

1. GENERAL

1.1 SECTIONS INCLUDED:

- .1 Substrate penetrations
- .2 Roofing accessory installation
- .3 Vapour & air barrier installation
- .4 Insulation installation
- .5 Membrane installation
- .6 Membrane flashing

1.2 RELATED WORK UNDER OTHER SECTIONS

- .1 Steel Roof Deck
- .2 Exterior Gypsum Board
- .3 Wood Blocking
- .4 Metal Flashing

1.3 REFERENCES

- .1 Roofing Contractors Association of Alberta; "Manual on Good Roofing Practice and Accepted Roofing Systems".
- .2 Carlisle Syntec System Canada E.P.D.M. Loose Laid Ballasted Roofing System Specification.
- .3 CSA A123.3-M, "Asphalt or Tar Saturated Roofing Felt".
- .4 CGSB 37-GP-52M, "Roofing and Waterproofing Membrane, Sheet Applied, Elastomeric".
- .5 ASTM C1002, "Steel Drill Screws for the Application of Gypsum Board".
- .6 CAN/CSA A82.27-M, "Gypsum Board Products".
- .7 CAN/CSA A247-M, "Insulating Fibreboard".
- .8 CSA A101-M, "Mineral Fibre Thermal Building Insulation".
- .9 CAN/CGSB-51.20-M, "Thermal Insulation, Polystyrene, Board and Pipe Covering".
- .10 CAN/CGSB-51.31-M, "Thermal Insulation, Mineral Fibre Board for Above Roof Decks".

1.4 DESCRIPTION

- .1 Furnish and install an E.P.D.M. Design B roofing system and related roofing accessories in strict accordance with the specifications and details. E.P.D.M. membrane sheets are to be loose laid over the air barrier and insulation and seamed together. System is to be ballasted with washed river stone or an approved substitute.

1.5 QUALITY ASSURANCE

- .1 Roofing contractor shall be an approved applicator of the system to be installed.
- .2 Workmen shall be trained and experienced in the installation of this type of roofing system and shall be under full time competent supervision.
- .3 Manufacturer's representative shall carry out upon completion of work, a final inspection with the Contractor and Architect's representative.
- .4 The Owner shall engage an independent roofing inspection agency to carry out inspections during the course of the work. This item is not to be included in the costs of this Section.

1.6 SUBMITTALS

- .1 Shop Drawings; Submit shop drawings detailing roof size, membrane sheet placement, location and type of penetration, type of vapour retarder, insulation, and air barrier and methods of installation for approval prior to the commencement of the work.

1.7 DELIVERY, STORAGE & HANDLING

- .1 Deliver all roofing materials in original, unopened containers, complete with labels indicating brand name, contents, usage instructions and safety precautions.
- .2 Protect membranes from cuts, abrasion or other abuse that might adversely affect performance in service.
- .3 WHMIS safety bulletins on all hazardous products are to be readily available to the work crew at all times.
- .4 Adhesives, sealants and flashing accessories are to be stored in a clean, dry area at a temperature between 5°C and 27°C. If exposed to a lower temperature, restore to an acceptable level before using.

- .5 Do not work during periods of rain, fog, sleet, snow or cold temperatures (below -15°C).
- .6 Store felts off the ground and under cover. Store rolls on end.
- .7 Remove damaged materials from the site promptly.
- .8 Ensure that all materials are dry at the time of application.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Do not apply roofing membrane during inclement weather or when the air temperature may fall below -10°C taking into consideration the added wind chill factor.
- .2 Do not apply roofing membrane to a damp, frozen or unsuitable deck surface.
- .3 Deck surfaces shall be clean and sufficiently dry to ensure proper adhesion.
- .4 Steel decks shall be free from rust, scale or grease.
- .5 Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during the same day.
- .6 Decks shall be free of snow and ice, including flutes of metal deck.

1.9 WARRANTY

- .1 Roofing System supplier shall provide a written [material, watertight] warranty on supplier's standard form for a period of 10 years from the date of roofing system completion.
- .2 Roofing Contractor shall provide a written warranty against leaks or workmanship defects for a period of two years from the date of roofing system completion.

2. PRODUCTS

2.1 ROOFING MEMBRANE SYSTEM

- .1 Membrane to be a 1.1mm (0.045") thick standard E.P.D.M. membrane (ethylene propylene diene monomer). Membrane to meet the requirements of the ASTM Test Methods for thickness tolerance, tensile strength, elongation, tear resistance, ozone

resistance, brittleness, water absorption, linear dimension change and factory seam strength.

- .2 Flashing: as provided by the membrane manufacturer.
- .3 Splice Cleaner: as provided by the membrane manufacturer.
- .4 Splice adhesive: as provided by the membrane manufacturer.
- .5 Splice tape: as provided by the membrane manufacturer.
- .6 Rap sealant: as provided by the membrane manufacturer.
- .7 Perimeter bonding adhesive: as provided by the membrane manufacturer.
- .8 Pourable sealer: as provided by the membrane manufacturer.
- .9 Water cut-off mastic: as provided by the membrane manufacturer.
- .10 Night sealant: as provided by the membrane manufacturer.
- .11 Termination sealer tape: as provided by the membrane manufacturer.
- .12 Termination bar: as provided by the membrane manufacturer.
- .13 Protection mat: as provided by the membrane manufacturer.
- .14 Pavers: 750 x 600 precast concrete patio pavers to locations indicated.
- .15 Ballast: smooth 2 - 4 cm diameter, washed river stone or an acceptable substitute system.
- .16 Vapour Retarder: 2 ply asphalt roofing system.
 - .1 Asphalt felt: Asphalt saturated organic felt to CSA A123.3-M1979 15 lbs. per 100 sq.ft., perforated.
 - .2 Base sheet: Asphalt coated glass fibre felt, factory coated, 40 lbs. per 100 sq.ft.
 - .3 Asphalt: To CSA A123.4-M1979, Type 2 or Type 3, as required.
 - .4 Asphalt primer: To CGSB 37-GP-9M.

- .17 Insulation: Expanded polystyrene roof insulation consisting of 24" x 96" panels made of foam conforming to CAN/CGSB-51.20-M87, Type 4, with R = 5 per inch.
 - .1 Acceptable manufacturers and products:
 - .1 "Styrofoam SM" manufactured by Dow Chemical.

2.2 ACCESSORIES

- .1 Vent stack and mastic pan flashing.
- .2 Roof drains.
- .3 Screws for fastening gypsum board to steel deck: To ASTM C1002-83, No. 10, Flathead with corrosion resistant treatment, double thread design, self-drilling, type S, minimum 1" long.
- .4 Fibre cant strip: Laminated wood fibreboard insulation, asphalt impregnated. Approximately 4" x 4", of 12" thick laminations.
- .5 Gypsum board: To CAN/CSA A82-27-M91, plain type, 1/2" thick minimum.
- .6 Roofing Nails: No. 10 gauge hot dipped zinc coated (not electrogalvanized) with 1/2" diameter heads.
- .7 Pressure sensitive tape: 2" wide self-adhering polyethylene-coated cloth tape commonly known as "duct tape".
- .8 Pourable sealer: Polyurethane based product, black, two component, solvent free, 100% solids, as manufactured by Carlisle Syntec Systems Canada or Firestone Building Products Company or Lexcan Industrial Supply Limited.
- .9 Penetration pockets: Prefabricated pocket as manufactured by Lexcan Industrial Supply Limited. Acceptable Alternate: Galvanized sheet metal pocket with soldered joints maximum length 12", base flange one piece with no open corners extending 5" out from pocket. Minimum height of pocket 4" above roof surface.

3. EXECUTION

3.1 INSPECTION

- .1 Inspect roof deck to ensure deck is clean and smooth, free of deficiencies.

- .2 Prior to installation of roof, check and confirm that roof drains are located at least 36" from cant strips, and that all curbs, penetration pockets, etc., especially those for mechanical and electrical items, are located at least 36" from perimeters, except when clearly detailed and dimensioned otherwise.
- .3 Verify that every penetration for pipes, conduits, ducts, or other appurtenance passing through the roof has a properly constructed curb for terminating the roof membrane or that a penetration pocket is supplied and that perimeter blocking and nailing strips have been properly installed.
- .4 Prior to commencing roofing operations correct any conditions which would affect the proper application and performance of the roofing.

3.2 PREPARATION

- .1 Protect surrounding surfaces against damage from roofing work. Where hoisting is necessary, hang tarpaulins to protect walls prior to delivery of hot asphalt from around the roof.
- .2 Ensure that adequate fire extinguishers are located near any kettle being used, when the kettle is located on or in the building. Location of the kettle is subject to approval of the Architect.
- .3 Do not allow smoke, gases or vapours from kettles or roofing work to enter air intake system.

3.3 INSTALLATION

- .1 Apply gypsum board to steel deck roofs. Lay with board length at right-angles to the steel deck, stagger joints, and support end joints on tops of flutes.
- .2 Secure gypsum board using screws at 16" o.c. within boards each way, minimum 20 screws per 4' x 8' sheet. Centre screws on ribs. Select screws long enough to penetrate the deck 3" - d". Drive heads flush with the surface of the sheathing.
- .3 Apply pressure sensitive tape to joints.

3.4 PREPARATION OF ASPHALT

- .1 Maintain roofing equipment in good working order. Keep kettles at least one-half full during working period. Add cold bitumen in small quantities. Stir contents of kettles frequently to prevent localized overheating.

- .2 Equip kettles with thermometers. Provide portable stem thermometer to check surface temperature and to check thermometer attached to kettle.
- .3 Do not heat asphalt above 232°C as measured at the outlet valve of the kettle or tanker.
- .4 Apply asphalt at a temperature range of 218°C maximum and 205°C minimum, as measured in the pail on the roof.
- .5 Do not allow asphalt which has been spread to cool to a degree that will impair its adhesive quality.

3.5 VAPOUR RETARDER - FELT

- .1 Over the gypsum board apply asphalt at a rate of 20 lbs/100 sq.ft., in compliance with the Alberta Building Code requirements.
- .2 Embed into hot asphalt two plies of No. 15 asphalt saturated organic felt. Overlap felt edges 2" ends 6".
- .3 Extend vapour retardant to roof edge construction and seal to adjacent wall construction at the plane of the vapour barrier or cavity wall adhesive with rubber sheet and adhesive of indicated, otherwise with modified bituminous membrane to maintain continuity of air and vapour tightness of the building envelope.
- .4 Seal all penetrations through the vapour retardant with rubber sheet if movement is anticipated or with modified bituminous membrane.

3.6 INSULATION

- .1 Loose lay insulation panels over vapour retardant felts with joints tightly butted, and with upper surface flush across joints, following the layout procedures recommended by the manufacturer, in accordance with the reviewed shop drawings.
- .2 Cut insulation to fit neatly to perimeter blocking and around all projects through the roof.
- .3 Apply no more insulation than can be covered with roof membrane on the same day.
- .4 Make insulation no less than 2" thick anywhere.

3.7 POSITIONING MEMBRANE SHEETS

- .1 Ensure substrate is clean, flat and free from dirt or debris that might be detrimental to the performance of the membrane.
- .2 Unroll membrane sheets and position according to the shop drawings, allowing a minimum 10 - 15 cm overlap with adjoining sheets. Let sheets relax for a minimum of 30 minutes before performing work.

3.8 SPLICING MEMBRANE SHEETS

- .1 Fold top sheet of splice area back and clean seam area with Seam Cleaner. Apply Splice Adhesive to both mating surfaces with a paint brush using straight painting strokes (not a circular motion). Allow adhesive to dry until it is tacky but does not stick to a dry finger touch.
- .2 Apply Standard Seam Tape to folded edge of membrane, overlapping the edge 5 - 8 mm. Roll back of tape heavily with a steel roller. Remove paper backing and allow upper membrane to fall into place, without stretching. Roll seam with steel hand roller.
- .3 Apply 30 cm square patch of Flashing with Splice Adhesive centred over seam joints at all "T junctions", horizontal / vertical transitions or crossing expansion joints. Roll flashing heavily with a hand roller.
- .4 Apply Lap Sealant to all membrane and flashing edges then feather with tool provided.
- .5 Thoroughly inspect all seams for proper adhesion prior to proceeding with ballast application.

3.9 PERIMETER SECUREMENT (FLATBOND METHOD)

- .1 Insulation around roof perimeter and near large protrusions (skylights, roof hatches) is to be mechanically fastened to the deck with appropriate insulation fasteners. Fasteners are to be located in one row on 45 cm centres, 15 cm out from the perimeter. In lieu of mechanical fastening, an approved adhesive may be used to adhere the insulation. The insulation must be fully adhered a minimum of 125cm out from the perimeter.
- .2 E.P.D.M. membrane is to be fully bonded with Bonding Adhesive to a minimum 23 cm wide strip of the insulation or substrate extending out from the roof perimeter and any large roof protrusions (hatches, skylights, equipment curbs, etc.).

Apply adhesive to both mating surfaces according to the adhesive application instructions. Membrane is also to be fully bonded to all vertical surfaces including walls, curbs and parapets.

- .3 Unless approved detail shows otherwise, membrane must either terminate in a reglet, be fastened according to paragraph 3.7.5 below, or be carried overtop of wall or parapet and counterflashed with sheet metal.
- .4 If terminating membrane part way up a wall or parapet, apply Termination Sealer Tape or 50mm wide bead of Water Cut-off Mastic to backside of membrane edge. Press membrane against wall and roll with a steel hand roller. Position Termination Bar over the upper edge of the membrane and fasten into the wall with appropriate fasteners. Ensure a minimum separation between bar strips of 2cm. Apply Water Cut-off Mastic caulking along upper edge of bar and overtop of all fastener heads.

3.10 FLASHING & ACCESSORY INSTALLATION

- .1 Install pre-formed metal flashings, drain hoppers etc. according to the manufacturer's installation instructions.
- .2 Flash all corners, vent pipes, posts, curbs and pre-formed flashings in strict accordance with current Lexcan installation instructions and details. Flashing edges are to be caulked with Lap Sealant. Membrane is to be sealed to drains with Water Cut-off Mastic or Termination Sealer Tape as per approved details.

3.11 PAVER INSTALLATION

- .1 If pavers have sharp edges, place an additional layer of E.P.D.M. membrane or Protection Mat underneath to protect the main roofing membrane.
- .2 Position pavers neatly on membrane or pedestals. Ensure pavers are properly seated and are flush with adjacent pavers.

3.12 BALLAST INSTALLATION

- .1 Apply washed river stone ballast over top of membrane at the minimum rate of 50 kg/m². If washed river stone is unavailable, gravel or slag may be substituted provided protection mat is placed over top of the E.P.D.M. membrane first. Protection Mat sheets are to be loose laid and lapped a minimum of 30 cm on all sides.

3.13 CLEAN-UP

- .1 Remove all cut pieces, wrappings, waste and debris from the job site.

3.14 WARRANTY INSPECTION

- .1 Upon completion of the roofing system, an authorized representative will make an inspection of the installation for warranty acceptance.

***** END OF SECTION *****