

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED REQUIREMENTS

- .1 Section 06 10 00: Rough Carpentry.
- .2 Section 07 27 26: Fluid Applied Membrane Air Barrier.
- .3 Section 07 42 43: Composite Metal Wall and Roof Panels.
- .4 Section 07 62 00: Metal Flashings and Trim.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM C1177/C1177M-13, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .2 ASTM C1396/C1396M-14a, Standard Specification for Gypsum Board.
 - .3 ASTM D4434-09, Standard for Poly Vinyl Chloride Sheet Roofing.
 - .4 ASTM E2178-13, Standard Test Method for Air Permeance of Building Materials.
 - .5 ASTM E96/E96M-2016, Water Vapor Transmission of Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced.
- .3 Canadian Roofing Contractors Association (CRCA)
 - .1 CRCA Roofing Specifications Manual, current edition.
- .4 CSA International
 - .1 CSA A123.21-04(R2009), Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems
 - .2 CSA A231.1-14/A231.2-14, Precast Concrete Paving Slabs / Precast Concrete Pavers.
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced.
 - .2 CAN/ULC-S706-09, Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Convene pre-installation meeting one week prior to beginning roofing Work, with Contractor, roofing contractor's superintendent, and Departmental Representative in accordance with Section 01 14 10 – Scheduling and Management of Work to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide electronic copies of most recent technical roofing components datasheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit electronic copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements and indicate VOC content for:
 - .1 Primers.
 - .2 Sealers.
 - .3 Adhesives.
- .3 Shop Drawings:
 - .1 Indicate flashing, tapered insulation details.
 - .2 Provide layout for tapered insulation.
- .4 Samples: submit two (2) samples of roofing membrane 300 x 300 mm.
- .5 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .6 Test and Evaluation Reports: submit laboratory test reports certifying compliance of roofing materials membrane with specification requirements.
- .7 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .8 Manufacturer's field report: in accordance with Section 01 45 00 – Testing and Quality Control.
- .9 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

1.6 QUALITY ASSURANCE

- .1 Installer qualifications: company or person specializing in application of PVC roofing systems approved by manufacturer with 10 years documented experience.
- .2 Mock-ups:
 - .1 Construct mock-up in accordance with Section 01 45 00 – Testing and Quality Control.
 - .2 Construct mock-up 10 m² minimum size showing:
 - .1 Typical lap joint, one inside corner and one outside corner.
 - .2 Mock-up also to include:
 - .1 Curb anchor roof flashing.
 - .2 Flat roof anchor: stack jack installation welded to PVC roof membrane.
 - .3 Curved barrel vault roof anchor: installation of membrane to anchor and stack jack to cladding with support.
 - .3 Accepted mock-up may form part of complete work.
 - .4 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with roofing work.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of adhesive, sealing compounds, primers and caulking materials.
 - .2 Provide and maintain dry, off-ground weatherproof storage.
 - .3 Store rolls of PVC flat on cross supports.
 - .4 Remove only in quantities required for same day use.
 - .5 Store materials in accordance with manufacturer's written instructions.
 - .6 Store insulation protected from sunlight, weather and deleterious materials.
- .3 Packaging Waste Management: Dispose of pallets, crates, padding and packaging materials in accordance with Section 01 74 21 – Construction / Demolition Waste Management and Disposal.
 - .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
 - .2 Fold up metal banding, flatten and place in designated area for recycling.

1.8 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 Temperature, relative humidity, moisture content.
 - .1 Apply PVC membrane only when surfaces and ambient temperatures are within manufacturers' prescribed limits.
 - .2 Do not install PVC membrane when temperature remains below 5 degrees C, or when wind chill gives equivalent cooling effect.
 - .3 Install PVC membrane on dry substrate, free of snow and ice. Use only dry materials and apply only during weather that will not introduce moisture into system.

1.9 WARRANTY

- .1 For the Work of this Section 07 54 19 - Polyvinyl-Chloride Roofing, 12 months warranty period is extended to 10 years covering all materials and workmanship.

PART 2 - PRODUCTS

2.1 PERFORMANCE CRITERIA

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

2.2 DECK COVERING

- .1 Gypsum Sheathing: to ASTM C1177 / 1177M, fiberglass mat faced, moisture resistant, gypsum core roof sheathing, 12.7 mm thick, 1220 mm wide x maximum practical length. Acceptable material manufactured by:
 - .1 Canadian Gypsum Company.
 - .2 CertainTeed Inc.
 - .3 G-P Gypsum Corporation.
 - .4 Or approved equal.
- .1 Plywood: As specified in Section 06 10 00 - Rough Carpentry.

2.3 VAPOUR RETARDER

- .1 Self-Adhesive SBS rubberized asphalt compound,: to CAN/CGSB-51-33 Type I, integrally laminated to thermoplastic film, 1.0 mm thick.
Acceptable Materials:
 - .1 Blue Skin SA, with water based primer, by Henry Company Canada
 - .2 Sarnavap SA, with water based primer, by Sika Canada.
 - .3 or approved equal.

2.4 ROOF MEMBRANE

- .1 Flexible polyvinyl chloride PVC sheet membrane: to ASTM D4434.
 - .1 Class A, Type 2- reinforced, 2.0 mm (80 mils) thickness.
Acceptable products:
 - .1 G410-20 PVC Sarnafill membrane, colour white, with Sarnacol 2121 low VOC adhesive.
 - .2 Or approved equal.

2.5 POLYISOCYANURATE INSULATION

- .1 Rigid Roof Insulation: Polyisocyanurate/Urethane to CAN/ULC-S704-01, facing to be factory applied kraft paper, CFC free, RSI value of 1.05/25 mm thickness. Acceptable material:
 - .1 ISO Sarnatherm Type 3 Fiberglass facer, by Sika Canada.
 - .2 Isox Maritime Limited - "ISO MAR - Type 1".
 - .2 John's Manville Canada Inc. - "E'NRG'Y 3".
 - .3 Soprema – ISO.
 - .4 IKO Industries Ltd. - "Ikothem".
 - .5 or approved equal.
- .2 Rigid Tapered Roof Insulation: Polyisocyanurate/Urethane to CAN/ULC-S704-01, minimum slope 1:100, shiplapped edge with fibre-reinforced facer top and bottom, RSI value of 1.05/25 mm thickness. Acceptable material:
 - .1 ISO Sarnatherm Sloped, by Sika Canada.
 - .2 Type 1 Tapered Roof Insulation Panels – Isox Maritime Limited.
 - .3 Tapered "E'NRG'Y 3".- John's Manville Canada Inc.
 - .4 Tapered ISO – by Soprema.
 - .5 Tapered Polyisocyanurate Roof Insulation – Accu-Plane Enterprises Inc.
 - .6 or approved equal.

2.6 ADHESIVES

- .1 Water-based, low VOC adhesives: as recommended by membrane manufacturer.
 - .1 Adhesives and sealants: maximum VOC limit 30 70 250 g/l to SCAQMD Rule 1168 to GSES GS-36.
- .2 Adhesives: as recommended by membrane manufacturer.

2.7 SEALANTS

- .1 Sealants: as recommended by roofing membrane manufacturer..

2.8 WALKWAYS

- .1 Precast concrete roof pavers: 610 x 610 x 50 mm thick reinforced precast concrete pavers to CSA A231.1. Precast concrete pavers to be used with 510 x 510 x 25 mm thick extruded polystyrene roof insulation spacers.

2.10 ACCESSORIES

- .1 Edge and fascia flashings: PVC clad galvanized steel, mm thickness.
- .2 Steel termination strips, "U" shaped steel channels, PVC cord, distribution plates as recommended by membrane manufacturer.
- .3 Retrofit roof drains: Heavy-duty spun aluminum retrofit roof drain with PVC coating, and aluminum strainer with rubber seal. Sized to fit existing roof drain diameter. Acceptable products:
 - .1 Aluminator Retrofit Drain, by Marathon Roofing Products.
 - .2 Sarnadrain Aluminum with U-Flow Seal, by Sika Canada.
 - .3 or approved equal.

2.11 SOURCE QUALITY CONTROL

- .1 Submit laboratory test reports in accordance with Section 01 45 00 - Quality Control.
- .2 Submit glass transition temperature of all PVC materials considered for use on this project, 'as manufactured' and after heat-aging for 28 days at 100 degrees C. The increase in the glass transition temperature (Tg) shall not exceed 5 degrees C regardless of its value.

PART 3 - EXECUTION

3.1 QUALITY OF WORK

- .1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual.
- .2 The interface of the walls and roof assemblies will be fitted with durable rigid material sheet metal plywood providing connection point for continuity of air barrier.
- .3 Assembly, component and material connections to be fully adhered with water based, low VOC adhesive- made in consideration of appropriate design loads, with reversible mechanical attachments.

3.2 EXAMINATION OF ROOF DECKS

- .1 Verification of Conditions: inspect with Departmental Representative deck conditions including parapets, mechanical equipment curbs, roof drains, plumbing vents and roof safety anchors to determine readiness to proceed.
- .2 Evaluation and Assessment: prior to beginning of work ensure:
 - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.

3.2 EXAMINATION OF ROOF DECKS (continued)

.2 (continued)

- .2** Curbs have been built.
- .3** Roof drains have been installed at proper elevations relative to finished roof surface.
- .4** Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.

- .3** Do not install roofing materials during rain or snowfall.

3.3 PROTECTION OF IN-PLACE CONDITIONS

- .1** Cover walls, slopped roofs and adjacent work where materials hoisted or used.
- .2** Use warning signs and barriers. Maintain in good order until completion of Work.
- .3** Dispose of rain water away from face of building until drains or hoppers installed and connected.
- .4** Protect from traffic and damage. Comply with precautions deemed necessary by Departmental Representative.
- .5** Place plywood runways over work to enable movement of material and other traffic.
- .6** At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.
- .7** Seal and ballast exposed edges.

3.4 DECK SHEATHING

- .1** Adhesive-adhered to steel deck Glass Mat Gypsum Board Sheathing.
- .2** Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.

3.5 VAPOUR RETARDER

- .1** Apply self-adhesive vapour retarder using water-based low VOC primer as per manufacturer's instructions.

3.6 (EXPOSED) CONVENTIONAL MEMBRANE ROOFING (CMR) APPLICATION

- .1 Insulation: fully adhered, adhesive application:
 - .1 Adhere insulation to vapour retarder using water-based adhesive.
 - .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .3 Cut end pieces to suit.
 - .4 Apply adhesive in continuous ribbons at 300 mm on centre.
- .2 Tapered insulation application:
 - .1 Adhere tapered insulation to top layer of flat insulation
 - .2 Install tapered insulation as second insulation layer, in accordance with shop drawings. Stagger joints between layers 150 mm minimum.
- .3 Membrane:
 - .1 Install fully adhered single-ply PVC membrane roofing and flashings in accordance with ASTM D4434 and manufacturer's written instructions.
- .4 Flashings:
 - .1 Install PVC membrane flashings in accordance with manufacturer's written instructions.
- .5 Roof penetrations:
 - .1 Install retrofit roof drain, vent stack jack covers, and other penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details.

3.7 WALKWAYS

- .1 Provide pre-cast concrete pavers where indicated on drawings.
- .2 Set pre-cast concrete pavers on top of insulation spacers.

3.8 EXISTING ROOF ANCHORS

- .1 Upon completion of roofing work, all roof and roof curb safety anchors to be inspected and re-certified by ProTek Roof Anchors Inc., Dartmouth, Nova Scotia; telephone: 902-444-5123.

3.9 FIELD QUALITY CONTROL

- .1 Inspection:
 - .1 Inspection and testing of PVC membrane application will be carried out by testing laboratory designated by Departmental Representative.
 - .2 Departmental Representative will pay for tests as specified in Section 01 45 00 – Testing and Quality Control.
 - .3 Inspection and testing of membrane application will be carried out by testing laboratory designated by Departmental Representative.
 - .4 Costs of tests will be paid by Departmental Representative.

3.10 **CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Place materials defined as hazardous or toxic in designated containers.
 - .3 Clearly label location of salvaged material's storage areas and provide barriers and security devices.
 - .4 Ensure emptied containers are sealed and stored safely.
 - .5 Divert unused aggregate materials from landfill to local quarry facility for reuse as reviewed by Departmental Representative.
 - .6 Unused paint coating material must be disposed of at official hazardous material collections site as reviewed by Departmental Representative.
 - .7 Unused adhesive, sealant and materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
 - .8 Dispose of unused adhesive material at official hazardous material collections site approved by Departmental Representative.
 - .9 Dispose of unused sealant material at official hazardous material collections site approved by Departmental Representative.
 - .10 Dispose of other unused roofing materials at official hazardous material collections site approved by Departmental Representative.
 - .11 Divert unused gypsum materials from landfill to recycling facility as reviewed by Departmental Representative.
 - .12 Collect, package and store PVC membrane cut-offs and waste material for recycling and return to recycler in accordance with Waste Management Plan.
- .4 Clean to Departmental Representative's approval, soiled surfaces, spatters, and damage caused by work of this Section.
- .5 Check drains to ensure cleanliness and proper function, and remove debris, equipment and excess material from site.

END OF SECTION