

PART1 - GENERAL

1.1 RELATED WORK

- .1 Section 055000 - Metal Fabrications.
- .2 Section 061000 - Rough Carpentry.
- .3 Section 076200 - Metal Flashing and Trim.
- .4 Section 079000 - Sealants.

1.2 SYSTEM DESCRIPTION

- .1 Furnish all labour, materials, equipment and services necessary for the complete supply and installation of roofing and sheet metal as indicated on the drawings and as specified.
- .2 The work of this Section is to include, but not necessarily be limited to, the supply and installation of the following:
  - .1 Protected modified bitumen roof membrane tie-in to existing membrane and roof hatch curb, guard rail supports, duct support framing and mechanical unit support frame to provide a complete weather tight and waterproof roofing system.
  - .2 Prefinished metal flashings at roof penetrations and curbs.

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
  - .2 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
  - .3 CGSB 37-GP-15M-76, Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
  - .4 CGSB 37-GP-19M-76, Cement, Plastic, Cutback Tar.
  - .5 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.
  - .6 CGSB 37-GP-56M-80, Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

- .7 CAN/CGSB-51.20-M87, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .3 Canadian Standards Association (CSA)
  - .1 CSA O80.27-M89, Fire-Retardant Treatment of Plywood by Pressure Processes. This Standard covers the fire-retardant treatment of Douglas Fir, hardwood, softwood, and Poplar plywood by pressure processes. Fire-Retardant Treatment of Plywood by Pressure Processes. This not a stand alone specification.
  - .2 CSA A123.4-M1992, Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.

#### 1.4 STORAGE AND HANDLING

- .1 Deliver and store materials in original containers with manufacturers labels and seals intact.
- .2 Provide and maintain dry, off-ground weatherproof storage.
- .3 Store rolls of felt and membrane in upright position. Store membrane rolls with selvage edge up.
- .4 Remove only in quantities required for same day use.
- .5 Store sealants at +5°C minimum.
- .6 Store insulation protected from daylight and weather and deleterious materials.
- .7 Store combustible materials away from heat and open flame.
- .8 Do not leave roofing material unsecured at the job site where they may be dislodged by wind.

#### 1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install roofing when temperature remains below -18°C for torch application, or -10°C, or to manufacturers' recommendations for mop application.
- .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.

#### 1.6 PROTECTION

- .1 Fire Extinguishers: maintain one cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle, ULC labeled for A, B and C class protection. Size 9 kg on roof per torch applicator, within 10 m of torch applicator.
- .2 Maintain fire watch for 1 hour after each day's roofing operations cease.

#### 1.7 GUARANTEE AND INSPECTION

- .1 Contractor hereby warrants that modified bituminous roofing and membrane flashings will stay in place and remain leak-proof in accordance with General Conditions, but for five years.
- .2 The independent inspection agency assigned by RCABC for this project is to provide inspection services as follows:
  - .1 Carry out full and complete inspections while the work is in progress, at completion of roofing installation and just prior to the date of Substantial Performance.
  - .2 Submit: A daily report sheet while work is in progress, showing weather, temperature, condition and progress of job, protection of materials and any other pertinent information including approved deviation from the Contract Documents; all on Roofing Inspection Company's Inspection form to:
    - the  
Departmental  
Representative  
s
    - the Roofing Sub-contractor's  
Superintendent
    - the Contractor's Superintendent
    - Department  
al  
Representa  
tives
  - .3 This report is to be countersigned by the Roofing Subcontractor's Superintendent acknowledging content.
- .3 Inspect and review materials and workmanship including storage, handling and protection.

inspections.

### 1.8 COMPATIBILITY

.1 Compatibility between existing and new components of roofing system is essential. Provide written declaration to Departmental Representatives stating that materials and components, as assembled in system, meet this requirement.

### 1.9 QUALITY ASSURANCE

- .1 Workmanship Standards: Conform to the latest "Minimum Standards" of the Roofing Contractors Association of British Columbia (RCABC) as published in the "RCABC Roofing Practices Manual" for a five year guarantee, unless modified by the contract documents to exceed those minimums.
- .2 Qualification of Workers: Employ skilled applicators approved by membrane manufacturer.
- .3 Inspection costs to be included in the tender price for this Section.

## PART 2 - PRODUCTS

### 2.1 ROOFING MATERIALS

- .1 Standards: Conform to the RCABC "Minimum Standards" and the appropriate CSA, CGSB and ASTM Standards for the materials used in the roofing system specified. Materials to be listed on RCABC Accepted Materials List; latest edition.
- .2 Use only components supplied or accepted by the roofing membrane manufacturer.

### 2.2 DECK COVERING

- .1 Fire Retardant Treated Plywood: DFP or CSP sheathing grade, fire-retardant treated to CSA O80.27, square edge, 12 mm thick.

### 2.3 DECK PRIMER

- .1 Asphalt primer: to CGSB 37-GP-9Ma.

## 2.4 MEMBRANE

- .1 Base sheet: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, minimum 2.2 mm thickness, polyester reinforcement, weighing 180 g/m<sup>2</sup>.
  - .1 Type 2, fully adhered.
  - .2 Class C - plain surfaced.
  - .3 Grade 2.
  - .4 Top surface suitable for torch-on application and bottom surface suitable for mopped application.
- .2 Cap sheet: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, minimum 4 mm thickness, polyester reinforcement, weighing 350 g/m<sup>2</sup>.
  - .1 Type 1.
  - .2 Class C - sanded surfaced.
  - .3 Grade 2.
  - .4 Bottom surface suitable for torch-on application.

## 2.5 BITUMEN

- .1 Asphalt: to CSA A123.4, Type 3.

## 2.6 INSULATION

- .1 To CAN/ULC-S701-97, Type 4, extruded expanded polystyrene, 610 x 1220 mm size, shiplapped edges.
  - .1 Concrete topped insulation: to match existing, 50mm thickness with integral factory applied 9 mm thick latex modified concrete topping.

## 2.7 SEALERS

- .1 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.
- .2 Sealants: Refer to Section 079000 - Joint Sealers.

## 2.8 FASTENERS

- .1 Covering to steel deck: No. 10 flat head, self-tapping, Type A or AB, cadmium plated screws to CSA B35.3.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- .1 Do roofing work in accordance with RCABC Standards for five year guarantee.
- .2 Do priming for asphalt roofing in accordance with CGSB 37-GP-15M.

3.2 PROTECTION

- .1 Cover walls and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of work.
- .3 Locate kettles so smoke will not discolour building. Install protective paper or plywood underneath kettles and on the adjacent ground.
- .4 Clean off drips and smears of bituminous material immediately.
- .5 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.
- .6 Protect roof from traffic and damage. Comply with precautions deemed necessary by Departmental Representatives. Where work must continue over finished roofing membrane cover finished roof membrane with 12 mm thick plywood sheets.
- .7 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.

3.3 EXAMINATION OF ROOF DECKS

- .1 Examine roof decks and immediately inform Departmental Representatives in writing of defects.
- .2 Prior to commencement of work ensure:
  - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.
  - .2 Roof hatch and metal supports for roof mounted equipment have been installed and inspected.
  - .3 Curbs have been built.
  - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
  - .5 Fall restraints complying to WCB requirements are in place.

### 3.4 DECK COVERING

- .1 Mechanically fasten to steel deck with screws at manufacturer's recommended spacings.
- .2 Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.

### 3.5 PROTECTED MEMBRANE ROOFING APPLICATION

- .1 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 asphalt applied at rate of 1.2 kg/m<sup>2</sup>, at 230°C.
  - .3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps. Lap minimum 150 mm over existing membrane.
  - .4 Application to be free of blisters, wrinkles and fishmouths.
- .2 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 torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
  - .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.
- .3 Flashings.
  - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
  - .2 Mop base sheet onto substrate in 1 metre wide strips.
  - .3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by mopping or torch welding.
  - .4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.
  - .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.

- .4 Roof penetrations.
  - .1 Install roof penetration flashings and seal to membrane in accordance with the manufacturer's recommendations and details.
- .5 Insulation: match insulation to existing roof.
  - .1 Lay insulation boards tight with shiplapped edges.
  - .2 Cut end boards to suit.
  - .3 Offset joints in insulation boards in two layer application.

### 3.6 FIELD QUALITY CONTROL

- .1 Inspection and testing of roofing application will be carried out by RCABC approved inspection agency in accordance with requirements for RCABC five year guarantee.
- .2 Inspection costs associated with RCABC five year guarantee to be included in the tender price for this Section.
- .3 Departmental Representatives will pay for additional daily roofing inspections by local RCABC approved inspection agency. Deficiencies noted during additional inspections to be corrected to satisfaction of the Departmental Representatives.

### 3.7 ADJUST AND CLEAN

- .1 Immediately repair, remove and clean all drips or smears of asphalt on exposed finished surfaces or surfaces to be subsequently finished.
- .2 Remove any surplus supplies and debris resulting from the work of this Section promptly upon completion of the work.

END OF SECTION



PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 055000 - Metal Fabrications.
- .2 Section 075500 - Protected Membrane Roofing.
- .3 Section 079000 - Sealants.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
  - .1 ASTM A525M-91a, Specification for General requirements for steel sheet, zinc coated (galvanized) by the Hot-Dip Process (Metric)
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA A123.3-98, Asphalt Saturated Organic Roofing Felt.
  - .2 CSA B111-1974(R1998), Wire Nails, Spikes and Staples.
- .4 Roofing Contractors Association of British Columbia Roofing Practices Manual, latest edition.
- .5 Sheet Metal and air Conditioning Contractors National Association Inc. (SMACNA) Architectural Sheet Metal Manual, latest edition.

1.3 SAMPLES

- .1 Submit shop drawings in accordance with Section 013300 - Submittal Procedures.
- .2 Submit duplicate 200 mm x 200 mm samples of each type of sheet metal material, colour and finish.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 013550 - Waste Management and Disposal.

- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .5 Divert unused metal materials from landfill to metal recycling facility.
- .6 Unused paint and sealant material must be disposed of at an official hazardous material collections site.
- .7 Unused paint and sealant material 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.
- .8 Fold up metal banding, flatten and place in designated area for recycling.

## PART2 - PRODUCTS

### 2.1 PREFINISHED STEEL SHEET

- .1 Zinc coated steel sheet: 0.61 mm base metal thickness, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.
- .2 Finish: Prefinished steel sheet conforming to Canadian Sheet Steel Building Institute (CSSBI) with minimum 2-coat fluoropolymer paint system cured by baking, using metallic colours of proven durability for exterior exposure.
  - .1 2-coat 10 000 Series system based on Kynar 500 or Hylar 5000 resin system with twenty year guarantee against cracking, peeling and fading.
  - .2 Colour to match existing.

### 2.2 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
- .3 Underlay for metal flashing: No. 15 perforated asphalt felt to CSA A123.3.

- .4 Sealants: gunnable grade, single component urethane caulk.
- .5 Cleats: of same material, and temper as sheet metal, continuous width. Thickness same as sheet metal being secured.
- .6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .8 Solder: to ASTM B32.
- .9 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.
- .10 Touch-up paint: as recommended by prefinished material manufacturer.

### 2.3 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable RGC Guarantee Standards and Sheet Metal and Air Conditioning Contractors National Association Inc. (SMACNA) Architectural Sheet Metal Manual details.
- .2 Form pieces in 2 400 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.
- .6 Use S-lock seams as standard with standing seams at corners.

### 2.4 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of 0.61 mm base metal thickness galvanized prefinished steel.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install sheet metal work in accordance with applicable RGC Guarantee Standards and Sheet Metal and Air Conditioning Contractors National Association Inc. (SMACNA) Architectural Sheet Metal Manual details.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal where flashings do not cover roof membrane. Secure underlay in place and lap joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock and standing seams forming tight fit over hook strips.
- .5 Lock end joints and caulk with sealant.
- .6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .7 Insert metal flashing under cap flashing to form weather tight junction.
- .8 Extend base flashings down over membrane flashing on curbs and cants to minimum 25 mm above roof membrane surface.
- .9 Turn top edge of flashing into recessed reglet minimum of 25 mm. Lead wedge flashing securely into joint.
- .10 Caulk flashing at reglet with sealant.
- .11 Install pans, where shown around items projecting through roof membrane.

END OF SECTION

PART 1        GENERAL

1.1 SUMMARY

- .1    This Section specifies caulking and sealants not specified in other Sections.
- .2    Refer to other sections for other caulking and sealants.
- .3    Supply all labour, materials and equipment necessary to complete all caulking and sealing of exterior and interior joints where shown on the drawings and as specified herein.

1.2 REFERENCES

- .1    CAN/CGSB-19.24-M90, Type 2, Class B, Multi-component, polyepoxide urethane sealant.
- .2    CAN/CGSB-19.17-M90, One Component Acrylic Emulsion Base Sealing Compound.
- .3    CAN/CGSB-19.21-M87, Sealing and Bedding Compound Acoustical.

1.3 SITE CONDITIONS

- .1    Sealant and substrate materials to be minimum five degrees C.

1.4 QUALIFICATIONS OF APPLICATOR

- .1    Caulking installation to be performed by workmen thoroughly skilled and specially trained in the techniques of caulking and who are completely familiar with the published recommendations of the manufacturer of the caulking material to be used.
- .2    Indication of lack of skill on the part of caulking applicators will be sufficient grounds for the Departmental Representatives to reject installed caulking and to require its immediate removal and complete recaulking at no extra cost to the contract price.

1.5 WARRANTY

- .1    Provide a written warranty, signed and issued in the name of the Owner, stating that

caulking work of this Section is guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion, staining adjacent surfaces, or other failure, for a period of ten years from the date of Certificate of Substantial Performance.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels intact.
- .2 Protect materials from freezing, moisture and water.

#### 1.7 ENVIRONMENTAL AND SAFETY REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials and regarding labeling and provision of material safety data sheets acceptable to Human Resources Development 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.
- .3 Ventilate work area using approved portable supply and exhaust fans.

#### 1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01355 - Waste Management and Disposal and the Waste Reduction Workplan.
- .2 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .3 Dispose of surplus chemical and finishing materials and used hazardous sealant tubes and other containers in accordance with federal, provincial and municipal regulations.

- .4 Separate corrugated cardboard in accordance with the Waste Management Plan and place in designated areas for recycling.
- .5 Fold up metal banding, flatten, and place in designated area for recycling.
- .6 Use trigger operated spray nozzles for water hoses.
- .7 Return solvent and oil soaked rags for contaminant recovery and laundering or for proper disposal.
- .8 Use the least toxic sealants, adhesives, sealers, and finishes necessary to comply with the requirements of this section.
- .9 Close and seal tightly all partly used sealant containers and store protected in well ventilated fire-safe area at moderate temperature.

#### 1.9 PROTECTION

- .1 Protect the work of this Section from damage by others and protect the work of others from the work of this Section.
  - .1 Seal the junctions of differing exterior wall materials.

### PART 2 PRODUCTS

#### 2.1 SEALANT MATERIALS

- .1 Use sealant(s) specified below:
  - .1 Type 1: Multi-component, polyepoxide urethane sealant. To meet specified requirements of CGSB specification CAN/CGSB-19.24-M90, Type 2, Class B. Use at all exterior locations, except where another type is specified.

### PART 3 EXECUTION

#### 3.1 PREPARATION

- .1 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil, grease and other matter which may impair work.

- .2 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.
- .3 Ensure joint surfaces are dry and frost free.
- .4 Prepare surfaces in accordance with manufacturer's directions.

### 3.2 MIXING

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

### 3.3 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 or 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 Locations:
  - .1 Caulk all joints where indicated on the drawings and at all locations where required to provide a complete weathertight building.
  - .2 Install sealants in all locations shown on drawings.



- .3 Install sealant at the perimeter of all exterior openings where doors, windows, grilles and other items that abut or penetrate the exterior wall materials.
- .5 Seal the junctions of differing exterior wall materials.
- .6 Provide a minimum of two continuous beads of sealant under all prefinished galvanized steel wall flashings.
- .3 Curing.
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.
- .4 Cleanup.
  - .1 Clean adjacent surfaces immediately and leave work neat and clean.
  - .2 Remove excess and droppings, using recommended cleaners as work progresses.
  - .3 Remove masking tape after initial set of sealant.

End of Section