Rev.2 – Issued for tender - Revised (2015-10-06)

1 – Issued for tender (2015-05-20)

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1.0 GENERAL

1.1 **Conditions**

.1 Division 01 – General Requirements shall be read in conjunction with and shall govern Section.

.2 **Acceptable materials or products**: when materials or products are prescribed by their trademark, consult **Instructions to Bidders** regarding the request for approval of materials or substitutes.

1.2 **General Information**

.1 This Section covers all materials, equipment, tools and labour for the supply and installation of membrane roofing, complete with all required accessories.

.2 See **Section 05 05 00** for description of basic metal materials and finishes, and welding procedures.

.3 See **Section 05 41 00** for all metal stud work for parapets.

.4 Unless otherwise instructed, certain related products, specified elsewhere as indicated, are to be supplied and installed by this Section for the work of this Section.

.5 Roof drains are supplied installed by this Section, and connected by **Mechanical.**

.6 This Section also includes:
- .1 Removal of existing roofing assembly, down to concrete slab, and cleaning of the latter.
- .2 Removal of existing flashings and copings, as indicated.
- .3 Removal and installation of certain elements, as indicated.

.7 Also included are repairs to or rebuilding of existing substrates, parapets, curbs and roofing affected by the work of this Section, with identical or compatible materials.

1.3 **Related Work**

.1	Demolition and repairs	Section 02 41 99
.2	Basic metal materials and finishes	Section 05 05 00
.3	Metal framing parapets	Section 05 41 00
.4	Metal work	Section 05 50 00
.5	Roof drains	Mechanical
.6	Mechanical	Mechanical
.7	Electrical	Electrical
.8	Existing surfaces	

1.4 **References**

.1 Comply with all standards mentioned in this specification, unless more stringent requirements are given herein.

.2 See **Section 01 41 00** for legend of standards.

.3 Materials and workmanship to comply with the "Devis couverture" manual of the AMCQ (QMRA).

1.5 **Performance Requirements**

.1 Achieve the complete and uninterrupted insulation and protection of the building envelope against air, moisture and water, from the foundation walls up to and including the roof, covering all surfaces, ensuring also continuity with existing surfaces, if any.

.2 The flashings and copings shall withstand all applicable positive or negative wind forces, 223 kg/m^2 (150 lb/pi^2) minimum.

.3 The minimum thermal resistance of the roof shall be RSI = 5.464 (R = 0.96).

.4 The roofing must correspond to ULC Class C for its fire resistance.

.5 The roofing must resist positive and negative wind loads as per NBC and standard CSA A123.21.

.6 Select and install roof components and assemblies to resist air leakage caused by static air pressure across roof assemblies, including interruptions to integrity of roof systems; to a maximum air leakage rate of 0.02 L/s.m^2 when subjected to a pressure differential of 75 Pa as measured in accordance with ASTM E96.

.7 Select and install roof components and assemblies to resist air leakage caused by dynamic air pressure across roof assemblies, including interruptions to integrity of roof systems; to a maximum air leakage rate of 0.02 L/s.m^2 when subjected to hourly wind design loads in accordance with NBC, using a 1 in 10 year probability, as measured in accordance with ASTM E96.

.8 The roofing assembly must resist thermal movements resulting of a temperature differential of 80^{o}C (-40^{o}C to 40^{o}C).

1.6 **Submittals**

.1 Submit the documents and elements as per **Section 01 33 00**, sending them also to the independent inspector, taking also into consideration the following precisions:

.1 Field reports (F.R.): see **Field Quality Control** below.

.2 Operation and maintenance data (O.D.): submit the instructions to maintain the roof clean and in good repair.

.3 Mock-up (M.U.): apply all components in a staggered manner, exposing each material about 300 mm (12"). Build connection details of membrane flashings and metal counter- flashings and copings at parapets.

1.7 **Qualifications** (P.Q.)

.1 All work of this Section shall be executed by a roofer who is member in good standing with the Association des Maîtres Couvreurs du Québec, and with the Canadian Roofing Contractors' Association, having been trained by manufacturers of waterproofing systems specified with acceptable

products mentioned, and having a minimum experience of **10 years** in the installation of these waterproofing systems, with supporting references.

.2 All work involving manufacturing, installation, waterproofing and sealing in this Section must be performed by a minimum of **5 trained workers** having their competency certificates, one having at least **5 years** and the others at least **3 years** of experience in this kind of work, and being employed by a firm having at least **5 years** of experience in this kind of roofing.

.3 The superintendent shall have a minimum **5 years** experience.

.4 The Contractor must submit, with the bid, to assure its validity, a certificate of accreditation by the manufacturer for each type of membrane for the current year, certifying that the roofing contractor has the experience and competence necessary to execute the waterproofing work adequately.

1.8 **Source Quality Control**

.1 In case of discrepancies between the requirements of the standards mentioned herein and the manufacturer's recommendations, notify the Departmental Representative of these discrepancies and confirm your procedures before starting work.

1.9 **Meeting prior to Installation**

.1 **1 week** before the commencement of waterproofing work, hold a meeting with the representatives of the Contractor, the roofing subtrades, the inspectors and the Departmental Representative. During this meeting:
- .1 Review the requirements of the work.
- .2 Determine the corrections to be made to the installation and the support for the waterproofing systems.
- .3 Coordinate the work of this Section with those carried out by other trades.
- .4 Review installation instructions of the manufacturer as well as the terms of the warranty offered by the latter.

1.10 **Identification and Delivery**

.1 Indicate on containers or wrappings:
- .1 Manufacturer's name and brand.
- .2 Compliance with applicable standard.
- .3 Mass where applicable.

.2 Deliver materials in original containers, sealed, with manufacturer’s labels intact.

.3 Deliver fasteners in boxes or kegs and keep in protective storage until used. Do not oil or grease.

.4 Supply three copies of purchase orders to the Departmental Representative, including the following data:
- .1 Purchase order number.
- .2 Supplier's name and address.
- .3 Purchaser's name and address.

.4 Contract number and job number.
.5 Material and governing specification including type, grade, colour, class and quantity.
.6 Package label or bill of lading for bulk hot liquid asphalt must indicate type, softening point, flash point, equiviscous temperature range and final blowing temperature.
.7 Shipping instructions.
.8 Destination.

1.11 **Storage and Handling**

.1 Comply with the safety requirements of WHMIS with regard to primers, adhesives, sealants and caulking.

.2 Do not store material and equipment on the roof.

.3 Handle and store materials in such a manner that no damage will be done to the materials of the work.

.4 Store materials in a weather-tight building, raised clear of the ground so that the materials are protected from weather, dampness and deterioration. Do not use materials which have been damaged by exposure to moisture or by any other cause.

.5 Store packaged materials, undamaged, in their original wrappings or containers with manufacturers' labels and seals intact, and according to their recommendations.

.6 Store rolls on end, jointing side on the top, and keep them in a heated storage prior to cold weather application at 4°C or below.

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

.8 Keep insulation from contact with solvent-based adhesives, plastics and paints, and protect against ultraviolet rays at all times by covering with opaque polyethylene film or light coloured tarpaulins.

.9 Do not expose products other than the membrane to temperatures above 27°C.

.10 Store adhesives and liquid sealants above ground in spaces at above 5°C; warm them up to at least to 15°C before use.

.11 Store metal and aluminum flashings and copings in such a manner that they are not scratched, bent and are not otherwise damaged.

1.12 **Job Conditions**

.1 Use of asphalt for application of membranes or other components shall not be permitted.

.2 Use of primers and adhesives containing solvents must be reduced to a minimum, if not eliminated completely.

.3 Use only dry materials and install them only if weather conditions are such that no humidity will penetrate roofing system.

.4 Do not install membrane on rainy or foggy days, bad weather, or if surface is frozen or wet.

.5 Minimum application temperature:
- .1 Stop product application if temperature drops below -10°C, especially when wind chill effect would tend to set bitumen before proper adhesion takes place.
- .2 Take into account "wind chill" factor by measuring the temperature:
  Adjusted temperature (°C) = Air temperature (°C) - wind speed (km/h) / 2
- .3 See the CRCA roofing manual for a precise table for wind chill factor.
- .4 Perform membrane adherence tests if temperature is less than -5°C.

.6 Consider meteorological forecasts in planning start and interruption of work. Thus, if the forecast announces a sudden drop in temperature below predicted limits, do not start work; if temperature rises during the day, work can be started if temperature is slightly lower than the limit.

.7 Follow roofing suppliers'/manufacturers' recommendations for precautions and safety measures to be taken; see also **Part 3.0- Execution** of this Section.

.8 During the work, maintain on the roof the number of workers required by the AMCQ for the type of roof installed,

1.13 **Waste Treatment**

.1 Waste treatment to be done as per **Section 01 74 21**.

1.14 **Extended Warranty** (E.W.)

.1 With reference to the work (materials and labour) of **Section 07 52 00**, the guaranteed period of 12 months shall be prolongated to **60 months**. According to the provisions of **Section 01 33 00**, supply a written and signed document in the name of Canada.

Rev.2 .2 With reference to the membranes of **Section 07 52 00**, the guaranteed period of 12 months shall be prolongated to **120 months**. According to the provisions of **Section 01 33 00**, supply a written and signed document in the name of Canada.

.3 Replace or repair defective work and make good related incidental damage for areas developing defects such as but not limited to:
- .1 Water penetration through roof membranes or flashings;
- .2 Surface deterioration, gravel or granule loss, crazing, cracking, alligatoring, delamination blisters, fish mouths or defects affecting membrane durability or drainage path;
- .3 Membrane slipping;
- .4 Membrane or flashing uplift or displacement from wind or ice;
- .5 Membrane or metal flashing delamination, deterioration, open joints or defects affecting durability, performance or appearance;
- .6 Caulking or roofing cement deterioration, failure or defects affecting joint or lap durability, if the defect is not due to faulty maintenance.
- .7 Vapour barrier membrane delamination, deterioration or change in vapour transmission characteristics.

.8 Insulation delamination, deterioration, dimensional change, distortion or change in heat transmission characteristics;

.9 Torsion, weakening, deterioration or all defaults affecting the durability and performance of lumber.

.10 The presence of more than 20% humidity in any one of the roofing components at instalment.

2.0 PRODUCTS

2.1 **General**

.1 Roofing materials and system shall comply with the requirements of Quebec Construction Code, of the NBC, of all applicable local building by-laws and of QMRA and CRCA, most recent issues in force.

.2 It is essential that all components of roofing system be compatible with each other and with the substrates.

.3 Materials shall also be compatible with other existing or new membranes coming into contact with them.

.4 Insulation must be thoroughly dry at all times. Replace all moist or wet insulation.

.5 Use adhesive and primers as per manufacturer's recommendations.

.6 Any name of an acceptable manufacturer, supplier or product model mentioned below is given only as a reference for a minimum level of quality.

2.2 **Membranes and Related Products**

.1 Type MEMB.11 - Concealed modified bitumen vapour barrier membrane, self-adhesive:

.1 SBS polymer modified bitumen membrane as per ASTM D6163, self-adhesive, min. 1.0 mm (40 mils) thickness, reinforced with a film of crossed polyethylene, for connections, transitions, seats, etc..

- Acceptable products:
  - .1 "Blueskin SA" or variants: "Blueskin SA LT" or "Blueskin SA HT" by Henry Canada (Bakor).
  - .2 "Sopraseal Stick 1100T" by Soprema Inc.
  - .3 "Aquabarrier AVB" by IKO
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.2 Type MEMB.21 – Modified bitumen one-ply vapour barrier or flashing membrane:

.1 SBS modified bitumen membrane, as per CGSB 37-GP-56M (9th edition), Type 2, Class C, Grade 2, where applicable. Note that the self-adhesive variant shall only be used in limited applications (e.g.: repairs, joints in flashings, etc.), and where acceptable to the Departmental Representative.

.2 Self-adhesive: of minimum thickness as indicated, with a non-woven 180 g/m^2 polyester or 160 g/m^2 non-woven polyester and glass scrim reinforcement, self adhesive, back face

covered with a detachable silicone paper, and with a thermofusible polyethylene covered upper surface.

- Acceptable products:
  - .1 "Modified Plus NP180 Tack Sheet" (3 mm/120 mils) by Henry Canada (Bakor).
  - .2 "Armourbond 180" (3 mm/120 mils) by IKO.
  - .3 "Sopralene Flam Stick" (2.5 mm/100 mils) by Soprema Inc..
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.3 Torch applied: minimum 3 mm (120 mils) thick, with a non-woven 180 g/m^2 polyester reinforcement, with thermofusible polyethylene covered faces (to be burnt before installation of insulation).

- Acceptable products:
  - .1 "Modified Plus NP180 p/p" by Henry Canada (Bakor).
  - .2 "Modiflex MP-180-FF-Base" by IKO.
  - .3 "Sopralene Flam 180" by Soprema Inc.
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.3 Type MEMB.21X – Modified bitumen one-ply vapour barrier membrane, extra thick, torch applied:

.1 SBS polymer modified bitumen membrane, as per CGSB 37-GP-56M, Type 2, Class C, Grade 2, where applicable, for use as vapour barrier and use at transition points, at parapets, curbs, and expansion and construction joints, torch applied, minimum 3.5 mm (140 mils) thick, with a non-woven 180 g/m^2 polyester reinforcement, with sanded upper face and thermofusible polyethylene covered back face.

- Acceptable products:
  - .1 As manufactured by Henry Canada (Bakor).
  - .2 "Torchflex TP-180-SF-Base (3.5)" par IKO.
  - .3 "Sopralene 180 SP 3.5" by Soprema Inc.
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.2 Primers and adhesives: see **below**.

.4 Type MEMB.25 – Modified bitumen two-ply exposed roofing membrane, granule surfaced:

.1 SBS polymer modified bitumen roofing membrane, as per CGSB 37-GP-56M, Type 2, Class C, Grade 2, where applicable.

.2 Base sheet, torch applied: minimum 3 mm (120 mils) thick, with a non-woven 180 g/m^2 polyester reinforcement, both faces with a thermofusible polyethylene film to receive top sheet by torch application.

- Acceptable products:
  - .1 "Sopralene Flam 180" de Soprema Inc.
  - .2 "Modified Plus NP180 p/p" de Henry Canada (Bakor)
  - .3 "Torchflex TP-180-FF-Base" de IKO.
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.3 Top sheet, torch applied: minimum 4 mm (160 mils) thick, with a non-woven 250 g/m^2 polyester reinforcement, thermofusible polyethylene covered back face for torch application and granular finish front face, light grey colour.

- Acceptable products:
  - .1 "Modified Plus NP 250gT4" by Henry Canada (Bakor).
  - .2 "Torchflex TP-250-Cap" by IKO.
  - .3 "Sopralene Flam 250gr" by Soprema Inc.
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.4 Primers and adhesives: see **below**.

.5 Type MEMB.26 – Modified bitumen two-ply exposed roofing membrane, granule surfaced:

.1 SBS polymer modified bitumen roofing membrane, as per CGSB 37-GP-56M, Type 2, Class C, Grade 2, used on parapets, curbs, other vertical exposed surfaces.

.2 Base sheet, torch applied: minimum 3 mm (120 mils) thick, with a non-woven 180 g/m^2 polyester reinforcement, both faces with a thermofusible polyethylene film to receive top sheet by torch application.

- Acceptable products:
  - .1 "Modified Plus NP180 p/p" by Henry Canada (Bakor).
  - .2 "Torchflex TP-180-FF-Base" by IKO.
  - .3 "Sopralene Flam 180" by Soprema Inc.
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.3 Top sheet, torch applied: minimum 4 mm (160 mils) thick, with a non-woven 250 g/m^2 polyester reinforcement, thermofusible polyethylene covered back face for torch application and granular finish front face, light grey colour.

- Acceptable products:
  - .1 "Modified Plus NP 250gT4" by Henry Canada (Bakor).
  - .2 "Torchflex TP-250-Cap" by IKO.
  - .3 "Sopralene Flam 250gr" by Soprema Inc.
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.4 Primers and adhesives: see **below**.

.6 Type MEMB.27A – Modified bitumen roof expansion joint system:

.1 A modified bitumen membrane as per CGSB 37-GP-56M (July 80), 4 mm (0.156") thick, with aluminum foil, polyester fabric and silicone protection. The top layer, with granule finish replaced with aluminum flashing and coping; separation sheet in non-woven glass fibre; fiberglass pad.

.7 Type MEMB.28D – Rubber protection and traffic pads:

.1 Grooved rubber mat, 19 mm ¾" thickness, 1830 mm (76") by 1220 mm (48")

.8 Type MEMB.32 – Flame retardant membrane of oxidised bitumen:

.1 With fiber glass, reinforcement, both surfaces sanded, 1.5 mm (1/16 ") thick, for installation over asphalt recover board RC.BD and as indicated:

.9 Type RC.BD – Asphalt core re-cover board:

.1 An asphaltic board consisting of a high softening point component between two layers of non-woven glass reinforcement, 3 mm (⅛") or 6 mm (1/4") thick, adhered to smooth surfaces with

Type ADH.11 adhesive, or mechanically fastened on rough surfaces (with granules unremoved), to be used where necessary.

- Acceptable products:
  - .1 "Re-Cover Board" by Henri Bakor.
  - .2 "Protectoboard" by IKO.
  - .3 "Sopraboard" by Soprema Inc.
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

2.3 **Insulation and Related Products**

.1 Type INSUL.8/R – Polyisocyanurate board roof insulation:
Type INSUL.8/R/SL – Polyisocyanurate board roof insulation, sloped:
as per ASTM C1289 and CAN/ULC-S704, Type III class 2, rigid, closed cell, inorganic/organic felt facing, with ecological expansion agent; RSI = 1.06 / 25 mm (R = 6 / 1"); board size: 1220 x 1220 (4'-0" x 4'-0"), to thicknesses indicated (minimum 12.7 mm (½") thick), regular or sloped for counterslopes, – use two layers where more than 51 mm or 63.7 mm (2" or 2½") is required; density: 32 kg/m^3 (2 lb/ft^3); compressive strength: 158 kPa (23 lb/in^2); edges: square; flame spread/smoke developed values: less than 25 as per CAN/ULC-S102; maximum allowable linear change : 2%, when conditioned at 70^{o}C and 97% R.H. for 7 days; minimum curing: 24 hours, plus 24 hours minimum per 25 mm (1") of thickness, at least 16^{o}C, before shipment from the manufacturer.

- Acceptable products:
  - .1 "ACFoam-II" or "ACFoam-III" by Atlas Roofing Corporation (Fransyl).
  - .2 "E'nrg'y 3" by NRG Polyiso (John Manville).
  - .3 As manufactured by Rmax.
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.2 Type INSUL.12D - Mineral fibre flexible insulation:
made of stone wool, as per CAN/ULC-S702, Type 1, RSI = 0.68 / 25 mm (R = 3.86 / 1"), 32 kg/m3 (2 lb/ft3) minimum density, thickness as required; applied where indicated and wherever required to complete the continuity of the thermal insulation.

.3 Type INSUL.12/R/DD/SL – Mineral fibre roof insulation, double density, sloped:
Type INSUL.12/R/DD/AC – Mineral fibre roof insulation, double density, with asphalt coating:
As per ASTM C726 standard CAN4 S114, made from basalt rock and steel slag, RSI = 0.65 / 25 mm (R = 3.7 / 1 ") at 24oC, with rigid upper layer, regular or sloped (beveled at the factory to create contrepentes minimum. 12.7 mm (½ ") thick), with or without coating of asphalt, 25 mm (1") thick, 220 kg/m3 (13.75 lb/ft3) density, and 139 kPa (20.2 lb/po2) resistance, and lower layer 160 kg/m3 (10.0 lb/ft3) density, and 71 kPa (10.3 lb/po2) for resistance to compression at 10% deformation.

- Acceptable products:
  - .1 "TopRock DD Plus" by Roxul.
  - .2 "SopraRock DD Plus" by Soprema.
  - .3 "ProtecRSS-X2" by ModulR TS.
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

2.4 **Deck Sheathing**

.1 Type GYP.3/E/R – Glass fibre mat faced, silicone core gypsum roof sheathing board, and Type GYP.3/E/R/FR – Glass fibre mat faced, silicone core gypsum roof sheathing board, fire resistive: 12.7 mm (½") and 16 mm (⅝") thick respectively over steel deck and 6 mm (¼") thick as insulation protection board, as indicated; as per ASTM C1177/C1177M and C1396/C1396M; square edges.

2.5 **Sealants**

.1 Type CLKG.1 – Epoxidized polyurethane terpolymer sealant:
.1 As per CAN/CGSB-19.24, non-sag; colour to be chosen from the standard colour chart of the manufacturer, for visible joints.

.2 Type CLKG.7 – Modified bitumen sealant: rubber asphalt caulking and sealing compound, as per CAN/CGSB 37.29 for concealed locations.
- Acceptable products:
.1 "Polybitume 570-05" by Henry Canada (Bakor).
.2 "Modiplast" of "Premier" series by Fransyl.
.3 "Sopramastic" by Soprema Inc.
.4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.3 Type BK.R.1 – Polyethylene closed cell foam backing rod: round, compressible and resilient, oversized 25%.
- Acceptable products:
.1 “Ethafoam 220 Round” by Dow Chemical Co.
.2 "ITP Standard Backer Rod" by Industrial Thermo Polymers Ltd.
.3 "Cera-Rod" by W. R. Meadows du Canada.
.4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.4 Bond breaker tape: polyethylene bond breaker tape which will not bond to sealant.

.5 Type PL.CEM – Plastic cement: a solvent type plastic cement, asbestos free, composed of asphalt or synthetic rubber, fibers and fillers, as per CAN/CGSB-37.5.
- Acceptable products:
.1 "Plastomere 810-21" by Bakor.
.2 "Econoplast" of "Premier" series by Fransyl Limitée.
.3 "Bestile Industrial Roof Cement" by Johns Manville.
.4 "Mammouth" by Soprema Inc.
.5 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

2.6 **Adhesives and Primers**

.1 Type ADH.1 – All-purpose adhesive for construction: polyurethane based adhesive, of high bonding strength, or based on other ecological products, without solvent.
- Acceptable products:

.1 "Lepage Bulldog Grip – PL Premium" by Henkel.
.2 "555 Total Adhesive " by NuFlex Sealants.
.3 As manufactured by Liquid Nails.
.4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.2 Type ADH.12D – Two-component, low expansion, urethane adhesive: for cold-bonding to polystyrene and polyisocyanurate insulation, vapour barrier and asphalt panels, applied at all temperatures.
- Acceptable product:
  .1 "Duotack" by Soprema Inc.
  .2 "Adphalt" - "Premier" Series by Fransyl Limited.
  .3 "Cold Gold" by IKO.
  .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.3 Type PR.ASPH.2 – Asphalt primer, Type 2 for torchable membranes, a non-penetrating primer with a mixture of elastomeric bitumen, volatile solvents and adhesive, for gypsum surfaces and concrete surfaces.
- Acceptable products:
  .1 "Métaprime" "Premier" Series by Fransyl.
  .2 "Roofcraft" by IKO.
  .3 "Elastocol 500" by Soprema Inc.
  .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.4 Type PR.MEMB/SA.1 – Primer for self-adhesive membranes, Type 1: a synthetic rubber based adhesive primer, containing solvents, for low temperature applications.
- Acceptable products:
  .1 "Blueskin LVC Primer" by Henry Canada (Bakor).
  .2 "Aquabarrier Primer" by IKO
  .3 "Elastocol Stick" by Soprema Inc.
- Acceptable alternate product:
  .1 "Mel-Prime" of Sealtight by W.R. Meadows (water-based or solvent-based according to temperature during application).
  .2 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.5 As much as possible use solvent-free primers and adhesives, always with the manufacturer's approval.

.6 All adhesives and primers to be compatible with each other and with the membranes, as recommended by the manufacturer of the latter.

2.7 **Fasteners for Roofing**

.2 Type FAST.4B - Wood screws with countersunk heads: as per ANSI B18.6.1.
  .1 Hot dip galvanized Type GV.F.1, for exterior use, of type and dimension according to usage.

.1 Type FAST.8A – Felt nails: with large diameter head, galvanized steel.

.2 Type FAST.8B – Screws for gypsum board and fibre board: standard roofing fasteners for fastening gypsum board and fiberboard panels to steel deck, 25 mm (1") longer than the board thickness, with #3 Phillips head, in carbon steel with anti-corrosion coating, with 75 mm (3") square or round stress plates made of galvanized steel 0.5 mm (0.0185") thick, with Type GV.F.3 finish. Fasteners to be FM Global approved in homologated assemblies.

- Acceptable products:
  - .1 "CR-158" with "SPGA3-C" plate, by Olympic Fasteners.
  - .2 "Insul-Fixx #12" with "IF-3"-S" (Type II) plate by Stadler Inc.
  - .3 "Dekfast #12" with "Steel Hex Plate" by Construction Fasteners Inc. (Dekfast Product Group).
  - .4 "Pre-Assembled Trufast" by Trufast.
  - .5 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.3 Type FAST.8C – Insulation fasters: similar to Type FAST.8B, with high density polyethylene plastic washer, 76 mm (3"), self-locking, as recommended by the insulation manufacturer.

- Acceptable products:
  - .1 "ASAP 3P" by Olympic Fasteners.
  - .2 As manufactured by Stadler Inc.
  - .3 As manufactured by Trufast.
  - .4 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

.4 Type FAST.8D – Wood framing and blocking nails: galvanized steel, with Type GV.F.1, type and size to suit applicable conditions.

.5 Type FAST.8E – Bolts, nuts, washers: galvanized steel, with Type GV.F.1, 9.5 mm (3/8") diameter, length to suit applicable conditions.

.6 Type FAST.8F – Sheet metal screws: same material as the metal sheet, flat head nails of length and thickness suitable for flashing application.

.7 Type FAST.8G – Cleats: in same material as sheet metal, minimum 50 mm (2") wide, and 0.9 mm (20 ga) thick, or in stainless steel, as required.

.8 Type FAST.8H – Fastener strips: continuous 3 mm x 25 mm (1/8" x 1") galvanized steel with Type GV.F.1 finish, 3 mm x 25 mm (⅛ "x 1") Maximum length available, no sharp edges, fitted with angle reinforcement at the base, pre-perforated with oblong holes 6.4 mm x 9.6 mm (¼ "x ⅜") at 152 mm (6 ") c / c for fixing the membrane.

.9 Type FAST.8J – Screws for membranes: steel finished with Type F.GV.1, 12 gauge, 32 mm (1 ¼ ") long, flat head, fitted with galvanized steel washers at least 25 mm (1 ") diameter.

2.8 **Other Accessories**

.1 Type MFL/PP – Metal flashing and coping, prepainted, base metal minimum 0.61 mm (24 ga) thick, or as indicated, Type F.GV.2 galvanization and Type F.PP.1 prepainted finish; colour as per existing.

.2 Type REGL.1 – Reglets for inserted flashings, Type 1: in PVC plastic extrusions, as per ASTM D1784, Class 14333D, embedded in concrete to receive flexible flashings..

.3 Type EXP.JT/R – Expansion joint trim for roofing: a combination of flexible rubber membranes supported by a closed cell foam to form flexible bellows, with two metal flanges.

.4 Type R.ACC.1 – Roof accessory Type 1: prefabricated, non-corrosive, insulated equipment supports, with:

.1 16" to 23" (406 mm to 584 mm) high adjustable height hollow aluminum with mill finish, urethane insulated supports, 2" (51 mm) dia., with appropriate hardware (adhesive type supplied by others) for fastening to structural roof deck

.2 cross-bar carrier of length to suit application with EPDM anti-vibration pads, and 1-1/2" (38 mm) dia. pipe section reinforcing ties.

.3 Non-insulated New-Standard STACK JACK flashing for concrete deck

.4 7" (178 mm) high consisting of .064" (1.6 mm) mill finish alloy aluminum, 2" (51 mm) dia. to CSA B272-93 with EPDM Triple Pressure Grommet Seal and EPDM Base Seal and bituminous painted deck flange.

. 5 Type R.ACC.2 – Roof accessory Type 2: prefabricated, non-corrosive, insulated, antenna anchor, as indicated, with:

.1 Epoxy coated, urethane insulated hollow steel support, including appropriate fastening to structural roof deck (adhesive type by others), and steel ring with galvanized eye and stainless steel cap for affixing antenna wire (by others).

.2 Manufacturer's standard urethane insulated .064" (1.6 mm) mill finish alloy aluminum flashing and EPDM Base Seal and bituminous painted deck flange.

. 6 Type R.ACC.3 – Roof accessory Type 3: prefabricated, non-corrosive, insulated equipment supports, with:

.1 16" to 28" (406 mm to 711 mm) high adjustable height hollow aluminum with mill finish, urethane insulated supports, 2" (51 mm) dia., with appropriate hardware (adhesive type supplied by others) for fastening to structural roof deck

.2 cross-bar carrier of length to suit application with EPDM end caps, EPDM anti-vibration pads and 1-1/2" (38 mm) dia. pipe section reinforcing ties.

.3 non-insulated New-Standard STACK JACK flashing for concrete deck

.4 7" (178 mm) high consisting of .064" (1.6 mm) mill finish alloy aluminum, 2" (51 mm) dia. to CSA B272-93 with EPDM Triple Pressure Grommet Seal and EPDM Base Seal and bituminous painted deck flange

. 7 Type R.ACC.4 – Roof accessory Type 4: Multiple satellite dish roof supports, prefabricated, non-corrosive, insulated, with:

.1 Adjustable height hollow aluminum with mill finish, urethane insulated supports, 2" (51 mm) dia., with appropriate hardware (adhesive fasteners by others) for fastening to structural roof deck, aluminum

.2 cross-bar carrier with EPDM end caps, aluminum anchor plates, length according to number of satellite dish (minmum 152mm between satellite dish).

.3 7" (178 mm) high consisting of .064" (1.6 mm) mill finish alloy aluminum, 2" (51 mm) dia. to CSA B272-93 with EPDM Triple Pressure Grommet Seal and EPDM Base Seal and bituminous painted deck flange

. 8 Type R.ACC.5 – Roof accessory Type 5: Staircase support, prefabricated, non-corrosive, insulated, with:

.1 Adjustable height, epoxy coated, urethane insulated hollow steel supports including appropriate hardware (adhesive fasteners supplied by others) for fastening to structural roof deck.

.2 cap / plate assembly designed for affixing equipment or items (by others) shown on drawings.

.3 7" (178 mm) high consisting of .064" (1.6 mm) mill finish alloy aluminum, 2" (51 mm) dia. to CSA B272-93 with EPDM Triple Pressure Grommet Seal and EPDM Base Seal and bituminous painted deck flange

.4 Support fixed to staircase, see **Section 05 50 00**.

. 9 Type R.ACC.6 – Roof accessory Type 6: Gooseneck dryer vent, prefabricated, non-corrosive, with:

.1 Galvanized steel gooseneck ±200mm x 200mm x 200mm high fixed on a galvanized anchor plate of 355mm x 355mm.

.2 Collar for junction with the conduit of 150mm x 150mm de hauteur, extends 75mm above the anchor plate and is sealed to the anchor plate.

.10 Type JN.TP.10/SA – Joint tape, firestop, self-adhesive: SBS modified bitumen, with glass scrim reinforcement, adhesive side protected with detachable silicone film, 1.6 mm (1/16") thickness, 76 mm (3") wide, for panel and substrate joints, and where indicated.

.11 Type WD/T - Wood, pressure treated, water resistant: softwood, S4S, (milled 4 sides), shall have moisture content 19% or less in accordance with CAN/CSA-O141 and NLGA requirements for classification; treated with chromated copper arsenate, with water-repellant additives in emulsion for treatment in closed vacuum cylinder, to obtain net retention of 6.4 kg/m^3 of wood, as per CSA O80 Series; touch-ups with a 2% copper naphthenate solution, colour "Soft Green", ignition point 38^{o}C min.

.12 Type SLP/COMP - Composite sleepers: fabricated of a mix of recuperated wood and plastic, nominal dimensions 100 mm x150 mm (4" x 6"), in lengths of 2440 mm (8'-0"), or as required.

2.9 **Roof Drains**

.1 Type R.DR.3 – Roof drains for exposed membrane: copper drain assembly, complete with gasket, insulation and vapour barrier, as well as sleeve and flexible coupling, consistent in diameter with downspouts or as required by **Mechanical**.

- Acceptable Products:
  - .1 "Ultra Plus" + "U-Flow Seal" par les Produits Murphco.
  - .2 "RD-7C-RR" par Thaler Metal Industries.
  - .3 Substitutes: approved by addendum in accordance with the **Instructions to Bidders**.

2.10 **Roof Openings**

.1 Type R.HT.1/P – Roof hatch, single leaf, with security post: of galvanized and primed steel construction, insulated, with 90° openings; 914 mm x 762 mm (3'-0" x 2'-6"), with safety post.

2.11 **Roofing Systems**

.1 See **drawings**.

3.0 EXECUTION

3.1 **General**

.1 Work shall be carried out in accordance with good roofing practice, QMRA (AMCQ) and Quebec Construction Code and NBC requirements , CSA A123.21, and manufacturer's instructions. Obtain the necessary approvals.

.2 Installation procedures shall conform to the Canada "Model National Energy Code for Buildings" (MNECB).

.3 Follow the procedures of "Fire Prevention" of QMRA (AMCQ).

.4 Full cooperation should be given to the Inspectors and the Departmental Representative in the making of inspections and tests at all places where work is being done or stock is piled.

.5 Ensure to obtain the necessary quantities of materials to be supplied by other Sections before starting Work.

.6 Sweep all roof surfaces before commencing work and remove debris.

.7 Apply materials only to surfaces which are dry and free from dust, rainwater, dew, ice and snow.

.8 Select primers, adhesives and sealants (caulking) depending on weather conditions, substrates and materials to adhere, and apply to all surfaces according to manufacturer's recommendations. Assure that they are dry before the application of membranes. Comply with the safety requirements of WHMIS.

.9 Always start installation of all layers at the lowest point to ensure water runoff over joints.

.10 Ensure the surface of an applied membrane is free of air pockets, folds, wrinkles or tears.

.11 Ensure new membranes overlap existing membranes by at least 150 mm (6"), with sealed watertight joints between strips and at perimeters.

.12 Press the membrane along the laps and the end joints, check and if need be torch seal the joints at the end of the work day.

.13 Cooperate with other Sections to ensure watertight junctions wherever pipes, vents and other items

pass through the roof, as well as the continuity of air/moisture protection and insulation.

.14 Repair substrates, as well as existing roofing damaged because of age or demolition or other work, with materials identical or compatible with the existing.

.15 Apply roofing systems not described below in detail as per the manufacturer's instructions.

.16 As much as possible, reduce the use of asphalt to a minimum, using adhesive or torching to install membranes and other elements.

3.2 **Asphalt Heating**

.1 Heat asphalt in a kettle or tanker, to a point where the temperature reaches equiviscosity at the time of application.

.2 In cold weather use insulated equipment and material to reduce heat loss to the maximum.

.3 Asphalt transported in a tanker must not be heated above the temperature limit of the blower.

.4 In a kettle the heating of asphalt to the temperature limit of the blower can be tolerated provided that the material is used within the following 4 hours.

.5 Kettles and tankers must be equipped with thermometers in good working condition.

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. Locate kettles considering direction of prevailing winds, building fans and air handling units, to prevent smoke and fumes entering surrounding occupied buildings or discolouring adjacent surfaces. If wind changes direction, relocate kettle on daily basis according to Departmental Representative directives.

.4 Maintain continuous supervision while kettles are in operation and provide metal covers for kettles to smother flames in case of fire. In addition, provide appropriate type and number of fire extinguishers.

.5 Clean kettles and other equipment frequently, in order to function effectively. Remove charred bitumen regularly.

.6 To spread the bitumen, use exclusively fiberglass mops.

3.4 **Protection**

.1 Protect walls and adjacent surfaces where hoisting is necessary or where work will be executed.

.2 Locate kettles at ground level so that smoke will not discolour the building or adjacent buildings. Hang

tarpaulins to protect walls.

.3 Protect the substrate against damage that may be caused among others by traffic or transport. Make arrangements deemed necessary by the Departmental Representative.

.4 Use warning signs and barriers. Maintain in good order until completion of work. Take all measures deemed necessary by the Departmental Representative.

.5 Remove without delay droppings and stains of bitumen.

.6 Provide ladders or other access to the roof at least at two locations. Obtain approval of the Departmental Representative for type and location.

.7 No lighters or other sources of lighting fire are to be allowed on the roof, except for torch application of membranes.

.8 Dispose of rain water off roof and away from face of building until roof drains are installed and connected.

.9 Before the installation of permanent protection, temporarily protect the membrane from mechanical damage or oil and solvent spills.

.10 Prevent traffic over completed roofing except where required by work above roof level. Take precautions deemed necessary to protect completed work, such as plywood traffic pathways. Repair or replace, at no cost to the Departmental Representative, all work damaged due to the work of other Sections.

.11 At the end of the work day mops are to be removed from the roof and stored in a ventilated and secured area to minimize the risk of spontaneous combustion. Place them in such a way that in case of spontaneous combustion occurring, no other materials will catch fire.

.12 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.

.13 Where other work may be performed by passing over finished roofing membrane, protect surface within minimum 12.7 mm (1/2") thick plywood sheets.

.14 In the case of repairs to an existing built-up membrane, spread without delay gravel which has been set aside for the purpose.

.15 Provide two chemical fire extinguishers of 14 kg each on the site: one on the roof and the other near the boiler. Also keep a water hose equipped with a variable pressure nozzle. During the entire work period, maintain the hose under pressure.

.16 Also ensure the presence on the roof of a fire inspector when torches are used for the installation of membranes, at least until **60 minutes** after the extinction of the torches

.17 If necessary, protect against the spread of dust to the floor immediately below a roof

under repair or to any other area affected by the work.

3.5 **Examination of Roof Decks**

.1 Examine roof deck, accompanied by the representative of the independent laboratory and immediately inform the Departmental Representative in writing of any defects.

.2 Prior to commencement of work ensure:
- .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.
- .2 Curbs have been built, ready to receive membranes.
- .3 Roof drains and downspouts have been installed at proper elevations relative to finished roof surface.
- .4 Nailer plates to walls and parapets have been installed as indicated.
- .5 All defects have been corrected.

.3 Commencement of work implies acceptance of the condition of the deck.

3.6 **Preparation of Substrate**

.1 Concrete deck:
- .1 Ensure the concrete surface is clean, dry, and suitable to receive roofing, to the satisfaction of the membrane manufacturer.
- .2 Repair voids, cracks, holes, honeycombs and other damaged horizontal or vertical surfaces before application of the membrane.
- .3 Seal cracks and joints with a sealant.

.2 Block all drains temporarily during application of products.

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3.7 **Installation of Roof Drains**

.1 Install drain hoppers according to the manufacturer's instruction.

.2 Install membrane to drains as per the manufacturer’s detailed directions.

.3 Reduce insulation thickness around drains on a 915 mm (36") distance to create a slope towards the drains.

.4 Remove flashing collar.

.5 Provide1000 mm x 1000 mm (3' - 4" x 3' - 4") Type MEMB.21 or Type MEMB.21X membrane reinforcement around each drain, positioned at 45º with respect to roofing membrane. Install membrane with continuous application of adhesive. Remove wrinkles / entrapped air. Apply mastic to exposed edge of membrane inside the drain opening.

.6 Reclamp flashing collar to drain in bed of sealant exerting sufficient pressure to form a seal between the clamp and the membrane.

.7 Cut/remove excess sheeting within drain. Provide supports if necessary.

3.8 **Treatment of Projections**

.1 At mechanical vents, cable supports, curbs, projections, pipe flashings, install additional layer of membrane Type MEMB.21 or Type MEMB.21X.

.2 Fill with plastic cement Type PL.CEM, plastic boxes, plastic sleeves or other accessories in a manner to assure a complete seal, or use a chemical curb system Type CHEM.CRB or Type SEAL.BOX for this purpose.

.3 Seal perimeter of all projections with a strip of 76 mm (3") wide of Type MEMB.21 or Type MEMB.21X, centered on the joint.

3.9 **Treatment of Parapets and Curbs**

.1 Place Type MEMB.11, Type MEMB.21, Type MEMB.21A or Type MEMB.21X air/vapour barrier membrane to underside of steel runners or nailers before installation, where applicable. Extend membrane 300 mm (12") outside the building, where applicable.

.2 Apply strip continuous with 200 mm (8") overlap at joints, free of wrinkles and tears, with at least 200 mm (8") exposed for overlap on roof deck and on wall.

.3 For the installation of membrane flashing see **below**.

3.10 **Application of Exposed Membrane Roofing System**

.1 Type MEMB.21 – Vapour barrier membrane, modified bitumen, one ply:
- .1 After the primer is dry, starting from the low point of the roof and perpendicular to the slope, install Type MEMB.21 vapour barrier membrane using a torch application.
- .2 Ensure side laps of 76 mm (3") and end laps of 150 mm (6").
- .3 Press the membrane along the overlap and end joints. Prevent the formation of wrinkles, bulges, or openings. Eliminate any air pockets. Check, and if necessary, seal joints with a torch at the end of each working day.
- .4 At roof edges or vertical projections, extend the membrane on the vertical surface to the height of the insulation protection board and fold over, overlapping 150 mm (6 ") onto the horizontal surface of the roof.
- .5 At the meeting with walls, equipment bases, parapets, etc. torch-apply the flashing as recommended by the manufacturer, continuously overlapping 200 mm (8 ") on the horizontal surface of the roof and walls of the projection, with a minimum overlap of 76 mm (3 "). Prepare substrates adequately beforehand.
- .6 Ensure the continuity of the vapour barrier membrane at wall and roof junctions.

.2 Type ISOL.8/T – Polyisocyanurate roof insulation, Type ISOL.12T/DD - mineral fiber roof Insulation dual-density, Type PN.RC / IS / EA – fiber panel overlay with asphalt primer, variants and related products:
- .1 Install panels with adhesive type ADH.12D .

.2 Butt panels together perfectly , with no spaces . Successive bands should be staggered 80 %; also overlap the joints vertically. Do not force or twist the panels.

.3 Fill cracks between insulation panels with insulation ISOL.12D type if necessary.

.4 In the case of panels having a laminated membrane layer, ensure overlap on the membrane joints, press along overlaps and at ends of panels, and weld to render all joints perfectly sealed.

.5 Provide all required counterslopes with sloped insulation, to ensure at least 2% slope for drainage at all roof edges, including at bases for electro-mechanical equipment, etc. . Refer to **Mechanical** and **Electrical** for quantity and locations.

.3 Types MEMB.25 – Exposed roofing membrane, two-ply:

.1 Plan work so that both side and end joints of each row are not superimposed with those of the base sheet, and are offset 300 mm (12") for sides and 460 mm (18") for end laps. Use a line to locate first roll of each row.

.2 Unroll the base ply, dry, on the substrate to adjust the alignment. Extend the membrane vertically to the level of the fastening strip Type FAST.8H.

.3 Install the base ply with by torching, as per manufacturer's recommendations.

.4 Attach the base ply perimeter upturn at the base of the parapets reinforced by Asphalt re-cover board Type RC.BD, with fastener strips Type FAST.08H and screws Type FAST.08J, as indicated on **details**.

.5 Seal joints between membrane and projections (conduits, etc.) with a 76 mm (3") wide strip of splicing membrane, centered on the joint.

.6 Cover also the intersections of slopes with a supplementary base ply, after the complete base ply has been laid.

.7 Lap base and cap sheets 75 mm (3") on sides and 150 mm (6") on ends.

.8 At end overlaps, where "T" joints occur, cut membrane corner at a 45° angle.

.9 Unroll the finish ply, and torch weld the membrane according to the manufacturer's recommendations. Overlap finish ply onto base ply of parapet and curb flashings as shown on **details**.

.10 Take care not to overheat, so as not to burn membranes and their respective reinforcements.

.11 Make sure no air pockets remain under the membrane.

.12 Offset a minimum of 300 mm (12") membrane joints of the base ply from those of the top ply..

.13 Check after application to make sure no slippage has occurred and no asphalt smudges occur at the joints. Cover them with additional granules, if necessary.

3.11 Application of Flashing Membrane

.1 Place the joint tape Type RB.JN.10/AA over joints of support panels, if the flame arrester type MEMB.32 membrane is not used, or staple the membrane type MEMB.32 over the existing substrate and fix the re-cover board PN.RC type using screws Type ATT.4B.

.2 Install membrane Type MEMB.21 or Type MEMB.21X membrane, torch welded, covering also counter slopes and where indicated.

.3 Cut membrane in 1 m (3'-4") wide strips by length required to suit detail.

.4 Extend membrane flashing a minimum of 150 mm (6") onto roof surface and extend all the way to the top horizontal and front vertical surfaces of the parapets and curbs.

.5 Overlap laterally a minimum 76 mm (3") and offset at least 300 mm (12") in relation to those of the sub-layer membrane, to avoid excessive thickness at the overlapped ends; at "T" joints, cut corner of membrane at a 45° angle.

.6 Anchor base sheet and flashing membrane onto vertical surfaces at the base of the parapets and curbs, using galvanized screws having semi-rigid attached heads, 25 mm (1") in diameter. Place screws at 300 mm (12") on centre.

.7 Extend finish ply of membrane Type MEMB.26 a minimum of 200 mm (8") minimum onto the roof surface after the finish ply of the roofing membrane has been installed. Also extend to the top of the vertical face(s) of parapets and curbs.

.8 Torch weld this finish membrane to the sub-layer; creating a complete weld between the two membrane plies, leaving no air pockets or folds.

.9 Overlap membranes 76 mm (3") laterally and not less that 150 mm (6") on the roof surface; turn up finish ply equal with upper edge of vertical surfaces of elevated portions of the roof; remove granules at overlaps in the same manner as the rest of the finish membrane.

.10 At junctions with existing surfaces, make watertight connections, providing for membrane movement, if applicable.

3.12 **Aluminum or Metal Flashings and Copings**

.1 Flashings to be installed according to FM Global Document 1-49.

.2 Do not install flashings and copings until all roofing and membrane flashings have been inspected by the Departmental Representative.

.3 Flashings and copings shall be applied over all membrane flashings at all curbs, copings, parapet walls, upstands, wherever shown and where required, in accordance with the details, or as prescribed by codes.

.4 Separate different metals with bituminous paint Type BPT.

.5 All flashings and copings shall be anchored over continuous non-corroding cleats and as detailed.

.6 Fix high parapet flashings at the vertical joints with mechanical fasteners, at 200 mm (8") from the horizontal surface.

.7 Provide for expansion and contraction of flashings by installing slip-lock seams at maximum 2400 mm (8'-0") intervals. Expansion joints shall be lapped type allowing free movement of metal, without distortion, or loss of watertightness.

.8 Lock seams shall be 25 mm (1") wide. Slip seams shall be 100 mm (4") wide.

.9 Copings shall be formed as detailed and all exposed edges shall be folded 12.7 mm (1/2") forming "S"

seams to join pieces together; raw exposed edges are unacceptable.

.10 Align visible joints of copings with other architectural features and indicate on shop drawings.

.11 All flashing corners shall be dovetailed, mitred and soldered or sealed.

.12 Provide all necessary ribs and stiffeners for a secure weathertight installation.

.13 All seams and edges shall be secured on continuous heavy gauge cleats (next higher gauge than the flashing) minimum 50 mm (2") high, fastened at 300 mm (12") centers maximum with stainless steel screws. Cleats shall be turned back to conceal fasteners.

.14 There shall be no exposed fasteners on flashings or copings. All unsoldered seams shall be sealed with sealant within.

.15 Seal joints between sections of flashings and copings, and between these and adjacent surfaces as well as end joints.

.16 All copings caps shall have a minimum 1:10 slope, notwithstanding indications.

.17 If necessary, install reglets surface-mounted or embedded in concrete plumb and level. Caulk the upper edge of reglets by means of a sealant.

.18 Insert the metal flashing into the reglets in order to form a watertight seal.

.19 With a sealant, caulk the flashing at its intersection with the reglet.

.20 Seal around all supports of equipment or other elements installed on the coping, if any.

.21 At junctions with the existing surfaces, make watertight connections, making the necessary repairs.

3.13 **Control and Expansion/Construction Joint Systems**

.1 Unless otherwise indicated, construct control joints as specified by AMCQ.

.2 Build curbs as shown on drawings to receive Type MEMB.27A or Type EXP.JT/R expansion joint system. Install the flexible flashing in a similar manner as described above, and build construction joints as shown on drawings and as recommended by the system manufacturer.

.3 Install membrane Types MEMB.21 and MEMB.21X as shown, and ensure continuity of air/vapour barriers and insulation.

3.14 **Transition Membrane**

.1 Install membrane Type MEMB.11 in strips of appropriate dimension at all intersections of different materials and around openings, including foundation walls columns, mechanical and electrical conduits, etc., and where indicated.

.2 When installing in cold weather, apply membrane using continuous pressure with a roller.

.3 Before applying membrane, fill all cracks larger than 12.7 mm (½"), or install a suitable support material over the crack.

.4 Extend the membrane up a minimum of 150 mm (6'') at the intersection with a vertical plane.

.5 Overlap joints a minimum of 50 mm (2'') at the intersection with existing membranes. Roll the overlapping materials with a steel or polyethylene roller to achieve complete seal.

3.15 **Protection and Traffic Pads**

.1 Where indicated, glue traffic pads Type MEMB.28D onto the top layer of roofing surface after removing the granules, in conformity with the manufacturer's recommendations. Leave 25 mm (1") space between each pad

3.16 **Other Accessories**

.1 Install equipment supports and other accessories as per the manufacturer's instructions.

.2 Coordinate with **Mechanical** and **Electrical** and install accessories Type R.ACC according to manufacturer's instructions. Attach to structural elements, not to steel deck.

.3 Vents shall have aluminum sleeves. Top flanges of sleeves shall be free and be folded down into vents by not less than 50 mm (2"). Bottom flanges of sleeves shall be at least 150 mm (6") wide, set over roof membrane with hot asphalt and made watertight with membrane plies. Protect metals from electrolytic reaction with other material of vents.

.4 Steel and aluminum in contact with dissimilar metals or concrete or masonry shall receive two coats of bituminous paint Type BPT to prevent electrolytic reaction.

.5 All metal work shall be watertight, shall be sealed and installed with proper allowances for anticipated thermal movement throughout the year.

.6 After installation, all sheet metal shall be cleaned with approved solvent, to the satisfaction of the Departmental Representative.

.7 Install roof hatches according to manufacturer's recommendations and ensure continuity of air / water vapour / moisture protection.

3.17 **Caulking**

.1 Application of Types CLKG.1 (exposed) and CLKG.7 (concealed) sealants shall be done by skilled applicators and in strict accordance with manufacturer's printed directions, using pressure guns and equipment approved by the sealant manufacturer and under his supervision.

.2 Seal all joints between metal-to-metal, and metal-to-masonry or other surfaces, where necessary and as directed by the Departmental Representative.

.3 Fill spaces deeper than 12.7 mm (1/2") with polyethylene backing rod or joint filler material packed tightly in place to within 9.5 mm (3/8") of finished surface. Fill remaining space with sealant.

.4 At seams in sheet metal work, apply continuous bead of sealant prior to folding and/or locking of seams.

.5 Apply sealant to clean, dry, grease and oil free surfaces. Prime surfaces to receive sealant. Exposed sealant shall be smooth, free from ridges, wrinkles, air pockets and embedded foreign materials.

.6 Remove excess sealant and droppings.

3.18 **Field Quality Control** (F.R.)

.1 Notify the Departmental Representative before covering membranes.

.2 A representative of the manufacturer of the waterproofing membrane shall verify the support before the start of work, during and at the completion of the work; when needed, the representative shall furnish technical assistance to the installer and submit recommendations so that the installation of the membrane will conform to requirements of the manufacturer and the current specification Section. Any comments on the quality of the installation are to be reported in writing to the Departmental Representative.

.3 In a timely fashion, and with at least **48 hours** notice, the Contractor shall notify the Departmental Representative and the manufacturer's representative so that they can make a preliminary inspection of the roof deck to receive the roofing system, regarding slope, strength, and cleanliness. This inspection also includes the approval of the construction and preparation of related structures such as walls, railings, eaves, downspouts, plumbing vents, and any other work required.

.4 Inspection of roofing described in this Section and the relevant tests will be made in accordance with the requirements and procedures of the estimate monitoring Departmental Representative, and will be provided by an independent inspection firm, specializing in roofing, approved by AMCQ and appointed by the Departmental Representative. An inspector appointed to this project must provide written proof that he has completed training by the AMCQ.

.5 The inspection company shall perform a preliminary inspection to verify the substrate to receive roofing materials, slopes, solidity, cleanliness, preparation, and to ensure that related work such as walls parapets, eaves, downspouts, plumbing vents and all other work is compliant. This inspection should take place in sufficient time for the necessary repairs to the substrate prior to the roofing work. No extension of the schedule shall be permitted if the inspection is not performed within the time required.

.6 The inspection company will inspect the roof during installation and as directed by the Departmental Representative. A daily written report shall be submitted.

.7 The roofing membrane is to be tested by blocking the roof drains and flooding the roof drainage basins for a period of at least 24 hours; the test is to be coordinated with and witnessed by the Departmental Representative.

.8 After installation of the vapor barrier, the Contractor and the roofing contractor should check surfaces and slopes of the deck to detect any depression that might cause an accumulation of water on the surface of the new roofing. If necessary, they must notify the Departmental Representative and the manufacturer's representative before continuing the work.

.9 For the duration of the roofing work, including metal flashings, the Contractor shall notify the Departmental Representative and the manufacturer's representative of the evolution of the site, to allow them to make the necessary visits to ensure perfect execution of the work.

10 For the duration of the laying of roofing materials, the inspector shall be continuously present and no interruptions will be permitted. If the inspector must be absent for a valid reason, he must take measures to ensure that upon return, the work has been performed in compliance with requirements of the plans and specifications, as the inspector assumes full responsibility for meeting these requirements.

.11 The presence of the inspector is not required during the execution of the work of cleaning the substrate, whether disposal of surplus materials, accumulations of snow or ice or drying of the surfaces. If the Contractor inadvertently summons the inspector when his/her presence is not required, the Contractor shall assume the cost of such presence.

.12 After the sheet metal installation, the inspector shall ensure that the execution of the sheet metal work is consistent with plans and specifications, and meets applicable installation requirements. Continuous presence of the inspector is not required during sheet metal installation.

.13 The Contractor shall ensure continuity in the execution of roofing work so that the materials incorporated into the work are not damaged by any cause whatsoever.

.14 The inspection of roofing work shall ensure compliance with the plans and specifications and shall include among others the following verifications:

.1 Cleanliness, strength and steepness (slope) of the surfaces to be waterproofed
.2 The nature, thickness, weight and number of waterproof membranes.
.3 The overlapping and sealing of membrane joints.
.4 The construction of bitumen and metal flashings on walls, control joints or expansion joints.
.5 The watertightness of bases for mechanical/electrical equipment, or other elements on the roof.
.6 The flow of rain water to the various drains.

.15 The Contractor shall submit a document issued by a certified testing laboratory, showing that the specified roofing system has been tested according to CSA A 123.21 standard. The test results must demonstrate that the roofing system can withstand the wind pressures on the current area, edges, and corners of the roof, as required by codes and standards.

.16 After acceptance of the work, the Inspector shall provide the Contractor with a certificate attesting to the quality of the work and compliance with the requirements of installation that will serve as a precondition to the issuance of the extended warranty, as specified and Part 1.

.17 The Departmental Representative may also retain the services of a specialized company to do thermography tests of completed work.

.18 The Departmental Representative shall be responsible for the costs of tests, as prescribed in **Section 01 40 00.**

3.19 **Protection**

.1 Protect all finished surfaces from damage and contaminants of any kind. Protection material shall not damage the finishes.

.2 Any accidental damage shall be immediately brought to the attention of the Departmental Representative and repaired to her/his satisfaction at no additional cost to the Departmental Representative.

.3 Remove all protection just before completion. Clean and refit all damaged surfaces to the satisfaction of inspectors and the Departmental Representative.

3.20 **Clean-Up**

.1 Do cleaning as per **Section 01 74 11**.

.2 Clean surfaces of spills and any damage resulting from stains due to present work.

.3 Unblock and verify drains to ensure cleanliness and good working order. Remove from site all debris, equipment, and unused materials.

3.21 **Final Inspection and Repairs**

.1 The Departmental Representative, the Contractor, and membrane manufacturers' representative will proceed to a final inspection of all membrane installations once they are finished.

.2 If need be, repair perforations and tears with an additional layer of membrane, extending it over damaged surfaces by 50 mm (2") in all directions.

End of Section