

1 General

1.1 DESCRIPTION

- .1 The work covered in this section shall include the patching of the existing built-up roofing (BUR) system with a suitable conventional BUR roofing system to the standards identified in the following sections.
- .2 The work shall also include the flashing of newly constructed roof curbs to the following standards.
- .3 Use of proposed protected membrane application shall be submitted to the Engineer for approval, along with all required material specifications

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM D 1863-86, Specification for Mineral Aggregate Used on Built up Roofs.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
 - .2 CAN/CGSB-37.8-M88, Asphalt, Cutback, Filled, for Roof Coating.
 - .3 CGSB 37 GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .4 CGSB 37-GP-15M-84, Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
 - .5 CGSB 37-GP-19M-76(R1985) Cement, Plastic, Cutback Tar.
 - .6 CGSB 37-GP-21M-6(R1985), Tar, Cutback, Fibrated, for Roof Coating.
 - .7 CAN/CGSB-37.28-M89, Reinforced Mineral Colloid Type, Emulsified Asphalt for Roof Coatings and Waterproofing.
 - .8 CAN/CGSB-37.29-M89, Rubber Asphalt Sealing Compound.
 - .9 CAN/CGSB-51.25-M87, Thermal Insulation, Phenolic, Faced.
 - .10 CAN/CGSB-51.26-M86, Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.
 - .11 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
 - .12 CGSB 51-GP-38M-76, Thermal Insulation, Cellular Glass, Pipe Covering, Block and Board.

- .3 Canadian Standards Association (CSA).
 - .1 CSA A123.2 M1979(R1992), Asphalt Coated Roofing Sheets.
 - .2 CSA A123.3-M1979(R1992), Asphalt or Tar Saturated Roofing Felt.
 - .3 CSA A123.4-M1979(R1992), Bitumen for Use in Construction of Built Up Roof Coverings and Dampproofing and Waterproofing Systems.
 - .4 CSA A231.1-1972, Precast Concrete Paving Slabs.
 - .5 CAN/CSA A247-M86(R1996), Insulating Fibreboard.
 - .6 CSA A284-1976, Mineral Aggregate Thermal Roof Insulation.
 - .7 CAN/CSA ISO 9001 9002 9003, Requirements for Quality Assurance, Parts 1, 2 and 3.
 - .8 CSA O121 M1978, Douglas Fir Plywood.
- .4 Canadian Roofing Contractors Association (CRCA).
 - .1 CRCA Specification.
- .5 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S701-97, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S702-97, Standard for Mineral Fibre Thermal Insulation for Buildings.
 - .3 CAN/ULC-S704-98, Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.
 - .4 CAN/ULC-S706-98, Insulated Fiberboard.

1.3 SUBMITTALS

- .1 Submit proof of manufacturers CCMC Listing and listing number in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit proof of manufacturers ISO 14001 registration and compliance in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

1.4 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.

- .3 Submit product data sheets for bitumen, roofing felts, and insulation. Include:
 - .1 Product characteristics.
 - .2 Performance criteria.
 - .3 Limitations.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Provide and maintain dry, off ground weatherproof storage.
- .2 Store materials on supports to prevent deformation.
- .3 Remove only in quantities required for same day use.
- .4 Store materials in accordance with manufacturers written instructions.
- .5 Store insulation protected from sunlight and weather and deleterious materials.
- .6 Deliver materials in original containers, sealed, with labels intact. Ensure that shelf life of materials has not expired.
- .7 Deliver fasteners in boxes or kegs and keep in protective storage until used. Do not oil or grease fasteners.
- .8 Remove damaged and/or rejected materials from site.

1.6 WARRANTY

- .1 For Work in this Section, 12 months warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to 60 months.
- .2 Contractor hereby warrants that Built up Bituminous Roofing and Waterproofing and membrane flashings will stay in place and remain leakproof in accordance with CCDC 2 GC 24, but for 60 months.

2 Products

2.1 COMPATIBILITY

- .1 Compatibility between components of the proposed patching system and existing roofing materials is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.

2.2 DECK SHEATHING

- .1 Plywood: to CSA O121 or CSA O151, Sheathing Grade, 19 mm thick.

2.3 PRIMERS

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

2.4 VAPOUR RETARDER

- .1 Asphalt laminated sheets to CAN/CGSB 51.33, Type 1, and fire retardant adhesive.
- .2 2 ply asphalt and felt membrane.

2.5 BUILT-UP MEMBRANE

- .1 Contractor to review existing roofing system. Unless existing differs greatly, a four ply asphalt and felt built up conventional membrane roof system. Submit an alternate system to Departmental Representative for review if required.

2.6 BITUMEN

- .1 Asphalt: to CSA A123.4, Type 2.

2.7 FELTS

- .1 Saturated organic felts: to CSA A123.3 No.15, saturant asphalt .
- .2 Asphalt coated sheets: to CSA A123.2, Type S, smooth surface No. 50.

2.8 ROOF INSULATION

- .1 Roof insulation to match existing type and thickness.

2.9 SEALERS

- .1 Plastic cement: asphalt, to CAN/CGSB 37.5.
- .2 Sealing compound: to CAN/CGSB 37.29, rubber asphalt type.

2.10 FASTENERS

- .1 Insulation to substrate: fasteners and plates must meet Factory Mutual 4470 Standard for wind uplift and corrosion resistance.

2.11 FILTER FABRIC

- .1 UV resistant, black woven polyolefin fabric for installation between insulation and stone ballast in protected membrane system. Fabric to meet recommendation of insulation manufacturer.

2.12 BALLAST

- .1 Stone: size to match existing, well graded crushed stone, opaque, non porous, washed, free from fines, long splinters, moisture, ice and snow.

3 Execution

3.1 WORKMANSHIP

- .1 Do work in accordance with applicable, standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual except where specified otherwise.
- .2 Do priming for asphalt in accordance with CGSB 37 GP 15M.

3.2 HEATING OF ASPHALT

- .1 Asphalt to be heated in kettle or tanker sufficiently to provide correct EVT range at point of application.
- .2 In cold weather insulate hauling equipment and re circulation lines to minimize heat loss.
- .3 Do not heat asphalt above its Final Blowing Temperature (FBT) in tanker.
- .4 Heating asphalt above its FBT may be permissible in kettle as long as asphalt is used up within four hours.
- .5 Equip kettle and tanker with working thermometers.

3.3 PLANT AND EQUIPMENT

- .1 Do not use direct fired equipment.
- .2 Use only kettles equipped with thermometers or gauges in good working order.
- .3 Locate kettles in safe place outside of building or, if approved by Departmental Representative, on noncombustible substrate at location to avoid danger of igniting combustible material below. When locating kettles, give consideration to direction of prevailing winds, building fans and air handling units to minimize possibility of smoke and fumes entering surrounding occupied buildings. If wind direction causes smoke and fume problems, relocate kettles on daily basis when directed by Engineer.
- .4 Maintain supervision while kettles are in operation and provide metal covers for kettles to smother flames in case of fire. Provide suitable fire extinguishers.
- .5 Maintain efficiency of kettles and equipment by frequent cleaning. Remove all carbonized bitumen.

- .6 Use only fibreglass roofing mops.

3.4 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 Clean off drips and smears of bituminous material immediately.
- .4 Dispose of rain water off substrates and away from face of building until drains or hoppers installed and connected.
- .5 Protect from traffic and damage. Comply with precautions deemed necessary by Departmental Representative.
- .6 Place plywood runways over work to enable movement of material and other traffic.
- .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.
- .8 Install insulation promptly to avoid possibility of condensation beneath vapour retarder.

3.5 SUBSTRATE EXAMINATION

- .1 Examine substrates and immediately inform of Engineer in writing of defects.
- .2 Prior to commencement of work ensure:
 - .1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.
 - .2 Curbs have been built.
 - .3 Plywood and lumber nailer plates have been installed to walls and parapets as indicated.

3.6 PRIMING CONCRETE DECK

- .1 Apply primer on concrete deck at the rate specified on the container.

3.7 DECK SHEATHING

- .1 Over existing opening infills, mechanically fasten sheathing to wood joists with screws spaced 400 mm oc each way.

3.8 VAPOUR RETARDER (CONCRETE & PLYWOOD DECK)

- .1 Embed two piles of felts in hot bitumen spread at rate of 1 kg/m² for organic asphalt.

3.9 INSULATION: FULLY ADHERED, ADHESIVE APPLICATION

- .1 Adhere insulation to laminated vapour retarder with sprinkle mopped or narrow ribbons of hot asphalt.
- .2 Place boards in parallel rows and length parallel with slope, with ends staggered, and in firm contact with one another.
- .3 Cut end pieces to suit.

3.10 INSULATION: FULLY ADHERED, BITUMEN APPLICATION

- .1 Embed insulation in 1 to 1.5 kg/m² mopping of bitumen.
- .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
- .3 Cut end pieces to suit.

3.11 INSULATION: MECHANICALLY FASTENED APPLICATION

- .1 Mechanically fasten insulation using screws and pressure distribution plates.
- .2 Number and pattern of screws per board to meet Factory Mutual requirements.
- .3 Place boards in parallel rows with ends staggered, and in firm contact with one another.
- .4 Cut end boards to suit.

3.12 TAPERED INSULATION: APPLICATION

- .1 If required, mop insulation to felt vapour retarder and top layer of insulation to bottom layer with hot asphalt at rate of 1 kg/m².
- .2 Install tapered insulation as second insulation layer. Stagger joints between layers 150 mm minimum.

3.13 CONVENTIONAL MEMBRANE APPLICATION

- .1 Membrane application.
 - .1 Starting at low point, perpendicular to slope, embed four plies of roofing felts in hot asphalt over insulation.
 - .2 Overlap sheets 3/4 of their width plus 15 mm for four ply membrane and lap ends 150 mm.
 - .3 Apply asphalt at rate of 1 kg/m² with organic felts.
 - .4 Extend felts up to top of cant strip.

- .5 Install water cut offs at end of day, and remove before resuming work.
- .6 Apply uniform flood coat at rate of 3 kg/m^2 for asphalt and while bitumen is still hot, apply protective gravel at rate of 20 kg/m^2 .
- .7 Ensure that there are no skips in flood coat. If some are found, sweep gravel aside and reflow area.
- .8 Apply asphalt flood coat at rate of $0.8 \text{ } 1.2 \text{ kg/m}^2$ followed by asphalt emulsion at rate of 1.2 L/m^2 .
- .2 Flashing application.
 - .1 Build flashings out of four layers of felt strippings cemented together and to back up wall with asphalt.
 - .2 On exterior walls extend membrane flashing up inside face of parapet and over top to outside face of wall.
 - .3 On interior walls, build base flashing up to cavity wall or through wall flashing.
 - .4 Keep nails 200 mm above top of cant strip.
- .3 Gravel surfacing.
 - .1 Inspect entire area to ensure no wrinkles, buckles or fishmouths exist.
 - .2 Apply bitumen and gravel surfacing only after placement of roofing felts and membrane flashings.
 - .3 Apply flood coat of hot bitumen at 3 kg/m^2 into which, while hot, embed aggregate at minimum rate of 20 kg/m^2 . Ensure aggregate is dry and free from frost.

3.14 PROTECTION OF COMPLETED WORK

- .1 Ensure membrane is undamaged before application of protection board.
- .2 Apply protection board to cover membrane below paving.

END OF SECTION