

Part 1 General

1.1 SUMMARY

- .1 Work of this section includes provision of:
 - .1 Fabricated insulated roof panel with factory installed SBS Base sheet forming the components for an SBS Modified Bitumen roof assembly.
 - .2 SBS Membrane Cap Sheet.

1.2 RELATED REQUIREMENTS

- .1 Section 06 10 00 – Rough Carpentry
- .2 Section 07 21 13 – Board Insulation
- .3 Section 07 25 13 – Modified Bituminous Air and Vapour Membranes
- .4 Section 07 62 00 – Sheet Metal Flashing and Trim
- .5 Section 07 72 33 – Roof Hatches
- .6 Section 07 92 00 – Sealants
- .7 Section [_____].

1.3 REFERENCES

- .1 [Alberta Roofing Contractors Association Ltd. (ARCA)
 - .1 Roofing Application Standards Manual]
- .2 ASTM International
 - .1 ASTM D6164/D6164M-11, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- .3 [Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations 2009.
 - .2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Commercial Interiors.
 - .3 LEED Canada-EB: O M-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Existing Buildings: Operations and Maintenance 2009.]
- .4 Canadian Standards Association (CSA International)
 - .1 CSA A123.21-10, Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane Roofing Systems.
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S705.1-15, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, -Material – Specification.
 - .2 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Convene pre-installation meeting one week prior to beginning work of this Section, with Contractor, Consultant, installer, manufacturer's representative in accordance with Section 01 31 19 – Project Meetings 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. Ensure system meets ARCA warranty requirements.

1.5 SUBMITTALS

- .1 Provide as specified in Section 01 33 00 – Submittal Procedures.
- .2 Submit product data:
 - .1 Provide copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit shop drawings:
 - .1 Provide shop drawings including panel layout, seaming details and related roof details at parapets, roof penetrations, roof hatches.
- .4 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .5 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .6 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.
- .7 Sustainable Design Submittals:
 - .1 LEED Canada submittals: in accordance with [Section 01 35 21 - LEED Requirements].

1.6 QUALITY ASSURANCE

- .1 Installers: minimum two (2) years experience installing panels and approved by manufacturer.
- .2 Roofing membrane materials shall be from a single manufacturer.
- .3 Installer Qualifications: licensed and approved by Mule Hide and Mod Panel. Provide documentation during tender bid submission.
- .4 Inspection Agency: approved by Mule Hide and/or Mod Panel.
- .5 Roofing and sheet metal work shall be performed in conformance with roofing manufacturer's written recommendations using materials in accordance with CAN/ULC S107 to obtain Class [C] [A] [B] fire resistance rating.
- .6 [Conform to Roofing Application Standards Manual as published by ARCA.]

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in their original unopened containers or wrappings and clearly labeled with manufacturer's name, product identification and date of manufacture.
- .2 Protect materials from damage during transit, storage and delivery to the job site. Place materials on pallets and protect from moisture. Materials damaged in handling or storage shall not be used.
- .3 Store materials in a dry, clean area protected from elements.
- .4 Store sealants at temperatures between 60°F and 80°F. Materials exposed to lower temperatures affect the workability and performance of the product.
- .5 Store flammable materials in a cool, dry area away from open flames and sparks. Follow precautions outlined on containers or supplied by material manufacturer/supplier.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Do not perform roofing work when air temperature, including wind chill, falls below the membrane manufacturer's recommended limit.
- .2 Do not apply roofing materials to a damp, frozen or unsuitable surface.
- .3 Do not expose roofing materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during the same day.

1.9 WARRANTIES

- .1 ??Fabricated Roof Panel Manufacturer:
- .2 Roofing Membrane Manufacturer: Provide manufacturer's warranty stating that they will repair or replace defective roofing [(including labour)]and base flashing materials that do not remain watertight, that splits, tears, or separates at the seams or from the substrate within the specified warranty period and as follows:
 - .1 Warranty Period: [10] [15] years [Standard] [Platinum] Warranty, starting from Substantial Performance for the Project.
 - .2 Name of Warrantee: Warrantor shall issue a written and signed warranty identifying the owner's name as the warrantee, and stating that executed work will remain in place and be free of any defects in materials [and workmanship] for the stated warranty period.

Part 2 Products

2.1 MANUFACTURERS

- .1 Fabricated Roof Manufacturer:
 - .1 Mod Panel Manufacturing Ltd., Edmonton, AB. www.mod-panel.com

2.2 PERFORMANCE CRITERIA

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

- .3 Design roof panel assembly to meet or exceed the following minimum requirements:
 - .1 Structural Performance: Design panel composition and fastening requirements in accordance with ASTM E72 based on the following deflection criteria:
 - .1 Live Loads: Determine live load deflections in accordance with CSSBI 20M, as modified by the requirements of this Section.
 - .2 Wind Load: Determine wind loads using normal importance factors listed in the Building Code for deflection and strength, modified by the appropriate exposure, gust and pressure (internal and external) factors in accordance with Building Code structural commentaries.
 - .3 Deflection Limitation: L/180 based on maximum allowable deflection under 1 in 50 year sustained wind loading.
 - .4 Fatigue: Withstand 2 million alternate cycles of specified deflection limitation with no delamination of face skins from core, foam core cracking or permanent deformation.
 - .5 Movement: Allow for movement of components without causing buckling, failure of joint seals, undue stress on fasteners when subjected to seasonal surface temperatures ranging from -35°C to +50°C, and to accommodate movement between wall system and building structure by deflection of building structure.
 - .2 Polyurethane spray foam, closed cell, to CAN/ULC-S705.1, and applied to CAN/ULC-S705.2.
 - .3 Fire Performance:
 - .1 Flame Spread Tests: Provide materials with the following surface-burning characteristics in accordance with CAN/ULC S101 and as follows:
 - .1 Flame Spread Index: 25 or less.
 - .2 Smoke Developed Index: 450 or less.
 - .2 Fire Endurance Test: Panels to remain in place for not less than 15 minutes in accordance with CAN/ULC S101.
 - .3 Fire Growth Test: Provide panels tested in accordance with CAN/ULC S138.

2.3 PANELS

- .1 Insulated Modular Panel:
 - .1 Acceptable material: Mod-Panel MP-200.
 - .2 Size: 36" x 96".
 - .3 Insulation: Effective R Value: [R20] R30 [R40].
 - .4 Top Sheet: membrane base sheet and integral protection board.
 - .1 Mineral fortified asphalt core board with factory laminated SBS modified bitumen 180 gram polyester reinforced base sheet to ASTM D6164/D6164M; thermofusible top face.
 - .2 Double selvedge edge.
 - .3 Proprietary material: IKO Protectobase 180.
 - .5 Insulation core: closed cell spray foam insulation to CAN/ULC-S705.1. Certified CCMC 2lb medium density polyurethane insulation.

- .6 Bottom sheet: [3/8" oriented strand board] [1/2" Densdeck Prime].
- .2 Panel Accessories:
 - .1 Insulation Fasteners:
 - .1 Washer diameter: 2" to 3" in diameter.
 - .2 Depth of fastener plate and fastener screw to be provide by Mod Panel.
 - .3 Acceptable material: True Fasteners.
 - .2 Vapour Barrier Sealant:
 - .1 Synthetic and rubber sealant, wide service temperature of -40 degrees Celsius to 120 degrees Celsius (-40^oF to 250^oF).
 - .2 Acceptable material: LePage PL Acousti-Seal Vapour Barrier Sealant.

2.4 ROOF MEMBRANE CAP SHEET

- .1 Field area and flashing cap sheet membrane: to CAN/CGSB 37.56M and ASTM D6164/D6164M, composed of non-woven polyester and SBS modified bitumen and as follows:
 - .1 Thickness: 4 mm.
 - .2 Application: Torch applied.
 - .3 Underface: Thermofusible plastic film.
 - .4 Top face: ceramic mineral granules, colours to be selected by Consultant from manufacturer's standard range.
 - .5 Proprietary material:
 - .1 [IKO Torchflex TP 180 Cap] [IKO Torchflex TP 250 Cap].

2.5 ACCESSORIES

- .1 Accessories: Manufacturer's standard materials as required for a complete and functional installation including; but not limited to, the following:
 - .1 Fasteners: Concealed type; in joint hex or pan headed fasteners.
 - .2 Washers: Concealed type; weather tight.
- .2 Flashings, Enclosures and Trims: Matching colour and thickness of exterior sheet, coordinate requirements with Section 07 62 00.
- .3 Self adhering base sheet flashing:
 - .1 SBS modified sheet with non-woven reinforced polyester.
 - .2 Underside treated with self-adhesive.
 - .3 Top face with thermofusible film.
 - .4 Thickness: 2.5 mm.
 - .5 Proprietary material:
 - .1 IKO Armourbond Flash.
- .4 Mechanical Access Walkways:
 - .1 [Consisting of one additional ply of cap sheet membrane. Colour to be different from field membrane as selected by Consultant.]
 - .2 [Rubber mat: recycled rubber mat.]

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that support structures are aligned and tolerances are within requirements provided during preconstruction meeting; starting work of this Section denotes acceptance of conditions.

3.2 INSTALLATION OF INSULATION PANELS

- .1 Verify roof dimensions prior to panels arriving to site.
- .2 Ensure all surfaces are clean prior to installing the roof panel.
- .3 Lay out roof panel in accordance with reviewed shop drawings.
- .4 Seal lap joint with LePage Acousti-Seal prior to installing lap joints together to provide continuous vapour barrier.
- .5 Fasten roof panel as per panel fastening pattern using approved self-tapping metal screws.
- .6 Protrusions:
 - .1 Coordinate with mechanical Contractor/Engineer for location of penetration prior to installing roof panel.
 - .2 Install self-adhered vapor barrier membrane to roof protrusion and decking using primer to ensure adhesion and seal made to curb flange.
 - .3 Install necessary membrane detail terminations to make protrusions watertight.
- .7 Mechanical Equipment Installation:
 - .1 Coordinate with mechanical Contractor/Engineer for location of mechanical equipment prior to installing roof panel.
 - .2 Install self-adhered vapour barrier membrane to roof curb flange and decking using primer to ensure adhesion and seal made to curb flange and sandwich panel.
 - .3 Cut and install panel around roof curb and butt up against roof curb.
 - .4 Install necessary membrane detail terminations to make protrusions watertight.
- .8 Parapet Connection:
 - .1 At parapet edge, install self-adhered vapour barrier membrane to parapet wall and decking using primer to ensure adhesion and seal made to curb flange.
 - .2 Install parapet wall panel in accordance with reviewed shop drawings.
 - .3 Using gap insulation, apply spray foam between panel and parapet wall.

3.3 FIRE PROTECTION

- .1 Comply with safety measures described in manufacturer's written installation requirements, requirements of insurance companies and other requirements of the Authorities Having Jurisdiction.
- .2 Fire Extinguishers, located within six (6) meters of each roofing torch, ULC labelled for ABC protection.

- .3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed hot spots. Job planning must be organized to ensure workers are still on location at least one hour after torch application.
- .4 Do not apply torch directly to dry or unprotected wood surfaces Roofing Application Standards Manual

3.4 MEMBRANE INSTALLATION

- .1 Comply with manufacturer's installation instructions [and ARCA Roofing Application Standards Manual].
- .2 Cap sheet application – torched:
 - .1 Unroll cap sheet at drain. Carefully align first side lap (parallel to roof edge).
 - .2 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.
 - .3 Avoid overheating. Take care to avoid excessive bitumen bleed-out at joints during installation.
 - .4 Unless overlap widths differ between cap and base sheets, make sure joints between the two layers are staggered by at least 300 mm.
 - .5 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. Overlap surfaces must be granule-free or degranulated.
 - .6 Complete welds between two membranes. Leave no zone unwelded. In cold weather, adjust welding time to obtain homogenous seam.
 - .7 Once cap sheet is installed, carefully check overlapped joints. Leave bleed-out at joints ungranulated until inspected and accepted by the roofing inspector. Apply coloured granules to bleed-out area by priming with self-adhesive primer, and while still tacky shake granules onto surface and press into place.
- .3 Cap Sheet Flashings Application:
 - .1 Install cap sheet in one (1) metre widths. Overlap side laps by 75 mm. Stagger base and cap sheet overlaps on roof by at least 100 mm to avoid excessive layering. Make overlaps 150 mm wide.
 - .2 Draw parallel chalk line 150 mm from up stand or parapet bases.
 - .3 Sink surface granules into bed of hot bitumen with torch and round-nosed trowel from chalk line on roof to up stand or parapet base as well as over granulated vertical parts to be overlapped.
 - .4 Torch weld cap sheet directly onto base sheet from top to bottom to soften both membranes and obtain homogenous seal.
 - .5 During installation, avoid overheating membrane and excessive bitumen bleed-out at joints.

3.5 WALKWAYS

- .1 Install walkway [membrane] [rubber sheets] [in accordance with manufacturer's instructions] [and] as indicated.

3.6 FIELD QUALITY CONTROL

- .1 The manufacturer's representative, the Contractor and Consultant shall carry out final inspection and approval of completed Work.
- .2 [Inspection fees will be paid by Owner, in accordance with Section 01 45 00 – Quality control].
- .3 Deficiencies will be noted in accordance with Section 01 78 00 – Closeout Procedures, and corrections made before acceptance of Declaration for Substantial Performance of the Work.

3.7 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 Cleaning: Strip protective films, clean surfaces and remove any substances such as metal fillings caused by drilling that could cause discolouration or staining; remove excess materials, debris and equipment.

END OF SECTION