

PART 1 - GENERAL

1.1 RELATED WORK

.1	General Requirements	Division 1
.2	Structure Demolition	Section 02 41 16
.3	Rough Carpentry	Section 06 10 10
.4	Copper Sheet Metal Flashing & Trim	Section 07 62 10
.5	Joint Sealants	Section 07 92 10

1.2 REFERENCES

.1	CSA A82.27-M1977 Gypsum Board Products.
.2	CSA B35.3-1962 Tapping and Drive Screws (Slotted and Recessed Head, Thread).
.3	CSA O151-M1978 Canadian Softwood Plywood.
.4	CSA A123.21-10 Wind Uplift Resistance Testing
.5	CGSB 37-GP-56M-80 Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
.6	CAN/CGSB-51.20-M87 Thermal Insulation, Polystyrene, Boards and Pipe Covering.
.7	CAN/CGSB-51.26-M86 Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.
.8	CAN/CGSB-51.31-M84 Thermal Insulation, Mineral Fibre Board for Above Roof Decks.
.9	CAN/ULC-S107-01 Standard Method of Fire Tests of Roof Coverings.
.10	CAN/ULC-S126-M86 Standard Method of Test for Fire Spread Under Roof - Deck Assemblies.

1.3 SECTION INCLUDES

.1	Removal of membrane, membrane flashing, metal counter flashing, deck sheathing, and vapour retarder, exposing existing deck.
.2	Provision of new deck sheathing, vapour retarder, insulation, membrane, membrane flashing and metal counter flashing.

1.4 SHOP DRAWINGS

.1	Submit shop drawings in accordance with Section 01 33 00 - Submittals Procedures.
.2	Indicate flashing, control joints, tapered insulation details.
.3	Provide layout for tapered insulation.
.4	Provide requests for substitutions of materials and equipment under this specification section as per Section 01 33 00 - Submittal Procedures.

1.5 STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .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 Place plywood runways over work to enable movement of material and other traffic.
- .6 Store caulking at +5°C minimum
- .7 Store insulation protected from daylight and weather and deleterious materials.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install roofing when temperature remains below -18°C for torch application, or to manufacturers' recommendations for mop application.
- .2 Minimum temperature for solvent-based adhesive is -5°C.
- .3 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.

1.7 PROTECTION

- .1 Fire Extinguishers: maintain one 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 Contractor to provide safety person on site at all times during the roofing process and shall remain on site two (2) hours after work has ceased or after torching has stopped. Safety person shall scan the perimeter and roof penetration details with a hand held infrared gun.
- .3 Remove only as much existing roofing as can be replaced by the end of each working day.

1.8 WARRANTY

- .1 Provide a written guarantee signed and issued in the name of the Government of Canada by the

Roofing System Manufacturer stating that roofing membrane is free from manufacturing defects and that the system will stay in place and remain leak proof for a period of ten (10) years from date of Final Certificate of Completion, subject to the standard limitations and conditions of the manufacturer.

- .2 Provide a written guarantee, signed and issued in the name of the Government of Canada by the Contractor, stating that the roofing application has been performed in compliance with the plans and specifications, and for two (2) years from the date of Final Certificate of Completion, the

Contractor shall repair, at no expense to the Government of Canada, any defects which result of a failure to comply with the plans and specifications.

- .3 Defective work shall include, but not limited to: leaking, wind uplift, delamination of roofing materials, reduction of thermal value due to moisture in insulation, crazing and ridging.
- .4 Warranty to be non-prorated.

1.9 COMPATIBILITY

- .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.

1.10 QUALITY ASSURANCE

- .1 Membrane: applied by applicator acceptable to Departmental Representative and approved by manufacturer for application of its products.
- .2 Applicators: minimum 5 years proven experience.
- .3 Manufacturer's representative:
 - .1 Inspect roofing system at the start of construction, midway and at commissioning. Additional inspections shall be carried out at the discretion of the Roofing System Manufacturer.
 - .2 Provide technical assistance to applicator and assist where required in correct installation of roofing system.

1.11 MOCK-UP

- .1 Construct mock up 10 m² minimum size showing typical membrane lap joint, one inside and one outside corner parapet flashing. Accepted mock-up may form part of complete work. Insulation and fastening method, vapour barrier lap, gypsum board and fastening method and workmanship.
- .2 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with roofing work.

PART 2 - PRODUCTS

2.1 ROOFING SYSTEM

- .1 System to comply with CSA A123.21-10 Wind Uplift Resistance Testing

2.2 VAPOUR RETARDER

- .1 Description: Roofing membrane composed of SBS modified bitumen and a composite, non-woven polyester, glass mat reinforcement. The upper surface is sanded, the underface is covered with a thermofusible plastic film.
- .2 In conformance with: CAN/CGSB 37.56-M (9th Draft).

2.3 INSULATION

- .1 Polyisocyanurate Insulation
 - .1 Description: Closed-cell polyisocyanurate foam insulation board laminated on both sides with a fiberglass yarn-reinforced organic paper.
 - .2 Tapered Insulation Board

Description: Tapered crickets and backslopes polyisocyanurate insulation that meets CAN/ULC S-770-09, 1200mm x 1200mm square edge. (% of tapered crickets and backslopes to be double the slope of deck)

2.4 ASPHALT RECOVER BOARD

- .1 Board of a minimum thickness of 19.5 mm composed of SBS bitumen membrane and factory-laminated by

cold bonding reinforcement on a mineral wool board. The membrane measures 1 m by 4.91 m. The top face is covered with a thermofusible plastic film.

- .2 Adhered with adhesive to: ASTM D 412, ASTM D 1875, ASTM D 903, ASTM D 2556, and ASTM D 816.
- .3 Asphalt Recover Board to: ASTM C 518, ASTM D 165, ASTM C 612-09, ASTM C 356, ASTM C 209, and ASTM C 1104.

2.5 MEMBRANE

- .1 Description: Roofing membrane composed of SBS modified bitumen with a non-woven polyester reinforcement, factory laminated on a mineral wool board. Membrane measures 1m x 4.91m.. The surface is covered with a thermofusible plastic film. The thickness is 12.7mm.

.1 In conformance with: CGSB 37.56-M (9th Draft).

.2 Properties:	MD	XD
Strain energy (kN/m)	9	7
Breaking strength (kN/m)	17	12.5
Ultimate elongation (%)	60	65
Tear resistance (N)	60	
Static puncture resistance (N)	400	
Dimensional stability (%)	-0.4	0.3
Plastic flow (°C)	≥105	
Cold bending at -30 °C	No cracking	
Lap joint strength (kN/m)	Pass	> 4kN/m

- .2 Base Sheet Membrane for Flashings and Parapets

Description: Membrane composed of SBS modified bitumen and, non-woven polyester, reinforcement. The surface is covered with a thermofusible plastic film 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.

- .3 Roofing Cap Sheet Membrane for Field Surfaces

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 thermofusible plastic film. In conformance with ASTM D6162.

- .4 Roofing Cap Sheet Membrane for Flashings and Parapets

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 thermofusible plastic film. In conformance with ASTM D6162.

- .5 Starter Roll

Description: Waterproofing membranes composed of SBS modified bitumen, covered with granules on surface, with a 100 selvedge on both sides. The underface is covered with a thermofusible plastic film. In conformance with: CGSB 37.56-M (9th Draft).

2.6 ACCESSORY MEMBRANES

- .1 Cover Strip

Description: Membrane strip of 330 mm made of SBS modified bitumen with a composite reinforcement. Both faces are covered with a plastic thermofusible film. The strip ensures watertightness in the end laps. In conformance with: ASTM D6162.

2.7 PRIMER

- .1 Primer for Thermofusible Membranes

Description: Primer made of bitumen, volatile solvents and adhesive resins. Used as primer to improve the adhesion of thermofusible waterproofing membranes.

2.8 ADHESIVES

- .1 Insulation Adhesive

Description: Two-component, quick-setting, low-expansion foam urethane adhesive that can be applied at any temperature.

- .2 Adhered with adhesive to: ASTM D 412, ASTM D 1875, ASTM D 903, ASTM D 2556, and ASTM D 816.
- .3 Asphalt Recover Board to: ASTM C 518, ASTM D 165, ASTM C 612-09, ASTM C 356, ASTM C 209, and ASTM C 1104.

2.7 ACCESSORY WATERPROOFING PRODUCTS

- .1 Waterproofing Mastic

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

- .2 Sealing Product

Description: Bitumen/polyurethane waterproofing mono-component resin and polyester reinforcement.

PART 3 - EXECUTION

3.1 SURFACE EXAMINATION AND PREPARATION

- .1 Surface examination and preparation must be completed in conformance with instructions in the membrane manufacturer's technical documentation.
- .2 Before roofing work begins, the Departmental Representative and roofing foreman will inspect and approve deck conditions (including slopes and wood grounds) as well as flashings at parapets, roof drains, plumbing vents, ventilation outlets and other construction joints. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be carried out. The start of roofing work will be considered as acceptance of conditions for work completion.
- .3 Do not begin any portion of work before surfaces are clean, smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.
- .4 Be sure plumbing, carpentry and all other works have been duly completed.
- .5 No materials will be installed during rain or snowfall.

3.2 METHOD OF EXECUTION

- .1 Roofing work must be completed in a continuous fashion as surfaces are readied and as weather conditions allows it.
- .2 It's preferable to seal all joints that are not covered by a cap sheet membrane the same day. A second cap sheet cannot be installed if any moisture is present in joints.
- .3 Ensure waterproofing of roofs at all times, including protection during installation work by other trades and protection as work is completed (e.g. vents, drains, etc.).

3.3 SITE PROTECTION

- .1 Protect the exposed surfaces of finished work to avoid damage during roof installation and material transportation. Install walkways made of rigid boards over installed roofing materials to enable passage of people and transport of products. Assume full responsibility for any damage.

3.4 APPLICATION OF PRIMER

- .1 Wooden, metallic, concrete, and masonry surfaces or gypsum insulation substrate will receive a coat of primer. 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).

3.6 APPLICATION OF THERMOFUSIBLE VAPOUR BARRIER

- .1 Primer must be dry prior to the installation of the vapour barrier membrane.
- .2 Starting at the lowest point of the roof slope, the vapour barrier membrane must be heat-welded onto the substrate in conformance with manufacturer's written recommendations.
- .3 Overlap adjacent rolls of 75 mm and 100 mm. End laps must be 150 mm. Space end laps by at least 300 mm.

- .4 The roof vapour barrier must meet and overlap the air/vapour barrier on adjoining walls to ensure total continuity.
- .5 Pull up vapour barrier at insulation perimeters and around each element penetrating it to ensure sealed connections with flashing base sheet.

3.7 INSTALLATION OF INSULATION

- .1 Adhere insulation by using specified adhesive applied in continuous strips of 13 to 19mm width spaced 300 mm on the field surface.

3.8 INSTALLATION OF BOARDS AND FACTORY-LAMINATED BASE SHEET

- .1 Adhere base sheet board using adhesive applied in continuous strips of 13 to 19mm width spaced 300 mm on the field surface. Corners and perimeters must be installed as per FM requirements listed in the PLPDS 1-29].

3.9 INSTALLATION OF SELF-ADHESIVE BASE SHEET ON FLASHINGS AND PARAPETS

- .1 Apply base sheet flashing only after primer coat is dry.
- .2 Before applying membranes, always burn the plastic film from the section to be covered if there is an overlap (inside and outside corners and field surface). 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.

3.10 INSTALLATION OF REINFORCED GUSSETS

- .1 Install reinforcing gussets at all inside and outside corners.
- .2 Heat-weld the gussets in place after installing base sheet membrane.

3.11 INSTALLATION THERMOFUSIBLE CAP SHEET ON FIELD SURFACE

- .1 Begin with double-selvedge starter roll. If starter roll is not used, side laps covered with granules must be de-granulated by embedding granules in torch-heated bitumen over a 75-mm width.
- .2 Starting at drain, unroll the 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 along lines provided for this purpose, and will overlap by 150 mm at the ends. Space end laps a minimum of 300 mm.
- .5 Heat-weld cap sheet membrane with a torch on the base sheet to create a bleed out of 3 to 6 mm.
- .6 During installation, be careful not to overheat the membrane or its reinforcements.

- .7 Avoid the formation of wrinkles, swellings or fishmouths.
- .8 Avoid walking over finished surfaces; use rigid protective walkways as needed.

3.12 INSTALLATION OF THERMOFUSIBLE CAP SHEET ON FLASHINGS 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. 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 on 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 flashings and parapets.
- .5 Use a torch and round-nose trowel to embed the surface granules in the layer of hot bitumen, starting from the chalk line on the field surface to the bottom edge of the flashing or parapet, as well as on the granulated vertical surfaces to be overlapped.
- .6 This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top.
- .7 Avoid the formation of wrinkles, swellings or fishmouths.
- .8 During installation, be careful not to overheat the membrane and its reinforcements.

3.13 WATERPROOFING FOR VARIOUS DETAILS

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

END OF SECTION