Part 1 GENERAL

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C 1177/C1177M, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.2 Canadian General Standards Board (CGSB).

.1 CGSB 37-GP-19M, Cement, Plastic, Cutback Tar.

.2 CAN/CGSB-37.29, Rubber- Asphalt Sealing Compound.

.3 CAN/CGSB - 51.33 Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.3 Canadian Roofing Contractor's Association (CRCA)

.1 CRCA Specification Manual.

.4 Underwriters Laboratories' of Canada (ULC)

.1 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702.2, Standard for Mineral Fibre Thermal Insulation for Buildings.

.3 CAN/ULC-S704, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.2 SECTION INCLUDES

.1 Removal of stone cover, membrane, membrane flashing, metal counter flashing, deck sheathing, and air/vapour barrier, exposing existing deck.

.2 Provision of new deck sheathing, air/vapour barrier, insulation, membrane, membrane flashing and metal counter flashing.

1.3 SHOP DRAWINGS

.1 Indicate in shop drawings flashings, control joints, tapered insulation details, roof drains and all required roofing materials.

.2 Provide layout for tapered insulation.

1.4 STORAGE AND HANDLING

.1 Store materials off-ground in weatherproof storage.

.2 Store materials in upright position. Store membrane rolls with selvage edge up, store as per manufacturer's requirements to meet warranty.

.3 Remove only in quantities required for same day use.

.4 Place plywood runways over work to protect work and enable work flow.

.5 Store sealants at +5°C minimum.

.6 Store insulation protected from daylight, weather and deleterious materials.

1.5 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.

1.6 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.

.4 Contractor to verify existing under deck mounted electrical conduits prior to installing mechanically fastened roof assembly.

1.7 WARRANTY

.1 Provide a written guarantee signed and issued in the name of The Owner 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 Substantial 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 Owner 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 Substantial Certificate of Completion, the Contractor shall repair, at no expense to the Owner, 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.

1.8 COMPATIBILITY

.1 Compatibility between components of roofing system is essential. Provide written declaration to the Contract Administrator stating that materials and components, as assembled in system, meet this requirement.

1.9 QUALITY ASSURANCE

.1 Membrane: applied by applicator acceptable to Contract Administrator 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 as required for commissioning. Additional inspections may be carried out at the discretion of the Roofing System Manufacturer.

.2 Provide technical assistance where required to correct installation of roofing system.

.4 Submit laboratory test reports certifying compliance of bitumens and membranes with specification requirements.

1.10 MOCK-UP

.1 Mock-up to be constructed upon request of the Contract Administrator.

.2 Mock up to be 10 m^2 minimum size showing typical membrane lap joint, one inside and one outside corner parapet flashing. Insulation and fastening method, air/vapour barrier lap, gypsum board and fastening method and workmanship.

.3 Allow 48 hours for inspection of mock-up by Contract Administrator before proceeding with roofing work.

.4 Accepted mock up may form part of completed work.

Part 2 PRODUCTS

2.1 THERMAL BARRIER AND AIR/VAPOUR BARRIER
Option 1

.1 Thermal Barrier: Pre-primed glass mat faced gypsum panel non-asphaltic, highly filled proprietary heat-cured coating on one side, to ASTM C1177, 12.7 mm thick.

.2 Air/Vapour Barrier: Self adhering peel and stick air/vapour barrier composed of Styrene-Butadiene-Styrene (SBS) modified bitumen reinforced with high density polyethylene film, anti slip surface, minimum thickness 1.0 mm.

Option 2

.1 Thermal Barrier and air/vapour barrier: to CAN 2-51.31-M84, rigid mineral wool fiber board manufactured from basalt rock and steel slag, butt edge, CFC and HCFC free, 19 mm thick with a factory laminated 190 g/m2 non woven polyester reinforced SBS modified bituminous membrane with a sanded surface to CGSB 37-GP-56M.

2.2 INSULATION AND COVER BOARD COMPONENTS

.1 For sloped roof decks or roof structures, provide uniform thickness rigid insulation.

.2 For flat roof decks or roof structures, provide custom designed tapered insulation with minimum slope of 2.0 mm in 100 mm (2%). Taper insulation to drain, minimum RSI value at drain to be 1.3.

.3 Expanded Polystyrene Insulation (EPS), Cover Board and Asphalt Recover Board:

- .1 Expanded Polystyrene Insulation (EPS):
  - .1 To CAN/ULC-S701, Type 1, square edged.
  - .2 Insulation value thickness per cm based on values listed in the latest edition of NRC - Evaluation Listings.
  - .3 Provide two layers of insulation installed with staggered joints.
- .2 Cover Board: Nonstructural, glass mat faced gypsum panel with water-resistant core to ASTM C1177, 6.35 mm thick.
- .3 Asphalt Recover Board: Semi-rigid asphalt roofing substrate composed of mineral core between glass fibre mats, 1200 x 1500mm sheets, minimum thickness 3.0 mm.

.4 Extruded Polystyrene Insulation (XPS) and two layers of Asphalt Recover Board:

- .1 Extruded Polystyrene Insulation (XPS):
  - .1 To CAN/ULC-S701, Type 2, square edged.
  - .2 Insulation value thickness per cm based on values listed in the latest edition of NRC - Evaluation Listings.
  - .3 Provide two layers of insulation installed with staggered joints.
- .2 Two layers of Asphalt Recover Board: Semi-rigid asphalt roofing substrate composed of mineral core between glass fibre mats, 1200 x 1500mm sheets, minimum thickness 3.0 mm each.

.5 Polyisocyanurate Insulation and Asphalt Recover Board:

- .1 Polyisocyanurate Insulation:
  - .1 To CAN/ULC-S704, glass reinforced felt facers, square edged and containing no CFC.
  - .2 Insulation value thickness per cm based on values listed in the latest edition of NRC - Evaluation Listings.
  - .3 Provide two layers of insulation installed with staggered joints.

.2 Asphalt Recover Board: Semi-rigid asphalt roofing substrate composed of mineral core between glass fibre mats, 1200 x 1500mm sheets, minimum thickness 3.0 mm.

.6 Total assembly RSI value:

.1 Minimum average RSI value of assembly insulation components to be 4.0. Insulation assembly components to consist of thermal barrier, insulation and cover board.

2.3 Base Sheet

.1 Base Sheet: Base sheet: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, non woven, polyester reinforcement, weighing 180 g/m ^{2}.

.1 Type 2, fully adhered.
.2 Class C-plain surfaced.
.3 Grade heavy duty service.
.4 Top and bottom surfaces:
.1 Polyethylene/polyethylene.
.5 Base sheet membrane properties:
.1 Strain energy (longitudinal/transversal): 9.0/7.0 kN/m.
.2 Breaking strength (longitudinal/transversal): 17.0/12.5 N/5 cm.
.3 Ultimate elongation (longitudinal/transversal): 60/65 %.
.4 Tear resistance: 60 N.
.5 Cold bending at -30 degrees C : no cracking.
.6 Static puncture resistance: > 400.
.7 Dimensional Stability: -0.3 / 0.3 %.

2.4 CAP SHEET

.1 Cap sheet: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, glass, polyester reinforcement, weighing 250 g/m^2.

.1 Type 1, fully adhered.
.2 Class A-granule surfaced.
.3 Grade heavy duty service.
.4 Bottom surface polyethylene.
.5 Colour to be light grey unless otherwise indicated.
.6 Cap sheet membrane properties:
.1 Strain energy (longitudinal/transversal): 13.0/10.0 kN/m.
.2 Breaking strength (longitudinal/transversal): 25.0/16.0 kN/m.
.3 Ultimate elongation (longitudinal/transversal): 60/65 %.
.4 Tear resistance: 80 N.
.5 Cold bending at -30 degrees C: No cracking.
.6 Static puncture resistance: > 470.

.7 Dimensional Stability: -0.2 / 0.2 %.

.2 Minimum total thickness if base sheet and cap sheet combined to be 5.8 mm. Cap sheet and base sheet to be of same manufacturer.

.3 Install contrasting colour cap sheet, 2.0 m wide, along the entire perimeter of all roof sections. Contrasting colour cap sheet to be installed over cap sheet. Colour to be as per Contract Administrator's selection from manufacturer's standard colour range.

2.5 BASE SHEET FLASHING

.1 To CGSB 37-GP-56M, Type 2, Class C, Grade 2, non-woven polyester reinforced 180g/m^2, self-adhesive membrane with polyethylene top face and release film under face.

2.6 SEALERS

.1 Mastic made of synthetic rubbers, plasticized with bitumen and solvents with aluminum pigments to provide greater resistance to U.V.

2.7 PRIMERS

.1 For self-adhesive membranes: A blend of elastomeric bitumen, volatile solvents and adhesive enhancing resins used to prime porous and non-porous substrates such as gypsum board, wood, concrete or metal to enhance the adhesion of self-adhesive membranes at temperatures above -10°C.

.2 For heat welded membranes: A blend of elastomeric bitumen, volatile solvents and adhesive enhancing additives used to prime concrete or metal substrates to enhance the adhesion of torch-applied membranes.

2.8 FASTENERS

.1 Fasteners: minimum #14 mechanical fasteners made of case-hardened carbon steel with corrosion resistance coating, complying with FM standards. 75 mm diameter round or hexagon stress plates complying with CSA B35.3 and FM 4470 approval standards, diameter and lengths as required to suit total assembly thickness. Ensure fasteners have the following deck penetration:

- .1 For concrete decks: minimum 25 mm.
- .2 For wood decks: minimum 25 mm.
- .3 For metal decks: minimum 19 mm and maximum 25 mm longer than assembly being secured. Fasteners to engage metal deck top flange. At gymnasium locations, fastener points of all fasteners to be removed.

.2 Roofing adhesive: single-component, moisture cured, solvent free polyurethane adhesive, dispensed from a portable disposable pre-pressurized container.

2.9 roof drains

.1 Sump pan: 600 x 600 mm galvanized steel.

Part 3 EXECUTION

3.1 WORKMANSHIP

.1 Do roofing work in accordance with applicable, standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual, except where specified otherwise.

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 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.

.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 Install insulation promptly to avoid possibility of condensation beneath vapour retarder.

.8 Take necessary measures ensuring no penetration of the elements will occur to the building after commencement of work, including but not limited to water.

.9 Only remove quantities of existing roofing material and install quantities of new roofing materials per day that can be covered with waterproofing membranes.

3.3 EXAMINATION ROOF DECKS

.1 Examine roof decks and immediately inform the Contract Administrator in writing of defects.

.2 Prior to commencement of work ensure:

.1 Decks are firm, straight, smooth, dry, and free of snow, ice or frost, and swept clean of dust and debris.

.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.

3.4 EXPOSED MEMBRANE ROOFING APPLICATION (CONCRETE DECK)

.1 Air/Vapour Barrier:

.1 Prime all surfaces to receive self-adhering modified bituminous sheet air/vapour barrier as per manufacturer's instructions.

.2 Apply self-adhering modified bituminous sheet air/vapour barrier to concrete deck substrate in an overlapping shingle fashion. Stagger all vertical joints.

.3 Align modified bituminous sheet air/vapour barrier, remove protective film and press firmly into place. Ensure minimum 50 mm overlap at all ends and side laps. Roll membrane, including seams, with counter top roller to ensure full contact.

.2 Insulation

.1 Apply beads of roofing adhesive to air/vapour barrier in accordance with manufacturer's written instructions.

.2 Adhere insulation in adhesive and walk-in insulation boards to insure maximum contact with adhesive.

.3 Place boards in parallel rows with ends staggered, and in firm contact with one another.

.4 Cut end boards to suit.

.5 Install tapered insulation in accordance with shop drawings.

.3 Cover Board Components (Expanded Polystyrene (EPS)):

.1 Apply beads of roofing adhesive to insulation in accordance with manufacturer's written instructions.

.2 Adhere cover board in adhesive and walk-in cover boards to insure maximum contact with adhesive.

.3 Place boards in parallel rows with ends staggered and in firm contact with one another.

.4 Cut end boards to suit.

.5 Apply beads of roofing adhesive to cover board in accordance with manufacturer's written instructions.

.6 Adhere asphalt recover board in adhesive and walk-in asphalt recover boards to insure maximum contact with adhesive.

.7 Fit boards tight together. Stagger joints between asphalt recover board and cover board. Install fasteners/adhesive based on design wind uplift securement requirements, for the building site location, for insulation and cover board, using FMRC approved roofing adhesive placed in accordance with manufacturer's recommendations.

OR

Cover Board Components (Extruded Polystyrene (XPS)):

.1 Apply beads of roofing adhesive to insulation in accordance with manufacturer's written instructions.

.2 Adhere asphalt recover board in adhesive and walk-in asphalt recover boards to insure maximum contact with adhesive.

.3 Place boards in parallel rows with ends staggered and in firm contact with one another.

.4 Cut end boards to suit.

.5 Apply beads of roofing adhesive to first layer of asphalt recover board in accordance with manufacturer's written instructions.

.6 Adhere second layer of asphalt recover board in adhesive and walk-in asphalt recover boards to insure maximum contact with adhesive.

.7 Fit boards tight together. Stagger joints between layers of asphalt recover board. Install fasteners/adhesive based on design wind uplift securement requirements, for the building site location, for insulation and cover board, using FMRC approved roofing ashesive placed in accordance with manufacturer's recommendations.

OR

Cover Board Components (Polyisocyanurate (Polyiso)):

.1 Apply beads of roofing adhesive to insulation in accordance with manufacturer's written instructions.

.2 Adhere asphalt recover board in adhesive and walk-in asphalt recover boards to insure maximum contact with adhesive.

.3 Place boards in parallel rows with ends staggered and in firm contact with one another.

.4 Cut end boards to suit.

.5 Fit boards tight together. Install fasteners/adhesive based on design wind uplift securement requirements, for the building site location, for insulation and cover board, using FMRC approved roofing adhesive placed in accordance with manufacturer's recommendations.

.4 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 recover board taking care not to burn membrane or its reinforcement.

.3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.

.4 Application to be free of blisters, wrinkles and fishmouths.

.5 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.

.6 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 150 mm and seal by 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.

3.5 ROOF PENETRATIONS

.1 Install roof drain pans, vent stack covers and other roof penetration Flashings and seal to membrane in accordance with the manufacturer's recommendations and details.

.2 All new roof drains and relocated roof drains to be installed by certified plumber. Coordinate installation and relocation of roof drains so that work can be inspected by Contract Administrator prior to commencement of remaining roof work.

3.6 CLEANING

.1 Check drains to ensure cleanliness and proper function, and remove debris, equipment and excess material from site.

.2 Remove bituminous markings from finished surfaces.

.3 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their instructions.

.4 Repair or replace defaced or disfigured finishes caused by work of this section.

END OF SECTION