

*Tremco has available MasterFormat specifications for its systems.*

*These are available in hard copy or on CD-Rom in WordPerfect®  
or Word® format.*

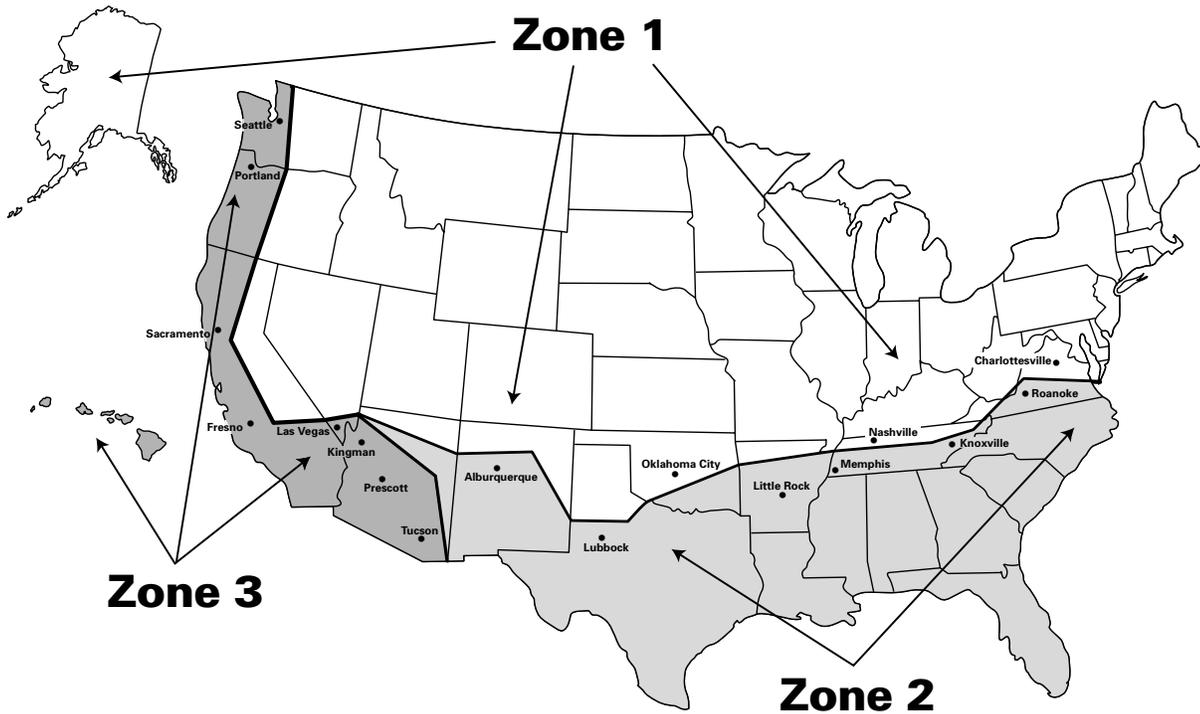
The CD contains the specifications in a format in which non-applicable options can be easily deleted to make the preparation of MasterFormat specifications as easy as possible.

The CD and hard copy can be obtained by completing the registration card in the front of this binder.

# U.S. Roofing Zone Map

*Because the weather and climate throughout the United States varies significantly, roofing systems have been developed for each of the zones.*

*Each roofing system is identified with a zone number or numbers to indicate what zones that particular system can be used in.*



**Note:** This Roof Zone Map is based on the %RH map produced by Wayne Tobiason of the Cold Regions Research and Engineering Laboratory and is also reproduced in ASTM Manual 18, Moisture Control in Building.

# Design Considerations For New Construction

## Structural Slope:

- Provide slope to drain structurally where possible. Slope can be provided with tapered insulation, but structural slope is best.
- Codes specify minimum slope, normally 2% (1/4:12) or 4% (1/2:12). Provide adequate drain/slope to remove all water from roofing system within 24 hours.
- Do not use plastic drain assemblies.
- Use 75 mm (3 in) diameter roof drains as a minimum to avoid blockage.
- Do not locate drains on columns, as they typically are the high points of the roof.
- Install roof drains into roof sumps.

## Roof Decks:

- Roof deck surfaces must be smooth.
- At roof deck directional changes, provide expansion joints.
- At roof deck material changes, provide expansion joints.
- Run true expansion joints through the parapets and include expansion joints in the roof specification.
- Bring no conduit or vents through deck within 460 mm (18 in) of a vertical intersection.
- Avoid penetrations in valleys or waterways.
- Install crickets on the up-slope behind solid vertical obstructions to prevent trapping of water.

## Insulation:

- Two layers of insulation are recommended as a more stable substrate for roofing instead of one.
- When using two layers of insulation, stagger and offset the joints a minimum of 150 mm (6 in) in both directions.
- Verify specified insulation is acceptable to Tremco.
- Verify code required “U” value for building.
- It is often less expensive to install insulation under the deck than on top of the deck.
- If owner is FM insured, specify a FM approved/accepted assembly.
- Based on height and location of roof, design for proper wind loading of roofing system.

## Fire Resistance:

- Specify only UL rated roofing systems.
- Verify with local code requirements if an A, B or C rated system is required. (Rated systems provide the most safety to the occupants in a fire.)

## Wind Resistance:

- Check wind maps for design requirements.
- Check local building requirements for design requirements.
- Use proper gauge for sheet metal flashings. Increase metal thickness one gauge in high wind areas.
- Use wood cants for all assemblies requiring FM rated flashings.
- Use wooden nailers 50 mm (2 in) wider than the deck flange for fascia metal.

## System Design:

- Design systems specific to the building and intended use.
- Design the Roof System for the location.
- Design a more durable roofing system if the occupants do not have a staff capable of roofing maintenance. Consult with your Tremco representative for building specific designs.

## Division Cross-references:

- **Carpentry:** Division 6 — Rough Carpentry for wood blocking, curbs, cants, and nailers.
- **Sheet Metal:** Division 7 — Sheet Metal, Flashing and Trim.
- **Plumbing:** Division 15 — Plumbing Specialties for roof draining.

# Design Considerations When Reroofing

## Building Codes:

Ensure the proposed roofing or reroofing systems being considered meet or exceed all pertinent codes.

## Structural Integrity:

The need for sufficient structural capacity of the roof deck must never be overlooked.

- Check the original design dead load for roofing. If the design dead load is unavailable, determine the dead load.
- Check if any new loads (new HVAC units, roof retrofits, ceilings etc.) have been added since original construction.

Note: Building codes in recent years have been changed to reflect heavier loading due to drifting snow at changes in building elevation. If the building to be reroofed was constructed prior to these code changes, the supporting structure may have to be reinforced.

If the original roof is a lightweight, mechanically attached single ply system, installation of heavier systems such as built-up roofing with aggregate may not be possible. Lightweight roofing systems may indicate reduced loading capacity of the structure.

## Deck Condition:

Defective decking can lead to roof failure.

- Check deck for damage. Workers may have inadvertently damaged the deck using axes or power cutting tools during roof removal or repair.
- When roofing is removed, loosely attached decking may be observed. All loose decking must be properly attached using techniques appropriate to the construction.
- The installation of roof mounted equipment or projections often requires cutting the deck. These areas, and any area in which the deck has been cut, should be thoroughly examined and properly reinforced as is necessary.
- Areas of damaged deck should be properly repaired. Deteriorated deck should be removed, as necessary, to eliminate the spread of deterioration. Appropriate treatments such as corrosion inhibitors should be applied.
- All deck replacement should be compatible with the original construction and should include an area sufficient to assure the structural integrity of the deck. The deck replacement should be fastened using techniques appropriate to the construction.
- Reinforcing mesh of gypsum decks should not be rusted.

## Insulation Requirements:

- Check building codes for required “U” value. Sometimes requirements differ between tear-off and roof overlay.
- Ensure proposed roofing systems are compatible with insulation. Tremco accepts only certain insulations for its roofing systems.

## Fire Resistance:

Check local building codes for the required fire resistance. Tremco has a wide variety of approvals. Approval agencies (Underwriters Laboratory and Factory Mutual), approve specific roofing systems, not merely components. Ensure that the roof specified conforms to published approval.

## Wind Resistance:

Ensure the reroofing design considers wind resistance. Building height, location, and local geography all play a part in determining the proper design.

- Ensure the existing perimeter wood nailers/blocking are adequately attached to the structure before adding additional blocking. In most cases, roof blow-offs originate at the perimeter edge; pay particular attention to its design. Use continuous cleats.
- Design perimeter flashing according to Factory Mutual Loss Prevention Data Sheet 1-49.
- Use the proper gauge for sheet metal flashings. Refer to SMACNA (Sheet Metal and Air Conditioning Contractors National Association, Inc.) guidelines for all metal details.
- Check local code for wind resistance requirements.

## Drainage:

All roofs should provide positive drainage. If original roof does not drain adequately, consider the installation of tapered insulation, approved cellular concrete systems or additional drains.

- Sump all drains.
- Ensure that the drain components are not broken and are properly installed and tightened.
- Ensure that the roof design includes the proper number and size of drains (as determined by local plumbing code).
- Drain inserts should be avoided.
- When possible, ensure that drains are properly attached to the deck.
- Ensure that exterior drainage from upper elevations have proper conductors and splash blocks.

## Flashings:

Good roof design ensures that the minimum flashing height of the final roofing system is 205 mm (8 in). Existing curbs, utility lines, and through-wall flashings may have to be raised.

- Avoid termination bar flashings without the appropriate counterflashings.
- Refer to SMACNA guidelines for all formed sheet metal.
- Install appropriate flashing at all drains and plumbing vents. (Single ply systems require specific non-metal flashing details.)
- Elevate flashing surface above the roof level through the use of tapered edge strips.
- Avoid the use of pitch pans whenever possible. If pitch pans must be used, combine service entries with equipment mounting.
- Where pitch pans are used, include a metal cover which seals to the projection and sheds water.
- Do not use flashings that terminate in a horizontal reglet.
- Securely fasten all flashings. Metal flanges, except lead, should be nailed 75 mm (3 in) on center (o.c.) with the nailing pattern staggered. Wood blocking must be wider than metal flashing flange.
- Avoid use of "I" beam supports and angled supports. Use round supports which can be properly sleeve-flashed. Where "I" beams exist, weld in metal plates and install proper sleeve flashing.
- Check threshold levels at all roof access doors. These may have to be raised and the doors refitted.
- Do not flash above a through-wall counterflashings.
- Do not block weep holes in walls.

## Mechanical Equipment:

- Ensure that the minimum roof flashing height is 205 mm (8 in). Raise units, if necessary, to ensure units rest on a solid base, not on roof insulation.
- Units should be mounted on curbs, resting directly on the deck and flashed properly.
- Check duct and duct insulation for leakage. Waterproof if necessary.
- Provide walkway panels at all equipment access points.
- Lift and reset units as necessary to flash properly.
- Remove unused equipment to deck level.

# General Roofing Requirements

## 1.0 Responsibility:

The design and construction of the building, including the roof, are the responsibility of the architect, design engineer, general contractor, and owner and are items for which Tremco assumes no responsibility.

Tremco takes responsibility for providing quality materials and for specifications and recommendations for their proper installation. As neither Tremco itself nor its representatives practice architecture or engineering, Tremco offers no opinion on, and expressly disclaims any responsibility for the soundness of any structure on which its products may be applied.

If questions arise as to the soundness of a structure or its ability to properly support a planned installation, the owner should obtain the opinions of competent structural engineers before proceeding. Tremco accepts no liability for any structural failure or for resultant damages. Tremco representatives are not authorized to vary this disclaimer.

The following application information is designed to serve as a general guide intended for each roofing application, including but not limited to: BURmastic®, THERM®, POWERply™, TremFAST® and Trem-LAR® LRM systems. For application specifications for your particular roof, consult your Tremco field representative, or contact Tremco Incorporated, 3735 Green Road, Beachwood, OH 44122-8069, (216) 292-5000.

For applications specific to BURmastic, THERM, POWERply, TremFAST and Trem-LAR LRM systems, consult the details for the particular system.

## 2.0 Deciding to Reroof:

Options available to designers are limited compared to new construction roofing. For instance:

- Attachment methods to the deck may determine insulation type.
- Insulation type may affect membrane attachment and type.
- Tolerance for minor ponding must be considered as compared to total correction.
- Structural loading capacity must be checked if additional weight is added to the designed dead load or if the original design dead load is unknown.
- To determine the presence of moisture or the extent of deterioration of an existing roof system, visual inspection accompanied by detailed physical analysis is recommended.
- Addition of drains may seem practical, but installation of drain leaders may prove impossible due

to lack of space and proliferation of mechanical equipment below deck level.

Before reroofing, the roof designer must determine the reason that the original roofing failed and why the building leaks. New designs must avoid the original design pitfalls, if any.

A tool that can aid a roof designer in understanding the scope of the roofing problem is the Tremco Thermocore™ analysis. It can aid the building owner, architect, engineer, or specifier in determining the presence of moisture in a roofing system. The Thermocore survey maps areas of wet insulation and provides detailed roof analysis.

To assist in determining that reroofing is necessary, the Tremco Roof Analysis Core Evaluation (TRACE®) is a detailed analysis of a built-up roof core including its tensile strength, ply structure and types, softening point, bitumen weight, ply adhesion and asbestos content.

Asbestos Core Testing (ACT®) is an analysis of a roof core for presence of asbestos. The presence of asbestos affects the options available for an existing roof.

Finally, there is no substitute for the Tremco representative's personal observations. He or she has the capability of putting all available information together in a comprehensive package.

## 2.1 General Conditions for Reroofing:

- Provide adequate drainage.
- Determine the amount of weight that will be added or removed during installation of the new system.
- Remove loose gravel and existing roofing.
- Remove all flashings.
- Provide a smooth, clean, dry deck surface.

## 3.0 On-Site Quality Control:

During the course of roofing application, visually inspect to determine:

- If deck surface is clean, firm, smooth, dry, and properly attached against uplift and lateral movement. Repair damaged area(s).
- That materials and construction comply with specifications.
- If roof slope is adequate to provide proper drainage.
- That the correct number, pattern, and type of fasteners are used.
- That application provides proper coverage rate and adhesion without voids, dry spots, entrapped moisture, wrinkles and/or fishmouths.
- That insurance and/or code requirements are met.

#### 4.0 Vapor Retarder:

The decision to use a vapor retarder should be based on:

- Climatic conditions.
- Wintertime indoor relative humidity.
- Initial or expected future occupancy and building utilization.

#### 5.0 Deck Requirements:

##### 5.1 General:

Decks must be designed and constructed to provide sufficient strength to support anticipated dead and live loads and normal construction traffic without excessive deflection or movement. Provisions for expansion and contraction should be incorporated into the design. The deck should be constructed according to the deck manufacturer's specifications, following established practices. The roof should be able to support roofing applicators and their necessary equipment without deflection that will in any way damage or harm roofing components, or deform or harm the deck itself.

##### 5.2 Deck Preparation:

Roof replacement usually involves more complexities than new construction roofing. Such contingencies as rusted or deteriorated decks, rotted wood components, rooftop equipment which cannot be moved or shut down, and numerous other conditions are often encountered. The following application information is designed to serve as a general guide.

- All holes, deformations, depressions, etc., must be reinforced and/or smoothed prior to the roofing application.
- Determination and acceptance of a deck for reroofing is the responsibility of the architect or engineer.
- Deck should provide slope to drain.
- If insulated, pressure treated nailers of the same total thickness as the insulation, must be mechanically fastened at the deck edges and around all projections and extensions. On slopes greater than 16.6% (2:12), insulation stops must be used to provide a nailing surface for roofing felts.

##### 5.3 Wood Decks:

Wood decks shall be constructed of seasoned lumber. The deck must be constructed so it will securely support the weight of roofing materials and projections.

The deck shall not be constructed with warped boards. Cover all knotholes and cracks greater than 6 mm (1/4 in) by securely nailing sheet metal to the deck. Plywood sheathing must be exterior grade and not less than 11 mm (15/32 in) thick and secured to purlins, joists etc., according to American Plywood Association PS 1-83.

Install a fastened base sheet over a rosin sheet if no insulation is used.

##### 5.4 Structural Wood Fiber Decks:

Decks must be structurally sound and installed according to the manufacturer's specifications. Anchor all slabs against uplift and lateral movement. No more deck shall be laid in one day than can be covered with roofing the same day. Remove and replace decking if it is wet or deformed. Use only fasteners recommended by deck and membrane manufacturers. Always install rosin sheathing paper if no insulation is used.

Install a fastened base sheet if no insulation is used or if insulation is adhered.

##### 5.5 Steel Decks:

Decks shall be installed; welded, and/or mechanically fastened according to the specifications of the manufacturer and the Steel Deck Institute. Decks must be a minimum of 22 gauge. They shall be either shop painted, galvanized or similarly treated. Decks shall meet Factory Mutual Class 1 construction, Underwriters Laboratories, and/or local building codes. Steel decks must be covered with an acceptable roof insulation board of suitable thickness to span the rib opening as recommended by the insulation manufacturer.

Vented/slotted steel decks are typically specified as a substrate for lightweight insulating concrete. If lightweight insulating concrete is removed from the vented steel deck during roof replacement and will not be replaced, the vented steel deck must be covered with a vapor retarder system consisting of a double layer gypsum board staggered or a single layer gypsum board with taped joints. Finally, a hot applied vapor retarder is applied, to prevent positive pressure from the facility from affecting the roof system from underneath.

##### 5.6 Structural Concrete Decks:

Poured-in-place structural concrete decks must be installed as specified by the manufacturer. Decks shall be firm, smooth, and thoroughly dry. Expansion joint locations and their degree of cure shall conform to the deck manufacturer's recommendations. Surfaces must be primed with an asphalt primer. Insulation must be installed to separate installed roofing from deck.

##### 5.7 Prestressed or Precast Concrete Decks:

New roof decks must cure 28 days before installation of roof systems.

Decks of prestressed or precast concrete shall be firm, smooth, dry, and free from defects. Anchor slabs to supporting framework as protection against

lateral movement and uplift. Joints shall be grouted and smoothed. Roofing must not be directly applied to the deck. Install insulation to separate installed roofing from the concrete deck.

### 5.8 Lightweight Concrete Roof Decks:

Install lightweight insulating concrete according to the deck manufacturer's specifications. A slotted steel deck substrate will allow for downward drying of residual moisture. Perimeter venting of the moisture is also required. Proper coordination between contractors is required to assure the lightweight insulating concrete is placed, cured, and then roofed to minimize exposure to environmental conditions, such as rain. Roofing over the relatively high casting moisture content of lightweight poured-in-place concrete roof deck can result in blisters and damage to the roofing system. Caution must be taken to avoid trapping moisture under the new roofing assembly. The required minimum fastener pull-out is 18 kg (40 lb).

A foil/kraft laminate sheet must be mechanically attached to the lightweight concrete roof deck prior to installation of the mechanically attached venting base sheet.

NOTE: When using vermiculite or perlite decks, special precautions must be taken. Decks should be of sufficient density to provide a solid, secure substrate. For new construction, roof application shall not proceed without deck suppliers' inspection and a written report included in the specification that the deck is sufficiently dry for roofing.

Always install a nailed venting base sheet before application of a roofing system with appropriate perimeter details to allow for adequate ventilation of moisture.

### 5.9 Gypsum Decks:

Install poured-in-place gypsum in accordance with manufacturer's recommendations. The finished deck shall have a minimum thickness of 50 mm (2 in).

### 5.10 New and Unusual Decks and Surfaces:

Authorization to apply roofing products to new and/or unusual decks or surfaces for warranty applications shall be obtained in writing from Tremco.

### 6.0 Insulation — General:

Insulation is used as a base for roof membranes. It should be dimensionally stable, thermally resistant and lightweight.

### 6.1 Acceptable Roof Insulations:

Insulation must be dry and kept dry during the roofing process. No more insulation shall be installed than can be covered and waterproofed within the

application day. Adhesion with Tremco Fas-n-Free® Insulation Adhesive or mechanical fastening are the preferred methods of attachment unless otherwise specified.

The insulation must be manufactured specifically as a roof insulation, and the insulation manufacturer must accept responsibility for any manufacturing defects which occur in the insulation. Insulation must be approved by Factory Mutual and Underwriters Laboratories and must meet all the specific requirements listed for the generic insulation type. Maximum insulation dimensions: 1220 mm x 2440 mm (4 ft x 8 ft). When applied according to specifications, the following insulations are acceptable bases for Tremco roofing systems:

- Fiberglass and tapered fiberglass roof insulations:
    - Fiberglass must meet ASTM C 726.
    - Minimum thickness: 19 mm (3/4 in).
    - Maximum thickness: 41 mm (1-5/8 in) per layer.
  - Wood fiberboard roof insulation:
    - Wood fiberboard must meet ASTM C 208 and be asphalt or emulsion coated.
    - Minimum thickness: 13 mm (1/2 in).
  - Perlite roof insulation (hot applied systems only):
    - Perlite must meet ASTM C 728.
    - Minimum thickness: 25 mm (1 in).
  - Isocyanurate insulations:
    - Minimum thickness: 38 mm (1.5 in).
    - Must meet Federal Specification HH-1-1972/2(1) and the physical properties of the RIC/TIMA Standard Specification for Polyurethane and Polyisocyanurate roof insulation.
- (For all BUR and modified bitumen systems, isocyanurate insulations must be overlaid with one of the other approved insulation boards above.)

Insulation facers play an important role in the adhesion of roofing to insulation. Incompatibility of the facer and the roofing system has resulted in roofing failures. Manufacturers of Polyisocyanurate insulations often change their facers. It is therefore necessary to contact Tremco to determine the acceptability of a particular insulation. Regardless of the facer type, hot applied systems require an overlayment of either 13 mm (1/2 in) fiberboard, 19 mm (3/4 in) fiberglass, or 25 mm (1 in) perlite roof insulation (minimum thicknesses) over isocyanurate insulations.

### 6.2 Insulation Application:

Roof insulation must be laid over a clean, smooth, dry and firm surface and be adhered/attached as specified using Premium III or Premium IV asphalt

1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>)\*, Fas-n-Free 0.6 L/m<sup>2</sup> (1.5 gal/100 ft<sup>2</sup>) or mechanical fasteners. Install insulation boards in courses parallel to roof edges with mopping surface up. Cut and neatly fit insulation where the roof deck intersects vertical surfaces. Do not jam or deform boards. Prevent open joints or irregular surfaces by mitering edges of the insulation boards at ridges, valleys, sumps and projections. On metal decks form continuous insulation joints on deck flanges. Do not cantilever insulation edges over deck ribs. Minimum bearing surface: 38 mm (1-1/2 in). When insulation is mechanically attached to a steel deck, use the shortest length fastener which will penetrate the top flange of the steel deck a minimum 19 mm (3/4 in).

Tolerances:

Maximum board size: 1220 mm x 2440 mm (4 ft x 8 ft), 1220 mm x 1220 mm (4 ft x 4 ft) for Fas-n-Free.

Maximum insulation gap: 6 mm (1/4 in).

Maximum elevation variations between boards at joints: 3 mm (1/8 in).

Minimum fill size: 457 mm x 457 mm (18 in x 18 in).

### 6.3 Wet Insulation:

Do not apply Tremco roofing systems over wet insulation. Wet insulation must be removed and replaced with dry insulation.

### 6.4 Insulation Stops and Backnailing:

- Insulation stops and backnailing shall be required on roof slopes greater than 16.6% (2:12).
- For roof slopes between 16.6% (2:12) and 25% (3:12), insulation stops shall be installed on 6.1 m (20 ft) centers, perpendicular to the roof slope.
- For roofs sloped over 25% (3:12), insulation stops shall be installed on 1220 mm (4 ft) centers, perpendicular to the roof slope.
- Roof system is applied parallel to roof slope and fastened to insulation stops 75 mm (3 in) on center.
- If roof system is installed without the use of thermal insulation, backnailing will follow the above procedure, omitting insulation stops.

### 7.0 Drainage:

Tremco roofing systems are not intended to perform under ponding water. Positive drainage is required. Roof decks shall be designed to shed water as quickly as possible. Decks shall be graded to drain all water freely. Drains shall be of sufficient size and number to ensure rapid removal of water from the roof.

Where positive drainage does not exist, or where the deck does not meet the minimum required slope for the specified roof, drainage must be accomplished by lowering the drains and/or installing Tremco approved cellular concrete, tapered insulation, or additional drainage.

### 8.0 Expansion Joints:

To prevent roof damage through the movement of the deck or structure from changes of the deck materials, from changes of deck direction, or from reentry corners, install adequate expansion joints. At construction or expansion joints in masonry or steel, the roof should have a corresponding expansion joint. An effective waterproof seal must bridge the gap between areas of roofing separated by the expansion joints.

### 9.0 Flashing and Cants:

#### 9.1 Flashings:

All flashings shall be accomplished according to the project specifications.

#### 9.2 Cap and Counterflashings:

Where necessary, sheet metal wall cap and counterflashings are recommended. Fasten according to Factory Mutual Loss Prevention Data Sheet 1-49.

#### 9.3 Cant Strips:

Cant strips must be installed at any vertical flashings.

#### 9.4 Projections and Through-the-Roof Extensions:

No projections shall be constructed through the perimeter flashing.

### 10.0 Surfacing:

- Gravel — Shall conform to ASTM D 1863. Gravel shall be hard, durable, opaque and washed free of clay, loam, sand or other foreign substances. Size should be 6, 7 or 6/7. Apply gravel at 19.5 kg/m<sup>2</sup> (400 lb/100 ft<sup>2</sup>) minimum.
- Granule — Conform to ASTM D 451 No. 11 sieve. Apply at minimum 2.9 kg/m<sup>2</sup> (60 lb/100 ft<sup>2</sup>)
- Smooth surfaces — Fire-resistant, heat reflective and polymer modified emulsion coatings are available.

Consult your local Tremco representative for specific surfacing recommendations for the roof specified.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

## 11.0 Tremco Roofing Systems:

### 11.1 BURmastic 200 Cold Applied Built-up System/Application:

#### **BURmastic 200 - 4 Ply System: (Zones 1, 2 and 3)**

Start and finish the roof membrane along the edges, terminations, and projections. Use starting/finishing strips — 230 mm, 460 mm, 685 mm and 915 mm (9 in, 18 in, 27 in, and 36 in) wide plies.

Install BURmastic Composite plies in shingle fashion. Overlap starter strips 750 mm (29 in) with the first ply, then overlap each succeeding ply 700 mm (27.5 in).

#### **BURmastic 200 - 3 Ply System: (Zones 1, 2 and 3)**

Start and finish the roof membrane along the edges, terminations, and projections. Use starting/finishing strips — 305 mm, 610 mm and 915 mm (12 in, 24 in, and 36 in) wide plies.

Install the BURmastic Composite plies in shingle fashion. Overlap starter strips 660 mm (26 in) with the first ply, then overlap each succeeding ply 625 mm (24-2/3 in).

#### **BURmastic 200B - 3 Ply System: (Zones 1, 2 and 3)**

Over an adhered base sheet, start and finish the roof membrane along the edges, terminations and projections. Use starter/finishing strips 460 mm and 915 mm (18 in and 36 in) wide plies.

Install the BURmastic Composite Ply roofing plies in shingle fashion. Overlap starter strips 510 mm (20 in) with first ply, then overlap each succeeding ply 485 mm (19 in).

#### **BURmastic 200 - Base + 2 Ply System: (Zone 3 only)**

Over a fastened base sheet, start and finish the roof membrane along the edges, terminations and projections. Use starter/finishing strips 460 mm and 915 mm (18 in and 36 in) wide plies.

Install the BURmastic Composite Ply roofing plies in shingle fashion. Overlap starter strips 510 mm (20 in) with first ply, then overlap each succeeding ply 485 mm (19 in).

#### **Interply Adhesive:**

Embed each ply in a uniform and continuous application of BURmastic Adhesive. Interply application: 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\* Ply shall never touch ply. Lightly broom plies from the unfinished side of the roof. Overlap previous work 610 mm (24 in). Lap ply sheet ends 150 mm (6 in). Extend all plies to the top edges of all cants and cut the excess evenly. Stagger the end laps.

### 11.2 BURmastic 100 Cold Applied Built-up System/Application:

Cut the fiberglass plies (BURmastic Glass Ply) in 6 m (18 ft) lengths maximum. Allow the lengths to relax at least 30 minutes at 13°C (55°F) or above; allow 60 minutes minimum below 13°C (55°F).

#### **BURmastic 100 - 4 Ply System: (Zones 1, 2 and 3)**

Start and finish the roof membrane along the edges, terminations, and projections. Use starting/finishing strips 230 mm, 460 mm, 685 mm and 915 mm (9 in, 18 in, 27 in, and 36 in) wide plies.

Install BURmastic Glass plies in shingle fashion. Overlap starter strips 750 mm (29 in) with the first ply, then overlap each succeeding ply 700 mm (27.5 in).

#### **BURmastic 100 - 3 Ply System: (Zones 1, 2 and 3)**

Start and finish the roof membrane along the edges, terminations, and projections. Use starting/finishing strips 305 mm, 610 mm and 915 mm (12 in, 24 in, and 36 in) wide plies.

Install the BURmastic Glass plies in shingle fashion. Overlap starter strips 660 mm (26 in) with the first ply, then overlap each succeeding ply 625 mm (24-2/3 in).

#### **BURmastic 100B - 3 Ply System: (Zones 1, 2 and 3)**

Over an adhered base sheet, start and finish the roof membrane along the edges, terminations and projections. Use starter/finishing strips 460 mm and 915 mm (18 in and 36 in) wide plies.

Install the BURmastic Glass Ply roofing plies in shingle fashion. Overlap starter strips 510 mm (20 in) with first ply then overlap each succeeding ply 485 mm (19 in).

#### **BURmastic 100 - Base + 2 Ply System: (Zone 3 only)**

Over a fastened base sheet, start and finish the roof membrane along the edges, terminations and projections. Use starter/finishing strips 460 mm and 915 mm (18 in and 36 in) wide plies.

Install the BURmastic Glass Ply roofing plies in shingle fashion. Overlap starter strips 510 mm (20 in) with first ply, then overlap each succeeding ply 485 mm (19 in).

#### **Interply Adhesive:**

Embed each ply in a uniform and continuous application of BURmastic Adhesive. Interply application: 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\* Ply shall never touch ply. Lightly broom plies from the unfinished side of the roof. Overlap previous work 610 mm (24 in). Lap ply sheet ends 150 mm (6 in). Extend all plies to the top edges of all cants and cut the excess evenly. Stagger the end laps.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

### 11.3 THERM 200 Hot Applied Built-up System/Application:

Install the roof insulation protection course or base sheet by mechanical attachment or in a uniform and continuous mopping of THERMastic® Adhesive applied at 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>)\*.

Plan the placement of roofing ply sheets to ensure that water will flow over or along, but not against the exposed edges. Use a standard kettle equipped with a circulating pump. Do not heat hotmelt adhesives above their flash point. Apply at EVT. Starting at the low point of the roof, apply a uniform and continuous mopping of THERMastic Adhesive using a standard roofing mop or Tremco approved felt layer.

Ply shall never touch ply. Apply the specified hotmelt adhesive no more than 3 m (10 ft) ahead of each roll. Overlap previous work 610 mm (24 in). Lap ply sheet ends 150 mm (6 in). Extend all the plies to the top edges of all cants and cut the excess evenly. Stagger end laps. Lightly broom the plies to ensure complete adhesion. Avoid walking on the plies until the hotmelt adhesive has cooled.

#### THERM 200 - 4 Ply System: (Zones 1, 2 and 3)

Start and finish the roof membrane along the edges, terminations and projections. Use starting/finishing strips 250 mm, 490 mm, 760 mm and 1010 mm (9-7/8 in, 19-3/8 in, 29-7/8 in, and 39-3/4 in) wide plies.

Install the PolyTHERM roofing plies in shingle fashion. Overlap starter strips 800 mm (32 in) with the first ply, then overlap each succeeding ply 770 mm (30-1/4 in).

#### THERM 200 - 3 Ply System: (Zones 1, 2 and 3)

Start and finish the roof membrane along the edges, terminations and projections. Use starting/finishing strips 335 mm, 675 mm and 1010 mm (13-1/4 in, 26-1/2 in, and 39-3/4 in) wide plies.

Install the PolyTHERM roofing plies in shingle fashion. Overlap starter strips 715 mm (28-1/8 in) with the first ply, then overlap each succeeding ply 690 mm (27-1/8 in).

#### THERM 200B - 3 Ply System: (Zones 1, 2 and 3)

Over a fully adhered base sheet, start and finish the roof membrane along the edges, terminations and projections. Use starter/finishing strips 505 mm and 1010 mm (19-7/8 in and 39-3/4 in) wide plies.

Install the PolyTHERM roofing plies in shingle fashion. Overlap starter strips 715 mm (28-1/8 in) with first ply, then overlap each succeeding ply 690 mm (27-1/8 in).

#### THERM 200 - Base + 2 Ply System: (Zone 3 only)

Over a fastened base sheet, start and finish the roof membrane along the edges, terminations and projections. Use starter/finishing strips 505 mm and 1010 mm (19-7/8 in and 39-3/4 in) wide plies.

Install the PolyTHERM roofing plies in shingle fashion. Overlap starter strips 555 mm (21-7/8 in) with first ply, then overlap each succeeding ply 530 mm (20-7/8 in).

#### Interply Adhesive:

Embed each ply in a uniform and continuous mopping of specified hotmelt adhesive. Ply shall never touch ply. Apply the specified hotmelt adhesive no more than 3 m (10 ft) ahead of each roll. Lightly broom plies from the unmopped side to ensure complete adhesion. Overlap the previous work 610 mm (24 in). Lap ply sheet ends 150 mm (6 in). Extend all plies to the top edges of all cants and cut the excess evenly. Stagger the end laps. Avoid walking on the plies until the adhesive has cooled.

Interply application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>)\*.

### 11.4 THERM 100 Hot Applied Built-up System/Application:

Install the roof insulation protection course or base sheet by mechanical attachment or in a uniform and continuous mopping of THERMastic Adhesive or Premium III or Premium IV asphalt applied at 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>)\*.

Plan the placement of the roofing ply sheets to ensure that water will flow over or along, but not against exposed edges. Use a standard kettle equipped with a circulating pump. Do not heat hotmelt adhesives above their flash point. Apply at EVT. Starting at the low point of the roof apply uniform and continuous mopping of THERMastic Adhesive or Premium III or Premium IV asphalt using a standard roofing mop or Tremco approved felt layer.

#### THERM 100 - 4 Ply System: (Zones 1, 2 and 3)

Start and finish the roof membrane along the edges, terminations and projections. Use starter/finishing strips 230 mm, 305 mm, 685 mm and 915 mm (9 in, 18 in, 27 in, and 36 in) wide plies.

Install the THERMglass Plus or THERMglass Type IV roofing plies in shingle fashion. Overlap starter strips 750 mm (29 in) with the first ply, then overlap each succeeding ply 700 mm (27-1/2 in).

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

**THERM 100 - 3 Ply System:  
(Zones 1, 2 and 3)**

Start and finish the roof membrane along the edges, terminations and projections. Use starter/finishing strips 305 mm, 610 mm and 915 mm (12 in, 24 in, and 36 in) wide plies.

Install the THERMglass Plus or THERMglass Type IV roofing plies in shingle fashion. Overlap starter strips 660 mm (26 in) with the first ply, then overlap each succeeding ply 630 mm (24-2/3 in).

**THERM 100B - 3 Ply System:  
(Zones 1, 2 and 3)**

Over a fully adhered base sheet, start and finish the roof membrane along the edges, terminations and projections. Use starter/finishing strips: 460 mm and 915 mm (18 in and 36 in) wide plies.

Install the THERMglass Plus or THERMglass Type IV roofing plies in shingle fashion. Overlap starter strips 510 mm (20 in) with first ply, then overlap each succeeding ply 485 mm (19 in).

**THERM 100 - Base + 2 Ply System:  
(Zone 3 only)**

Over a fastened base sheet, start and finish the roof membrane along the edges, terminations and projections. Use starter/finishing strips 460 mm and 915 mm (18 in and 36 in) wide plies.

Install the THERMglass Plus or THERMglass Type IV roofing plies in shingle fashion. Overlap starter strips 510 mm (20 in) with first ply then overlap each succeeding ply 485 mm (19 in).

**Interply Adhesive:**

Embed each ply in a uniform and continuous mopping of specified hotmelt adhesive. Ply shall never touch ply. Apply the specified hotmelt adhesive no more than 3 m (10 ft) ahead of each roll. Lightly broom plies from the unmopped side to ensure complete adhesion. Overlap the previous work 610 mm (24 in). Lap ply sheet ends 150 mm (6 in). Extend all plies to the top edges of all cants and cut the excess evenly. Stagger the end laps. Avoid walking on the plies until the adhesive has cooled.

Interply application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>)\*

**11.5 POWERply Modified Bitumen Hot Applied System/Application:**

**(Zones 1, 2 and 3)**

Plan the placement of POWERply systems to ensure water flows over or along, but not against exposed edges. Replace areas of wet insulation, deteriorated deck, and wood components. Install roof insulation or base sheet. Use a standard kettle equipped with a circulating pump. Do not heat adhesive above its flash point.

Start at the low point of the roof, apply a uniform and continuous mopping of THERMastic or POWERply Modified Hot Melt Adhesive using a standard mop or Tremco approved felt layer at 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>)\*.

Install one ply of POWERply HT or POWERply HE Base Sheet or two plies of PolyTHERM, POWERply IV or POWERply VI felts as base roofing.

Place POWERply membrane in a uniform and continuous mopping of THERMastic or POWERply Hot Melt Adhesive at 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>)\*.

Hot bitumen adhesive should be applied at its EVT or 218°C (425°F) (whichever is higher at its application point) to apply POWERply plies. Plies should be immediately broomed into hot adhesive.

Lap the selvage a minimum of 100 mm (4 in) and end laps a minimum of 150 mm (6 in). Offset the POWERply laps from the base sheet laps. Stagger the end laps 915 mm (36 in) minimum.

To ensure complete and uniform adhesion, the adhesive should extend past lap edges.

Use a rounded trowel to test the lap security. Install flashings as specified.

For granule surfaced POWERply, granules may be broadcast into exposed surfaces of mastics or adhesive to maintain uniform finished appearance of the roof. For smooth surfaced POWERply, apply a flood coat with aggregate or an asphalt emulsion with reflective coating.

**11.6 POWERply Modified Bitumen Cold Applied System/Application:**

**(Zones 1, 2 and 3)**

Plan the placement of POWERply systems to ensure water flows over or along, but not against exposed edges. Replace areas of wet insulation, deteriorated deck and wood components. Install roof insulation or base sheet. Use POWERply Rubberized Cold Adhesive which can be sprayed, brushed or squeegeed applied.

Start at the low point of the roof, apply a uniform and continuous application of POWERply Rubberized Cold Adhesive. Interply application is 1.0 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>)\*. Roll base sheet and membrane immediately into adhesive. Do not allow for flash off time.

Lap the selvage a minimum of 100 mm (4 in) and end laps a minimum of 150 mm (6 in). Offset the POWERply laps from the base sheet laps. Stagger the end laps 915 mm (36 in) minimum.

To ensure complete and uniform adhesion, the adhesive should extend past lap edges.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

Use a rounded trowel to test the lap security. Install flashings as specified.

Full broom base sheet and membrane to assure positive contact.

For granule surfaced POWERply, granules may be broadcast into exposed surfaces of mastics or adhesive to maintain uniform finished appearance of the roof. For smooth surfaced POWERply, apply a flood coat with aggregate or an asphalt emulsion with reflective coating.

## 11.7 TremFAST – PIB Single Ply Membrane System/Application:

(Zones 1, 2 and 3)

### Installation of Hot Applied System:

Start at low point of the roof and position a roll of TremFAST roof membrane square with the roof edge. The factory applied self-sealing lap edges shall be aligned along the low edge of the roof.

Initially roll out the entire first roll dry, with no adhesive applied to substrate. Roll out a second roll parallel to the first, overlapping the second roll 51 mm (2 in) onto the first along the side lap. Assure both roll runs are tight and properly aligned. Join the seam (see Seaming).

Fold back the sheet from the first roll onto the second and apply the membrane adhesive. Evenly cover the substrate under the first sheet (which is folded back) with the specified hotmelt adhesive applied in a serpentine pattern. Center the serpentine ribbon of the specified hotmelt adhesive so it will be located equally between the edges of the sheet. Do not allow any hotmelt adhesive to be placed under the seam area.

Coverage Rate: Evenly cover a minimum of 50% of the area under each roll with the specified hotmelt adhesive applied in a serpentine pattern at a rate of 0.7-0.9 kg/m<sup>2</sup> (15-18 lbs<sup>2</sup>)\*. For roof perimeter areas, increase the specified hotmelt adhesive coverage rate to cover 85% of the area under each roll.

After the hotmelt adhesive is in place, pick up and place the membrane into the adhesive. Start from the center of the sheet to minimize wrinkling. Temperature range of hotmelt adhesive during application of sheet should be 176-204°C (350-400°F).

After the first roll is adhered, fold the second sheet back onto the first and repeat the application of specified hotmelt adhesive in a serpentine pattern on the second roll as described above.

On all succeeding rolls, first roll out the sheet dry and assure it is properly aligned and is overlapped 51 mm (2 in) onto the preceding roll. Then fold it back onto the previously applied roll and apply hotmelt adhesive as described above. Set sheet into the hotmelt adhesive as described above. Finally, join the seam (see Seaming).

### Installation of the Cold Applied System:

Start at low point of the roof and position a roll of TremFAST roof membrane square with the roof edge. The factory applied self-sealing lap edge shall be aligned along the low edge of the roof.

Using the TremKART, apply TremFAST Adhesive LV in 6.3 mm (1/4 in) beads at a coverage rate of approximately 3.75 m<sup>2</sup>/L (150 ft<sup>2</sup>/ gal)\*.

Along all roof edges, increase adhesive bead width to 12.6 mm (1/2 in). In roof perimeter corner areas, increase bead width to 13 mm (3/4 in). Alternately, apply TremFAST Adhesive LV in a full coverage at 2 m<sup>2</sup>/L (75 ft<sup>2</sup>/ gal)\* in these areas.

Roll TremFAST roof membrane into the adhesive within 10 minutes of application. Assure proper overlap of 51 mm (2 in) of the roll onto previously applied roll. Assure roll remains tight with no wrinkling.

Join the seam (see Seaming), then apply the next roll in TremFAST Adhesive as described above.

### Seaming:

Clean the lap area of the lower membrane with TremFAST Solvent prior to joining the lap seam. After solvent has completely dried, remove the protective release paper from the factory applied self-sealing seam tape. At the same time, apply pressure to and join the laps by walking on the lap toe to heel. Roll the entire lap area firmly with a steel roller. Inspect seams immediately with a needle probe to assure proper bonding.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

# Standard Specifications

## PART 1 — General

### 1.01 Quality Assurance

- A. Roofing applicator qualifications:
  - 1. Experienced in roofing system specified for a minimum of five (5) years under current contractor name.
  - 2. Acceptable to owner and to Tremco.
  - 3. Tremco Approved/Certified/Elite Contractor.
  - 4. Licensed and insured to do business in the state where the project is located.
  - 5. Not currently in bankruptcy nor in bankruptcy in the past five (5) years.
  - 6. Provide list of at least five (5) projects available for inspection employing specified roofing system within specified radius.
- B. Roofing material manufacturer's qualifications:
  - 1. Associate Member in good standing with National Roofing Contractors' Association (NRCA) for a minimum of five (5) years.
  - 2. Nationally recognized in roofing, waterproofing, and moisture survey industry.
  - 3. Has not been in Chapter 11 during the last five (5) years.
  - 4. ISO 9001 registered for at least five (5) years.
  - 5. Provide names of at least three (3) Approved/Certified/Elite Roofing Contractors.
  - 6. Employ full-time field technical services representative available for monitoring project work on a full-time basis, and available for final roof inspection.
  - 7. Provide local field representative to make periodic site visits, report work quality and job progress.
  - 8. Provide list of at least five (5) projects available for inspection employing same roofing system within a specified radius of project.
  - 9. Provide proof of twenty (20) quarters of continuous plant inspections of specified roofing system over past five (5) years by an independent Nationally Recognized Testing Laboratory (NRTL). Testing and certification must be accomplished by an NRTL accredited program as defined by OSHA (29 CFR 1910.7).
  - 10. Submit a formalized Corporate Health, Safety and Environmental Policy and demonstrate active participation in such a policy.
  - 11. The presence and activity of the manufacturer's representative and/or owner's representative shall in no way relieve the contractor of contractual responsibilities or duties.
- C. Project meetings:
  - 1. Pre-Construction Conference:
    - a. Will be scheduled by architect/specifier.
    - b. Attendance:
      - 1) Roofing material manufacturer/specifier.
      - 2) Contractor.
      - 3) Representative of architect/specifier.
    - c. Agenda:
      - 1) Submittal of insurance certificates.
      - 2) Submittal of executed bonds.
      - 3) Payment terms.
      - 4) Tax exemption certificate.
      - 5) Execution of Owner-Contractor Agreement.
      - 6) Distribution of contract documents.
      - 7) Submittal of list of subcontractors, material submittals, and progress schedule.
      - 8) Designation of responsible personnel.
      - 9) Walkover inspection.

- D. Progress meetings:
  - 1. Will be scheduled by architect/specifier.
  - 2. Attendance:
    - a. Architect/specifier.
    - b. Contractor.
    - c. Job superintendent.
    - d. Roofing material manufacturer.
    - e. Subcontractors, as appropriate.
  - 3. Minimum agenda:
    - a. Review of work progress.
    - b. Field observations, problems, and decisions.
    - c. Identification of problems which impede planned progress.
    - d. Maintenance of progress schedule.
    - e. Corrective measures to regain projected schedules.
    - f. Planned progress during succeeding work period.
    - g. Coordination of projected progress.
    - h. Maintenance of quality and work standards.
    - i. Effect of proposed changes on progress schedule and coordination.
    - j. Other business relating to work.
- E. Final inspection:
  - 1. Will be scheduled by roofing material manufacturer upon job completion.
  - 2. Attendance:
    - a. Contractor.
    - b. Roofing material manufacturer/specifier.
    - c. Architect/specifier.
    - d. Owner.
  - 3. Minimum agenda:
    - a. Walkover inspection.
    - b. Identification of problems which may impede issuance of warranty.
- F. Regulatory requirements:
  - 1. Uniform Building Code.
  - 2. Standard Building Code.
  - 3. BOCA National Building Code.
  - 4. UL 790, Class \_\_\_\_\_.
  - 5. FM 4470, Class I, Windstorm I-\_\_\_\_\_.

## 1.02 Submittals

- A. Submit at pre-construction conference:
  - 1. Product data sheets.
  - 2. Material Safety Data Sheets.
  - 3. Samples of coatings, adhesives, and roofing ply sheets.
  - 4. Samples of each material specified, properly labeled.
  - 5. Shop drawings or samples of metal flashings, showing exact profile, lengths, joints, terminations, and methods of attachment.
  - 6. Shop drawing of cellular concrete installation showing planned slope, maximum height, and average "R" value.
  - 7. Product liability insurance certificate.
- B. Do not order project materials or start work before receiving owner's written approval.

## 1.03 Delivery, Storage and Handling

- A. Delivery of materials:
  - 1. Deliver materials to job-site in new, dry, unopened, and well-marked containers showing product and manufacturer's name.
  - 2. Deliver materials in sufficient quantity to allow continuity of work.
  - 3. Coordinate delivery with owner.

B. Storage of materials:

1. Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises.
2. Store roll goods on ends only. Discard rolls which have been flattened, creased, or otherwise damaged. Place materials on pallets. Do not stack pallets.
3. Stack insulation on pallets.
4. Store materials marked "keep from freezing" in areas where temperatures will remain above 4°C (40°F).
5. Neatly stack wood on dunnage.
6. Store metal roof deck on pallets with one end elevated to provide drainage.
7. Remove plastic packaging shrouds. Cover top and sides of all stored materials with canvas tarpaulin (not polyethylene). Secure tarpaulin.
8. Rooftop storage: Disperse material to avoid concentrated loading.
9. Store roofing materials in ventilated watertight trailers. Remove plastic packaging shrouds.
10. Materials necessary for two days' work may be stockpiled on roof.
11. Should the contractor be required to quickly cover material temporarily, such as during an unanticipated rain shower, all materials shall be stored on a raised platform covered with secured canvas tarpaulin (not polyethylene), top to bottom.

C. Material handling:

1. Handle materials to avoid bending, tearing, or other damage during transportation and installation.
2. Material handling equipment shall be selected and operated so as not to damage existing construction or applied roofing. Do not operate or situate material handling equipment in locations that will hinder smooth flow of vehicular or pedestrian traffic.
3. BURmastic Composite Ply: Do not remove packaging tubes until roll is ready for use.

## 1.04 Site Conditions

A. Field measurements and material quantities:

1. Applicator shall have SOLE responsibility for accuracy of all measurements, estimates of material quantities and sizes, and site conditions that will affect work.

B. Existing conditions:

1. Building space directly under roof area covered by this specification will be utilized by on-going operations. Do not interrupt owner operations unless written approval is received from owner.
2. Access to roof shall be from exterior only. No roofing employees will be allowed within building.
3. Air conditioning units and other equipment shall be moved as required to install roofing materials complete and in accordance with plans and specifications. When units and equipment are to be moved, they shall be carefully disconnected and moved to a protected area so as not to damage any part or component thereof, and shall be reconnected in such a way that they are restored to a prior work condition.
4. All disconnection and reconnection shall be performed by a mechanical and/or electrical company licensed to perform such work.

C. Asbestos:

1. Owner agrees to exonerate, indemnify, defend, and hold harmless contractor and roofing material manufacturer from and against all claims, demands, lawsuits, damages, expenses and losses incurred by contractor's removal of asbestos-containing materials from owner's building and work site provided contractor conducts its operations according to applicable requirements established by:
  - a. Occupation Safety and Health Administration (OSHA).
  - b. Environmental Protection Agency (EPA).
2. Contractor must file a Uniform Hazardous Waste Manifest from proper landfill site for each load of asbestos containing material removed. Copies to owner and material manufacturer/specifier.
3. Contractor must comply with federal, state and local laws and regulations regarding removal and disposal of asbestos containing material.

D. Safety requirements:

1. All application, material handling, and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.
2. Comply with federal, state, local and owner fire and safety requirements.
3. Advise owner whenever work is expected to be hazardous to owner employees and/or operators.
4. Maintain a crewman as a floor area guard whenever roof decking is being repaired or replaced.
5. Maintain fire extinguisher within easy access whenever power tools, roofing kettles, and torches are being used.
6. Remove used mopping yarns from the roof at the end of each day for fire prevention. Store or dispose of used mopping yarns separately from combustible materials.

- E. Environmental requirements:
  - 1. Do not work in rain, snow, or in presence of water.
  - 2. Do not install materials marked “keep from freezing” when daily temperatures are scheduled to fall below 4°C (40°F).
  - 3. Remove any work exposed to freezing.
  - 4. Advise owner when volatile materials are to be used near air ventilation intakes so that owner may take appropriate actions to minimize disruptions to building occupants and operations.
- F. Security requirements:
  - 1. Comply with owner security requirements.
  - 2. Provide owner with current list of accredited persons.
  - 3. Require identification be displayed by all persons employed on this project.
  - 4. Provide owner with telephone number of emergency contact after hours.
- G. Temporary sanitary facilities:
  - 1. Furnish, install, and maintain temporary sanitary facilities for employee use during project. Remove upon project completion.
  - 2. Place portable toilets in conformance with applicable laws, codes, and regulations.

## 1.05 Unit Prices

- A. Quote unit prices on:
  - 1. Deck replacement — \$/m<sup>2</sup> (\$/ft<sup>2</sup>).
  - 2. Deck repair — \$/m<sup>2</sup> (\$/ft<sup>2</sup>).
  - 3. Roof removal — \$/m<sup>2</sup> (\$/ft<sup>2</sup>).
  - 4. Additional roof removal — \$/m<sup>2</sup> (\$/ft<sup>2</sup>).
  - 5. Additional insulation replacement — \$/m<sup>2</sup> (\$/ft<sup>2</sup>).
  - 6. Additional roof/insulation replacement — \$/m<sup>2</sup> (\$/ft<sup>2</sup>).
  - 7. Additional drains (with service connection) — \$/drain.
  - 8. Additional drains (without service connection) — \$/drain.
  - 9. Lowering drains — \$/drain.
  - 10. Drain flashing collar — \$/collar.
  - 11. Coping replacement — \$/linear meter (\$/linear ft).
  - 12. Wood blocking replacement — \$/linear meter (\$/linear ft).
  - 13. Unit removal — \$/unit, including deck installation to close opening.

## 1.06 Warranty/Guarantee

- A. Warranty:
  - 1. Upon project completion, manufacturer acceptance, and once complete payment has been received by both contractor and material supplier, contractor shall deliver to owner a manufacturer’s roofing system warranty.
  - 2. Roof material manufacturer shall provide detailed roof inspection and written report two (2) years and five (5) years after the warranty is issued.
  - 3. Roof material manufacturer shall provide preventive maintenance for the roof system two (2) years and five (5) years after the warranty is issued.
- B. Guarantee:
  - 1. Upon project completion and owner acceptance, effective upon complete payment, contract shall issue owner a guarantee against defective workmanship and materials for a period of two (2) years.

## **PART 2 — Products**

### **2.01 General**

- A. Comply with quality control, references, specifications, and manufacturer's data. Products containing asbestos are prohibited on this project. Use only asbestos free products.

### **2.02 Acceptable Manufacturer**

- A. Tremco Incorporated, Cleveland, OH 216/292-5000.

### **2.03 Roof Decking**

- A. Metal roof deck:
  - 1. Gauge, rib depth, rib configuration — match existing; three (3) span; lapped and stitched joints.
  - 2. ASTM A 653/A 653M, Grade 33, with G90 coating (galvanized).
  - 3. ASTM A 611, Grade C structural quality; with factory applied prime coat.
  - 4. Butt and finish strips: Twenty (20) gauge steel.
- B. Concrete deck repairs: One component, chemical action concrete.
  - 1. Below 29°C (85°F): Euco-Speed MP by Euclid Chemical Company, Cleveland, OH.
  - 2. Above 29°C (85°F): Euco-Speed MP Hot Weather by Euclid Chemical Company, Cleveland, OH.
- C. Gypsum concrete:
  - 1. Repairs for a gypsum concrete roof deck shall follow the minimum requirements set forth in ASTM C 956.
    - a. Gypsum formboard.
    - b. Steel reinforcement: Shall be made of zinc-coated (galvanized) welded or woven wire mesh having an effective cross-sectional area of not less than 55.1 mm<sup>2</sup>/m (0.026 in<sup>2</sup>/ft).
    - c. Gypsum concrete: Shall meet the requirements of specification ASTM C 317, Class A.
- D. Cementitious wood fiber roof deck:
  - 1. Deck material and accessories:
    - a. Tectum by Tectum, Inc., Newark, OH.
    - b. Fibroplank by Martin Fireproofing Georgia Inc., Elberton, GA.
    - c. Permadeck by Concrete Products, Inc., Brunswick, GA.
- E. Wood deck repairs:
  - 1. Wood decking: AITC, tongue and groove (match existing).
    - a. Size: match existing.
  - 2. Wood decking: No. 2 grade plank; free from warping and visible decay.
    - a. Size: match existing.
  - 3. Laminated wood decking: Decorative grade; glue laminated; tongue and groove (match existing); endmatched.
    - a. Size: match existing.
  - 4. Plywood roof sheathing: APA C-D Rated Sheathing, Exposure 1, Structural 1, 32/16, 4/5 ply, PS 1-83.
  - 5. Purlins and subpurlins:
    - a. Free from warping and visible decay.
    - b. Design value equal to or greater than existing purlin/subpurlin design value.

### **2.04 Wood Blocking and Curbs**

- A. Lumber:
  - 1. Southern Yellow Pine, Hem-Fir, or California Redwood; No. 2 grade; free from warping and visible decay. Southern Yellow Pine and Hem-Fir shall be pressure-treated with chromated copper arsenate (CCA) to meet AWPB, LP-22, 0.40 retention, and marked.
  - 2. Plywood sheathing: APA C-D, Plugged and Touch Sanded, Exposure 1, PS 1-83.

### **2.05 Cellular Insulating Concrete**

- A. Cellular concrete:
  - 1. Foaming agent: ASTM C 796; supplied by manufacturer, approved by roofing systems manufacturer.
  - 2. Portland Cement: ASTM C 150, Type I.
  - 3. Water: Potable, clean and free from deleterious amounts of acid, alkali, and organic materials.
- B. Curing compound: ASTM C 309, Type II, Class B; white-pigmented curing compound; resin or water based.
  - 1. Topping admixture: ASTM C 1059, Type II, Latex Bonding Agent.

- C. Insulation: ASTM C 578, Type VIII, 2x4 expanded polystyrene, 1.25 lb density, incorporating six to eight 5.7 mm (2-1/4 in) diameter bond holes.
- D. Reinforcing mesh: ASTM A 82, Keydeck style 2160-2-1619 galvanized reinforcing by Keystone Steel & Wire Co., Peoria, IL.

## 2.06 Insulation

- A. Fiberglass:
  - Minimum thickness: 19 mm (3/4 in).
  - Maximum thickness per layer: 45 mm (1-5/8 in).
- B. Wood fiberboard: ASTM C 208: Minimum thickness: 12.5 mm (1/2 in) — asphalt or emulsion coated.
- C. Perlite roof insulation: ASTM C 728: Minimum thickness: 25 mm (1 in).
- D. Isocyanurate: Federal Specification HH-I-1972/2(1) 30 mm (1.2 in) black organic/glass facer.
- E. Tremco Approved Cellular Concrete System.

## 2.07 Mechanical Fasteners

- A. Base sheet to cellular, vermiculite, or perlite lightweight insulating concrete:
  - 1. Tremco Base Sheet fastener by Tremco Incorporated, Cleveland, OH.
  - 2. Olympic Base Sheet fasteners by Olympic Fasteners, Arawan, MA.
- B. Base sheet to cementitious wood fiber roof deck:
  - 1. Insuldeck Loc-Nail by ES Products, Inc.
- C. Base sheet to wood deck:
  - 1. Nails: Spiral or annular ring shank, 12 gauge minimum, with integral 25 mm (1 in) cap.
- D. Base sheet to gypsum concrete:
  - 1. Nail-Tite® Type A by ES Products, Inc.
  - 2. Nail-Tite Type R by ES Products, Inc.
- E. Insulation to steel deck:
  - 1. No. 12-11 Standard Roofing Fastener, with CR-10 fluorocarbon coating; 76 mm (3 in) diameter plastic or metal disc.
    - a. Length: Use the shortest fastener which will penetrate the top flange of the steel deck 19 mm (3/4 in).
- F. Insulation to wood deck:
  - 1. No. 12-11 Standard Roofing Fastener, with CR-10 fluorocarbon coating; 76 mm (3 in) diameter plastic or metal disc.
    - a. Length: Sufficient to penetrate deck 32 mm (1-1/4 in).
- G. Wood to wood:
  - 1. Galvanized, common, annular ring nail.
    - a. Length: Sufficient to penetrate underlying wood blocking 32 mm (1-1/4 in).
- H. Termination bar to masonry/concrete:
  - 1. Lead masonry anchors.
    - a. Length: Sufficient to provide 32 mm (1-1/4 in) embedment.

## 2.08 Roofing Materials

- A. Adhesives, surfacings and reflective coatings:
  - 1. Base ply adhesive: (CHOOSE ONE)
    - a. BURmastic Adhesive by Tremco.
    - b. BURmastic Base Sheet Adhesive by Tremco.
    - c. Premium III Asphalt by Tremco.
    - d. Premium IV Asphalt by Tremco.
    - e. THERMastic Hot Melt Adhesive by Tremco.
    - f. POWERply Modified Hot Melt by Tremco.
    - g. POWERply Rubberized Cold Adhesive by Tremco.
    - h. POWERply Standard Cold Adhesive by Tremco.

2. Interply adhesive: (CHOOSE ONE)
    - a. BURmastic Adhesive by Tremco.
    - b. Premium III Asphalt by Tremco.
    - c. Premium IV Asphalt by Tremco.
    - d. THERMastic Hot Melt Adhesive by Tremco.
    - e. THERMastic 50 Hot Melt Adhesive by Tremco.
    - f. POWERply Modified Hot Melt by Tremco.
    - g. POWERply Rubberized Cold Adhesive by Tremco.
    - h. POWERply Standard Cold Adhesive by Tremco.
  3. Surfacing adhesive: (CHOOSE ONE)
    - a. BURmastic Adhesive by Tremco.
    - b. Premium III Asphalt by Tremco.
    - c. Premium IV Asphalt by Tremco.
    - d. THERMastic Hot Melt Adhesive by Tremco.
    - e. THERMastic 50 Hot Melt Adhesive by Tremco.
    - f. ECOLastic® by Tremco.
    - g. POWERply Modified Hot Melt by Tremco.
    - h. POWERply Rubberized Cold Adhesive by Tremco.
    - i. POWERply Standard Cold Adhesive by Tremco.
  4. Cold surfacings:
    - a. TremLastic® by Tremco.
    - b. TremLastic S by Tremco.
  5. Reflective coatings:
    - a. Double Duty Aluminum LV by Tremco.
    - b. Polarcote FR by Tremco.
    - c. High Build Reflective Coating by Tremco.
  6. Insulation adhesive:
    - a. Premium III Asphalt by Tremco.
    - b. Premium IV Asphalt by Tremco.
    - c. THERMastic Hot Melt Adhesive by Tremco.
    - d. Fas-n-Free Insulation Adhesive by Tremco.
  7. Flashing adhesive:
    - a. Tremco Sheeting Bond:
      - 1) Black
      - 2) White
    - b. Tremco ELS.
    - c. Premium III Asphalt by Tremco.
    - d. Premium IV Asphalt by Tremco.
    - e. THERMastic Hot Melt Adhesive by Tremco.
  8. Vapor retarder adhesive:
    - a. Premium III Asphalt by Tremco.
    - b. Premium IV Asphalt by Tremco.
    - c. THERMastic Hot Melt Adhesive by Tremco.
    - d. BURmastic Adhesive by Tremco.
    - e. BURmastic Base Sheet Adhesive by Tremco.
- B. Base plies:
1. ASTM D 2178, Type VI, THERMglass Premium VI by Tremco.  
ASTM D 2178, Type IV, THERMglass Type IV by Tremco.
  2. PolyTHERM heat stabilized polyester ply sheet by Tremco.
  3. BURmastic Composite Ply by Tremco.
  4. ASTM D 4601, Type II, BURmastic Glass Ply by Tremco.
  5. POWERply HT Base Sheet by Tremco.
  6. POWERply Heavy Duty Base Sheet by Tremco.
  7. POWERply HE Base Sheet by Tremco.
- C. Base sheet:
1. ASTM D 4601, Type II, BURmastic Glass Ply by Tremco.
  2. BURmastic Composite Ply by Tremco.

- D. Ply sheet:
  - 1. ASTM D 2178, Type VI, THERMglass Premium VI by Tremco.  
ASTM D 2178, Type IV, THERMglass Type IV by Tremco.
  - 2. ASTM D 4601, Type II, BURmastic Glass Ply by Tremco.
  - 3. BURmastic Composite Ply by Tremco.
  - 4. PolyTHERM heat stabilized polyester ply sheet by Tremco.
  - 5. POWERply HT Base Sheet by Tremco.
  - 6. POWERply Heavy Duty Base Sheet by Tremco.
  - 7. POWERply HE Base Sheet by Tremco
- E. Modified bitumen roofing membrane:
  - 1. POWERply Standard by Tremco.
  - 2. POWERply Standard FR by Tremco.
  - 3. POWERply HE FR by Tremco.
  - 4. POWERply Premium FR by Tremco.
  - 5. POWERply Supreme HT FR by Tremco.
  - 6. POWERply Standard Smooth by Tremco.
  - 7. POWERply Premium Smooth by Tremco.
  - 8. POWERply Supreme Smooth by Tremco.
- F. Vapor retarder:
  - 1. ASTM D 4601, Type II, BURmastic Glass Ply by Tremco.
  - 2. BURmastic Composite Ply by Tremco.
  - 3. ASTM D 2178, Type IV, THERMglass Type IV by Tremco.
  - 4. ASTM D 2178, Type VI, THERMglass Premium VI by Tremco.
- G. Flashings:
  - 1. Ply sheets:
    - a. PolyTHERM Ply Sheet by Tremco.
    - b. THERMglass Premium VI by Tremco.
    - c. THERMglass Type IV by Tremco.
    - d. BURmastic Glass Ply by Tremco.
    - e. BURmastic Composite Ply by Tremco.
    - f. TremFLASH Flashing membrane by Tremco.
  - 2. Membrane:
    - a. POWERply Standard by Tremco.
    - b. POWERply Standard FR by Tremco.
    - c. POWERply HE FR by Tremco.
    - d. POWERply Premium FR by Tremco.
    - e. POWERply Supreme HT FR by Tremco.
    - f. POWERply Standard Smooth by Tremco.
    - g. POWERply Premium Smooth by Tremco.
    - h. POWERply Supreme Smooth by Tremco.
    - i. Hypalon® Elastomeric Sheet by Tremco.
    - j. TRA Elastomeric Sheet by Tremco.
- H. Related materials:
  - 1. Asphalt mastic:
    - a. ELS by Tremco.
    - b. Fibermat® by Tremco.
  - 2. Elastomeric mastic:
    - a. POLYroof® LV by Tremco.
  - 3. Tar mastic:
    - a. Tremfix® by Tremco.

4. Sealants:

- a. TremSEAL® GP by Tremco.
- b. TremSEAL HP by Tremco.
- c. TremSEAL S by Tremco.
- d. TremSEAL D by Tremco.
- e. Reglet Joint Sealant by Tremco.

5. Primers:

- a. General purpose primers:
  - 1) TremPrime QD Low Odor by Tremco.
  - 2) TremPrime WB by Tremco.
- b. Sealant primers:
  - 1) Masonry Primer No. 1 by Tremco.
  - 2) Metal Primer No. 6 by Tremco.
  - 3) Silicone Metal Primer #20 by Tremco.
  - 4) Silicone Porous Primer #23 by Tremco.

I. Aggregate:

- 1. ASTM D 1863, hard, durable, opaque; washed free of clay, loam, sand or other foreign substances; size:
  - a. 6-9.5 mm to 19 mm (3/8 in to 3/4 in) aggregate.
  - b. 7-4.5 mm to 12.5 mm (3/16 in to 1/2 in) aggregate.
  - c. 6/7-4.5 mm to 19 mm (3/16 in to 3/4 in) aggregate.
- 2. Roofing granules: ASTM D 451, No. 11 sieve. For use with cold flood-coat only.

## 2.09 Metal Flashings

A. Tremline® Fascia by Tremco:

- 1. Fascia width:
  - a. 200 mm (8 in).
  - b. 150 mm (6 in).

B. Termination bar:

- 1. Metal-flash termination bar flashing:
  - a. 3 mm x 25.5 mm (1/8 x 1 in) flat aluminum bar.
  - b. 2.5 mm x 38 mm (3/32 x 1-1/2 in) extruded aluminum bar with caulking cup.

## 2.10 Dampproofing

A. Decktite™ WDS by Tremco.

B. Wall-Tite F by Tremco.

## PART 3 — Execution

### 3.01 Examination

- A. Verify conditions as satisfactory to receive work.
  - 1. Do not begin roofing until all unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions.
  - 2. Verify that work of other trades penetrating roof deck or requiring men and equipment to traverse roof deck has been approved by owner, manufacturer, and roofing contractor.
  - 3. Check projections, curbs and deck for inadequate anchorage, foreign material, moisture, or unevenness that would prevent quality and execution of new roofing system.
- B. Conduct Thermocore roof analysis.
- C. Conduct Asbestos Core Testing (ACT).

### 3.02 General Workmanship

- A. The presence and activity of the manufacturer's representative and/or owner's representative shall in no way relieve the contractor of contractual responsibilities or duties.
- B. Substrate: Free of foreign particles prior to laying roof membrane.
- C. Phased application: Not permitted. All plies shall be completed each day.
- D. Traffic and equipment: Kept off completed plies until adhesive has set.
- E. Wrapper and packaging materials: Not to be included in roofing system.
- F. Entrapped aggregate: Not permitted within new membrane. Its discovery is sufficient cause for rejection.
- G. Ply shall never touch ply, even at roof edges, laps, tapered edge strips, and cants.
- H. Fit plies into roof drain rims; install flashing and finishing plies; secure clamping collars; install drain screens.
- I. Extend roofing membrane to top edge of cant at wall and projection bases.
- J. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.
- K. Plies: Prior to placement, cut the ASTM D 4601, Type II fiberglass base sheets in 6 m (18 ft) lengths. Allow lengths to relax at least 30 minutes 13°C (55°F) or above; 60 minutes 13°C (55°F) or below. Stack lengths. Do not reroll.
- L. Mechanical fasteners:
  - 1. Seated firmly in discs with fastener heads flush or below disc's top surface.
  - 2. Length:
    - a. Sufficient to accommodate roof insulation thickness and engage wood deck 25 mm (1 in) minimum.
    - b. Sufficient to accommodate roof insulation thickness and engage plywood deck completely.
    - c. Sufficient to accommodate roof insulation thickness and engage the top flange of the metal deck 19 mm (3/4 in).
- M. Insulation:
  - 1. Form continuous insulation joints over deck flange. Do not cantilever insulation edges over deck ribs. Minimum bearing surface: 38 mm (1-1/2 in).
  - 2. Install insulation boards in courses parallel to roof edges mopping surface up.
  - 3. Firmly butt each insulation board to surrounding boards. Do not jam or deform boards.
  - 4. Eliminate open joints and uneven surfaces.
  - 5. Tolerances:
    - a. Maximum insulation gap: 6 mm (1/4 in).
    - b. Maximum elevation variation between boards at joints: 3 mm (1/8 in).
  - 6. Fill insulation board joint gaps larger than 6 mm (1/4 in) with roof insulation.
  - 7. Cut and fit insulation boards where roof deck intersects vertical surfaces. Cut board 3 mm (1/4 in) from vertical surface.
  - 8. Stagger joints at least 150 mm (6 in).
  - 9. Filler size: 460 mm (18 in) in length or width, minimum.
- N. Base flashing height: Not less than 200 mm (8 in) above finished roof surface.

- O. Bitumen heating requirements:
  1. Use low burner flames during initial meltdown.
  2. Circulate bituminous materials after initial meltdown.
  3. Keep kettle free of contaminants.
  4. Do not exceed recommended maximum bitumen temperatures during heating period.
  5. Use separate kettles for asphalt and THERMastic.
- P. Cold process adhesive heating:
  1. An in-line heat exchange unit may be used to facilitate application.
    - a. Maximum adhesive temperature: 38°C (100°F). Do not exceed flash point of material.
  2. Follow operation procedures as recommended by equipment manufacturer.
- Q. Backnailing on slopes:
  1. For roof slopes between 2:12 (16.6%) and 3:12 (25%):
    - a. Mechanically attach wood blocking to the deck 6 m (20 ft) o.c. perpendicular to the slope.
    - b. Apply roof membrane parallel to the slope.
    - c. During application, backnail each roofing ply to the wood blocking staggered 75 mm (3 in) o.c. on the back edge of the ply (the section covered by the overlapping ply).
      - 1) Fasteners shall be covered by a minimum of 2 plies.
  2. For roof slopes of 3:12 (25%) and greater:
    - a. Mechanically attach wood blocking to the deck 1220 mm (4 ft) o.c. perpendicular to the slope.
    - b. Apply roof membrane parallel to the slope.
    - c. During application, backnail each roofing ply to the wood blocking staggered 75 mm (3 in) o.c. on the back edge of the ply (the section covered by the overlapping ply).
      - 1) Fasteners shall be covered by a minimum of 2 plies.

### 3.03 Preparation

- A. Protection:
  1. Contractor shall be responsible for protection of property during course of work. Lawns, shrubbery, paved areas, and building shall be protected from damage. Repair damage at no extra cost to owner.
  2. Provide at site prior to commencing removal of debris, a dumpster or dump truck to be located adjacent to building as directed by owner.
  3. Roofing, flashings, membrane repairs, and insulation shall be installed and sealed in a watertight manner on same day of installation or before arrival of inclement weather.
  4. At start of each work day drains within daily work area shall be plugged. Plugs to be removed at end of each work day or before arrival of inclement weather.
  5. Preparation work shall be limited to those areas that can be covered with installed roofing material on same day or before arrival of inclement weather.
  6. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surface, and equipment movement. Move equipment and ground storage areas as work progresses.
  7. Construct an enclosed chute from roof for removal of debris from roof area. Protect building surfaces at chute/set-up areas with tarpaulin. Secure tarpaulin. Remove dumpster from premises when full and empty at approved dumping or refuse area. Deliver empty dumpster to site for further use. Upon job completion, dumpster/chute shall be removed from premises. Spilled or scattered debris shall be cleaned up immediately. Removed material to be disposed from roof as it accumulates.
  8. Seal nailed base sheet at perimeters, projections, and other roof penetrations at end of each day.  
Note: Base sheet itself is not considered adequate waterproofing protection. Vented base sheets should be properly applied to allow edge venting.
  9. Provide clean plywood walkways and take other precautions required to prevent tracking of aggregate/debris from existing membrane into new work area where aggregate/debris pieces can be trapped within new roofing membrane. Contractor shall instruct and police his workers to ensure that aggregate/debris is not tracked into new work areas on workers' shoes or equipment wheels. Discovery of entrapped aggregate/debris within new membrane is sufficient cause for its rejection.
  10. Cover windows with protective covering prior to application of dampproofing materials.
  11. Protect building facade from spillage, drippage, overspray, etc.
  12. Do not allow pilot holes and/or insulation fasteners to penetrate through formboard.

- B. Surface preparation:
1. Remove and replace masonry and existing through-wall flashing.
  2. Repoint:
    - a. Complete masonry work before installation of new roofing.
  3. Clean roof of loose gravel, dirt and dust by (embedded gravel to remain in place):
    - a. Power brooming. Note: Several broomings may be necessary.
    - b. Vacuuming.
    - c. Wet-vacuuming.
  4. Remove: Existing roofing, insulation to roof deck.
  5. Sweep clean roof deck.
  6. Lift counterflashing; cut corners to within 25 mm (1 in) of reglet.
  7. Remove counterflashing.
  8. Remove flashing to substrate.
  9. Remove as directed by owner:
    - a. Unused equipment.
    - b. Sleepers.
  10. Remove perimeter gravel stop to wood blocking.
  11. Remove heavy bituminous encrustations; fill small depressions; allow insulation to lay flat.
  12. Prime with asphalt primer applied at 0.16 L/m<sup>2</sup> (0.4 gal/100 ft<sup>2</sup>). Allow to dry:
    - a. Roof surface.
    - b. Concrete deck.

### 3.04 Carpentry

- A. Flashings:
1. Mechanically attach wood blocking. Offset blocking layers 305 mm (12 in); weave corners.
    - a. Blocking thickness: Even with final insulation thickness.
    - b. Width: 150 mm (6 in) nominal.
  2. Fasteners shall be installed in two (2) rows staggered. Spacing in any one (1) row shall not exceed 610 mm (24 in). Within 2.5 m (8 ft) of outside corners, spacing shall not exceed 305 mm (12 in) in any one (1) row.
  3. Install wood cants to wood blocking. Fasteners shall be installed in two (2) rows staggered. Spacing in any one (1) row shall not exceed 610 mm (24 in). Within 2.5 m (8 ft) of outside corners, spacing shall not exceed 305 mm (12 in) in any one (1) row.

### 3.05 Dampproofing

- A. Clean masonry using moderate pressure hot water and/or steam, without cleaning solutions or grit. Pressure: 14.1-19.3 kg/cm<sup>2</sup> (200-275 psi), directed at masonry at no more than thirty degrees (30°).
- B. Dampproof masonry with:
1. One (1) coat of Decktite WDS applied at approximately 4.3-6.1 m<sup>2</sup>/L (175-250 ft<sup>2</sup>/gal) of properly diluted dispersion.
  2. Two (2) coats Wall-Tite F applied at specified rate.

### 3.06 Roof Deck Repairs

- A. Metal roof deck repairs:
1. Deck reinforcement: Install sheet steel reinforcement profiled to existing decking configuration over all rusted openings 105 cm<sup>2</sup> (16 sq in) or less. If two (2) or more rusted openings exist in same deck section, replace section.
  2. Deck reattachment:
    - a. Mechanically reattach loose sections of deck to steel support members 305 mm (12 in) o.c.
    - b. Side laps:
      - 1) Nestable side lap: Mechanically fasten 460 mm (18 in) o.c.
      - 2) Interlocking side lap: Button punch 460 mm (18 in) o.c.
  3. Deck replacement:
    - a. Remove defective metal decking. Examine supports. If unsound, contact owner immediately for future action.
    - b. Install new metal decking in accordance with SDI, Design Manual for Composite Decks, Form Decks, Roof Decks.
  4. Deck protection: Apply rust inhibitive paint over surface rust.

- B. Concrete deck repairs:
  1. Remove spalled/deteriorated deck areas until sound base is reached.
  2. Wire brush flaking rust from exposed reinforcing bar. Apply rust inhibitive paint. Allow to dry.
  3. Fill prepared area flush with one-component, chemical action concrete according to manufacturer's directions. Allow to set.
- C. Gypsum concrete repairs:
  1. Repair areas: As determined by owner.
  2. Install gypsum concrete in accordance to ASTM C 956, standard specification for installation of cast-in-place reinforced gypsum concrete.
  3. Pour gypsum concrete even with surrounding deck. Screed all surfaces to a smooth, even plane.
- D. Cementitious wood fiber roof deck repairs:
  1. Remove defective decking. Replace rusted or defective subpurlins. Install roof tiles evenly between subpurlins. Square cut ends shall fall over supporting purlin member. Drive ends tightly together.
  2. Install premixed grout in void around bulb tee level with top of tile. Scrape off excess after initial set.
- E. Plywood deck repairs:
  1. Plywood deck reattachment:
    - a. Reattach loose deck panels.
    - b. Reattach 150 mm (6 in) o.c. at edges; 305 mm (12 in) o.c. at intermediate supports.
  2. Plywood deck replacement:
    - a. Remove deteriorated deck panels. Examine joists for rot. If unsound, contact owner immediately for future action.
    - b. Attach new decking 150 mm (6 in) o.c. at edges; 305 mm (12 in) o.c. at intermediate supports.
    - c. Provide 3 mm (1/8 in) gap between panels at panel edges.
- F. Wood deck repairs:
  1. Wood deck reattachment: Reattach loose decking; replace warped decking. Face nail each decking with two (2) nails per support.
  2. Wood deck replacement:
    - a. Remove deteriorated decking. Examine joists for rot. If unsound, contact owner immediately for future action.
    - b. Install new decking in accordance with deck material manufacturer's requirements. New decking shall match existing.

### 3.07 Cellular Concrete

- A. Ensure sound structure for application.
- B. Install Tremco Approved Cellular Concrete System to prepared area, 50 mm (2 in) minimum thickness, sloped to existing drains. Slope:
  1. 1% (1/8:12) 3 mm (1/8 in) per running foot, minimum.
  2. 2% (1/4:12) 6 mm (1/4 in) per running foot, minimum.
  3. 4% (1/2:12) 13 mm (1/2 in) per running foot, minimum.
  4. Mix and pump cellular concrete into place using personnel and equipment approved by cellular concrete manufacturer. Mixing time shall be sufficient to provide a consistent, thorough mix that will flow freely and screed to a smooth surface.
 

Proportion cellular concrete to provide a density at point of placement of 18 kg (40 lb/ft<sup>3</sup>) (±5% and 28 day compressive strength of 1.1 kg/mm<sup>2</sup> [160 psi]).

Place only when air temperatures of 4°C (40°F) or above are predicted for first 24-48 hours after placement.
  5. (Insulated Option) Cover deck with slurry coat. Thickness: 19 mm (3/4 in) minimum. Embed insulation into fluid slurry coat. Graduate thickness of insulation from high to low point. Stagger end joints. Butt all joints to moderate contact. Allow slurry coat/insulation to set 24 hours. Install top pour of cellular concrete over insulation. Fill all bond holes. Minimum top cover thickness over insulation: 50 mm (2 in).
 

Use screeds and darbies to attain smooth, even surface.

Plan work to attain smooth, even surface.

Plan work to minimize cold joints. Scarify cold joints to provide mechanical key.

Protect installation from freezing until initial set is attained.
  6. (Reinforcing mesh) Provide reinforcing mesh into all areas where cellular concrete is placed. Butt or space sides not more than 100 mm (4 in). Cut mesh to fit all walls, curbs, and openings.

7. Provide daily two (2) ply bituminous tie-ins/connections at cellular concrete/roofing termination. Remove embedded gravel from top ply along termination. Width: 205 mm (8 in).  
Install five (5) course felt/mesh bituminous reinforcement; extend membrane at least 150 mm (6 in) onto roofing and at least 150 mm (6 in) onto top surface of cellular. Use asphalt mastic or flashing bitumen. Make watertight.  
At beginning of next day's work remove tie-in/connection.
8. Provide spray application of curing compound to entire surface within 24 hours after placement.
9. Roofing readiness:
  - a. Allow cellular concrete to cure to achieve sufficient surface hardness to adequately withstand foot traffic and other light roofing operations without damage (approximately three (3) days).  
Ensure exposed surface is dry.
  - b. Protect cellular concrete from rain during curing process by the use of tarps, plastic sheets, etc.

### 3.08 Vapor Retarder Application

#### A. Steel deck:

1. Attach thermal insulation to steel deck using Fas-n-Free Insulation Adhesive or appropriate fasteners. Install additional fasteners to ensure insulation is firm under foot.
2. Stagger joints at least 150 mm (6 in).
3. Drive mechanical fasteners flush to top surface.
4. Install boards in courses parallel to roof edges.
5. Firmly butt each board to surrounding boards. Do not jam or deform boards.
6. Cut and fit boards where roof deck intersects vertical surfaces.
7. Filler boards require two (2) fasteners per board, minimum. Filler size: 460 mm (18 in) in length or width, minimum.
8. Adhere two (2) plies ply sheet shingle fashion in uniform and continuous:
  - a. Application of BURmastic Composite Ply with BURmastic Adhesive.  
Interply application rate: 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
  - b. Application of BURmastic Glass Ply with BURmastic Adhesive.  
Interply application rate: 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
  - c. Application of THERMglass Premium VI or THERMglass Type IV in mopping of THERMastic.  
Interply mopping rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
  - d. Application of THERMglass Premium VI or THERMglass Type IV in mopping of Premium III or Premium IV.  
Interply mopping rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
9. Adhere one (1) ply Composite Ply sheet lapped 100 mm (4 in) at edges to mechanically fastened base sheet in uniform and continuous:
  - a. Application of BURmastic at a rate of 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
  - b. Mopping of THERMastic at a rate of 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
  - c. Mopping of Premium III or Premium IV at a rate of 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
10. Use 460 mm (18 in) and 915 mm (36 in) wide plies to start and finish vapor retarder along roof edges and terminations. Overlap each ply 485 mm (19 in). Seal all roof openings using two (2) plies reinforcing membrane/asphalt mastic.

#### B. Nailable decks:

1. Lay one (1) ply rosin sheathing paper perpendicular to slope direction over roof deck.  
Sidelaps — 50 mm (2 in); endlaps — 100 mm (4 in). Nail to hold in place.
2. Install base sheet over sheathing paper. Lap 100 mm (4 in) on sides and ends. Nail 230 mm (9 in) o.c. at lap; two (2) rows staggered 460 mm (18 in) o.c.; 305 mm (12 in) from each edge.
3. Install base ply over deck. Lap 100 mm (4 in) on sides and ends. Nail 230 mm (9 in) o.c. at lap; two (2) rows staggered 460 mm (18 in) o.c.; 305 mm (12 in) from each edge.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

4. a. Adhere second ply sheet to mechanically fastened ply sheet in a uniform and continuous:
    - 1) Application of BURmastic Composite Ply with BURmastic Adhesive.  
Interply application rate: 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
    - 2) Application of BURmastic Glass Ply with BURmastic Adhesive.  
Interply application rate: 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
    - 3) Mopping of THERMastic.  
Interply mopping rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
    - 4) Mopping of Premium III or Premium IV.  
Interply mopping rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
  - b. Laps 100 mm (4 in).
  - c. Seal all roof openings using two (2) plies reinforcing membrane/asphalt mastic.
  5. Adhere two (2) plies ply sheets shingle fashion to mechanically fastened base sheet in uniform and continuous:
    - a. Application of BURmastic Composite Ply with BURmastic Adhesive.  
Interply application rate: 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
    - b. Application of BURmastic Glass Ply with BURmastic Adhesive.  
Interply application rate: 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
    - c. Application of THERMglass Premium VI or THERMglass Type IV in mopping of THERMastic.  
Interply mopping rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
    - d. Application of THERMglass Premium VI or THERMglass Type IV in mopping of Premium III or Premium IV.  
Interply mopping rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
      - 1) Use 460 mm (18 in) and 915 mm (36 in) wide plies to start and finish vapor retarder along roof edges and terminations. Overlap each ply 485 mm (19 in).
      - 2) Offset adhered ply laps from mechanically fastened first ply laps.  
Seal all roof openings using two (2) plies reinforcing membrane/asphalt mastic.
  6. Adhere one (1) ply Composite Ply sheet lapped 100 mm (4 in) at edges to mechanically fastened base sheet in uniform and continuous:
    - a. Application of BURmastic at a rate of 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
    - b. Mopping of THERMastic at a rate of 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
    - c. Mopping of Premium III or Premium IV at a rate of 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
- C. Concrete decks:
1. Prime deck with asphalt primer at rate of 0.16 L/m<sup>2</sup> (0.4 gal/100 ft<sup>2</sup>).\*  
Adhere two (2) plies base sheet shingle fashion in uniform and continuous:
    - a. Application of BURmastic Composite Ply with BURmastic Adhesive.  
Interply application rate: 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
    - b. Application of BURmastic Glass Ply with BURmastic Adhesive.  
Interply application rate: 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
    - c. Application of THERMglass Premium VI or THERMglass Type IV in mopping of THERMastic.  
Interply mopping rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
    - d. Application of THERMglass Premium VI or THERMglass Type IV in mopping of Premium III or Premium IV.  
Interply mopping rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
  2. Use 460 mm (18 in) and 915 mm (36 in) wide plies to start and finish vapor retarder along roof edges and terminations. Overlap each ply 485 mm (19 in).
  3. Adhere one (1) ply Composite Ply sheet lapped 100 mm (4 in) at edges to mechanically fastened base sheet in uniform and continuous:
    - a. Application of BURmastic at a rate of 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
    - b. Mopping of THERMastic at a rate of 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
    - c. Mopping of Premium III or Premium IV at a rate of 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*  
Seal all roof openings using two (2) plies reinforcing membrane/asphalt mastic.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

## 3.09 Thermal Insulation

- A. None.
- B. Fill removed sections with:
  - 1. Wood fiber insulation.
  - 2. Glass fiber insulation.
  - 3. Perlite insulation.
  - 4. Polyisocyanurate insulation.
- C. Insulation thickness equal to surrounding roof surface.
- D. Mechanically attach fill insulation to deck. Fastener density: To meet code requirements.
- E. Single layer system:
  - 1. Adhere insulation to:
    - a. Primed deck.
    - b. Vapor retarder.
    - c. Mechanically fastened base sheet.
  - 2. Use a uniform and continuous application of:
    - a. Premium III or Premium IV at a rate of 1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>).\*
    - b. THERMastic applied at minimum rate of 1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>).\*
  - 3. Immediately after placement, walk insulation boards into hot bitumen to achieve solid bond.
  - 4. With ribbon coverage of Tremco Fas-n-Free Insulation Adhesive at a rate of 0.4-0.8 L/m<sup>2</sup> (1-2 gal/100 m<sup>2</sup>). Immediately after placement, walk insulation boards into adhesive to achieve solid contact.
- F. Two layer system:
  - 1. Bottom layer in adhesive:
    - a. Adhere bottom layer to:
      - 1) Primed deck.
      - 2) Vapor retarder.
      - 3) Mechanically fastened base sheet.
    - b. Use uniform and continuous application of:
      - 1) Premium III or Premium IV at a rate of 1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>).\*
      - 2) THERMastic applied at a minimum rate of 1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>).\*
    - c. Immediately after placement, walk insulation boards into hot bitumen to achieve solid bond.
    - d. Promptly spread any bitumen pools that may accumulate on insulation surface to achieve smooth surface for roofing insulation.
    - e. With ribbon coverage of Tremco Fas-n-Free Insulation Adhesive at a rate of 0.4-0.8 L/m<sup>2</sup> (1-2 gal/100 m<sup>2</sup>). Immediately after placement, walk insulation boards into adhesive to achieve solid contact.
  - 2. Bottom layer, fastened:
    - a. Mechanically attach insulation to deck.
    - b. Fastener density according to applicable code requirements.
    - c. Install additional fasteners to ensure insulation is firm under foot.
    - d. Drive mechanical fasteners flush to top surface.
    - e. Filler insulation requires two (2) fasteners per piece minimum.
  - 3. Top layer in adhesive:
    - a. Adhere top layer insulation to:
      - 1) Bottom layer.
      - 2) Vapor retarder.
    - b. Use uniform and continuous mopping of:
      - 1) THERMastic applied at a rate of 1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>).\*
      - 2) Premium III or Premium IV applied at a minimum rate of 1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>).\*
    - c. Offset joints of top layer 150 mm (6 in) in both directions from joints of base layer. Immediately after placement, walk insulation boards into hot bitumen to achieve solid bond. Promptly spread any bitumen pools that may accumulate on insulation surface to achieve smooth surface for roofing insulation.
    - d. With ribbon coverage of Tremco Fas-n-Free Insulation Adhesive at a rate of 0.4-0.8 L/m<sup>2</sup> (1-2 gal/100 m<sup>2</sup>). Immediately after placement, walk insulation boards into adhesive to achieve solid contact. Offset joints of top layer 150 mm (6 in) in both directions from joints of base layer.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

- G. Mechanically fastened:
1. Mechanically attach insulation to deck.
  2. Fastener density according to applicable code requirements.
  3. Install additional fasteners to ensure insulation is firm under foot.
  4. Drive mechanical fasteners flush to top surface.
  5. Filler insulation requires two (2) fasteners per piece minimum.
- H. Tapered insulation:
1. Install tapered insulation in pattern prescribed by shop drawings. Mechanically attach insulation to deck.
    - a. Fastener density according to applicable code requirements.
  2. Adhere tapered insulation system in pattern prescribed by shop drawings in a uniform and continuous mopping of:
    - a. Premium III or Premium IV applied at a minimum rate of 1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>).\*
    - b. THERMastic applied at a rate of 1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>).\*
  3. Adhere tapered insulation system in pattern prescribed by shop drawings with ribbon coverage of Tremco Fas-n-Free Insulation Adhesive at a rate of 0.4-0.8 L/m<sup>2</sup> (1-2 gal/100 ft<sup>2</sup>). Immediately after placement, walk insulation boards into adhesive to achieve solid contact.
- I. Insulation over tapered insulation:
1. Adhere overlay insulation over tapered insulation system in a uniform and continuous mopping of:
    - a. THERMastic applied at a rate of 1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>).\*
    - b. Premium III or Premium IV applied at a minimum rate of 1.5 kg/m<sup>2</sup> (30 lb/100 ft<sup>2</sup>).\*
  2. Offset joints of top layer 150 mm (6 in) in both directions from joints of tapered insulation system.
  3. Adhere overlay insulation over tapered insulation system with ribbon coverage of Tremco Fas-n-Free Insulation Adhesive at a rate of 0.4-0.8 L/m<sup>2</sup> (1-2 gal/100 ft<sup>2</sup>). Immediately after placement, walk insulation boards into adhesive to achieve solid contact. Offset joints of top layer 150 mm (6 in) in both directions from joints of tapered insulation system.
  4. Lay insulation in 1220 mm (48 in) wide courses.

### 3.10 Roof System Application

- A. Base sheet application:

#### **Nailable Decks (Rosin Paper optional on Lightweight Concrete/Gypsum Decks)**

1. Lay one (1) ply rosin sheathing paper perpendicular to slope direction over roof deck. Sidelaps — 50 mm (2 in); endlaps — 100 mm (4 in). Nail to hold in place.
2. Install base sheet over sheathing paper. Lap 50 mm (2 in) on sides; 100 mm (4 in) on ends. Nail 230 mm (9 in) o.c. at lap; two (2) rows staggered 460 mm (18 in) o.c.; 305 mm (12 in) from each edge.

#### **Single Base Sheet Application (hot or cold)**

1. Install base sheet to roof and all wall, curb, and projection bases in a uniform and continuous application of adhesive. Ply laps: 100 mm (4 in).
2. Broom ply. Ensure complete and continuous seal and contact between bitumen and ply sheets, including ends, edges, and laps without wrinkles, fishmouths, or blisters. Broom width: 865 mm (34 in) minimum. Avoid walking on plies until adhesive has set.
3. Lap ply membrane ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.
4. Adhesive application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>)\* (hot), 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>) (cold).
5. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
6. Roofing ply shall never touch roofing ply, even at roof edges, laps, tapered edge strips, and cants.
7. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

## B. Roof membrane application:

### **BURmastic200 - 4 Ply (Zones 1, 2 and 3)**

1. Install four (4) plies of BURmastic Composite Ply sheet, shingle fashion. Overlap starter strips 750 mm (29 in) with first ply, then overlap each succeeding ply 700 mm (27-1/2 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 230 mm, 460 mm, 685 mm and 915 mm (9 in, 18 in, 27 in and 36 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
3. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.
4. Embed each BURmastic Composite Ply in a uniform and continuous application of interply mastic.  
Interply application rate: 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

### **BURmastic 200 - 3 Ply (Zones 1, 2 and 3)**

1. Install three (3) plies of BURmastic Composite Ply sheet, shingle fashion. Overlap starter strips 660 mm (26 in) with first ply, then overlap each succeeding ply 630 mm (24-3/4 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 305 mm, 610 mm and 915 mm (12 in, 24 in and 36 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
3. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.
4. Embed each BURmastic Composite Ply in a uniform and continuous application of interply mastic.  
Interply application rate: 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

### **BURmastic 200B - 3 Ply (Must install over base sheet) (Zones 1, 2 and 3)**

1. Install two (2) plies of BURmastic Composite Ply sheet, shingle fashion over a fully adhered base sheet. Overlap starter strips 510 mm (20 in) with first ply, then overlap each succeeding ply 485 mm (19 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 460 mm and 915 mm (18 in and 36 in) wide plies to start and finish roof membrane along roof edge and terminations.
2. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
3. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.
4. Embed each BURmastic Composite Ply in a uniform and continuous application of interply mastic.  
Interply application rate: 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

**BURmastic 200 - Base + 2 Ply (Must install over base sheet) (Zone 3 only)**

1. Install two (2) plies of BURmastic Composite Ply sheet, shingle fashion over a fastened base sheet. Overlap starter strips 510 mm (20 in) with first ply, then overlap each succeeding ply 485 mm (19 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 460 mm and 915 mm (18 in and 36 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
3. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.
4. Embed each BURmastic Composite Ply in a uniform and continuous application of interply mastic.  
Interply application rate: 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

**BURmastic 100 - 4 Ply (Zones 1, 2 and 3)**

1. Cut BURmastic Glass Ply sheet in 6 m (18-20 ft) length maximum. Allow the lengths to relax at least thirty (30) minutes at 13°C (55°F) or above; allow 60 minutes minimum below 13°C (55°F).
2. Install four (4) plies of BURmastic Glass Ply sheet, shingle fashion. Overlap starter strips 750 mm (29 in) with first ply, then overlap each succeeding ply 700 mm (27-1/2 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 230 mm, 460 mm, 685 mm and 915 mm (9 in, 18 in, 27 in and 36 in) wide plies to start and finish roof membrane along roof edges and terminations.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
4. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.
5. Embed each BURmastic Glass Ply in a uniform and continuous application of interply mastic.  
Interply application rate: 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
6. Avoid walking on plies until adhesive has set.
7. Overlap previous day's work 610 mm (24 in).
8. Lap ply sheet 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

**BURmastic 100 - 3 Ply (Zones 1, 2 and 3)**

1. Cut BURmastic Glass Ply sheet in 6 m (18-20 ft) length maximum. Allow the lengths to relax at least thirty (30) minutes at 13°C (55°F) or above; allow 60 minutes minimum below 13°C (55°F).
2. Install three (3) plies of BURmastic Glass Ply sheet, shingle fashion. Overlap starter strips 660 mm (26 in) with first ply, then overlap each succeeding ply 630 mm (24-3/4 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 305 mm, 610 mm and 915 mm (12 in, 24 in and 36 in) wide plies to start and finish roof membrane along roof edges and terminations.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
4. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.
5. Embed each BURmastic Glass Ply in a uniform and continuous application of interply mastic.  
Interply application rate: 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
6. Avoid walking on plies until adhesive has set.
7. Overlap previous day's work 610 mm (24 in).
8. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

### **BURmastic 100B - 3 Ply (Must install over base sheet) (Zones 1, 2 and 3)**

1. Cut BURmastic Glass Ply sheet in 6 m (18-20 ft) length maximum. Allow the lengths to relax at least thirty (30) minutes at 13°C (55°F) or above; allow 60 minutes minimum below 13°C (55°F).
2. Install two (2) plies of BURmastic Glass Ply sheet, shingle fashion over a fully adhered base sheet. Overlap starter strips 510 mm (20 in) with first ply, then overlap each succeeding ply 485 mm (19 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 460 mm and 915 mm (18 in and 36 in) wide plies to start and finish roof membrane along roof edges and terminations.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
4. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.
5. Embed each BURmastic Glass Ply in a uniform and continuous application of interply mastic.  
Interply application rate: 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
6. Avoid walking on plies until adhesive has set.
7. Overlap previous day's work 610 mm (24 in).
8. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

### **BURmastic 100 - Base + 2 Ply (Must install over base sheet) (Zone 3 only)**

1. Cut BURmastic Glass Ply sheet in 6 m (18-20 ft) length maximum. Allow the lengths to relax at least thirty (30) minutes at 13°C (55°F) or above; allow 60 minutes minimum below 13°C (55°F).
2. Install two (2) plies of BURmastic Glass Ply sheet, shingle fashion over a fastened base sheet. Overlap starter strips 510 mm (20 in) with first ply, then overlap each succeeding ply 485 mm (19 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 460 mm and 915 mm (18 in and 36 in) wide plies to start and finish roof membrane along roof edges and terminations.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
4. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.
5. Embed each BURmastic Glass Ply in a uniform and continuous application of interply mastic.  
Interply application rate: 1.2 L/m<sup>2</sup> (3 gal/100 ft<sup>2</sup>).\*
6. Avoid walking on plies until adhesive has set.
7. Overlap previous day's work 610 mm (24 in).
8. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

### **THERM 200 - 4 Ply (Zones 1, 2 and 3)**

1. Install four (4) plies of PolyTHERM polyester ply sheet, shingle fashion. Overlap starter strips 800 mm (32 in) with first ply, then overlap each succeeding ply 770 mm (30-1/4 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 250 mm, 490 mm, 760 mm and 1010 mm (9-7/8 in, 19-3/8 in, 29-7/8 in and 39-3/4 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 915 mm (36 in) minimum.
4. Embed each ply in a uniform and continuous application of interply adhesive.  
Interply application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

### **THERM 200 - 3 Ply (Zones 1, 2 and 3)**

1. Install three (3) plies of PolyTHERM polyester ply sheet, shingle fashion. Overlap starter strips 715 mm (28-1/8 in) with first ply, then overlap each succeeding ply 690 mm (27-1/8 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 335 mm, 675 mm and 1010 mm (13-1/4 in, 26-1/2 in and 39-3/4 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 915 mm (36 in) minimum.
4. Embed each ply in a uniform and continuous application of interply adhesive.  
Interply application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

### **THERM 200B - 3 Ply (Must install over base sheet) (Zones 1, 2 and 3)**

1. Install two (2) plies of PolyTHERM polyester ply sheet, shingle fashion, over a fully adhered base sheet. Overlap starter strips 555 mm (21-7/8 in) with first ply, then overlap each succeeding ply 530 mm (20-7/8 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 505 mm and 1010 mm (19-7/8 and 39-3/4 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 915 mm (36 in) minimum.
4. Embed each ply in a uniform and continuous application of interply adhesive.  
Interply application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

### **THERM 200 Base + 2 Ply (Must install over base sheet) (Zone 3 only)**

1. Install two (2) plies of PolyTHERM polyester ply sheet, shingle fashion, over a fastened base sheet. Overlap starter strips 555 mm (21-7/8 in) with first ply, then overlap each succeeding ply 530 mm (20-7/8 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 505 mm and 1010 mm (19-7/8 and 39-3/4 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 915 mm (36 in) minimum.
4. Embed each ply in a uniform and continuous application of interply adhesive.  
Interply application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

## **THERM 100 - 4 Ply (Zones 1, 2 and 3)**

1. Install four (4) plies of THERMglass Plus or THERMglass Type IV ply sheet, shingle fashion. Overlap starter strips 750 mm (29 in) with first ply, then overlap each succeeding ply 700 mm (27-1/2 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 230 mm, 460 mm, 685 mm and 915 mm (9 in, 18 in, 27 in and 36 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
4. Embed each ply in a uniform and continuous application of interply adhesive.  
Interply application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

## **THERM 100 - 3 Ply (Zones 1, 2 and 3)**

1. Install three (3) plies of THERMglass Plus or THERMglass Type IV ply sheet, shingle fashion. Overlap starter strips 660 mm (26 in) with first ply, then overlap each succeeding ply 630 mm (24-3/4 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges. Use 305 mm, 610 mm and 915 mm (12 in, 24 in and 36 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
4. Embed each ply in a uniform and continuous application of interply adhesive.  
Interply application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

## **THERM 100B - 3 Ply (Must install over base sheet) (Zones 1, 2 and 3)**

1. Install two (2) plies of THERMglass Plus or THERMglass Type IV ply sheet, shingle fashion over a fully adhered base sheet. Overlap starter strips 510 mm (20 in) with first ply, then overlap each succeeding ply 485 mm (19 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges.
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
4. Embed each ply in a uniform and continuous application of interply adhesive.  
Interply application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

**THERM 100 Base + 2 Ply (Must install over base sheet) (Zone 3 only)**

1. Install two (2) plies of THERMglass Plus or THERMglass Type IV ply sheet, shingle fashion over a fastened base sheet. Overlap starter strips 510 mm (20 in) with first ply, then overlap each succeeding ply 485 mm (19 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges.
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Immediately after installation, broom ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths, or blisters.  
Broom width: 865 mm (34 in) minimum.
4. Embed each ply in a uniform and continuous application of interply adhesive.  
Interply application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
5. Avoid walking on plies until adhesive has set.
6. Overlap previous day's work 610 mm (24 in).
7. Lap ply sheet ends 150 mm (6 in). Stagger end laps 305 mm (12 in) minimum.

**POWERply Modified Bitumen - Base Sheet and Cap Sheet, 1 + 1 Configuration (Hot Application) (Zones 1, 2 and 3)**

1. Install one (1) ply of POWERply base ply to roof and all wall, curb, and projection bases in a full, continuous application of hot bitumen.
  - a. Adhesive application rate: 1.2 kg/m<sup>2</sup>(25 lb/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Use mop technique to ensure selvage receives hottest bitumen; in no case lower than 218°C (425°F). Immediately set sheet in hot bitumen.
4. Broom each ply from the unmopped side before adhesive cools. Ensure complete and continuous seal and contact between bitumen and each successive ply, including ends, edges, and laps without wrinkles, fishmouths, or blisters. Avoid walking on plies until adhesive has set.
5. Install one (1) ply POWERply roof membrane over base ply. Place roofing membrane in a manner to ensure water flows over or parallel to, but never against exposed edges.
  - a. Adhesive application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
  - c. Overlap ply ends 150 mm (6 in).
  - d. Stagger end laps 915 mm (36 in) minimum.
6. Apply uniform and continuous pressure to selvage and end laps to ensure complete adhesion.
7. Roofing membrane shall never touch roofing membrane, even at roof edges, laps, tapered edge strips, and cants.
8. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

## **POWERply Modified Bitumen - Base Sheet and Cap Sheet, 1 + 1 Configuration (Cold Application) (Zones 1, 2 and 3)**

1. Cut POWERply Base Sheet and cap sheet membranes in 4.9 to 5.5m (16 ft to 18 ft ) lengths maximum. Stack lengths and allow to relax. At temperatures above 13°C (55°F ), allow to relax for 30 minutes minimum. At temperatures below 13°C (55°F ), allow to relax for 60 minutes minimum.
2. Install one (1) ply of POWERply base ply to roof and all wall, curb, and projection bases in a full, continuous application of cold adhesive.
  - a. Adhesive application rate: 0.6 L/m<sup>2</sup> (1.5 gal/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
3. Immediately after installation, broom POWERply Base Sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths or blisters. Broom width: 865 mm (34 in) minimum.
4. Install one (1) ply POWERply roof membrane over base ply. Place roofing membrane in a manner to ensure water flows over or parallel to, but never against exposed edges.
  - a. Adhesive application rate: 1 L/m<sup>2</sup> (2.5 gal/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
  - c. Overlap end laps 150 mm (6 in).
  - d. Stagger end laps 915 mm (36 in) minimum.
5. Apply uniform and continuous pressure to selvage and end laps to ensure complete adhesion.
6. Roofing membrane shall never touch roofing membrane, even at roof edges, laps, tapered edge strips, and cants.
7. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.
8. Avoid walking on completed membrane until adhesive has set.

## **POWERply Modified Bitumen - 2 Ply Base Sheet (PolyTHERM Ply Sheet) + 1 POWERply Membrane, 2+1 Configuration (Hot Application) (Zones 1, 2 and 3)**

1. Install two (2) plies polyester ply sheet, shingle fashion to roof and all wall, curb, and projection bases in a uniform and continuous mopping of steep asphalt.
  - a. Overlap starter strips 545 mm (21-1/2 in) with the first ply, then overlap each succeeding ply 525 mm (20-2/3 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges.
  - b. Use 495 mm and 990 mm (19-1/2 in and 39 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Use mop technique to ensure selvage receives hottest bitumen; in no case lower than 218°C (425°F). Immediately set sheet in hot bitumen.
4. Broom ply before adhesive cools from unmopped side. Ensure complete and continuous seal and contact between bitumen and ply sheets, including ends, edges and laps without wrinkles, fishmouths, or blisters. Avoid walking on plies until adhesive has set.
5. Install one (1) ply POWERply roof membrane over base ply. Place roofing membrane in a manner to ensure water flows over or parallel to, but never against exposed edges.
  - a. Adhesive application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
  - c. Overlap ply ends 150 mm (6 in).
  - d. Stagger end laps 915 mm (36 in) minimum.
6. Apply uniform and continuous pressure to selvage and end laps to ensure complete adhesion.
7. Roofing membrane shall never touch roofing membrane, even at roof edges, laps, tapered edge strips, and cants.
8. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

**POWERply Modified Bitumen - 2 ply Base Sheet (POWERply IV or POWERply VI) and POWERply Membrane, 2 + 1 Configuration (Hot Application) (Zones 1, 2 and 3)**

1. Mop two (2) base plies shingle fashion to substrate and all wall, curb, and projection bases in a uniform and continuous mopping of hot bitumen.
  - a. Adhesive application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Use mop technique to ensure selvage receives hottest bitumen; in no case lower than 218°C (425°F). Immediately set sheet in hot bitumen.
4. Broom ply before adhesive cools from unmopped side. Ensure complete and continuous seal and contact between bitumen and ply sheets, including ends, edges and laps without wrinkles, fishmouths, or blisters. Avoid walking on plies until adhesive has set.
5. Install one (1) ply POWERply roof membrane over base ply. Place roofing membrane in a manner to ensure water flows over or parallel to, but never against exposed edges.
  - a. Adhesive application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
  - c. Overlap ply ends 150 mm (6 in).
  - d. Stagger end laps 915 mm (36 in) minimum.
6. Apply uniform and continuous pressure to selvage and end laps to ensure complete adhesion.
7. Roofing membrane shall never touch roofing membrane, even at roof edges, laps, tapered edge strips, and cants.
8. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.

**POWERply Modified Bitumen - 2 ply Base Sheet (POWERply HT Base Sheet) and POWERply Membrane, 2 + 1 Configuration (Cold Application) (Zones 1, 2 and 3)**

1. Cut POWERply Base Sheet and cap sheet membranes in 4.9 m to 5.5 m (16 ft to 18 ft) lengths maximum. Stack lengths and allow to relax. At temperatures above 13°C (55°F), allow to relax for 30 minutes minimum. At temperatures below 13°C (55°F), allow to relax for 60 minutes minimum.
2. Install two (2) POWERply Base Sheet shingle fashion to substrate and all wall, curb, and projection bases in a uniform and continuous mopping of cold adhesive.
  - a. Adhesive application rate: 0.6 L/m<sup>2</sup> (1.5 gal/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
3. Immediately after installation, broom each base sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fishmouths or blisters. Broom width: 865 mm (34 in) minimum.
4. Install one (1) ply POWERply roof membrane over base sheets. Place roofing membrane in a manner to ensure water flows over or parallel to, but never against exposed edges.
  - a. Adhesive application rate: .06 L/m<sup>2</sup> (1.5 gal/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
  - c. Overlap end laps 150 mm (6 in).
  - d. Stagger end laps 915 mm (36 in) minimum.
5. Apply uniform and continuous pressure to selvage and end laps to ensure complete adhesion.
6. Roofing membrane shall never touch roofing membrane, even at roof edges, laps, tapered edge strips, and cants.
7. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.
8. Avoid walking on completed membrane until adhesive has set.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

## **POWERply Modified Bitumen - 2 Ply Base + MB Cap, PolyTHERM Ply Sheet (Hot Application) (Zones 1, 2 and 3)**

1. Install two (2) plies polyester ply sheet, shingle fashion to roof and all wall, curb, and projection bases in a uniform and continuous mopping of steep asphalt.
  - a. Overlap starter strips 545 mm (21-1/2 in) with the first ply, then overlap each succeeding ply 525 mm (20-2/3 in). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges.
  - b. Use 495 mm and 990 mm (19-1/2 in and 39 in) wide plies to start and finish roof membrane along roof edges and terminations.
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Use mop technique to ensure selvage receives hottest bitumen; in no case lower than 218°C (425°F). Immediately set sheet in hot bitumen.
4. Broom ply before adhesive cools from unmopped side. Ensure complete and continuous seal and contact between bitumen and ply sheets, including ends, edges and laps without wrinkles, fishmouths, or blisters. Avoid walking on plies until adhesive has set.
5. Install one (1) ply POWERply roof membrane over base ply. Place roofing membrane in a manner to ensure water flows over or parallel to, but never against exposed edges.
  - a. Adhesive application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>)\*.
  - b. Overlap base ply 100 mm (4 in).
  - c. Overlap ply ends 150 mm (6 in).
  - d. Stagger end laps 915 mm (36 in) minimum.
6. Apply uniform and continuous pressure to selvage and end laps to ensure complete adhesion.
7. Roofing membrane shall never touch roofing membrane, even at roof edges, laps, tapered edge strips, and cants.
8. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.

## **POWERply Modified Bitumen - MB Base Sheet and MB Cap, 1 + 1 Configuration (Hot Application) (Zones 1, 2 and 3)**

1. Install one (1) ply of POWERply base ply to roof and all wall, curb, and projection bases in a full, continuous application of hot bitumen.
  - a. Adhesive application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>)\*.
  - b. Overlap base ply 100 mm (4 in).
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Use mop technique to ensure selvage receives hottest bitumen; in no case lower than 218°C (425°F). Immediately set sheet in hot bitumen.
4. Broom each ply from the unmopped side before adhesive cools. Ensure complete and continuous seal and contact between bitumen and each successive ply, including ends, edges, and laps without wrinkles, fishmouths, or blisters. Avoid walking on plies until adhesive has set.
5. Install one (1) ply POWERply roof membrane over base ply. Place roofing membrane in a manner to ensure water flows over or parallel to, but never against exposed edges.
  - a. Adhesive application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>)\*.
  - b. Overlap base ply 100 mm (4 in).
  - c. Overlap ply ends 150 mm (6 in).
  - d. Stagger end laps 915 mm (36 in) minimum.
6. Apply uniform and continuous pressure to selvage and end laps to ensure complete adhesion.
7. Roofing membrane shall never touch roofing membrane, even at roof edges, laps, tapered edge strips, and cants.
8. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.

\*All coverage rates represent the required average application rate. Tolerances are ±20% for any point on the roof.

**POWERply Modified Bitumen - 2 Ply Base and MB Cap (POWERply IV or POWERply VI)  
(Hot Application) (Zones 1, 2 and 3)**

1. Mop two (2) base plies shingle fashion to substrate and all wall, curb, and projection bases in a uniform and continuous mopping of hot bitumen.
  - a. Adhesive application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
2. Apply adhesive no more than 3 m (10 ft) ahead of each roll being embedded.
3. Use mop technique to ensure selvage receives hottest bitumen; in no case lower than 218°C (425°F). Immediately set sheet in hot bitumen.
4. Broom ply before adhesive cools from unmopped side. Ensure complete and continuous seal and contact between bitumen and ply sheets, including ends, edges and laps without wrinkles, fishmouths, or blisters. Avoid walking on plies until adhesive has set.
5. Install one (1) ply POWERply roof membrane over base ply. Place roofing membrane in a manner to ensure water flows over or parallel to, but never against exposed edges.
  - a. Adhesive application rate: 1.2 kg/m<sup>2</sup> (25 lb/100 ft<sup>2</sup>).\*
  - b. Overlap base ply 100 mm (4 in).
  - c. Overlap ply ends 150 mm (6 in).
  - d. Stagger end laps 915 mm (36 in) minimum.
6. Apply uniform and continuous pressure to selvage and end laps to ensure complete adhesion.
7. Roofing membrane shall never touch roofing membrane, even at roof edges, laps, tapered edge strips, and cants.
8. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.

**TremFAST® Premium or TremFAST 100 - Applied in Hot Roofing Asphalt  
(Zones 1, 2 and 3)**

1. Plan placement of elastomeric sheeting:
  - a. To facilitate fabrication of the least number of seams.
  - b. To ensure water flows over or along, but not against, exposed edges.
2. Begin the installation at the low point of the roof. Position the first roll of elastomeric sheeting square with the roof in a manner which provides sufficient material to facilitate flashing. The factory applied self-sealing edge shall be aligned along the low edge of the roof.
3. Roll out the first roll dry, with no adhesive applied to the substrate. Roll out a second roll parallel to the first, overlapping the second roll to the base of the control numbers imprinted on the membrane (so they remain visible), which is approximately 51 mm (2 in) onto the first sheet along the side lap. Assure both roll runs are tight and properly aligned.
4. Clean the lap area of the lower membrane with approved solvent prior to joining the lap seam. After solvent has completely evaporated, remove the protective release paper from the factory applied self-sealing seam tape and at the same time apply pressure to and join the lap by walking on the lap in a toe to heel manner.
5. Roll the entire lap area firmly with a steel roller.
6. Immediately inspect all seams constructed with a needle probe to assure lap was properly bonded.
7. Fold back the sheet from the first roll onto the second and hot apply the membrane adhesive. Evenly cover a minimum 50% of the substrate under the first sheet (which is folded back) with the hotmelt adhesive applied in a serpentine ribbon pattern. Do not allow any hotmelt adhesive to be placed directly under a lap seam area.
  - a. Coverage rate of hotmelt adhesive is 0.7-0.9 kg/m<sup>2</sup> (15-18 lbs<sup>2</sup>).
  - b. For roof perimeter areas, increase the coverage rate to cover 85% of the areas under each roll.
8. After hotmelt adhesive is in place, pick up and roll the membrane into the adhesive. Start from the center of the sheet to minimize wrinkling. Temperature range of the hotmelt adhesive during application of the sheet should range between 176-204°C (350-400°F).
9. On all succeeding rolls, first roll out the sheet dry and assure it is properly aligned and overlapped 51 mm (2 in) onto the preceding roll, but not covering the control numbers. Properly join the lap seam by wiping the lower membrane with solvent and allowing solvent to dry, then removing the protective release paper and applying pressure by walking the lap toe to heel. Then fold the sheet back onto the previously applied roll and apply hotmelt adhesive and continue application.

10. For staggered endlaps offset a minimum 5 ft. Endlap overlaps must be 51 mm (2 in) minimum. Cut off a 45 degree angled 51 mm x 51 mm (2 in by 2 in) piece of the lower membrane before sealing the lap edge. Apply lap sealant paste to the 203 mm (8 in) length of the previously applied membrane, but centered over the endlap. Backwipe the lap sealant paste under the lap. Wipe the membrane with solvent, allow solvent to dry, then apply the 127 mm (5 in) self-adhesive flashing tape centered over the endlap. Apply lap sealant paste to the T-joints of the following membrane sheet to be installed, extending out 51 mm (2 in) onto adjacent sheet. Roll the entire self-adhesive tape with a steel roller and immediately inspect edges with a needle probe to assure lap was properly bonded. Ensure water does not flow against endlap flashing lap by placing endlap flashing under the sealing edge of the sheet lap on the high side of the slope.
11. For continuous endlaps, seal with 178 mm (7 in) double seal reinforced flashing. Endlap overlaps must be 51 mm (2 in) minimum. Wipe the membrane with solvent, allow to dry, then lay out the 178 mm (7 in) double seal reinforced flashing centered over the endlap overlap. Adhere the 178 mm (7 in) double seal reinforced flashing by removing the release paper from the factory applied self-sealing seam tape. At the same time apply pressure to and join the lap by walking on the lap toe to heel. Roll the entire lap with a steel roller and immediately inspect seams with a needle probe to assure lap was properly bonded. Apply lap sealant paste to all T-joint overlaps and backwipe lap sealant paste into the T-joint.

### **TremFAST® Premium or TremFAST 100 - Applied in Cold Adhesive (Zones 1, 2 and 3)**

1. Plan placement of elastomeric sheeting.
  - a. To facilitate fabrication of the least number of seams.
  - b. To ensure water flows over or along, but not against, exposed edges.
2. Begin the installation at the low point of the roof. Position the first roll of elastomeric sheeting square with the roof in a manner which provides sufficient material to facilitate flashing. The factory applied self-sealing edge shall be aligned along the low edge of the roof.
3. Using an approved mechanical applicator, apply membrane adhesive in 6.3 mm (1/4 in) beads at a coverage rate of 3.75 m<sup>2</sup>/L (150 ft<sup>2</sup>/ gal).
  - a. Along all roof edges, increase adhesive bead width to 12.6 mm (1/2 in).
  - b. In roof perimeter corner areas, fully adhere sheet at a coverage rate of 1.25 m<sup>2</sup>/L (50 ft<sup>2</sup>/ gal).
4. Roll roof membrane into adhesive within ten (10) minutes of application. Assure proper overlap of 51 mm (2 in) onto previously applied roll. Assure roll remains tight with no wrinkling.
5. Clean the lap area of the lower membrane with approved solvent prior to joining the lap seam. After solvent has completely dried, remove the protective release paper from the factory applied self-sealing seam tape and join the lap.
6. Join the lap by removing the protective release paper and at applying pressure by walking the lap toe to heel. Roll the entire lap area firmly with a steel roller.
7. Immediately inspect seams with a needle probe to assure proper bonding.
8. For staggered end laps offset a minimum 5 ft. Endlap overlaps must be 51 mm (2 in) minimum. Cut off a 45 degree angled 51 mm x 51 mm (2 in by 2 in) piece of the lower membrane before sealing the lap edge. Apply lap sealant paste to the 203 mm (8 in) length of the previously applied membrane, but centered over the endlap. Backwipe the lap sealant paste under the lap. Wipe the membrane with solvent, allow solvent to dry, then apply the 127 mm (5 in) self-adhesive flashing tape centered over the end lap. Apply lap sealant paste to the T-joints of the following membrane sheet to be installed, extending out 51 mm (2 in) onto adjacent sheet. Roll the entire self-adhesive tape with a steel roller and immediately inspect edges with a needle probe to assure lap was properly bonded. Ensure water does not flow against endlap flashing lap by placing endlap flashing under thesealing edge of the sheet lap on the high side of the slope.
9. For continuous endlaps, seal with 178 mm (7 in) double seal reinforced flashing. Endlap overlaps must be 51 mm (2 in) minimum. Wipe the membrane with solvent, allow to dry, then lay out the 178 mm (7 in) double seal reinforced flashing centered over the endlap overlap. Adhere the 178 mm (7 in) double seal reinforced flashing by removing the release paper from the factory applied self-sealing seam tape. At the same time apply pressure to and join the lap by walking on the lap toe to heel. Roll the entire lap with a steel roller and immediately inspect seams with a needle probe to assure lap was properly bonded. Apply lap sealant paste to all T-joint overlaps and backwipe lap sealant paste into the T-joint.

### 3.11 Flashing Installation

Note: The diversity of flashings and their specific requirements precludes the inclusion of a comprehensive listing of flashing options. Instead, the general elements of sound flashing installation will be outlined. See drawings in Details section or refer to specific flashing materials and design specifications for detailed construction specifications.

#### A. General

1. All flashings, except for those using lead flashing material, shall have pressure treated wood nailers.
2. All lead flashing shall be 1.8 kg (4 lb) lead.  
Note: Some jurisdictions do not permit lead. Check with your Tremco Advisor for alternative.
3. All drains shall be appropriately sumped.
4. All raised flashings shall have cants.
5. A layer of adhesive or mastic shall be used to separate any membrane from contact with sheet metal flashing elements.
6. All metal surfaces shall be appropriately cleaned and primed before the application of sealant, mastic or adhesive.
7. The waterproofing membrane shall be terminated at the wood blocking or the top of the cant.
8. The waterproofing membrane shall be mechanically attached.
9. All raised flashings shall be a minimum of 200 mm (8 in) above the surface of the finished roof surface.
10. All raised flashings shall be mechanically attached to a vertical surface.
11. All raised flashings shall have a counterflashing.
12. All flashings shall extend a minimum of 150 mm (6 in) onto the roof surface and shall be appropriately adhered and sealed to the roof.
13. All metal fascia or counterflashing shall be attached through the appropriate use of clips, cleats, fasteners or metal joints so as to assure continued attachment.
14. Fiber cants may be used, but if FM approval is required then Section 2.04 must be followed and wood cants must be used.
15. All sheet metal work shall conform to SMACNA guidelines.

### 3.12 Daily Waterstop/Tie-ins

- A. Remove embedded gravel from top ply of felt along termination. Width: 460 mm (18 in).
- B. Adhere 305 mm and 460 mm (12 in and 18 in) wide No. 15 ply sheets from exposed deck to existing roofing with a continuous 3 mm (1/8 in) thick application of tie-off mastic. Glaze cut-off with surfacing mastic. Extend 460 mm (18 in) wide felt 75 mm (3 in) either side of 305 mm (12 in) felt.
- C. Install "deadman" insulation filler at insulation staggers.
- D. Extend roofing system at least 305 mm (12 in) onto prepared area of adjacent roofing. Embed base ply of system into asphalt mastic. Seal edge with either:
  1. 150 mm (6 in) wide fiberglass ply sheet embedded between continuous courses of tie-off mastic; remove voids and wrinkles.
  2. At beginning of next day's work remove temporary connection by cutting felts evenly along edge of existing roof system. Remove "deadman" insulation fillers.

### 3.13 Adjusting and Cleaning

#### A. Repair of deficiencies:

1. Installations of details noted as deficient during final inspection must be repaired and corrected by applicator, and made ready for re-inspection, within five (5) working days.

#### B. Clean up:

1. Immediately upon job completion, roof membrane and flashing surfaces shall be cleaned of debris.
2. Clean gutters and downspouts of debris.

*Building code compliance based on UL Classifications and FMRC Approvals is the foundation for Roofing and Weatherproofing Peace of Mind. The most immediate benefit to design professionals and building owners is eliminating the rework and corrective action if code enforcement stops a roofing job in progress.*

The code criteria promote **design quality**, as well as public safety. Many of the factors influencing resistance to fire, wind uplift resistance and load capability are the same factors affecting the overall durability and service of a commercial low-slope roof system.

Some of the basic benefits of codes and standards are:

- 1) Protecting the public welfare.
- 2) Safety from catastrophic events.
- 3) Provide the specifier, building owner and occupants with additional assurance of quality.
- 4) Degree of protection from early failure and subsequent loss.

During the many years that Tremco has been manufacturing roofing systems, many of our systems have been tested and classified or approved by Underwriters Laboratories and Factory Mutual. These classifications and approvals can be found in the books and documents published by Underwriters Laboratories and Factory Mutual.

Tremco is constantly upgrading our roofing systems and developing new ones. These roofing systems are then tested by Underwriters Laboratories and/or Factory Mutual and in our own approved in-house laboratories and testing facilities. When they pass, the necessary classifications and approvals are issued by Underwriters Laboratories and Factory Mutual.

Because the books and documents from Underwriters Laboratories and Factory Mutual are published annually, newly classified and approved systems are not listed until the appropriate documents are reissued.

To ensure that you have the most up-to-date selection of classified and approved systems, your Tremco representative has computer access to the updated list of Underwriters Laboratories classifications and Factory Mutual approvals of Tremco systems on our TREMCOM electronic database.

If you want to know if a particular Tremco roofing system is classified or approved, or if you want an updated list of classified and approved Tremco roofing systems, contact your Tremco representative who will be pleased to supply you with the information from our up-to-date listings.

If you have any questions regarding Underwriters Laboratories classifications or Factory Mutual approvals, contact your Tremco representative who will be pleased to assist you.

# Classifications and Approvals

*Roofing systems and applications are subject to various codes and approvals. The systems outlined in this manual have many approvals which are listed in Approval Guides published by Underwriters Laboratories and Factory Mutual System.*

The necessary test criteria which are predominant in the area of built-up roofing are ASTM E 108, UL (Underwriters Laboratories) 790 and FM (Factory Mutual System) Class 1. All of these criteria are specific to a designed system. It is, therefore, incorrect to say that a particular product meets UL, FM, or ASTM criteria. It is only in a completely specified system configuration, including combustible or noncombustible deck, insulation type, thickness and fastening, that a roof can receive these approvals.

ASTM E 108 and UL 790 are virtually identical tests of the fire resistance of a roofing system but there is a difference between the two. A certification of passing an ASTM E 108 test indicates that the system, as tested, passed the criteria for this test method.

A UL 790 classification indicates that UL witnessed the construction of the panels using representative materials from the manufacturer. A UL classification also indicates that the materials used in a classified system carry a UL label, which indicates that UL periodically analyzes them and inspects their production to assure that they are the same as those tested. Additionally, UL reserves the right to periodically retest any system at their discretion to assure that the system is still capable of passing the test. A UL 790 classification will satisfy the requirements of ASTM E 108. However, certification of passing ASTM E 108 is not equivalent to UL 790 classification. Be sure to check the specifics of the applicable code requirements on this important safety related issue before specifying a system.

Tremco has an in-house, fire test laboratory which is capable of testing products to either ASTM E 108 or UL 790 test criteria. This valuable asset can substantially reduce the time necessary to obtain approval for a new system configuration (this can typically take up to a year through the standard UL testing procedures) and can aid in the rapid design of a new system which will obtain approval.

FM is a large insurance underwriter of buildings. They have established criteria for roof construction and performance which, in their estimation, make a particular roof an acceptable risk to insure.

An FM system approval implies the successful FM testing of a roof system to FM 4470 test criteria. These criteria include fire resistance (ASTM E 108), fire contribution (calorimeter), wind uplift criteria (1-60 or 1-90), hail damage testing, fastener corrosion resistance, ultraviolet weathering and leakage. Only those systems which meet all of the criteria will receive a Class 1 rating and are FM approved. Class 1 roofs are subclassified as 1-60 or 1-90 for wind uplift and A, B or C for the ASTM E 108 rating. They also indicate slope limitations as part of their approval.

Failure to meet any of the FM criteria will automatically result in a Class 2 approval. FM standards require the installation of sprinkler systems in the buildings with Class 2 approval.

Understanding the various codes and approvals and their ramifications represents a critical element in the proper design and specification of a roof.