 Alberta Roofing Contractors Association (ARCA)

- .1 ARCA Roofing Specifications Manual.

.5 Canadian Standards Association (CSA International)

- .1 CSA A123.21-14, Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems
- .2 CSA-A123.3-05 (2010), Asphalt Saturated Organic Roofing Felt.
- .3 CSA-A123.4-04 (R2013), Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.

.6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).

.7 Underwriters Laboratories' of Canada (ULC)

- .1 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.8 2015 CSC Technical Criteria Document.

.9 CSC General Procedures and Standards – Latest Edition.

.10 All applicable codes (National Building Code).

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Convene pre-installation meeting two weeks prior to beginning waterproofing Work, with roofing contractor's representative, Departmental Representative in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart to:

- .1 Verify project requirements.
- .2 Review installation and substrate conditions.
- .3 Co-ordination with other building subtrades.
- .4 Review manufacturer's installation instructions and warranty requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

- .1 Provide two copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Provide two copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures, and indicate VOC content for:
  - .1 Primers.
  - .2 Asphalt.
  - .3 Sealers.
  - .4 Filter fabric.
- .3 Provide proof of ARCA material approval.

.3 Provide shop drawings:

- .1 Indicate flashing, control joints, tapered insulation details.
- .2 Provide layout for tapered insulation.

.4 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

.5 Test and Evaluation Reports: submit laboratory test reports certifying compliance of bitumens, roofing felts, and membrane with specification requirements.

.6 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.

.7 Manufacturer's field report: in accordance with Section 01 45 00 - Quality Control.

.8 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

1.4 QUALITY ASSURANCE

.1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems approved by manufacturer with 5 years documented experience.

.2 Installer to be a member in good standing with the ARCA (Alberta Roofing Contractors Association).

1.5 FIRE PROTECTION

.1 Prior to the start of work, conduct a site inspection to ensure its safety in order to minimize fire risks and hazards.

.2 Respect safety measures recommended by the related local authorities.

.3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed fire. Job planning must be organized to ensure workers are still on location at least 2 hours after welding works. An inspection must be performed by an employee of the roofing contractor who specializes in this kind of job at the end of works and, if necessary, with the help of a member of the fire protection service of the city.

.4 Never apply the torch directly to flammable materials.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.

.2 Storage and Handling Requirements:

.1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.

.4 Remove only in quantities required for same day use.

.5 Place plywood runways over completed Work to enable movement of material and other traffic.

.6 Store sealants at +5 degrees C minimum.

.7 Store insulation protected from weather and deleterious materials.

.3 Packaging Waste Management: remove for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

.4 Materials delivered in rolls will be carefully stored upright; flashings will be stored to avoid wrinkling, buckling, scratches or any other possible damage.

.5 Avoid gathering construction materials on the roof, which may affect the structural integrity by imposing loads exceeding what is admissible.

1.7 SITE CONDITIONS

.1 Ambient Conditions

.1 Do not install roofing when temperature remains below -18 degrees C for torch application, or -to manufacturers' recommendations.

.2 Minimum temperature for solvent-based adhesive is -5 degrees C.

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

1.8 DESCRIPTION

.1 This section specifies the supply and installation of the components required for a SBS Modified Bituminous Roofing system.

.2 Existing Roof System:

.1 Remove to drawings for the description of the existing roof membrane system.

.3 Install new membranes to the existing roofing membranes.

.1 The components of the replacement roof area are to be comprised of the components identified in Part 2 of the section and on the architectural drawings.

1.9 INSPECTIONS

.1 Provide Third Party Inspections required by ARCA.

.2 Contractor to pay for Third Party Inspections.

1.10 WARRANTY

.1 The Contractor shall, at no additional expense to the Departmental Representative, repair any actual leaks or deficiencies in the roofing system, occurring within the warranty period, and which have resulted from faulty or improper workmanship.

.2 Stop leaks which have resulted from a deficiency, within a time reasonably determined by Departmental Representative.

.3 Correct deficiencies within 15 working days of notification by Departmental Representative, or as otherwise determined by the Departmental Representative.

.4 Roofing system has been constructed by a member of the ARCA, Contractor shall obtain, on behalf of the Departmental Representative, an ARCA Fifteen Year Warranty Certificate, for the performance of Contractor's obligations under the extended warranty. Departmental Representative will not accept other roofing certificates.

Part 2 Products –

2.1 PERFORMANCE CRITERIA

.1 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.

.2 Roofing System: to CSA A123.21 for wind uplift resistance.

.3 All materials and application techniques to be approved by ARCA

2.2 ROOF DECK

.1 Fibreglass Mat Faced Gypsum Roof Board.

.1 Thickness: 12.5 mm.

.2 Weight: 2.0 lb/sq.ft.

.3 Surfacing: Fibreglass mat with non-asphaltic coating.

.4 Flexural Strength, Parallel (ASTM C473): 80 lbf, minimum.

.5 Flute Span (ASTM E661): 125 mm.

.6 Permeance (ASTM E96): greater than 23 perms.

.7 Water Absorption (ASTM C1177): Less than 10% of weight.

.8 Compressive Strength (Applicable Sections of ASTM C472): 900 pounds per square inch.

.9 Surface Water Absorption (ASTM C473): Not more than 2 grams.

2.3 DECK PRIMER – UPSTANDS, CURBS, AND PARAPETS

.1 Self adhesive membrane composed of SBS synthetic rubbers, adhesive enhancing resins, and volatile solvents.

.1 Specific Gravity: 0.79 kg/L

.2 Colour: Red.

.3 Solids by Weight: 24%

.4 Viscosity: 200 cP.

2.4 VAPOUR RETARDER

.1 Self-adhesive membrane composed of SBS modified bitumen, with a surface screen made of high-density polyethylene laminated between two layers of polyethylene films. The width of the membrane is 1.14 m (45 in) to allow the membrane to fit on the top of most structural steel deck profiles. The self-

adhesive underface is protected with a silicone plastic release film. Resistance to water vapour transmission: 0.92 ng/Pa.s.m^2 (0.016 Perm)Thickness: 3.5 mm

.2 Continuity Strip: Waterproofing membrane with composite reinforcement and SBS modified bitumen. The surface is sanded and the underface is self-adhesive and covered with a silicon release film.

2.5 ADHESIVE

.1 Two-component, quick-setting, low-expansion foam urethane adhesive that can be applied at temperature recommended by manufacturer.

.2 Tensile Strength: ASTM D412: 1.72 MPa.

.3 Density: ASTM D1875: 1.19 kg/L and 1.01 kg/L.

.4 Peel Strength: ASTM D903: 3.0 kN/m.

.5 Viscosity: ASTM D2556: 1800 cP, and 2800 cP.

2.6 EXPANDED POLYSTYRENE INSULATION

.1 Polystyrene: to CAN/ULC-S701, Type 2, thickness to thickness as per drawings.

.2 Tapered insulation panel designed to create a 2% slope.

.3 Conform to ARCA MB5.3 Primary Insulation.

2.7 POLYISOCYANURATE INSULATION

.1 To CAN/ULC-S704, facing glass fiber reinforced, flame spread classification: thickness as indicated. Closed-cell polyisocyanurate foam insulation board laminated on both sides with a glass fibre coating.

.2 Provide a minimum of 50 mm of polyisocyanurate installed directly under 2 ply SBS membrane.

.3 Conform to ARCA MB5.4 Secondary Insulation.

2.8 INSULATION SUBSTRATE OVERLAY

.1 SBS modified base sheet membrane and polyester reinforcement, factory-laminated on a semi-rigid asphaltic board. The board measures 0.91 m x 2.44 m. The top surface is covered with sand plastic film. The membrane side lap is 60% self-adhesive and 40% thermofusible.

2.9 MEMBRANE

.1 Base Sheet Membrane

.1 Description: Membrane composed of SBS modified bitumen and glass mat reinforcement. The surface is sanded and the underface is covered with a release protection film. The surface shall be marked with three (3) chalk lines to ensure proper roll alignment.

.2 In conformance with: ARCA MB6.5 accepted S.B.S. Modified Systems.

.2 Roofing Cap Sheet Membrane for Field Surfaces

.1 Description: Roofing membrane composed of SBS modified bitumen with a composite reinforcement and elastomeric bitumen. The surface is protected by coloured granules. The underface is covered with a release protection film. The cap sheet side lap is 50% self-adhesive and 50% thermofusible.

.2 In conformance with: ASTM D6162.

.3 Roofing Cap Sheet Membrane for Flashings and Parapets

.1 Description: Roofing membrane composed of SBS modified bitumen with a composite reinforcement and elastomeric bitumen. The surface is protected by coloured granules. The underface is covered with a release protection film. The cap sheet side lap is 50% self-adhesive and 50% thermofusible.

.4 Cover Strip: Membrane strip of 330 mm made of SBS modified bitumen with a composite reinforcement. The self-adhesive underface is covered by a release protection film and the surface is sanded. The strip ensures water-tightness in the end laps.

2.10 PRIMER

.1 Primer for Self-Adhesive Membranes: Primer composed of SBS synthetic rubber, adhesive resins and volatile solvents. Used as primer to improve the adhesion of self-adhesive membranes.

.2 Adhesive for Membrane Overlaps: Cold-applied adhesive for SBS modified polymer and fibre membranes.

2.11 FASTENERS

.1 Membrane fasteners: fasteners with #14 self-tapping screws, with washer of 50 mm in diameter.

2.12 COMPLEMENTARY WATERPROOFING

.1 Waterproofing Mastic: Multi-purpose mastic composed of SBS modified bitumen, fibres, aluminium pigments, mineral fillers and solvents.

.2 Pitch Pocket Filler: Polyurethane pitch pocket system made of pre-fabricated modules of various sizes, with interlocking compounds and solvent-free mastic, composed of two-component urethane and mono-component elastomeric sealant.

.3 Sealing Product: Bitumen/polyurethane waterproofing mono-component resin and polyester reinforcement.

2.13 MISCELLANEOUS

.1 Install new PVC vent pipes, complete with insulation to meet NRCA and ARCA requirements.

.2 Drains: Install new coated cast iron metal drain bowl, complete with attached self locking dome metal basket and accessories, and standard drainage.

Part 3 Execution

3.1 QUALITY OF WORK

.1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual, CRCA Roofing Specification Manual, Alberta Roofing Association Manual.

.2 Do priming in accordance with manufacturers written recommendations.

.3 Assembly, component and material connections will be made in consideration of appropriate design loads, with reversible mechanical attachments.

3.2 EXAMINATION OF ROOF DECKS

.1 Verification of Conditions:

.1 Inspect with Departmental Representative deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.

.2 Evaluation and Assessment:

.1 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.

.3 Do not install roofing materials during rain or snowfall.

3.3 PROTECTION OF IN-PLACE CONDITIONS

.1 Cover walls, walkways, 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.

3.4 EXECUTION

.1 Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

.2 Consult container labels and Material Safety Data Sheets (MSDS) for specific safety instructions.

.3 Deliver materials to job site in their original containers as labeled by the manufacturer.

.4 Keep insulation materials used in construction of roofing systems dry before and during application. Store roll goods on end. Use breather type coverings such as canvas.

.5 Apply adhesive in pattern as directed by manufacturer and approved by ARCA.

3.5 PREPARATION OF CONCRETE DECK

.1 Prepare surfaces according to manufacturer's recommendations.

.2 Install Fibreglass Roof Deck, use manufacturer approved adhesive.

3.6 APPLICATION OF PRIMER

.1 Concrete surfaces will receive a coat of primer at a rate as per manufacturer's recommendations (no primer is required for factory-painted metals). All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence. Primed surfaces must be covered with the roofing membrane as soon as possible (on the same day for self-adhesive membranes).

3.7 VAPOUR RETARDER

.1 Primer must be dry prior to the installation of the vapour barrier membrane.

.2 Starting at the bottom of the slope, without adhering the membrane, unroll it onto the substrate for alignment. Do not immediately remove the silicone release film.

.3 Align the roll parallel to the ribs of the steel deck. Make sure membrane overlaps are supported along their entire length.

.4 Remove one end of the silicone release film and adhere this part of the membrane to the substrate. Remove the remaining release film at a 45º angle to avoid wrinkles in the membrane.

.5 Overlap adjacent rolls of 75 mm and 100 mm. End laps must be 150 mm. Space end laps by at least 300 mm.

.6 When the vapour barrier is installed directly on a steel deck, place a thin sheet of metal under the end laps of the vapour barrier.

3.8 INSTALLATION OF INSULATION

.1 Adhere insulation by using specified adhesive in continuous strips, corners and perimeters must be installed as per CSA.A123.21-14.

3.9 INSTALLATION OF BOARDS, AND FACTORY LAMINATED BASE SHEETS

.1 Adhere base sheet board by using specified adhesive in continuous strips, corners and perimeters must be installed as per CSA.A123.21-14.

3.10 INSTALLATION OF SELF ADHESIVE BASE SHEET ON FLASHINGS AND PARAPET

.1 Apply base sheet flashing only after primer coat is dry.

.2 For sanded base sheet membranes, apply primer for self-adhesive membrane on the area to be covered at the foot of the parapets.

.3 Cut off corners at end laps of areas to be covered by the next roll.

.4 Each selvedge will overlap the previous one along lines provided for this purpose, and by 150 mm at the ends.

.5 Position the pre-cut membrane. Remove 150 mm of the silicone release film to hold the membrane in place at the top of the parapet.

.6 Then, gradually peel off the remaining silicone release film, pressing down on the membrane with an aluminum applicator to ensure good adhesion. Use the aluminum applicator to ensure a perfect transition between the flashing and the field surface. Smooth the entire membrane surface with a membrane roller for full adhesion.

.7 Install a reinforcing gusset at all inside and outside corners.

.8 Always seal overlaps at the end of the workday.

.9 Avoid the formation of wrinkles, swellings or fishmouths.

.10 Mechanical fixation of the Self-adhesive base stripping membrane is required using Round Top Nails. First row 100 mm above the finished roof level and then every 200mm up the vertical surface. This procedure will be repeated every 300mm along the parapet wall or curb location.

3.11 INSTALLATION OF REINFORCED GUSSETS

.1 Install reinforcing membranes specified according to the typical detailed instructions in the documentation of membrane manufacturer.

3.12 INSTALLATION OF SELF-ADHERED REINFORCING MEMBRANES

.1 Install reinforcing membranes specified according to the typical detailed instructions in the documentation of membrane manufacturer.

3.13 INSTALLATION OF SELF-ADHERED CAP SHEET ON FIELD SURFACES

.1 Apply self-adhesive membrane primer to the area to be covered.

.2 Starting at drain, Dry unroll the cap sheet membrane on the base sheet, taking care to align the edge of the first selvedge with the edge of the roof.

.3 Cut off corners at end laps at areas to be covered by the next roll.

.4 Each selvedge will overlap the previous one laterally along lines provided for this purpose, and will overlap by 150 mm at the ends. Space end laps a minimum of 300 mm.

.5 Remove the silicone release film, pressing down the membrane using a membrane roller to ensure good adhesion.

.6 Adhere the first 50 mm of the self-adhesive side laps using a membrane roller, then heat-weld the last 50 mm (self-adhesive, heat-welded side laps).

.7 Apply adhesive for the first 125 mm of the end laps using a steel trowel with 5 mm notches.

.8 Complete the application by welding the last 25 mm of the overlap to the field surface, using an electric hot-air welder and a membrane roller.

.9 Repeat these steps to install the other membranes.

.10 Avoid the formation of wrinkles, swellings or fishmouths.

3.14 INSTALLATION OF SELF-ADHERED CAP SHEET ONFLASHINGS AND PARAPETS

.1 This cap sheet must be installed in one-metre-wide strips.

.2 Each selvedge will overlap the previous one laterally along lines provided for this purpose, and will overlap by 150 mm the field surface. Cap sheet membranes for flashings must be spaced at least 100 mm with respect to the cap sheet membranes on the field surface, to avoid areas of excessive membrane thickness.

.3 Cut off corners at end laps of areas to be covered by the next roll.

.4 Use a chalk line to draw a straight line on the field surface 150 mm from the flashings and parapets.

.5 Apply a coat of self-adhesive membrane primer on the field surface and allow to dry.

.6 Position the pre-cut membrane. Remove 150 mm of the silicone release film to hold the membrane in place at the top of the flashing.

.7 Then, gradually peel off the remaining silicone release film, pressing down on the membrane with an aluminum applicator to ensure good adhesion. Use the aluminum applicator to ensure a perfect transition between the flashing and the field surface. Smooth the entire membrane surface with a membrane roller for full adhesion.

.8 Apply pressure on the entire membrane surface with a membrane roller for full adhesion.

.9 Adhere the first 50 mm of the self-adhesive side laps using a membrane roller, then heat-weld the last 50 mm (self-adhesive, heat-welded side laps).

.10 Apply adhesive for the first 125 mm of the end lap using a steel trowel with 5 mm notches.

.11 Complete the application by welding the last 25 mm of the overlap to the field surface, using an electric hot-air welder and a membrane roller.

3.15 INSTALLATION FOR VARIOUS DETAILS

.1 Install waterproofing membranes at various roofing details in conformance with typical details indicated in technical documentation of the manufacturer.

3.16 FLASHINGS

.1 Refer to Section 07 62 00.

3.17 TEMPORARY CLOSURE

.1 Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

3.18 FIELD QUALITY CONTROL

.1 Inspections:

.1 Inspection and testing of roofing application will be carried out by testing laboratory designated by Departmental Representative.

.2 Departmental Representative will pay for tests as specified in Section 01 45 00 - Quality Control.

.3 Inspection and testing of roofing application will be carried out by testing laboratory designated by Departmental Representative.

.4 Costs of tests will be paid by Departmental Representative.

3.19 MISCELLANEOUS DETAILS

.1 Curbed Plumbing Vent Detail: Remove and dispose of the existing spun aluminium roof jacks. Build new wood curb as per A.R.C.A. requirements. Install new R-40 batt insulation into the roof curb. Install 75 mm urethane spray foam in the bottom of the curb to complete an air seal. Install new sloped plywood cap cut to fit. Apply primer as per manufacturer's recommendations. Install a membrane over the new plywood cap and overlay lap 50 mm onto the vertical upstands of the vertical cap sheet. Foam a new lead sheet into the existing plumbing vent hub. Contour lead sheet over curb edges sufficient to cover newly applied membrane. Install new PVC pipe extensions to a height of 100 mm above the new lead sheet. PVC pipe to be secured in place with PC-4.

.2 Existing Drains: Remove the existing drain bowls and discard. Install new roof drain bowls. Install new clamp from existing pipe to new drain bowl. Check and tighten existing clamps in close proximity to existing plumbing that may be loose to varying degrees. Include cost to install short extension to accommodate adjustments of drain bowl piping. Install bowl insulation to match existing components. Upon installing the new drain bowl, set a ply of SBS membrane centered on the drain location. Install the sanded membrane into a bed of rubberized plastic cement. Drain bowl clamps to existing plumbing may be loose

to varying degrees. Include cost to install short extension to accommodate adjustments of drain bowl piping. Install new PVC downpipes with prefinished metal wraps color by Departmental Representative.

3.20 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 complying with their documented instructions.

.3 Repair or replace defaced or disfigured finishes caused by work of this section.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal"

.1 Place materials defined as hazardous or toxic in designated containers.

.2 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

.3 Ensure emptied containers are sealed and stored safely.

.4 Unused adhesive, sealant and asphalt materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.5 Dispose of unused adhesive material at official hazardous material collections site approved by Departmental Representative.

.6 Dispose of unused asphalt material at official hazardous material collections site approved by Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Aluminum Association (AA)

.1 DAF-45-R03, Designation System for Aluminum Finishes - 9th Edition.

.2 ASM-35-October 2000, Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.

.2 ASTM International

.1 ASTM A167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A240/A240M-11a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.3 ASTM A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.4 ASTM A792/A792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.

.5 ASTM B32-08, Standard Specification for Solder Metal.

.6 ASTM D523-89(2008), Standard Test Method for Specular Gloss.

.7 ASTM D822-01(R2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.

.2 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.

.3 CAN/CGSB-51.32- M77, Sheathing, Membrane, Breather Type.

.4 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.4 CSA International

.1 CSA A123.3-05(2010), Asphalt Saturated Organic Roofing Felt.

.5 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act (CEPA), 1999.

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.7 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC)

.1 CCMC-[2011], Registry of Product Evaluations.

.8 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act (TDGA), 1992.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for sheet metal roofing and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Proof of manufacturer's CCMC listing and listing number.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

.4 Samples:

.1 Submit 300 x 300 mm samples of each sheet metal material.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect sheet metal roofing from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 SHEET METAL MATERIALS

.1 Zinc coated steel sheet: to ASTM A653/A653M, commercial quality, with Z275 coating, regular spangle surface, 22 gauge.; profile to match existing.

2.2 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied silicone modified polyester.

.1 Colour selected by Departmental Representative from manufacturer's standard range.

.2 Specular gloss: 30 units +/-5 to ASTM D523.

.3 Coating thickness: 20 micrometres minimum.

2.3 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CAN/CGSB-37.5.

.3 Underlay: dry sheathing to CAN/CGSB-51.32.

.4 Slip sheet: as recommended by manufacturer.

.5 Sealant: Refer to Section 07 92 00 - Joint Sealants.

.6 Rubber-asphalt sealing compound: to CAN/CGSB-37.29.

.7 Cleats: of same material, and temper as sheet metal: 50 mm minimum wide.

.8 Fasteners: match existing.

.9 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.10 Solder: to ASTM B32.

.11 Flux: rosin, cut muriatic acid, or commercial preparation suitable for materials to be soldered.

.12 Touch-up paint: as recommended by sheet metal roofing manufacturer.

2.4 FABRICATION

.1 Fabricate aluminum sheet metal in accordance with AA ASM-35.

.2 Form individual pieces in 2400 mm maximum lengths. Make allowances for expansion at joints.

.3 Hem exposed edges on underside 12 mm, mitre and seal.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 Apply minimum 0.2 mm dry film thickness coat of plastic cement to both faces of dissimilar metals in contact.

.6 Protect metals against oxidization by backpainting with isolation coating where indicated.

.7 Tin edges of copper sheets to be soldered for width of 40 mm both sides with solder.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sheet metal roofing installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Use concealed fastenings except where approved in writing by Departmental Representative before installation.

.2 Include underlay under sheet metal roofing.

.1 Secure in place and lap joints 100 mm minimum.

.3 Apply slip sheet over asphalt felt underlay to prevent bonding between sheet metal and felt.

.1 Secure with anchorage and lap joints 50 mm minimum in direction of waterflow.

.4 Flash roof penetrations with material matching roof panels, and make watertight.

.5 Form seams in direction of water-flow and make watertight.

.6 Perform soldering with well heated coppers, heat seam thoroughly and sweat solder through its full width.

.7 Clean and flux metals before soldering.

.8 Follow sheet metal manufacturer's recommendations for soldering procedures.

.9 As work progresses, neutralize excess flux with 5% to 10% washing soda solution, and thoroughly rinse. Leave work clean and free of stains.

3.3 STANDING SEAM ROOFING

.1 Fold lower end of each pan under 20 mm.

.1 Slit fold 25 mm away from corner to form tab where pan turns up to make standing seam.

.2 Fold upper end of each pan over 50 mm.

.3 Hook 20 mm fold on lower end of upper pan into 50 mm fold on upper end of underlying pan.

.2 Apply sheet metal roofing beginning at eaves. Loose lock pans to valley flashing and edge strips at eaves and gable rakes.

.3 Finish standing seams 25 mm high on flat surfaces and 12 mm high on curved surfaces. Bend up one side edge 40 mm and other 45 mm.

.1 Make first fold 6 mm wide single fold and second fold 12 mm wide, providing locked portion of standing seam with 5 plies in thickness.

.2 Fold lower ends of seams at eaves over at 45 degrees angle.

.3 Terminate standing seams at ridge and hips by turning down in tapered fold.

.4 Form valleys of sheets not exceeding 3 m in length. Lap joints 150 mm in direction of flow.

.1 Extend valley sheet minimum 150 mm under roofing sheets.

.2 At valley line, double fold valley and roofing sheets and secure with cleats spaced 450 mm on centre.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by sheet metal roofing installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

.1 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM B32-04, Standard Specification for Solder Metal.

.2 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual 1997.

.3 Alberta Roofing Contractors Association (ARCA)

.4 ASTM A525M, Specification for General Requirements for Steel Sheet, Zinc-coated by Hot Dip Process.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 SHEET METAL MATERIALS

.1 Galvanized Sheet Steel: Commercial quality sheet to ASTM A653/A653M, Z275 zinc coating to ASTM A525M. 24 gauge, thickness equivalent 0.7010 mm, tolerance 0.1 mm; prefinished colour.

2.2 FABRICATION

.1 Form sections true to shape, accurate in size, square, and free from distortion or defects.

.2 Form pieces in maximum 1500 mm lengths.

.3 Hem exposed edges on underside 12.5 mm; mitre and seam corners.

.4 Form all cap flashing and base flashing corners with standing seams.

.5 Fabricate vertical faces with bottom edge formed outward 12.5 mm and hemmed to form drip.

.6 Fabricate cap flashings to lap 50 mm over base flashings.

.7 Fabricate cap flashings to have a drip leg with a fascia a maximum of 100 mm.

.8 Flashings to extend past the bottom of the blocking on the wall a minimum of 50 mm, or to cover the existing "fade" lines on walls visible from the ground level.

.9 No fascia portion of the metal cap is to exceed 150 mm. Switch to a two-piece detail.

.10 All fascias with a depth greater than 150 mm to have a reinforcing "V" break.

.11 Flashings visible from ground level to be fabricated from pre-painted metal. (Choice of colour by Departmental Representative from standard colours available.)

.12 Flashings for expansion joints, control joints, curbs and other miscellaneous items to be fabricated from galvanized steel unless otherwise directed in writing prior to tender closing.

.13 Fabricate a sheet metal sleeve around the scupper openings on the roof.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install sheet metal work in accordance with ARCA details.

.2 Install flashings not later than seven days after the installation of the membrane on any particular section of the roof.

.2 Install flashings so maximum distances between joints is 1500 mm.

.3 Fasten flashings through the extended "S" locks with annular ringed nails and secure with mechanical fasteners on fascia face, and mechanical fasteners on opposite face, mid-length of each panel.

.4 Install anchors using annular ringed nails.

.5 Fit flashings together so that one end of each section is free to move in the joint. Do not use any caulking or other sealant at joints.

.6 Lap, cap, or counter flashings with base flashing, minimum 50 mm.

.7 Where possible, do not set base flashing screws lower than 200 mm from top of the roof membrane.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 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.

3.4 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.

.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 Samples:

.1 Submit 2 samples of each type of material and colour.

.2 Cured samples of exposed sealants for each colour where required to match adjacent material.

.4 Manufacturer's Instructions:

.1 Submit instructions to include installation instructions for each product used.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect joint sealants from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

.1 Ambient Conditions:

.1 Proceed with installation of joint sealants only when:

.1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.

.2 Joint substrates are dry.

.3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.2 Joint-Width Conditions:

.1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Proceed with installation of joint sealants only after 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 Health Canada.

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 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.

.3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Silicones one part: to CAN/CGSB-19.13.

.2 Single component elastomeric sealant without isocyanates.

2.3 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.

.2 Primer: in accordance with sealant manufacturer's written recommendations.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for joint sealants installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative .

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 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 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.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Clean adjacent surfaces immediately.

.3 Remove excess and droppings, using recommended cleaners as work progresses.

.4 Remove masking tape after initial set of sealant.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by joint sealants installation.

3.9 SCHEDULE

.1 Silicone Sealant: use at metal flashing joints.

.2 Elastomeric Sealant: use around drains, vents, and skylights.

END OF SECTION