

The Executed Agreement including General Conditions and Supplementary Conditions, Division 01, applicable Drawings and amendments are part of and are to be read in conjunction with this Section.

## PART 1 - GENERAL

### 1.1 SUMMARY OF SECTION

- .1 As summarized and described herein, but not restricted to the following:
  - .1 The intent of this Section is to provide a new insulated 2-ply modified bitumen roofing system upon removal of existing and facilitated by the following:
    - .1 Remove the existing roofing system down to the concrete substrate.
    - .2 Provide any temporary waterproofing necessary to ensure complete water protection during removal and install of new roofing system.
    - .3 Provide new parapet curbs and mechanical curbs as noted
    - .4 Provide all new roof drains
    - .5 Remove and disconnect all roof top units, including mechanical and electrical work, and reinstall and reinstate existing units on new curbs.
  - .2 Roof anchoring system
    - .1 A roof anchoring report provided by “Protech Building Safety Systems”. Contractor to provide all fall protection systems as noted in the report.
    - .2 Refer to paragraph 01 10 10 1.16.1.3 for copy of the report.
    - .3 All shop drawings are to be stamped and signed by a structural engineer registered to practice in province of work.

### 1.2 REFERENCES

- .1 American National Standards Institute (ANSI) Factory Mutual (FM):
    - .1 ANSI/FM Approval 4474, Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures (Class range from 1-60 to 1-990).
  - .2 American Society for Testing and Materials International (ASTM):
    - .1 ASTM C578-14a Specification for Rigid, Cellular Polystyrene Thermal Insulation.
    - .2 ASTM C1289-14a, Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
    - .3 ASTM D4586/D4586M-07(2012)e1, Asphalt Roof Cement, Asbestos Free
    - .4 ASTM D6164/D6164M-11, Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
  - .3 American Wood Protection Association (AWPA)
  - .4 Canadian Standards Association (CSA)
    - .1 CAN/CSA A247-M86(R1996), Insulating Fibreboard.
  - .5 Canadian Roofing Contractors’ Association (CRCA) – Roofing Specifications Manual.
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- .6 National Lumber Grades Authority (NLGA) - Standard Grading Rules for Canadian Lumber
- .7 New Brunswick Construction Safety Association (NBCSA), Occupational Health and Safety Act (OHSA)
- .8 Underwriters Laboratories of Canada (ULC):
  - .1 CAN/ULC S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
  - .2 CAN/ULC S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced

### 1.3 SUBMITTALS

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, including installation instructions, MSDS sheets, specifications and data sheets in accordance with Section 01 33 00 Submittal Procedures.
  - .2 Reference Products in Part 2 when submitting manufacturers' literature.
- .2 Provide shop drawings including, flashing details to adjacent wall and roof areas, and manufacturer's list of materials. Roof materials must be compatible.
  - .1 To ANSI/FM requirements 4474 - Class 1-90 wind uplift recommendations.
  - .2 Provide specific adhering requirements to ensure all wind up-lifts, pull outs are specifically addressed by the manufacturer of the system.
  - .3 Manufacturer to ensure all components used within the roofing system are compatible to provide a full warranty system.
- .3 Submit samples of cap sheet complete with finish granules, vapour barrier, base layer, rigid insulation and all adhesives specified for Consultants review and comment.

### 1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of materials.
  - .2 Refer to the Manufacturer's recommendations regarding installation of roofing system at ambient temperatures. Roofing system should be applied when temperatures are above 0°C.
  - .3 Refer to the Manufacturer's recommendations of temperatures required for conditioning the materials prior to application and install and curing after.
  - .4 Manufacturers recommendations re environmental conditions should be included for air temperature and surface temperature of the substrate.
  - .5 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.
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- .6 Only 'Dry' materials are to be installed. Materials that are installed wet, or materials that become wet during inclement weather to be removed and replaced.

#### 1.5 SAFETY REQUIREMENTS

- .1 Contractor to abide by the Occupational Health and Safety Act of the province of work.
- .2 All roof installers to take the Fall Protection course and abide by Fall Protection Legislation of the province of work.
- .3 On site safety, refer to Section 01 35 29 .06 for specific safety requirements for roofing, refer to CRCA manual, chapter 1a.
- .4 The entire portion of the perimeter for all roofs and all openings within the roof area, under renovation of this contract, are to be protected with approved temporary barriers.

#### 1.6 WASTE MANAGEMENT

- .1 Contractor to remove debris immediately from site to a designated landfill approved by Provincial Regulations to accept existing roofing materials debris.
- .2 Provide an enclosed garbage chute to remove debris from the roof to an area designated by the project engineer for removal from site.
- .3 Removal from site to be immediate.

#### 1.7 PERFORMANCE CRITERIA

- .1 Do roofing work in accordance with applicable, standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual and to prescribed 90 lb wind uplift as selected by FM/ASTM listing requirements where mechanically fastened.

#### 1.8 DELIVERY, STORAGE AND PROTECTION OF PRODUCT

- .1 Deliver and store materials in compliance with Section 01 61 00 Common Product Requirements.
- .2 Comply with manufacturer's recommendations for handling, storage and protection during installation.
- .3 Protect and store materials off the ground, away from physical damage and from becoming wet, soiled or covered with ice or snow before, during and after installation.
- .4 Label packages to include material name, production date and/or product code.
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- .5 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.
- .6 Remove only in quantities required for same day use.
- .7 Place plywood runways over work to enable movement of material and other traffic.
- .8 Store roofing material at +5C minimum.

#### 1.9 QUALITY ASSURANCE/QUALITY CONTROL

- .1 Submit laboratory test reports in accordance with Section 01 45 00 Testing and Quality Control.
- .2 Roofing applicator must be a good standing member of the CRCA and approved by the Roof Manufacturing Company selected on this Project, and have completed projects of this magnitude in the last five (5) years.
- .3 Contractor to hold pre-construction meeting with Manufacturer's Technical Representative to review the substrate condition and review the process of installation. Manufacturer's Representative to visit site three (3) times unannounced during construction and once at completion and provide inspection reports to the Consultant. These reviews will become part of Contract Closeout Submittals.
- .4 Water tightness during construction and deconstruction is imperative. Measures have been noted in the documents to ensure this. This contractor will be held liable for any damage accrued to the interior due to lack of measures to prevent this.

#### 1.10 FIRE WATCH

- .1 Fire Extinguishers: maintain one cartridge operated type with hose and shut-off nozzle, ULC labelled for A, B and C class protection, within 3 meters of torch applicator.
- .2 Cease torching at least three (3) hours before leaving for the day and maintain fire watch for two (2) hours after each day's roofing operations cease.
- .3 Designate a person, equipped with a fire extinguisher and a cell phone, responsible in the event of a fire, to do a mandatory walk-about to check for hot spots.
- .4 Make sure all workers know the escape route.

#### 1.11 TESTING

- .1 The Owner may engage a third party roof inspection company to check and verify all systems from Shop Drawing review, to Roof preconstruction. Meetings to review during the application of the system.
- .2 All costs of the third party testing will be borne by the Owner.

## 1.12 WARRANTIES

- .1 Roofing Contractor to supply the Owner with a CRCA warranty certifying work completed as installed to be free of roof defect for a period of two (2) years from date of substantial performance.
- .2 Provide full system warranty (non-pro-rated) in the name of the PWGSC stating roofing system will remain watertight for a period of a full ten (10) years from the date of substantial completion. This warranty to include both labour and materials necessary to affect water tightness.

## PART 2 - PRODUCTS

### 2.1 VAPOUR BARRIER ROOF UNDERLAYMENT

- .1 Base Sheet: 180 g/m; Standard of Acceptance: IKO-GS material, or approved alternate..
  - .1 Non-woven reinforcing matt, polyester coated and permeated with SBS modified bitumen.
  - .2 Thickness: 2.2 mm (87 mils).
  - .3 Bottom side coated with sand for cold process, topside sand coated cold process. Manufacture to ASTM D6164 for Type 1, Grade 'S' materials.
  - .4 Acceptable Alternate Manufacturers:
    - .1 Henry Company
    - .2 Soprema

### 2.2 EXPANDED POLYSTYRENE INSULATION

- .1 Polystyrene Insulation Type I or Type II Board manufactured to CAN/ULC-S701 and ASTM C578. Contains no CFC, HCFC or HFC blowing agents.
- .2 Size Board: 4'-0" (1220 mm) x 4'-0" (1220 mm)
- .3 Thermal Resistance: R value = R30
- .4 Tapered Insulation: where noted on the drawings.
- .5 Edges ship lapped, or insulation applied in two layers with staggered joints.

### 2.3 POLYISOCYANURATE RIGID INSULATION

- .1 Polyisocyanurate roof insulation Type 2 or Type 3 manufactured to CAN/ULC-S704-03 or CAN/ULC-S704-11.
- .2 Size Board: 4'-0" (1220 mm) x 4'-0" (1220 mm) or 4'-0" (1220 mm) x 8'-0" (2440 mm)
- .3 Physical Properties
  - .1 Compressive strength: 140kPa minimum

- .2 Water absorption: 3.5% max (by volume)
- .4 Thermal Resistance: R value = R30
- .5 Mechanically fastened through deck with purpose made screws and plates. Fastening is to meet 1-90 wind uplift requirements.
- .6 Tapered Insulation: refer to roof plans for extent and dimensions of tapered insulation.
- .7 Edges ship lapped, or insulation applied in two layers with staggered joints

## 2.4 ROOFING ADHESIVES

- .1 Insulation and Overlayment Board Adhesive:
  - .1 Must be compatible with roofing system components, and meet roofing warranty requirements.
  - .2 Meets 1-90 wind uplift requirements.
  - .3 Low rise, low odor, foam adhesive.
  - .4 IKO Millennium, Soprema Duotack, or approved alternate.
- .2 Membrane Adhesive:
  - .1 Must be compatible with roofing system components, and meet roofing warranty requirements.
  - .2 Meets 1-90 wind uplift requirements.
  - .3 Solvent-free adhesive designed for cold application of roofing membranes.
  - .4 IKO Cold Gold adhesive, Soprema Colply, or approved alternate.

## 2.5 OVERLAYMENT BOARD WITH INTEGRAL BASE SHEET

- .1 ½" high density fibreboard with integral 180 g/m base sheet. Top face thermofusible film for torch application of cap sheet.
- .2 Meets CAN/ULC-S706 and ASTM C208
- .3 Cold adhered installation only, to meet 1-90 wind uplift requirements.
- .4 Membrane edges self-adhesive or cold adhered.
- .5 Acceptable products: Roofcraft-180-base-f/r-polyester, Lexbase-180-fr-Polyester, Soprabase FR-180, or approved alternate.

## 2.6 ROOF MEMBRANES

- .1 Base Sheet Flashing, 180 g/m; Standard of Acceptance: IKO, or approved alternate.
  - .1 Non-woven reinforcing matt, polyester coated and permeated with Modiflex SBS bitumen, self-adhering one side, thermo fusible plastic film over.
  - .2 Thickness: 2.5mm (98mils)
  - .3 Manufactured to ASTM D6164.

- .4 Primer as per manufacturer's recommendations.
- .5 Acceptable Alternate Manufacturers:
  - .1 Soprema
  - .2 Henry Company
  - .3 Polyglass
- .2 Cap Sheet and Cap Flashing 250g/m: Standard of Acceptance: IKO or approved alternate.
  - .1 Non-woven reinforcing mat, strengthened with selected glass fibre strands, coated and permeated with SBS modified bitumen.
  - .2 Thickness: 4.0mm (158mils)
  - .3 Coloured ceramic mineral granules embedded into top surface to provide protection against ultraviolet radiation with thermofusible coating bonded to underside for heat welding.
  - .4 Finish Colour Cap Sheet: as selected by Consultant from full colour range.
  - .5 Manufactured to ASTM D6164 for Type II, Grade G materials.
  - .6 Acceptable Alternate Manufacturers:
    - .1 Soprema
    - .2 Henry Company.
    - .3 Polyglass

## 2.7 ACCESSORIES

- .1 Sealers:
  - .1 As recommended by membrane manufacturer.
  - .2 Manufactured to ASTM D4586, Rubber Asphalt type.
- .2 Joint Sealants:
  - .1 As per manufacturer's recommendations.
- .3 Duct/Pipe Boots:
  - .1 Pre-manufactured Neoprene or material compatible with roof system to provide enclosure to penetrations through roof cap membrane.
  - .2 Vent stack flashings spun aluminum, insulated, complete with cover Thaler or acceptable alternative
- .4 Additional Cap Sheet Service Walkway:
  - .1 Provide additional installed layer of cap sheet for walking surface, with contrasting colour at roof.
  - .2 Refer to roof drawings for extent.
  - .3 Contrasting colour walkway to be chosen by consultant from full colour range.

## 2.8 CARPENTRY ITEMS

- .1 Refer to Section 06 10 00 for carpentry.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Manufacturer's Technical Representative to examine roof decks and immediately inform the Consultant, in writing, of defective areas requiring replacement, and that the substrate is acceptable for the new roofing system.

### 3.2 WORKMANSHIP

- .1 Do roofing work in accordance with applicable, standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual and as prescribed by 90 lb wind uplift requirements.

### 3.3 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 Protect adjacent roof and wall areas from traffic and damage. Comply with precautions deemed necessary by Engineer Consultant.
- .5 Place plywood runways over work to enable movement of material and other traffic.
- .6 Contractor to repair any damage caused by work of this contract - to adjacent roof and wall areas, and also to site areas such as lawns or paved areas that have damage caused by this contract.
- .7 Contractor responsible to protect and cover all interior areas for dust cover and migration of dirt stemming from work above

### 3.4 REMOVAL OF EXISTING ROOFING

- .1 Existing inverted roofing system consists of the following:
    - .1 Stone ballast
    - .2 Geotechnical fabric
    - .3 Rigid insulation
    - .4 Built-up asphalt ply-felts bonded to sloped cast-in-place concrete deck
  - .2 Remove stone ballast and ensure proper and safe method to lower to the grade for removal from site.
  - .3 Remove the insulation and geotechnical fabric
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- .4 Remove the existing roofing membrane to the concrete substrate
- .5 Coordinate removal in sections to ensure, at the end of the day, all temporary waterproofing is working. Provide to ensure full water tightness for the duration of deconstruction/construction portions of the building.
- .6 All removed materials must be transported away from site.

### 3.5 MECHANICAL AND ELECTRICAL

- .1 For removal and reinstatement of roof top RTU's; electrical appliances, refer to Mechanical and Electrical Sections.

### 3.6 PREPARATION OF EXISTING SUBSTRATE

- .1 Prepare the existing concrete substrate by totally removing all adhesive, vapour barrier membrane, to create a smooth, clean, dry concrete substrate.
- .2 Prior to installation of roofing system, manufacturer's representative must review and verify substrate is suitable.

### 3.7 ROOF ANCHORS

- .1 Roof anchorage system as described and provided as per paragraph 1.1.1.2.

### 3.8 PROTECTION DURING WORK.

- .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 Protect roof from traffic and damage. Comply with precautions deemed necessary by Consultant.
  - .5 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.
  - .6 Place plywood runways over work to enable movement of materials and other traffic.
  - .7 Contractor to ensure only as much of the roofing material removed from the roof as can be made watertight and secure by day end.
  - .8 Contractor is solely responsible for water damage, to the interior of the building caused by lack of protection of the system during the deconstruction or construction of this roofing system.
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### 3.9                    INSTALLATION

- .1     Vapour Barrier Installation:
  - .1     Adhere the SBS vapour barrier membrane sanded surface, direct to the prepared substrate in accordance with manufacturer's recommendations.
  - .2     As noted, apply only in "sections" to ensure water tightness is maintained at the end of each working day.
  - .3     Temperature is to be above 0°C when applying the membrane.
  - .4     Apply perpendicular to slope, apply beginning at low point of and proceed in "shingle fashion". Position sheet to achieve correct overlap and alignment.
  - .5     Verify there are no air bubbles or fish mouths in the application.
  - .6     Tie-ins to other wall areas of the building envelope are to be properly tied in to form a complete and continuous vapour enclosure, roof and wall conditions.
- .2     Insulation Panel Installation:
  - .1     Adhere the insulation panels with ship lapped tightly fitted together, over the vapour barrier.
  - .2     Discard broken insulation boards.
  - .3     Voids are to be completely filled with insulation.
  - .4     Install insulation to fit tightly next to curbs, parapets and roof protrusions.
  - .5     Provide tapered insulation in areas as noted on the plans.
- .3     Protection and Base Sheet Composite Board Installation:
  - .1     Adhere 1/2" (12.5 mm) fiber board over the insulation panels, with ribbon spacing requirements of 90 lb pull out requirements.
  - .2     Ensure the protection board composite with base sheet is properly bonded, and all overlap ends and sides are properly sealed and made water tight.
  - .3     If an overlayment board with integral base is used, install using cold adhered process with additional light torching of seams. No mechanical fastening will be permitted
  - .4     Each strip to have 3" (75mm) side laps and 6" (150mm) end laps.
  - .5     Application to provide a smooth surface, free of air pockets, wrinkles, fishmouths or tears.
  - .6     Adhere membrane perpendicular to slopes for roofs of less than 1:12 slope.
- .4     Base Membrane Flashing:
  - .1     Apply up and over parapets, mechanical curbs and on sidewalls.
  - .2     Self-adhered, installed to the deck first and then banded up the wall.
  - .3     Peel off backing paper as material is unrolled, and ensure that all side laps are overlapped minimum of 3" (75 mm), with no fish mouths or voids.
- .5     Cap Sheet Installation:
  - .1     Once the base sheet and base flashing has been applied and does not show defects, the cap sheet can be laid.
  - .2     Cap sheet to be unrolled starting from the low point of the roof. Cap sheet to be rerolled from both ends prior to torching. Care must be taken for good alignment of the first roll (parallel with the edge of the roof).
  - .3     Cap sheet to be torch welded on to the base sheet membrane, in accordance with recommendations of the membrane manufacturer. During this application, both surfaces to be simultaneously melted, forming an asphalt bead, pushed out in front of the cap sheet. While the membrane is still hot, apply enough pressure

with a steel roller onto the side lap so as to have bitumen seep out to create a continuous bead of bitumen on the side lap. Care should be taken not to embed the granules into the bitumen.

- .4 Care must be taken not to burn the membranes, and their reinforcements.
- .5 Base sheet and cap sheet seams to be staggered a minimum of 1'-0" (300 mm).
- .6 Cap sheet to have side laps of 3" (75 mm) and end laps of 6" (150 mm). Surface granules on end laps to be embedded prior to installation of following sheet.
- .7 Make sure the two membranes are properly welded, without air pockets, wrinkles, fishmouths or tears.
- .8 After installation of the cap sheet, check lap seams on the cap sheet.
- .9 During installation, care must be taken to avoid asphalt seepage greater than 1/4" (6 mm) at seams.

### 3.10 PROTECTION AFTER WORK COMPLETED

- .1 Contractor to repair damage caused by work of this contract - to adjacent roof and wall areas, and also to site areas such as lawns or paved areas that have damage caused by this contract.
- .2 Contractor responsible to protect and cover interior areas for dust cover and migration of dirt stemming from work above.

### 3.11 CLEANING

- .1 Contractor to provide clean-up for this roofing area. Debris and excess roofing items and all machinery to be removed from the site.

END OF SECTION

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