

1. **PART 1 General**

1.1. **STANDARDS**

1.2. Perform work to applicable standard in:

- Roof membrane manufacturer printed instructions [current edition].
- Canadian Roofing Contractors Association [CRCA] Specification Manual [current edition].
- Ontario Building Code.
- All applicable rules, regulations and directives as established by the local municipality.
- Current requirements of the Ontario Fire Marshall Office.

1.3. **REFERENCES**

FACED POLYISOCYANURATE FOAM	CAN/ULC S704-01 (CAN-51.26-M86
SBS MODIFIED BITUMINOUS MEMBRANE	CGSB 37-GP-56M
ROOFING ASPHALT	CSA 123.4-M1979 TYPE 1,2,3
ASPHALT PRIMER	CGSB 37-GP-9MA 1983
CUTBACK ASPHALT PLASTIC CEMENT	CGSB 37-GP-5MA 1983
RUBBER-ASPHALT SEALING COMPOUND	CAN/CGSB-37.29 .
GLASS MAT GYPSUM SUBSTRATE.	ASTM C 1177
(SBS) MODIFIED BITUMINOUS SHEET MATERIALS USING GLASS FIBER REINFORCEMENTS	ASTM D 6163
(SBS) STYRENE BUTADIENE STYRENE MODIFIED BITUMINOUS SHEET MATERIALS USING POLYESTER REINFORCEMENTS	ASTM D 6164,
VAPOUR BARRIER, POLYETHYLENE SHEET	CAN/CGSB 51.34M86

1.4. **PERFORMANCE REQUIREMENTS**

1.4.1. Work of this section shall:

- Prevent infiltration of outside water into the building and into the roof system through the roofing membrane or membrane flashing.
- Retard the transmission of moisture vapour from the building from passing into the insulation in the roof system.
- Resist up-lift on fasteners of the roofing to the supporting members which shall be designed for wind load as per NBC.
- Be designed to the wind load pressures for suction imposed and gusting for a return probability of one in thirty years.

1.5. **RELATED WORK**

- 1.5.1. METAL FLASHING AND TRIM 076200
- 1.5.2. Perimeter wood blocking replacement.
- 1.5.3. Existing perimeter wood blocking to remain unless damaged, rotten or deteriorated.
- 1.5.4. Contractor is responsible for the lifting and resetting of all mechanical roof top equipment.
- 1.5.5. The Contractor is responsible for all plumbing, / mechanical connections to existing plumbing below the roof deck
 - 1.5.5.1. Where plumbing is not accessible inside ceilings, retrofit mechanical connections will be considered as an acceptable alternative.
 - 1.5.5.2. Contractor is responsible for moving and replacing gas lines as needed to accommodate roof work.

1.6. REFERENCE STANDARDS

1.6.1. Perform work to applicable standard in:

- 1.6.1.1. Roof membrane manufacturer printed instructions [current edition].
- 1.6.1.2. Canadian Roofing Contractors Association [CRCA] Specification Manual current edition].
- 1.6.1.3. Ontario Building Code.
- 1.6.1.4. All applicable rules, regulations and directives as established by the local municipality.
- 1.6.1.5. Current requirements of the Ontario Fire Marshall Office.
- 1.6.1.6. The project specifications.

1.7. GUARANTEES AND WARRANTIES**1.7.1. ROOF MEMBRANE MANUFACTURER WARRANTY**

Provide a written fifteen (15) year "roof system labour and workmanship warranty" issued by the roof membrane manufacturer. The warranty shall cover the repair; labour and material costs, required to restore roofing system to watertight condition should deficiencies be the result of faulty materials or workmanship. The warranty shall be non-cancelable, include costs for this warranty, future inspections by the manufacturer and all other charges concerning the warranty at no further expense to the Owner.

1.7.2. ROOFING CONTRACTOR'S WARRANTY

Provide a written warranty stating that the Contractor will warrant to repair, at its own expense, any actual roof leaks or deficiencies in the roofing membrane, flashing membrane and related sheet metal work resulting from faulty workmanship for a period of 2 [two] years on the roofing membrane and flashing membrane and [one] year on the related sheet metal work after the effective date of the warranty.

1.7.3. The OIRCA standard form of two-year contract will be acceptable for the Roofing Contractor's Warranty.

1.7.4. The effective date of the warranties shall be the date of Final Inspection by the Roof Consultant.

1.8. SUBMITTALS

1.8.1. Prior to the start of work, the Roofing Contractor shall make all submittals to the Consultant.

1.8.2. PRODUCT DATA

- 1.8.2.1. Submit WHMIS MSDS - Material Safety Data Sheets
- 1.8.2.2. Submit product data sheets for materials. Include:
 - Product characteristics.
 - Performance criteria.
 - Limitations.

1.8.3. ADMINISTRATIVE

- 1.8.3.1. Workers' Safety and Insurance Board (WSIB) certificate.
- 1.8.3.2. All required Insurance Certificate or Certificates.
- 1.8.3.3. A specimen copy of the Employer Safety Policy as dictated and required by Ontario legislation and regulations.
- 1.8.3.4. A certified copy of the "Notice of Project" as required by the Ontario Department of Labour.
- 1.8.3.5. A specimen copy of the proposed warranties.

- 1.8.3.6. Written submission from roof membrane manufacturer stating that the Contractor is an approved applicator of the materials to be used

1.8.4. SHOP DRAWINGS

- 1.8.4.1. Indicate tapered insulation details.
- 1.8.4.2. Provide layout for tapered insulation.
- 1.8.4.3. Shop drawings of all proprietary items to be supplied and installed on this project.

1.8.5. SCHEDULE

- 1.8.5.1. Contractor to provide a proposed schedule including expected start and finish dates

1.9. WORKMANSHIP

- 1.9.1. All applications shall be by mechanics skilled in this trade, certified by the roof membrane manufacturer and have a minimum of 5 years experience with the work to be done.
- 1.9.2. Upon completion of the installation, and notification made to the roof membrane manufacturer, The Contractor shall require the manufacturer to perform an inspection in accordance with the Specifications and for the purpose of issuing the required warranty.
- 1.9.3. The Roofing Contractor shall be both, during the bidding period as well as during the installation, officially recognized as an approved Contractor by the roof membrane manufacturer.

1.10. DELIVERY STORAGE AND HANDLING OF MATERIALS

- 1.10.1. Materials must be delivered and stored according to the directions of the manufacturer and the instructions of the owners representative.
- 1.10.2. All materials shall be stored so that the materials are not in contact with the ground.
- 1.10.3. All materials shall be stored so that they are covered sufficiently to be protected from high winds, heavy rain and other environmental contaminants. Manufacturer wrap may not be sufficiently weatherproof to protect materials.
- 1.10.4. All Materials must be delivered and stored undamaged in original containers with Manufacturers markings, labels, and WHMIS markings intact and legible.
- 1.10.5. All rolled roofing products are to be stored on end, dry, and fully protected from moisture and environmental contamination.
- 1.10.6. All adhesives, caulking, and cements are to be stored protected, and at a temperature above the freezing point.
- 1.10.7. Any materials that are determined, by the Owner's representative or the Roof Consultant, to be damaged or otherwise unsuitable to be installed in the work are to be removed from the job site and replaced immediately at no cost to the Owner.
- 1.10.8. Materials stored on the roof shall not be in contact with the roof and shall be tightly tarped against environmental contaminants. The Roofing Contractor shall contact a structural Engineer to determine the loading for storage on the roof deck.
- 1.10.9. Propane tanks shall not be stored on the site overnight or over weekends.
- 1.10.10. Care shall be taken of the property of the Owner, including landscaped areas and paved areas..
- 1.10.11. The Contractor is responsible for any and all damage to asphalt paving; concrete walks and sodded areas including playing fields, gardens, walkways, side walks, lawns etc.

1.11. PROTECTION

- 1.11.1. Cover walls and adjacent work where materials hoisted or used.
- 1.11.2. Use warning signs and barriers. Maintain in good order until completion of work.
- 1.11.3. Clean off drips and smears of bituminous material immediately.

- 1.11.4. Protect roof areas from traffic and damage. Place plywood runways over work to enable movement of material and other traffic. Dispose of rainwater off substrates and away from face of building until drains or hoppers installed and connected.
- 1.11.5. Do not remove any more roof membrane that can be made waterproof within the same day with consideration to weather conditions and forecasts.
- 1.11.6. 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.
- 1.11.7. Install insulation promptly to avoid possibility of condensation beneath vapour retarder.
- 1.11.8. Interior spaces must be adequately protected. The contractor is responsible for any damages to interior space, or furnishings during the project.
- 1.11.9. Interior spaces should be reviewed before tear off. Sensitive equipment including computers, tools machinery, etc. should be given special consideration and adequate measures must be taken to protect from moisture, dust and debris.
- 1.11.10. Gymnasium floors should be protected with tarps to protect hardwood before roof materials are torn off. Coordinate interior protection with caretaking staff.

1.12. PREPARATION

- 1.12.1. Before commencing work, ensure environmental and site conditions are suitable for installation of material in accordance with Manufacturer's recommendations and requirements; and to the requirements and recommendations of the Consultant. If there is dispute or discrepancy with this requirement the Consultant shall intermediate to resolve the dispute or discrepancy.
- 1.12.2. Assure that substrates are free of voids, faults and/or other deficiencies that would affect the performance of the vapour retarder, insulation, flashing membrane or roof system.
- 1.12.3. On steel deck areas the Contractor shall clean all debris from the flutes prior to installation of new roofing system.
- 1.12.4. The Consultant must be notified in writing or by fax of unsuitable surfaces or conditions.
- 1.12.5. All work shall be scheduled and executed without exposing the interior of the building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.
- 1.12.6. Commencement of work shall imply acceptance of surfaces, site and all job conditions.

1.13. WORKING CONDITIONS

- 1.13.1. The Roofing Contractor will be allowed to set up his equipment as close to the work as possible but shall allow the Owner, staff, students, visitors, and the general public proper and reasonable access to the building. Access to kettle area shall be completely isolated from the public by temporary fencing or the equivalent to the satisfaction of the Owner and the Roof Consultant and any local regulations.
- 1.13.2. The Contractor shall not obstruct duly marked, or otherwise, fire access routes, safety lanes or other emergency access to the building or grounds.
- 1.13.3. The Contractor shall take all necessary precautions as to the protection of grounds, property, vehicles, and persons, of Owner, staff, students, visitors or the general public. The Contractor will include all costs for the provision or required protection, including but not limited safety barriers at equipment and at sidewalks walkways and roadways.
- 1.13.4. The Owner will provide reasonable access to water and electrical facilities to assist in the execution of the work. The Owner will not provide washroom facilities for the employees of the Contractor.
- 1.13.5. The means and methods of construction are the responsibility of the contractor. It is the contractor's responsibility to ensure equipment used is appropriate for the site conditions and that the equipment is used safely and as it was intended for.

1.14. FIELD QUALITY CONTROL

- 1.14.1. Daily inspections to be carried out throughout this section.
- 1.14.2. All work shall be subject to inspection by Jocelyn Roof Consultants Group inc., who will act on behalf of the Owner. The Contractor shall afford the Consultant or representative all facilities required for the inspection and testing of the work and shall immediately act upon any instruction regarding the work given by the Inspector.
- 1.14.3. Payment for all inspection work is to be by the Owner.
- 1.14.4. The Roof inspection shall in no way relieve the Roofing Contractor from his responsibilities or obligations under the terms of the Contract or the Contract Documents.
- 1.14.5. The Roofing Contractor shall notify the roof inspection company a minimum of 24 hours prior to starting the work, restarts or any other interruption in the work.
- 1.14.6. If the Inspector is required to make a wasted trip the cost of the wasted trip or trips will be back-charged to the Contractor.
- 1.14.7. The inspection company will also charge the Roofing Company for extra or additional trips necessitated by poor or faulty workmanship.
- 1.14.8. Upon completion of the project, a final inspection will be required with the installer, the consultant, and the owners representative.

1.15. FIRE WATCH

- 1.15.1. The Roofing Contractor shall have one-person stay at site for a minimum 3 hours after last torch work is done for the day. This person shall patrol and scan the torched areas for signs of smoke or other indications of smoldering or potential fire.

1.16. PRE-JOB SITE MEETING

The Roofing Contractor shall schedule a pre-start site meeting a minimum of two days prior to bringing material on site or starting any work on site. This meeting shall include the Roofing Contractor, Roofing Foreman, and Roof Consultant.

2 PRODUCTS**2.1 VAPOUR BARRIER SUPPORT PANELS (for use on metal deck)**

- .1 Description : Gypsum-Fiber Roof Board , [12.5 mm thick].
- .2 In conformance with : ASTM E 84 and ASTM C 1177
- .3 Specified product : Dens Deck Prime

2.2 VAPOUR BARRIER**.1 Modified Bitumen Vapour Barrier**

- .1 The SBS modified bitumen membrane shall be reinforced with polyester. The upper surface is sanded, the underface is covered with a thermofusible plastic film.
- .2 In conformance with: CAN/CGSB 37.56-M (9th draft).

.2 Self Adhesive Modified Bitumen Vapour Barrier (where application on wood or steel deck does not include mechanical fasteners)

- .1 Self-adhesive AVB for use on steel deck
- .2 Conforming to CAN2 -51.34M
- .3 High Density polyethylene cross laminated film top surface

- .4 Self-adhesive underside with release film

.3 **Vapour barrier continuity strip:**

- .1 Description: waterproofing membrane with composite reinforcement and SBS modified bitumen. The upper surface is sanded and the underface is self-adhesive.

2.3 INSULATION

.1 **Polyisocyanurate insulation**

- .1 Closed-cell polyisocyanurate foam insulation board laminated on both sides to CAN /ULC – S704
- .2 Insulation boards 1200mmx1200mm (4'x4') for adhesive application.
- .3 Insulation thickness is to be - 2 layers of 2" board unless otherwise noted on the drawings or scope of work.

.2 **Tapered Insulation Panel**

- .1 Tapered insulation panel made of polyisocyanurate designed to create a 2 percent (%) slope to the roof system.

.3 **Sump insulation panel for drain location**

- .1 Sump insulation panel made of [polyisocyanurate] designed to facilitate proper drainage around drain.
- .2 Tapered sumps to provide gradule 2% slope over 4' to drain. Sump size = 8'x8'

2.4 INSULATION OVERLAY

- .1 1/4" (6.35mm) thick semi rigid, multi-ply roofing substrate board, composed of mineral fortified asphaltic core between two asphalt saturated glass fibre mats.

2.5 MEMBRANES

.1 **Base Sheet Membrane**

- .1 Membrane composed of SBS modified bitumen and non-woven polyester reinforcement. The surface is covered with a thermofusible plastic film and the underface is covered with a thermofusible plastic film. The surface shall be marked with three (3) chalk lines to ensure proper roll alignment.
- .2 In conformance with: CGSB 37.56-M

.2 **Membrane for Flashings and Parapets.**

- .1 Membrane composed of SBS modified bitumen and non-woven polyester reinforcement. The surface is covered with a thermofusible plastic film and the underface is covered with a thermofusible plastic film. The surface shall be marked with three (3) chalk lines to ensure proper roll alignment.
- .2 In conformance with: CGSB 37.56-M

.3 **Self Adhesive Base Sheet Membrane for Combustible Surface and protection around penetrations.**

- .1 Description: Membrane composed of SBS modified bitumen and non-woven polyester reinforcement. The surface is covered with a thermofusible plastic film and the underface is covered with a thermofusible plastic film. The surface shall be marked with three (3) chalk lines to ensure proper roll alignment.

.4 **Roofing Cap Sheet Membrane for Field Surfaces**

- .1 Roofing membrane composed of SBS modified bitumen with a 250 g polyester reinforcement and elastomeric bitumen. The surface is protected by coloured granules. The underface is covered with a thermofusible plastic film.

.5 **Roofing Cap Sheet Membrane for Flashings and Parapets**

- .1 Roofing membrane composed of SBS modified bitumen with a 250 g polyester reinforcement and elastomeric bitumen. The surface is protected by coloured granules. The underface is covered with a thermofusible plastic film.

2.6 **ACCESSORY MEMBRANES**

.1 **Flame-stop membrane**

- .1 Description: Self-adhesive membrane composed of a reinforced glass mat and SBS modified bitumen designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes.

2.7 **PRIMER**

.1 **Primer for heat welded membranes**

- .1 Description: Made of bitumen, volatile solvents and adhesive enhancing additives. Used as primer to enhance the adhesion of torch-applied waterproofing membranes.

.2 **Primer for self-adhesive membranes**

- .1 [Description: Composed of SBS synthetic rubber, volatile solvents, adhesive enhancing resins and volatile solvent. Used as primer to enhance the adhesion of self-adhesive membranes.]

2.8 **Insulation adhesive**

- .1 Description: A highly elastomeric, two components foamable adhesive that can be applied at any temperature and sets in minutes.

2.9 **Insulation fasteners**

Description: pre-assembled fasteners with #14 drill point self-tapping screws, with 75mm (3") diameter galvalume plate in diameter.

In conformance with: FM 4470 Approvals standard.

Specified products: #14 HD Roofing Fasteners

2.10 **Waterproofing mastic**

- .1 Description: Multi-purpose solvent-based mastic, containing SBS modified bitumen fibres with aluminium pigments and mineral fillers.

2.11 Pitch pocket filler

- .1 Description: Polyurethane pre-fabricated pitch pocket system, in various size, with compounds that bond together, with solventless mastic and with one component elastomeric sealant.

2.12 Sealing product

- .1 Description: Bitumen/polyurethane waterproofing mono-component resin and polyester reinforcements.

2.13 Roof membrane walkways

- .1 Description: Waterproofing membrane composed of SBS modified bitumen and non-woven polyester reinforcement, used to protect membranes subjected to excessive foot traffic. The top face is covered with black granules; the underface is protected by a thermofusible plastic film.
- .2 In conformance with: CGSB 37.56-M (9th Draft).

2.14 ROOF DRAINS

- .1 Roof Drain: consists of a vandalproof cast aluminium dome with cleaning provision, cast aluminium stabilizer ring, aluminium mounting bolts, recessed copper drain body and straight outlet, and under-deck securement.

2.15 MECHANICAL ELECTRICAL FLASHING

- .1 Mechanical/Electrical Flashing: AMS model MEFA, 12" (305 mm) high c/w Gooseneck Assembly with multiple wire sleeves
- .2 Use for all electrical and mechanical penetrations through the roof membrane.

2.16 VENT STACK FLASHINGS

- .1 Insulated spun aluminum sleeve and base flange.
- .2 Removable self-sealing cap.
- .3 thaler SJ 26/27 or equivalent Mechanical/Electrical Flashing: AMS model MEFA, 12" (305 mm) high c/w Gooseneck Assembly with multiple wire sleeves

2.17 GAS LINE SUPPORTS

- .1 Gas line supports to include roller to allow for pipe movement, and galvanized pipe strap over gas line.
- .2 Supports to provide adjustable height and manufacturer supplied base.
- .3 Sized and spaced as required by code.

3 EXECUTION**3.1 SURFACE EXAMINATION AND PREPARATION**

- .1 Surface examination and preparation must be completed in conformance with manufacturer's instructions and recommendations.

- .2 Before roofing work begins, the owner's representative and roofing foreman will inspect and approve deck conditions (including slopes and wood blocking) as well as upstands and parapets, construction joints, roof drains, plumbing vents, ventilation outlets and others. If necessary, additional work may be required by the contractor so that required corrections can be made. The start of roofing work will mean roofing conditions have been accepted for work completion.
- .3 Do not begin any work before surfaces are smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.
- .4 Be sure plumbing, carpentry and all other work has been duly completed.
- .5 No materials will be installed during rain or snowfall.

3.2 METHOD OF INSTALLATION

- .1 Roofing work must be completed in a continuous fashion as areas prepared and weather conditions permit.
- .2 Seal all seams that are not covered by a cap sheet membrane in the same day. The cap sheet cannot be installed if any moisture is present at/in the base sheet seams.
- .3 Ensure waterproofing conditions for roofs at all times, including protection during installation work by other trades and progressive protection as work is completed (e.g. vents, drains, etc.).

3.3 SITE PROTECTION

- .1 Protect finished work to avoid damage during roof installation and material transportation. Install protective boardwalks over installed roofing materials to enable passage of people and products. Assume full responsibility for any damage.

3.4 PREPARATION WORK - METAL DECKING

- .1 Review deck for rust or corrosion and report to Roof Consultant.

3.5 PREPARATION WORK – CONCRETE DECK

- .1 Prepare the surfaces according to manufacturers recommendations.
- .2 Any loose or damaged areas are to be reported to the Consultant for review before proceeding.

3.6 VAPOUR BARRIER INSTALLATION ON CONCRETE DECK

- .1 Remove existing membrane materials.
- .2 Where existing membrane cannot be removed without damaging the substrate the material will need to be scraped and planed level to allow the application of new vapour retarder with full adhesion.
- .3 Prime existing substrate with applicable primer
- .4 Protect any openings or gaps in the concrete with self adhesive flame stop membrane.
- .5 Torch apply new vapour retarder.

3.7 VAPOUR BARRIER SUPPORT PANELS INSTALLATION ON STEEL DECK

- .1 Screw onto the steel deck's upper rib surfaces at a rate of 8 mechanical fasteners per board, increasing by 50% at perimeter and 75% in corners.
- .2 Cut boards so edges rest on centre of upper ribs. Cut straight lines with adequate tools.
- .3 Where slopes change, boards will be cleanly cut (avoid breaking boards) to acquire deck shape. Place boards perpendicular to deck ribs for continuous support at extremities.
- .4 Board joints will be staggered, at half-length, and perfectly butted. [Joints will be sealed with heat-resistant tape in both directions to prevent any asphalt leakage in finished areas.]

3.8 APPLICATION PRIMER

- .1 Roofing substrates of wood, metal, concrete, masonry or gypsum board surfaces will receive a coat of asphalt primer at a rate of .15 to .25 L/sq.m.. All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence. Cover primed surfaces with roofing membrane as soon as possible (same day coverage for self-adhesive membranes).

3.9 APPLICATION OF TORCH-APPLIED VAPOUR BARRIER

- .1 Primer must be dry prior installation of the vapour barrier membrane.
- .2 Starting at the lowest point of the roof, the vapour barrier membrane must be heat-welded onto the substrate in conformance with manufacturer's instructions and recommendations.
- .3 Overlap adjacent membranes by 75 mm (3 in). End lap joints must be 150 mm (6 in). Stagger the end laps a minimum of 300 mm (12 in).
- .4 The roof vapour barrier must meet and overlap the air/vapour barrier on adjoining walls to ensure total continuity.
- .5 Install vapour barrier membrane at insulation perimeters and around each element, piercing the insulation to ensure sealed connections with base sheet at upstands.

3.10 INSTALLATION OF INSULATION - ADHESIVE

- .1 Adhere insulation by using specified adhesive in continuous strips spaced 12" on the field surface, 8" on the perimeter, and 4" on corners. Corners and perimeters must be installed as per FM requirements listed in the PLPDS 1-29.
- .2 All the boards must be in perfect connection, without any significant differences in level, and must be adhered on all their surfaces completely.
- .3 Around the drain, cut out a slight slope of 0 to 10 mm (0 to 0.4 in) in a 600 mm (24 in) radius.
- .4 Install only as much insulation as can be covered in the same day.

3.11 INSTALLATION OF INSULATION – BITUMEN

- .1 Install Insulation in full and complete mopping of asphalt. 20lbs (pounds) per 100 square feet (1.2 kg/m²).
- .2 Place insulation in required position with all edges well-fitting to neighboring boards but not putting pressure on other boards.
- .3 Gaps in insulation greater than 1/4" must be filled with similar insulation material.
- .4 Insulation boards should be in staggered rows with staggered laps.

3.12 SUMP INSULATION PANEL INSTALLATION

- .1 Install sump insulation panel in conformance with manufacturer's instructions and recommendations
- .2 All vertical joints between level boards and sloped modules will be staggered.

3.13 INSTALLATION OF FLAME-STOP MEMBRANES

- .1 Adhere the membrane directly onto an approved substrate by peeling back the silicone release film. SOPRAGUARD TAPE is designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes.
- .2 Unroll the flame-stop membrane onto the insulation without adhering, being careful to overlap adjacent strips to ensure that the flame will not come in contact with the insulation.

3.14 MECHANICALLY FASTENED INSULATION COVER BOARD (No Adhesives)

- .1 Install sheets offset from insulation boards.
- .2 Cover board edges shall be placed in staggered rows.
- .3 On a change in plane, protection board should be cut at the apex and the base of the change.
- .4 Boards must lay flat without overlapped corners or edges.
- .5 Mechanically fastened board to have 5 fasteners per board in the field. Increase fasteners by 50% at the perimeter (10') and 75% in the corners.

3.15 BASE SHEET FLASHING INSTALLATION (HEAT-WELDED)

- .1 Apply base sheet flashing only after primer coat is dry.
- .2 Cut off corners at end laps to be covered by the next roll.
- .3 Overlap side laps by along lines provided for this purpose, and overlap end laps by 150 mm (6 in) Stagger end joints by a minimum of 300 mm (12 in).
- .4 This base sheet membrane must be welded directly to the prepared surface, proceeding from top to bottom, using a propane torch.
- .5 Avoid the formation of wrinkles, voids or fishmouths.

3.16 INSTALLATION OF REINFORCED GUSSETS

- .1 Install a reinforcing gusset in all inside and outside corners.
- .2 Heat-weld the gussets in place after installing base sheet membrane.

3.17 INSTALLATION OF HEAT-WELDED REINFORCEMENTS

- .1 Install reinforcements specified for various roof surfaces according to the following instructions and illustrations of membrane manufacturer.

3.18 ROOFING CAP SHEET INSTALLATION (TORCH-APPLIED MEMBRANE)

- .1 Begin with double-selvage starter roll. If starter roll is not used, side laps covered in granules must be degranulated by embedding side laps in torch-heated bitumen over a 75 mm (3 in) width.

- .2 Starting at drain, Unroll the cap sheet membrane on the base sheet without adhering, taking care to align the first strip parallel to the edge of the roof.
- .3 Cut off corners at end laps to be covered by the next roll.
- .4 Overlap side laps by along lines provided for this purpose, and overlap end laps by 150 mm (6 in) Stagger end joints by a minimum of 300 mm (12 in).
- .5 During installation, be careful not to overheat the membrane.
- .6 Avoid the formation of wrinkles, voids or fishmouths.
- .7 Conserve membrane's appearance. Avoid walking over finished surfaces; use protective walkways as needed.

3.19 INSTALLATION OF HEAT-WELDED CAP SHEETS ON UPSTANDS AND PARAPETS

- .1 This cap sheet must be installed in one-metre-wide strips.
- .2 Overlap side laps by along lines provided for this purpose, and overlap end laps by 150 mm (6 in). The side joints must overlap and must be staggered by at least 100 mm (4 in) with respect to the joints of the cap sheet on the field surface, to avoid areas of excessive membrane thickness.
- .3 Cut off corners at end laps to be covered by the next roll.
- .4 Use a chalk line to draw a straight line on the field surface 150 mm (6 in) from the upstands and parapets.
- .5 Use a propane torch and round-nose trowel to embed the surface granules in the layer of hot bitumen starting from the chalk line on the field surface to the bottom edge of the upstand or parapet as well as on the granulated vertical surfaces that are to be overlapped.
- .6 This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top.
- .7 Avoid the formation of wrinkles, voids or fishmouths.
- .8 During installation, be careful not to overheat the membrane.

3.20 MEMBRANE WALKWAY INSTALLATION

- .1 Install membrane walkways respecting requirements previously stipulated for cap sheet installation.
- .2 Degranulate 6" inside perimeter of area to be covered w/ walkway.
- .3 Apply primer to cap sheet before installing walkways.
- .4 Walkways required at all roof access points including doors and hatches.
- .5 Provide walkways around HVAC units requiring maintenance access.

3.21 ROOF DRAINS

- .1 Insulation and coverboard to be neatly cut around drains and plumbing stacks etc.
- .2 Roof drains are to be set in a layer of plastic cement on the base sheet and reinforced an additional layer of base sheet.
- .3 Flanges of the roof drains are to be primed with bitumastic paint and allowed to dry before installing.

3.22 WATERPROOFING FOR VARIOUS DETAILS

- .1 Install waterproofing membranes in conformance with various roofing details illustrated in the manufacturer's manual instructions and recommendations.

3.23 SEALING

- .1 Apply sealant to all reglets upon complete of flashing, at the junction of the metal flashing return and adjacent building members.
- .2 Apply sealant where shown or required by common good roofing practice.

END OF SECTION