1. GENERAL

1.1. RELATED REQUIREMENTS

.1 Section 07 26 00 – Vapour Retarders
.2 Section 07 46 13 – Thermofused Membrane Air/Vapour Barrier
.3 Section 07 62 00 – Sheet Metal Flashings & Trim
.4 Section 07 71 00 – Roof Specialties
.5 Section 07 92 00 – Joint Sealants

1.2. REFERENCES

.1 ASTM International Inc.
  .1 ASTM C 726-[05], Standard Specification for Mineral Fiber Roof Insulation Board.
  .2 ASTM C 728-[05], Standard Specification for Perlite Thermal Insulation Board.
  .3 ASTM C 1177/C 1177M-[06], Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  .4 ASTM C 1396/C 1396M-[06a], Standard Specification for Gypsum Board.
  .5 ASTM D 41-[05], Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
  .6 ASTM D 312-[00(2006)], Standard Specification for Asphalt Used in Roofing.
  .7 ASTM D 448-[03a], Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
  .8 ASTM D 2178-[04], Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
  .9 ASTM D 6162-[00a], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
  .10 ASTM D 6163-[00e1], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
  .11 ASTM D 6164-[05], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
  .12 ASTM D 6222-[02e1], Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcement.
  .13 ASTM D 6223-[02e1], Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcement.
  .14 ASTM D 6509-[00], Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcement.
.2 Canada Green Building Council (CaGBC)
  .1 LEED Canada NC 2009, LEED: Green Building Rating System Reference Package for New Construction and Major Renovations (including Addendum).
.3 Canadian General Standards Board (CGSB)
  .1 CGSB 37-GP-9Ma-[83], Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
  .2 CGSB 37-GP-56M-[80b(A1985)], Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
  .3 CAN/CGSB-51.33-[M89], Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
.4 Canadian Roofing Contractors Association (CRCA)
  .1 CRCA Roofing Specifications Manual-[1997] .
.5 Underwriters Laboratories' of Canada (ULC)
  .1 CAN/ULC-S701-[05], Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702.2-[03], Standard for Mineral Fibre Thermal Insulation for Buildings.
.3 CAN/ULC-S704-[03], Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
.4 CAN/ULC-S706-[02], Standard for Wood Fibre Thermal Insulation for Buildings.

1.3. PERFORMANCE REQUIREMENTS

.1 All waterproofing materials will be provided by the same manufacturer. Compatibility between components of roofing system is essential.

1.4. SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit two copies of most recent technical roofing components data sheets describing materials' physical properties.
.3 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures. Indicate setting plan for tapered insulation, layout of seams, direction of laps, flashing details and control joints.
.4 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
.5 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
.6 Co-ordinate submittal requirements and provide submittals required by Section 01 35 20 – LEED Sustainable Requirements.

1.5. QUALITY ASSURANCE

.1 Roofing Contractors and Subcontractors must, when bidding or performing Work, possess a roofing Contractor operating license.
.2 Only qualified, certified installers employed by a company with the appropriate equipment may execute the roofing Work.
.3 Roofing Contractors and Subcontractors must also be members of Local Chapter of Canadian Roofing Association and provide the Contract Administrator with a certificate to this effect before beginning any roofing Work.
.4 The roofing product manufacturer can delegate a representative to visit the Work Site at the start of roofing installation.
.5 The Contractor must at all times enable and facilitate access to the Work Site by said representative.
.6 Convene pre-installation meeting one week prior to beginning waterproofing Work, with Contract Administrator to:
  .1 Verify project requirements.
  .2 Review installation and substrate conditions.
  .3 Co-ordination with other building subtrades.
  .4 Review manufacturer's installation instructions and warranty requirements.

1.6. STORAGE AND HANDLING

.1 All materials will be delivered and stored in conformance with the requirements described in the Manufacture’s Manual; they must remain in their original packaging, displaying the manufacturer's name, product name, weight, and reference standards, as well as all other indications or references considered standard.
.2 At all times, materials will be adequately protected and stored in a dry and properly ventilated area, away from any welding flame or spark and sheltered from the elements or any harmful substance.
.3 Only materials destined for same-day use can be removed from this storage area. In cold weather, these materials should be stored in a heated area at a minimum temperature of +100C and removed prior to application.

.4 If rolls cannot be stored in a heated environment, they may be pre-conditioned before installation. For precise description, consult Manufacturer's "Roofers' Guide" on membrane application procedures.
.5 Store adhesives and emulsion-based waterproofing mastics at a minimum +50C. Store adhesives and solvent-based mastics at sufficiently high temperatures to ensure ease of application.
.6 Store rolls upright; flashing to be stored to avoid creasing, buckling, scratches or any other possible damage.
.7 Avoid material overloads which may affect the structural integrity of specific roof areas.
.8 Place plywood runways over completed Work to enable movement of material and other traffic.

1.7. PROTECTION

.1 Prior to the start of Work, conduct a Site inspection to establish safe Working practices and make sure that all procedures and proposed changes are approved to minimize the risk of fires.
.2 Conform to Health and Safety Plan, Manufacturer's Specifications Manual and local CRA association recommendations.
.3 At the end of each Workday, use a heat detector gun to spot any smouldering or concealed fire.
.4 Maintain fire watch for 1hour after each day's roofing operations cease.
.5 Throughout roofing installation, maintain a clean Site and have one approved ABC fire extinguisher within 6 meters of each roofing torch.

1.8. ENVIRONMENTAL REQUIREMENTS

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

1.9. WARRANTY

.1 For Work of this Section 07 52 00 - Modified Bituminous Membrane Roofing, 12 months warranty period is extended to 60 months.

2. PRODUCTS

2.1. PERFORMANCE CRITERIA

.1 Compatibility between components of roofing system is essential. Provide written declaration to Contract Administrator stating that materials and components, as assembled in system, meet this requirement.
.2 Roofing System: to CSA A123.21 for wind uplift resistance.

2.2. DECK COVERING

.1 Fiberglass mat faced gypsum roof board
.1 Thickness: 5/8"
.2 Size: 48" x 96"
.3 Weight: 2.5 lb/sq. ft.
.4 Surfacing: Fiberglass mat.
.5 Flexural Strength, Parallel (ASTM C473): 100 lbf, minimum.
.6 Permeance (ASTM E96): max. 32 perms.
.7 R-Value (ASTM C518): 0.67.
.8 Water Absorption (ASTM C1177): Less than 10 percent of weight.

.9 Compressive Strength (Applicable Sections of ASTM C472): min. 900 psi
.10 Acceptable material:
.1 DensDeck, Georgia-Pacific Gypsum.
.2 GlasRoc Roof Board, CertainTeed
.3 Securock Glass-Mat Roof Board, CGC
.4 Or approved equal in accordance with B7

2.3. VAPOUR RETARDER
.1 Self-adhesive Air/Vapour Barrier: membranes composed of bitumen modified with thermoplastic polymers and high-density polyethylene film. The self-adhesive under face is covered with a silicone release sheet. Water vapour permeability: 0.06 ng/Pa·s·m2 (0.0011 Perm).
.2 Acceptable material:
.1 SOPRAVAP'R by SOPREMA
.2 IKO MVP
.3 Or approved equal in accordance with B7

2.4. INSULATION
.1 Insulation: As specified in Section 07 21 13 – Board Insulation

2.5. RECOVERY BOARD (if base torch-on)
.1 Thickness to be 1/4" and maximum sheet size of 48"x48".
.2 One layer over polyiso insulation.
.3 Acceptable material:
.1 Soprema Sopraboard
.2 IKO Protecto Board
.3 Or approved equal in accordance with B7

2.6. MEMBRANE SYSTEM (base torch-on)
.1 Acceptable materials:
.1 SOPRAPLY BASE 520 by SOPREMA with SOPRAPLY TRAFFIC CAP-560 by SOPREMA (grey)
.2 IKO Torchflex TP-180-FF base sheet with IKO ArmourCool cap sheet
.3 Or approved equal in accordance with B7

2.7. MEMBRANE SYSTEM (base adhered)
.1 Acceptable materials:
.1 COLVENT BASE 830 by SOPREMA with COLVENT TRAFFIC CAP-860 by SOPREMA (grey)
.2 IKO Armourvent base sheet with IKO ArmourCool cap sheet
.3 Or approved equal in accordance with B7

2.8. UPSTAND SYSTEM (SELF ADHESIVE SHEET)
.1 Acceptable materials:
.1 SOPRAFLASH FLAM STICK by SOPREMA
.2 Cap sheet flashing membrane: SOPRALENE FLAM 180 GR by SOPREMA

2.9. ACCESSORIES MEMBRANES
.1 Acceptable materials:
.1 SOPRAFLASH FLAM STICK by SOPREMA
.2 IKO Armourbond Flash
.3 Or approved equal in accordance with B7

2.10. PRIMER

.1 Primer as per recommended by the manufacturer of self adhering membrane.

2.11. PREFABRICATED FLASHINGS

.1 Refer to Section 07 71 00 - Roof Specialties

2.12. SEALERS

.1 Sealants: Caulking - see Section 07 92 00 - Joint Sealants.

2.13. CARPENTRY

.1 Refer to Section 06 10 00 - Rough Carpentry.

2.14. SUBSTITUTIONS

.1 Refer to Section 01 25 00 Substitution Procedures

3. EXECUTION

3.1. WORKMANSHIP

.1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual, Provincial Roofing Association Manual, particularly for fire safety precautions, and to FM.

.2 The interface of the walls and roof assmblies will be fitted with durable rigid material providing connection point for continuity of air barrier.

.3 Assembly, component and material connections will be made in consideration of appropriate design loads.

3.2. EXAMINATION OF ROOF DECKS

.1 Inspect with Contract Administrator deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.

.2 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

.1 Cover walls, walks, slopped roofs 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 Contract Administrator.

.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.

3.4. APPLICATION PRIMER

.1 Apply one coat primer to Manufacturer’s installation manual.

3.5. INSTALLATION OF DECK COVERING

.1 Adhered over space frame: As recommended by roof system and/or adhesive manufacturer or as required by FM or UL guidelines for wind uplift resistance.

.2 Adhered or Mechanically Attached over service spaces: As recommended by roof system and/or adhesive manufacturer or as required by FM or UL guidelines for wind uplift resistance.

3.6. INSTALLATION OF VAPOUR RETARDER

.1 Beginning at the bottom of the slope, without adhering the membrane, unroll onto the substrate for alignment. Do not immediately remove the silicone release sheet.

.2 Align the roll parallel to the corrugations of the steel deck. Make sure the membrane overlaps are supported along their entire length.

.3 Peel back one end of the silicone release sheet and adhere this part of the membrane to the substrate. Peel back the remaining release sheet at a 45º angle to avoid wrinkles in the membrane.

.4 Overlap adjacent membranes by 75 mm. Overlap end laps by 150 mm. Stagger end laps by at least 300 mm.

.5 The primer must be dry when the vapour retarder is installed

.6 The roof vapour retarder must meet and overlap the air/vapour barrier on adjoining walls to ensure total continuity.

.7 Install vapour retarder membrane at insulation perimeters and around each element piercing the insulation to ensure sealed connections with base sheet at upstands.

.8 Roof vapour retarder must meet and overlap the air/vapour barrier on adjoining walls to ensure total continuity.

.9 Install vapour retarder membrane at insulation perimeters and around each element piercing the insulation to ensure sealed connections with base sheet at upstands.

3.7. INSULATION INSTALLATION

.1 Attach insulation with manufacturers recommended adhesive.

.2 Stagger all vertical joints between two rows of insulation board.

3.8. INSTALLATION OF SELF-ADHESIVE SEMI-ADHERED BASE SHEET SYSTEM

.1 Beginning at the low points, drains and perpendicular to the slope, install the base sheet membrane without adhering in parallel strips.

.2 Each strip should overlap the preceding strip by 75 mm along the side joint (use the blue line to facilitate alignment) and by 25 mm at the ends. Because of the nature of this system, base sheet membrane joints can be aligned (no staggering) to facilitate the installation of the reinforcing band.

.3 Let the membrane relax at least 15 minutes before installing it, or burn the plastic film in a zigzag fashion using a propane torch to relax it. In cold weather, use the second method.

.4 Peel back the silicone release paper to adhere the membrane to the substrate. Use a broom or brush to apply even pressure and ensure good adherence.

.5 Remove the paper protecting the selvedge then heat the side joints. Seal the joints using a trowel. A bead of molten bitumen should appear along the joint to ensure a perfect seal.

.6 Seal the end joints by welding a 300-mm-wide cover strips centred on the joint.

.7 The base sheet membrane should end over the cant strip or at the edge of the substrate.

3.9. INSTALLATION OF TORCH-ON BASE SHEET SYSTEM

.1 Unroll base sheet on the substrate, taking care to align the edge of the first selvedge with drain centre (parallel to roof edge).

.2 Cut off corners at end laps to be covered by the next roll.

.3 Weld the base sheet onto prepared substrate.

.4 Each selvedge will overlap the previous one along lines provided for this purpose, and will overlap the ends by 150 mm (6 in). Space end laps by a minimum of 300 mm (12 in).

.5 Avoid the formation of wrinkles, swellings or fishmouths.

3.10. INSTALLATION OF REINFORCEMENT GUSSETS

.1 Install gussets at every angle, on inside and outside corners.

3.11. BASE SHEET FLASHING INSTALLATION (SELF ADHERED)

.1 Apply base sheet flashing only once primer coat is dry.

.2 Before applying membranes, always remove the plastic film on the section to be covered if there is an overlap (inside and outside corners and field surface). For sanded base sheet membranes, apply **primer** to the area to be covered at the foot of the parapets.

.3 Position the pre-cut membrane piece. Peel back 4 to 6 inches (100 to 150 mm) of the silicone release paper to hold the membrane in place at the top of the parapet.

.4 Then, gradually peel back the remaining silicone release paper, pressing down on the membrane with an aluminium applicator to ensure good adhesion. Use the aluminium applicator to ensure a perfect transition between the upstand and the field surface. Smooth the entire membrane surface with a roller for full adhesion.

.5 Cut off corners at end laps to be covered by the next roll.

.6 Install a reinforcing gusset in all inside and outside corners.

.7 Always seal overlaps at the end of the Workday.

3.12. ROOF CAP SHEET INSTALLATION (TORCH APPLIED MEMBRANE)

.1 Once base sheet is applied and no defects are apparent, proceed with cap sheet installation.

.2 Begin with double-selvage starter roll. If starter roll is not used, side laps covered in granules must be degranulated by embedding side laps in torch-heated bitumen over a 75 mm width.

.3 Unroll cap sheet at drain. Carefully align first side lap (parallel to roof edge).

.4 Weld cap sheet onto base sheet with torch recommended by membrane manufacturer. During application, simultaneously melt both designated contact surfaces so a bead of bitumen is apparent as cap sheet unrolls.

.5 Avoid overheating.

.6 Make sure joints between the two layers are staggered by at least 300 mm.

.7 Overlap cap sheet side laps by 75 mm and end laps by 150 mm. Cut off corners at end laps to be covered by next roll. All overlap surfaces must be degranulated.

.8 Complete perfect welds between two membranes. Leave no zone unwelded. In cold weather, adjust welding time to obtain homogenous seam (it may be necessary to slow down in certain cases.)

.9 Once cap sheet is installed, carefully check all overlapped joints.

.10 During installation, take care to avoid excessive bitumen bleed-out at joints.

3.13. INSTALLATION OF CAP SHEETS ON UPSTANDS AND PARAPETS (HEAT WELDED)

.1 Cap sheet must be installed in one-metre-wide strips. The side joints must overlap by 75 mm and must be staggered by at least 100 mm with respect to the joints of the cap sheet on the field surface to avoid areas of excessive membrane thickness. The overlaps on the field surface must be 50 mm wider than those of the base sheet membrane on the upstands and parapets. At end laps, angle-cut the corners that will be covered by the following roll.

.2 Use a chalk line to draw a straight line on the field surface 150 mm from the upstands and parapets.

.3 Use a propane 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 upstand or parapet as well as] on the granulated vertical surfaces that are to be overlapped.

.4 This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top. This technique softens both membranes in order to obtain even, continuous weld.

3.14. WATERPROOFING FOR DRAINS, VARIOUS DETAILS

.1 Install waterproofing membranes in conformance with various roofing details illustrated in the SOPREMA Manual.

3.15. FIELD QUALITY CONTROL

.1 Comply with the requirements of Section (01 45 00 – Quality Control)

.2 All work to be inspected by a qualified testing agency upon completion of work.

3.16. 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.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 35 20 – LEED Sustainable Requirements and Section 01 74 19 – Waste Management and Disposal.

END OF SECTION.