

Part 1 General**1.1 RELATED SECTIONS**

- .1 Division 01- General Requirements.
- .2 Section 07 62 00 - Sheet Metal Flashing and Trim.
- .3 Section 07 92 00 – Joint Sealants.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C1396, Standard Specification for Gypsum Wallboard.
 - .2 ASTM D41-94(2002)e1, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - .3 ASTM D312-00, Asphalt Used in Roofing.
 - .4 ASTM D2178-97a, Asphalt Glass Felt Used in Roofing and Waterproofing.
 - .5 ASTM D6162-00a, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
 - .6 ASTM D6163-00e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
 - .7 ASTM D6164-00, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
 - .2 CGSB 37-GP-15M-84, Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
 - .3 CGSB 37-GP-19M-85, Cement, Plastic, Cutback Tar.
 - .4 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.
 - .5 CGSB 37-GP-56M-80b(A61985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
 - .6 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-1997.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA A123.21-04, Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems
 - .2 CSA-A123.4-04, Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
 - .3 CSA O121-08, Douglas Fir Plywood.
 - .4 CSA O151-04, Canadian Softwood Plywood.

- .5 Factory Mutual (FM Global)
 - .1 FM Approvals - Roofing Products.
- .6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .7 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 PERFORMANCE REQUIREMENTS

- .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.

1.4 SUBMITTALS

- .1 Submit most recent technical roofing components data sheets describing materials' physical properties.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets.
 - .1 Indicate VOC content for:
 - .1 Primers.
 - .2 Asphalt.
 - .3 Sealers.
- .3 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .4 Indicate flashing, control joints, and tapered insulation details.
- .5 Provide layout for tapered insulation.
- .6 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .7 Reports: indicate procedures followed ambient temperatures and wind velocity during application.

1.5 QUALITY ASSURANCE

- .1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems approved by manufacturer.
- .2 Submit laboratory test reports certifying compliance of bitumen, primers, adhesives and roofing membrane with specification requirements.
- .3 Convene pre-installation meeting one week prior to beginning roofing work, with roof contractor's representative & design-builder's roofing inspector to:
 - .1 Verify project requirements
 - .2 Review installation and substrate conditions
 - .3 Co-ordination with other building sub-trades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.6 FIRE PROTECTION

- .1 Fire Extinguishers: maintain one stored pressure rechargeable type with hose and shut-off nozzle, ULC labelled for A, B and C class protection. Sizes 1.14 and 14kg or as indicated on roof per torch applicator, within 6 m of torch applicator.
- .2 Maintain fire watch for 1 hour after each day's roofing operations cease.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .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 daylight, weather and deleterious materials.

1.8 SITE CONDITIONS

- .1 Ambient Conditions
 - .1 Do not install roofing when temperature remains below -18 degrees C for torch application.
 - .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.

1.9 EXTENDED WARRANTY

- .1 For the work of this Section 07 52 00 Modified Bituminous Membrane Roofing, the 12 month warranty period is extended to 24 months.

Part 2 Products**2.1 PERFORMANCE CRITERIA**

- .1 Roofing system: built-up roofing system with thermal barrier underlay board, rigid insulation, torch applied two ply mod-bit roofing membrane, white granular surfacing, and white surfacing.

2.2 DECK COVERING

- .1 Glass Mat Gypsum Roof Board: for cold adhered installation over steel deck to ASTM C 1177. Boards to be 1.2m x 2.4m, thickness 13.0mm (1/2") with pre-primed surface. Counter flashings to be 13mm thick boards pre-primed where specified.

2.3 VAPOUR RETARDER

- .1 Base sheet vapour retarder: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, non woven glass reinforced membrane, Type 2, Class C, Grade 1, thermofusible film both top and bottom.

2.4 MEMBRANE

- .1 Base sheet: to CGSB 37-GP-56M.
 - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, polyester reinforcement, having nominal weight of 180g/m².
 - .2 Type 2.
 - .3 Class C - plain surfaced.
 - .4 Grade heavy duty service.
 - .5 Top and bottom surfaces:
 - .1 Covered with thermofusible plastic film.
 - .6 Base sheet membrane properties: to CGSB 37-GP-56M.
 - .1 Strain energy (longitudinal/transversal): Min. 5.5kN/m.
 - .2 Breaking strength (longitudinal/transversal): Min. 8.8kN/m.
 - .3 Ultimate elongation (longitudinal/transversal): Min 35%.
 - .4 Tear resistance: Min 20N.
 - .5 Cold bending at -30 degrees C: no cracking.
 - .6 Softening point: \exists 110 degrees C.
 - .7 Static puncture resistance: >150 N.
 - .8 Dimensional Stability: \pm 0.3%.
 - .7 Cap sheet membrane: to CGSB 37-GP-56M.
 - .1 Styrene-Butadiene-Styrene(SBS) elastomeric polymer, prefabricated sheet, polyester reinforcement, having nominal weight of 250g/m²..
 - .2 Type 1,
 - .3 Class A-granule surfaced.
 - .1 Colour for granular surface: white.
 - .4 Grade heavy duty service.
 - .5 Bottom surface thermofusible plastic film.
 - .8 Cap sheet membrane properties: to CGSB 37-GP-56M.
 - .1 Strain energy (longitudinal/transversal): Min 5.5kN/m.
 - .2 Breaking strength (longitudinal/transversal): Min.17.5kN/m.
 - .3 Ultimate elongation (longitudinal/transversal): Min. 60%.
 - .4 Tear resistance: Min. 20N.
 - .5 Cold bending at -30 degrees C: No cracking.
 - .6 Softening point: \exists 110 degrees C.
 - .7 Static puncture resistance: > 150.
 - .8 Dimensional Stability: +/- 3%.

2.5 ADHESIVE

- .1 Adhesive is to be as per manufacturers instructions.

2.6 OVERLAY BOARD

- .1 Overlay Board: 6mm thick asphalt based recovery board with non-woven glass facers, as recommended by the membrane manufacturer.

- .1 Install over insulation in hot asphalt to provide torch safe surface.

2.7 BITUMEN

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

2.8 ROOF INSULATION

- .1 Extruded polystyrene (XPS) roof deck insulation to CAN/ULC S701, Type 2 Class 2 or 3, size 1.2 m x 1.2 m square edge. To be mechanically fastened in base layer, followed by hot asphalt adhered in two (2) remaining layers, minimum 2.0" each layer. Minimum compressive strength of 110 kPa. Minimum Thermal Resistance of 0.88 RSI per 25mm (R-5 per inch).
- .2 Extruded polystyrene (XPS): sloped insulation to CAN/ULC S701. Size as identified and required as per the layout on the roof plan, with minimum 1.2 m x 0.6 m thickness 12 mm to 0 mm. To be hot asphalt adhered – where applicable. Submit shop drawings for review and approval before starting project. Minimum compressive strength of 110 kPa. Minimum Thermal Resistance of 0.88 RSI per 25mm (R-5 per inch)

2.9 SEALERS

- .1 Plastic cement: asphalt, to CAN/CGSB-37.5.
- .2 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.
- .3 Low VOC.
- .4 Sealants: Caulking - see Section 07 92 00 - Joint Sealants.
- .5 Solar reflective coating with an SRI of 78 to be applied to entire roof membrane. Subtrade to provide documentation with supporting documentation.

2.10 CARPENTRY

- .1 Refer to Section 06 10 00.01 - Rough Carpentry – Short Form.

2.11 FASTENERS

- .1 Covering to steel deck: No. 10 flat head, self tapping, Type A or AB, cadmium plated screws.
- .2 Insulation to deck: coated insulation fasteners and galvanized plates must meet FM Approval for wind uplift and corrosion resistance, as recommended by insulation manufacturer. Use a minimum of a #12 deck screw with 3" diameter stress-plate as tested by the insulation manufacturer and Factory Mutual. Pattern to be as indicated by the insulation manufacturer.

2.12 REFLECTIVE COATING

- .1 A bright white Acrylic coating, water based to furnish a highly reflective surface.

Part 3 Execution**3.1 QUALITY OF WORK**

- .1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual, particularly for fire safety precautions.
- .2 Do priming for asphalt roofing in accordance with CGSB 37-GP-15M.
- .3 The interface of the walls and roof assemblies will be fitted with durable rigid material sheet metal providing connection point for continuity of air barrier.
- .4 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.
 - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
- .3 Do not install roofing materials during rain or snowfall.

3.3 PROTECTION OF IN-PLACE CONDITIONS

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

3.4 PREPARATION OF STEEL DECK

- .1 Install sound absorbing insulation in flutes of acoustical steel roof deck in accordance with deck manufacturer's instructions.

- .2 Steel decking will be treated with rust proofing or galvanization.

3.5 DECK SHEATHING

- .1 Mechanically fasten to steel deck Gypsum Board Sheathing with screws to steel deck's upper rib surfaces, spaced 400mm on centre each way, after deck has been inspected and approved.
- .2 Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.
- .3 Apply tapered polyisocyanurate with protection board in hot asphalt as per the manufacturer's specifications, where applicable – refer to drawings.

3.6 VAPOUR RETARDER

- .1 Adhere vapour retarder using manufacturer's instructions.

3.7 MEMBRANE ROOFING APPLICATIONS

- .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 torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.
 - .3 Lap sheets 75mm minimum for side and 150mm minimum for end laps.
 - .4 Application to be free of blisters, wrinkles and fish mouths.
 - .5 Do membrane application in accordance with manufacturer's recommendations
- .2 Cap sheet application:
 - .1 Starting at low point of 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 or substrate.
 - .3 Lap sheets 75mm minimum for side and 150mm minimum for end laps.
 - .4 Application to be free of blisters, wrinkles and fish mouths.
 - .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 Torch base and cap sheet onto substrate in 1 metre wide strips.
 - .3 Lap flashing base sheet to membrane base sheet minimum 150mm and seal by mopping or torch welding.
 - .4 Lap flashing cap sheet to membrane cap sheet 250mm minimum and torch weld.
 - .5 Provide 75mm minimum side lap and seal.
 - .6 Properly secure flashings to their support, without sags, blisters, fish mouths or wrinkles.

3.8 FIELD QUALITY CONTROL

- .1 Inspections:
 - .1 Inspection and testing of roofing application will be carried out by testing laboratory designated by Departmental Representative.
 - .2 Costs of tests and inspections will be paid under a cash allowance.

3.9 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.

END OF SECTION