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4.0-24.0 GENERAL DESIGN RECOMMENDATIONS

4.0 ROOF DECK REQUIREMENTS

4.1 GENERAL ROOF DECK REQUIREMENTS

Roof Drainage----Proper and adequate drainage of roof surfaces is critical, and a minimum slope of 1/4 in. per ft. is recommended. Positive drainage is required and is the responsibility of those involved in the design and construction of the roof deck and supporting structure.
TAMKO's definition of "inadequate drainage" refers to an area on a roof in which water does not move to the drains or off the edge of the roof. If standing water remains on the roof for more than 48 hours after a rain, the roof is considered to have areas of inadequate drainage. Questions concerning drainage on specific roofs should be directed to the TAMKO Technical Services Department in Joplin, Missouri at 1-800-641-4691.
LIMITED WARRANTIES WILL NOT REMAIN IN EFFECT FOR ANY AREAS OF ROOF THAT HAVE INADEQUATE DRAINAGE.

Roof Decks----Responsibility for the roof deck design and the proper inter-relationship of all building components rests with the architect, design engineer, and building owner. The density, internal moisture, integrity, and other inherent elements of the deck must be suitable. TAMKO is in no way responsible for any of these factors and under no circumstances will TAMKO assume such responsibility.

All roof decks (regardless of type) must be smooth, moisture free, dirt free, properly attached, properly constructed, and properly designed for anticipated loads with minimum deflection.

No electrical conduits, bolts, or other similar equipment shall be placed on the surface of the roof deck. Such surface irregularities cannot be properly insulated and roofed.

TAMKO AWAPLAN SA FR or AWASTAR SA FR Self-Adhered Roofing Systems are only acceptable for use on certain deck types. Additional information is available in the sections for each deck type that follow.

4.2 WOOD DECKS

All boards should have a bearing on rafters at each end and should be securely nailed. A deck is not satisfactory if boards deflect perceptibly under the average man's weight. Cracks wider than 1/4 in. and knotholes larger than 3/8 in. in diameter must be covered with metal that is securely nailed.

APA rated sheathing decks must be a minimum of 15/32 in. 32/16, Exposure 1, as defined by the Engineered Wood Association (APA). The APA rated sheathing application should be in accordance with the general recommendations of the APA.

Decks must cure and come to an equilibrium moisture content before installation of the roofing membrane. Unusually high or low moisture content at the time of membrane application may result in buckling or other dimensional changes in the boards.

Fastening of the TAMKO TYPE 43 Coated Base Sheet, GLASS-BASE, or BASE-N-PLY base sheet to the wood deck should be done through flat metal caps or with acceptable nails having attached caps of a minimum of 1 in. in diameter. TAMKO fastening recommendations are covered in Section 10.0.

It is not acceptable to install TAMKO AWAPLAN SA FR, AWASTAR SA FR, or AWABASE SA commercial self-adhering products directly to wood decks.

Prior to adhering AWAPLAN SA FR, AWASTAR SA FR or AWABASE SA fasten a layer of AWA NAILBASE to the wood deck.

Fastening of the AWA NAILBASE to the wood deck should be done through flat metal caps or with acceptable nails having attached caps of a minimum of 1 in. in diameter. TAMKO fastening recommendations are covered in Section 10.0.

4.3 POURED GYPSUM DECKS

A poured gypsum roof deck that is either surface-wet or frozen is not suitable to receive a TAMKO roof. The deck must be smooth and well troweled. Provisions must be made for venting of these decks from the underside and topside.

4.3 POURED GYPSUM DECKS (CONTINUED)

Adding additional board insulation directly over newly poured gypsum decks is not acceptable.

The gypsum must be a minimum of 2 in. thick and surface-dry before roofing is applied. TAMKO will not be responsible for leaks resulting from splits in the built-up roofing system that are caused by cracking of the gypsum deck after the roofing has been applied, regardless of the cause for cracking.

VAPOR-CHAN should be secured to the deck using an ES Nailtite Nail or other approved fastener with initial withdrawal resistance of not less than 40 lb. per fastener as recommended by the Gypsum Roof Deck Association. TAMKO fastening recommendations are covered in Section 10.0

For TAMKO AWAPLAN SA FR and AWASTAR SA FR Self-Adhered Roofing Systems, VAPOR-CHAN should be loose laid over the deck and AWA NAILBASE should be secured to the deck using an ES Nailtite Nail or other approved fastener with initial withdrawal resistance of not less than 40 lb. per fastener.

TAMKO fastening recommendations are covered in Section 10.0

For reroofing exceptions, contact the Technical Services Department at 1-800-641-4691.

4.4 LIGHTWEIGHT (INSULATING) CONCRETE DECKS

The high moisture content of lightweight (insulating) concrete decks may result in blistering and damage to the roofing membrane. These decks are acceptable for specific roofing systems when care is taken in the construction of the deck and in the application of the roofing system. The deck must have a minimum thickness of 2 in. The slope of the deck may not exceed 1 in. per ft. The cured deck should be smooth to the touch and free of depressions, ridging, and any exposed reinforcing mesh. The deck should be installed by a contractor who is approved by the deck manufacturer. The deck must be installed in accordance with the deck manufacturer's recommendations and specifications, and the deck installer shall provide certification to the roofing contractor that the deck is suitable to receive the roofing system. Lightweight structural concrete whose density is 100 to 200 lb. per cu. ft. should not be confused with lightweight insulating concrete whose density is 20 to 40 lb. per cu. ft. (see Section 4.6)

Provisions must be made for venting of these decks from the underside and topside. Underside venting will be accomplished with slotted galvanized structural steel decking that allows ventilation from below.

The base ply should be fastened using fasteners approved by the deck manufacturer. VAPOR-CHAN is required as the base ply, fastened in accordance with TAMKO's recommendations (see Section 10.0). For TAMKO AWAPLAN SA FR and AWASTAR SA FR Roofing Systems, VAPOR-CHAN should be loose laid over the deck and AWA NAILBASE should be fastened through the VAPOR-CHAN into the deck in accordance with TAMKO's recommendations (See Section 10.0). Adding additional board insulation directly over these decks is not acceptable. For possible exceptions, contact the Technical Services Department at 1-800-641-4691.

TAMKO will not be responsible for roof leaks that result from membranes splitting when applied over lightweight (insulating) concrete when the deck has moved or cracked after the membrane has been applied. Information concerning the use of lightweight (insulating) concrete decks is available through the Technical Services Department.

TAMKO will not approve nor accept TAMKO membranes over lightweight (insulating) concrete that is poured over structural concrete decking or any other nonventing substrate. For possible exceptions on nonventilating substrates (NVS) in some geographic locations, contact the Technical Services Department.

4.5 METAL DECKS

Any of the TAMKO specifications for use over insulation may be applied over a metal deck, providing the metal deck is covered with rigid insulation. TAMKO supports the NRCA's Technical Bulletin 15-91, Corrosion Protection for New Steel Roof Decks. Please contact the Technical Services Department at 1-800-641-4691 for further information regarding this technical bulletin.

The metal deck must be firm, capable of withstanding rooftop traffic and properly secured to the building's structural support system. The deck must be no lighter than 22 ga. (uncoated) and must comply with Factory Mutual Loss Prevention Data 1-28.

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4.5 METAL DECKS (CONTINUED)

The insulation must comply with TAMKO's requirements for roof insulation (see Section 6.0). The insulation must be of suitable thickness to span the rib opening as recommended by the insulation manufacturer.

For TAMKO AWAPLAN SA FR or AWASTAR SA FR Self-Adhered Roofing Systems, a single layer of insulation should be loose laid. AWA NAILBASE should be mechanically fastened through the insulation into the deck. The base sheet and insulation should be installed in accordance with the base sheet fastening pattern. (See Section 10.0)

TAMKO requires that the first layer of insulation be mechanically fastened or adhered with insulation adhesive. Since 1-1-84, Factory Mutual has required that the first layer of insulation must be mechanically fastened to the steel deck.

4.6 POURED CONCRETE DECKS

Concrete must be poured over steel reinforcement and removable forms. A concrete deck will not be considered satisfactory if it is either wet or frozen. Any sharp ridges or depressions should be hammered smooth and leveled. Perimeter nailers must be provided. All wood cant strips used in conjunction with concrete roof decks must be mechanically attached to the wood nailers.

All concrete decks must be primed with concrete primer at a rate of 3/4 gal. per 100 sq. ft. and insulated prior to the application of TAMKO roofing materials.

It is not acceptable to install TAMKO AWAPLAN SA FR or AWASTAR SA FR Self-Adhered Roofing Systems directly to poured concrete decks.

4.7 PRECAST CONCRETE DECKS

These decks are satisfactory as a base to receive a TAMKO roof only if they form a smooth surface and are insulated. Top joints between slabs should be grouted.

Precast concrete decks must be primed with concrete primer at the rate of 3/4 gal. per 100 sq. ft. and insulated prior to the application of TAMKO roofing materials. For specifications that do not require insulation , see Specifications 113 FR, 113, 113 HW, 213 FR, 213, 1013 FR, and 1013.

It is not acceptable to install TAMKO AWAPLAN SA FR or AWASTAR SA FR Self-Adhered Roofing Systems directly to precast concrete decks.

4.8 STRUCTURAL WOOD FIBER DECKS

Structural wood fiber roof deck panels that incorporate composite elements (e.g., polyurethane or other insulations, particleboard or chipboard) are **not approved** for use in TAMKO approved roofing systems. TAMKO Roofing System Limited Warranties will not be issued on these deck systems.

Questions regarding these decks and requirements should be directed to the Technical Services Department at 1-800-641-4691.

The approval of structural wood fiber roof deck systems is subject to the following conditions:

New construction:

1. A TAMKO TYPE 43 Coated Base Sheet or BASE-N-PLY must be mechanically fastened, followed by a 3/4 in. minimum layer of rigid insulation board (applied at a right angle to the panel length) solidly mopped to the base sheet or using insulation adhesive. Alternatively, a 3/4 in. minimum layer of rigid insulation may be mechanically fastened to the structural wood fiber roof deck.
2. Only 4-ply gravel-surfaced fiberglass BUR or modified systems are acceptable to receive a TAMKO Roofing System Limited Warranty.

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Reroof (without tearoff):

1. Only polyester-reinforced modified systems are acceptable to receive a TAMKO Roofing System Limited Warranty.

2. A layer of 1/2 in. minimum roof insulation is required when reroofing.

3. TAMKO will not approve the application of insulation and roofing membrane materials over badly deteriorated or moisture-laden existing roofing systems.

Reroof (with complete tear-off): Because of the potential for damage to the structural integrity of the deck system during membrane tear-off, TAMKO will not be responsible for damage to the deck.

It is not acceptable to install TAMKO AWAPLAN SA FR or AWASTAR SA FR Self-Adhered Roofing Systems over structural wood fiber decks.

4.9 ASPHALT/PERLITE/VERMICULITE FILL DECKS

TAMKO **will not** issue any roofing system limited warranties on systems installed over these types of decks.

5.0 VAPOR RETARDERS

The need for a vapor retarder should be determined based on consideration of occupancy, indoor /outdoor temperatures, and relative humidity utilizing accepted engineering practices. Extensive research on the effectiveness and use of vapor retarders has been published by the Cold Regions Research and Engineering Laboratory (CRREL). The decision to employ a vapor retarder system is the responsibility of the design engineer, architect, or building owner. The vapor retarder is not a part of the roofing specification. TAMKO is not responsible for damage to the roofing system when the vapor retarder is used primarily as a secondary membrane in the system design.

6.0 ROOF INSULATION

The following information represents the minimum requirements that must be met for an insulation to be used in a system that is to have a TAMKO Roofing System Limited Warranty.

The insulation manufacturer must inform TAMKO in writing that their insulation meets both the general and specific requirements as outlined in this section.

6.1 GENERAL INSULATION REQUIREMENTS

The insulation must be manufactured for use as a roof insulation.

The insulation manufacturer must accept responsibility for manufacturing defects that occur in the insulation.

The insulation must be approved by Factory Mutual.

The insulation must be approved by Underwriters Laboratories.

The insulation must meet all the specific requirements listed for the generic insulation type.

All insulated 15- and 20-year limited warranty specifications require a minimum of 2 layers of insulation, and the top layer must be adhered in hot asphalt or insulation adhesive.

Any roof insulation manufactured as a 4' x 8' board must be mechanically fastened according to the requirements of Factory Mutual.

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6.1 GENERAL INSULATION REQUIREMENTS (CONTINUED)

Mopping of 4'x 8' insulation boards is not acceptable.

For a list of acceptable roof insulations see Section 32.0 or contact TAMKO's Technical Services Department.

6.2 SPECIFIC INSULATION REQUIREMENTS

Wood Fiberboard:
1. Must meet ASTM Specification C 208.
2. Must meet ANSI Standard AHA A194.1.
3. Installation recommendations for cover board may vary; consult the specific manufacturer for their CURRENT installation recommendations.

Perlite:
1. Must meet ASTM Specification C 728.
2. Installation recommendations for cover board may vary; consult the specific manufacturer for their CURRENT installation recommendations.

Fiberglass:
1. Must meet ASTM Specification C 726.

Expanded Polystyrene:
1. Must meet ASTM C 578.
2. Must be a minimum 1.1 pound density.
3. Must be processed from modified EPS resin. Proof that the modified material is in compliance with applicable model codes must be maintained by a third-party certification and labeling program.
4. Must be aged a minimum of 7 days. Additional aging for thicker blocks is required. Boards with thickness exceeding 6 in. should be aged a minimum of 14 days.
5. Must have a minimum of 1/2 in. fiberboard, perlite, or fiberglass roof insulation over the expanded polystyrene, **and the joints of the overlay insulation must be taped in both directions**.
6. Individual board thickness should not exceed 6 in. when used with any built-up roofing specification.
7. TAMKO does not recommend solid mopping of boards greater than 6 in. thick over structural concrete decks.
8. Installation recommendations for cover board may vary, consult the specific manufacturer for their CURRENT installation recommendations.
9. Expanded Polystyrene insulation is not acceptable for use with AWAPLAN SA FR or AWASTAR SA FR Self-Adhered Roofing Systems.

Extruded Polystyrene:
1. Must meet ASTM Specification C578, Type IV.
2. Must be mechanically fastened.
3. Must have a minimum of 1/2 in. fiberboard, perlite, or fiberglass roof insulation over the extruded polystyrene and the joints of the overlay insulation must be taped in both directions and must be mechanically fastened.
4. Installation recommendations for cover board may vary; consult the specific manufacturer for their CURRENT installation recommendations.
5. Must meet the physical and performance characteristics of Dow Chemical Co.
6. Expanded Polystyrene insulation is not acceptable for use with AWAPLAN SA FR or AWASTAR SA FR Self-Adhered Roofing Systems.

Polyisocyanurate:
1. Must meet ASTM C 1289.
2. Must meet the physical properties of the **RIC/TIMA Standard Specification for Polyurethane and Polyisocyanurate Roof Insulation**.
3. Must have an overlay of a minimum of fiberboard, perlite, or fiberglass roof insulation.
4. Installation recommendations for cover board may vary; consult the specific manufacturer for their CURRENT installation recommendations.

5 For TAMKO AWAPLAN SA FR or AWASTAR SA FR Self-Adhered Roofing Systems, and overlay of a minimum fiberboard, perlite, or fiberglass roof insulation is not required when mechanically fastening a base sheet over the polyisocyanurate board.

6.2 SPECIFIC INSULATION REQUIREMENTS (CONTINUED)

Cellular Foam Glass:
1. Must meet ASTM Specification C 552; FS HH-I-551E
2. Must meet the physical and performance characteristics of Pittsburgh Corning Foamglass.
3. Must have a minimum of 1/2 in. fiberboard, perlite, or fiberglass roof insulation over the cellular foam glass and the joints of the overlay insulation must be taped in both directions and must be mechanically fastened.
4. Cellular Foam Glass insulation is not acceptable for use with Self-Adhered Roofing Systems.

Thermal Barrier:
1. Must meet ASTM Specification C-1177

6.3 ROOF INSULATION INSTALLATION

The installation of all roof insulation should be in accordance with the insulation manufacturer's recommendations and guidelines.

Any specific installation that varies from the insulation manufacturer's recommendations must be approved in writing by a member of the TAMKO Technical Services Department.

Note: Installation recommendations for cover board may vary; consult the specific manufacturer for their CURRENT installation recommendations. TAMKO does not recommend the use of 1 in. diameter cap fasteners for attachment of the insulation.

TAMKO will not issue Roofing System Limited Warranties on specifications that do not comply with the preceding requirements.

7.0 STORAGE OF ROOFING MATERIALS

All roofing materials must be properly stored in a dry location prior to application. When materials are stored, they must be on platforms off the ground or roof deck, and covered with opaque waterproof tarps that have been properly tied down. All rolls must be stored on end to prevent their becoming deformed or damaged. Wet or damp roofing materials should never be used in the construction of a TAMKO roof assembly.
AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, AWAFLEX, VERSA-CAP FR, AWABASE SA, AWAPLAN SA FR or AWASTAR SA FR: During cold and damp environmental conditions, the rolls should be placed in a heated area. Rolls should be stored in a standing position with the labels right side up. To prevent their becoming deformed or damaged, all rolls must be stored on end and not double stacked. If rolls become deformed, the material may be laid out on the roof to allow the sun to relax the material. Any areas where accidental damage occurs to the roll should be cut out before the material is installed.

The wrapper must be left on AWABASE SA, AWAPLAN SA FR and AWASTAR SA FR until the product is ready to be used.

8.0 APPLICATION OF ROOFING MATERIALS

The roofing contractor must maintain qualified supervision on the job at all times. The following material application information was written to provide TAMKO's recommendations and procedures during normal conditions. For specific cold-weather application recommendations see Section 15.0. For specific re-cover requirements in addition to the application recommendations listed below. See Section 23.0.

CAUTION: APPROPRIATE FALL PROTECTION METHODS SHOULD BE USED WHENEVER WORKING ON ROOFS.

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8.1 GENERAL APPLICATION RECOMMENDATIONS

All open eaves must have treated wood nailers. In the case of steel or masonry roof decks, wood nailers should be provided around the perimeter of the roof and around all openings.

Interply moppings of asphalt should consist of approximately 23 lb. (+ or -15%) per 100 sq. ft. of roof area. **Excessive interply moppings should be avoided as slippage may result.** Allow time for the asphalt to set up before walking on completed plies of glass felts. Displacement of the asphalt is inversely proportional to the set time. Recommendations for weights as stated are based upon application under average conditions. Application at extremely low or high temperatures can result in variation from the prescribed limits. For roof deck surfaces or insulating materials that absorb asphalt, the asphalt must be applied in a quantity sufficient to assure adequate adhesion.

All masonry and metal surfaces that are to receive a mopping of asphalt or an application of adhesive should be primed first with asphalt primer at a rate of approximately 3/4 gal. per 100 sq. ft. Primer must be allowed time to cure before the application of hot asphalt or adhesive to avoid problems with adhesion.

All plies of roofing membrane should commence at the low points. Application will not be accepted if at any point the flow of water is against the laps.

The base ply in all specifications should not be allowed to remain open without surface protection. **Phased application of TAMKO commercial roofing materials is not acceptable.**

All felts and coated rolls, including AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, and VERSA-BASE, should be rolled and broomed in place immediately behind the mop and firmly imbedded into the hot mopping. Care should be exercised to avoid heavy brooming of fiberglass ply sheets.

Sheets should not be “dropped” or nailed and turned back. End laps should not be less than 4 in.

Excessive traffic on any roof is discouraged.

8.2 HOT ASPHALT APPLIED POLYESTER SBS MODIFIEDS

This section applies to the following TAMKO polyester reinforced SBS modified products: **AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN VERSA-SMOOTH, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSAFLEX, or AWAFLEX** to be installed in moppings of hot asphalt. On jobs where accessibility makes it difficult to deliver hot asphalt to the point of application TAM-PRO 856 Premium SBS Adhesive or TAM-PRO M3 Adhesive cold-process adhesive products may be suitable alternatives to hot asphalt; refer to Section 8.4 or contact the Technical Services Department for product and application options.

Interply moppings of asphalt should consist of approximately 23 lb. (+or-15%) per square for AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN VERSA-SMOOTH, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSAFLEX, or AWAFLEX. **The asphalt must be a minimum of 400 degrees F at the point of application.** Care should be taken to avoid cooling of mopping asphalt during the application process. Do not mop the asphalt more than 4 ft. in front of the roll. Immediately press the roll into the hot asphalt by applying pressure to the factory core in the roll. ASTM D 312, TYPE III or TYPE IV ASPHALT should be used for application of AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN VERSA-SMOOTH, AWAPLAN 170 FR, AWAPLAN 170, AWAFLEX, or AWAPLAN VERSAFLEX. **Excessive interply moppings should be avoided as slippage may result.**

Side laps of the AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, AWAPLAN 170 FR, or AWAPLAN 170 membranes, should be in 4 in. (consistent with the factory selvedge). Side laps for AWAFLEX should be 3 in. The entire sheet, including the side lap, **must be totally adhered in hot asphalt with no void areas**. A small amount of asphalt protruding from the side lap is acceptable and assists in the inspection when determining proper application. Care should be taken to avoid excessive amounts of asphalt at the lap. All exposed asphalt in excess of 1/4 in. width should be covered with granules.

Alternatively, mopping the field of membrane and heat welding the laps is an acceptable method of installation for AWAPLAN PREMIUM FR, AWAPLAN PREMIUM, AWAPLAN 170 FR, AWAPLAN 170, AND AWAPLAN VERSA-SMOOTH.

End laps of the AWAPLAN PREMIUM FR, AWAPLAN PREMIUM, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, or AWAFLEX membrane should overlap the underlying sheet by a minimum of 6 in. The protrusion of asphalt from the end lap is acceptable and provides a checkpoint for the proper application of the material. All end laps should be staggered or a modified cap sheet installed over each row of the end laps; the center core of the roll should be used to firmly press the end into the hot asphalt.

Factory Splices: On rolls of**:** AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN VERSA-SMOOTH, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSAFLEX, or AWAFLEX where the splice exists, the splice is marked with a tag. This splice should be cut out before the roll is applied to the roof. Where the splice has been removed, the material should be lapped 6 in. in the same fashion as the normal end lap. An alternative method is to cover the splice with a full-width piece of AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN VERSA-SMOOTH, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSAFLEX, or AWAFLEX that extends at least 6 in. on both sides of the splice.

8.3 TORCH-APPLIED POLYESTER SBS MODIFIEDS

This section applies to the following TAMKO polyester reinforced SBS modified products: **AWAPLAN VERSA-SMOOTH, AWAPLAN PREMIUM FR, or AWAPLAN PREMIUM.**

Heat welding (also known as torching) requires that the applicator be experienced in this type of application. Certifications are available through various industry organizations. For further information contact TAMKO Technical Services Department. Fire extinguishers should be on the roof at all times. The torch should be used to warm up the surface to which the AWAPLAN membrane is being applied, to preheat portions of the roll that are about to be applied, and to melt a portion of the modified asphalt on the back of the sheet that will be used to adhere the membrane. The area of the roll where the modified asphalt is being melted is the most critical. It must be heated evenly across the entire width of the sheet that is being welded. During normal application, a small flow of asphalt should precede the roll as it is laid down. This flow of asphalt will be visible to the applicator and should flow out on both sides of the sheet. **Care should be taken to avoid excessive melting of the AWAPLAN membrane.**

Safety is of major importance when heat welding modified bitumens. It is the sole responsibility of the roofing applicator to enforce fire safety precautions and to ensure proper safety at all times. Torches should be extinguished when not in use and should not be left unattended. There should be a sufficient number of working fire extinguishers on the roof to handle any contingency that might develop. The roofing applicators should be trained in the proper use of fire extinguishers. If you need more information regarding the safe application of modified bitumens, contact the Asphalt Roofing Manufactures Association (ARMA) for their booklet regarding heat welding of modified bitumens, titled Torch Applied Roofing Do's and Don'ts or their video, A Guide to Safely Torch-On Modified Bitumen.

Factory Splices: On rolls of AWAPLAN VERSA-SMOOTH, AWAPLAN PREMIUM FR, or AWAPLAN PREMIUM where a splice exists, the splice is marked with a tag. This splice should be cut out before the roll is applied to the roof. Where the splice has been removed, the material should be lapped 6 in. in the same fashion as a normal end lap. An alternate method is to cover the splice with a full-width piece of AWAPLAN membrane which extends 6 in. on both sides of the splice.

Further information concerning the proper heat-weld application of AWAPLAN VERSA-SMOOTH, AWAPLAN PREMIUM FR, or AWAPLAN PREMIUM may be attained by contacting the Technical Services Department at 1-800-641-4691. **AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSAFLEX, AWAFLEX, and VERSA-CAP FR, are currently not available in a heat-welding grade.**

8.4 COLD-PROCESS-APPLIED POLYESTER SBS MODIFIEDS

This section applies to the following TAMKO polyester reinforced SBS modified products: **AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN VERSA-SMOOTH, AWAPLAN 170, AWAPLAN 170 FR and AWAPLAN VERSAFLEX.** Contact the Technical Services Department at 1-800-641-4691 for additional cold-process membrane and application options.

TAM-PRO M3 ADHESIVE may be applied using a 3/16 inch "V" notched squeegee or it may be sprayed using equipment designed for this purpose. The rate of application for TAM-PRO M3 Adhesive is approximately $1\text{-}^1/_2$ to 2 gallons per 100 square feet for squeegee application and $1\text{-}^1/_2$ to $2\text{-}^1/_2$ gallons per 100 square feet for spray application.

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8.4 COLD-PROCESS-APPLIED POLYESTER SBS MODIFIEDS (CONTINUED)

TAM-PRO 856 PREMIUM SBS ADHESIVE is to be applied using a 3/16 inch "V" notched squeegee. It should be lightly stirred prior to application. The rate of application for TAM-PRO 856 PREMIUM SBS ADHESIVE is approximately 1-$^{1}/_{2}$ gallons per 100 square feet.

Do not apply adhesive in excess of the recommended amounts as blistering may occur.

The base sheet surface to receive the adhesive must be smooth, dry, and free of any irregularities. It is recommended that the rolls of membrane be unrolled and allowed to relax prior to setting them into the adhesive. Broom the membrane as necessary to ensure complete embedding of the membrane into the adhesive. To relax the sheet, particularly in cold weather, the sheets may be cut in half prior to installation. Side laps of the AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, AWAPLAN 170 FR, or AWAPLAN 170 membranes, should be 4 in. (consistent with the factory selvedge). Side laps for AWAFLEX membranes should be 3 in. The entire sheet, including the side lap, **must be totally adhered in adhesive with no void areas**. A small amount of adhesive protruding from the side lap is acceptable and assists in the inspection when determining proper application. Care should be taken to avoid excessive amounts of adhesive at the lap. All exposed adhesive in excess of 1/4 in. width should be covered with granules. Alternatively, adhering the field of membrane and then hot air welding the laps is an acceptable method of installation for AWAPLAN PREMIUM FR, AWAPLAN PREMIUM, AWAPLAN 170 FR, AWAPLAN 170, and AWAPLAN VERSA-SMOOTH.

End laps of the AWAPLAN PREMIUM FR, AWAPLAN PREMIUM, AWAPLAN 170 FR AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, or AWAFLEX membrane should overlap the underlying sheet by a minimum of 6 in. The protrusion of adhesive from the end lap is acceptable and provides a checkpoint for the proper application of the material. Membrane end laps may be offset a minimum of 18 inches or butted. If they are butted, a full width of modified cap sheet must be applied perpendicular to the field sheets paying particular attention to "T" laps. Foot traffic on the SBS membrane should be avoided during and immediately after application as the membrane may shift in the uncured adhesive. In addition to the adhesive, backnailing of the SBS modified membrane is required on roof slopes above 3/4" per linear foot.

Side and end lap treatment will vary depending on the adhesive and the membrane.
For TAM-PRO 856 PREMIUM SBS ADHESIVE, the side and end laps may be set in adhesive or heat welded.
For TAM-PRO M3 ADHESIVE it is recommended that the side and end laps be heat welded.

Any exceptions to this rule should be referred to the TAMKO Technical Services Department. Heat welding may be accomplished using an electric hot air welder or a propane detail torch. **CAUTION SHOULD BE USED WHEN EXPOSING ANY ADHESIVE PRODUCTS TO AN OPEN FLAME.**

If end and side laps are adhered using adhesive, they should be lightly rolled to ensure complete contact of the lap. Care should be taken to avoid too much pressure that might result in displacing the mastic/adhesive. Heat welded laps should be rolled to ensure lap integrity. When possible, heat welded laps are the preferred method, especially when inclement weather is threatening since it will provide a watertight lap immediately following application. At the end of the day all laps should be carefully inspected to ensure that they are properly sealed. AWAFLEX side laps and end laps should be sealed using adhesive only.

Factory Splices: On rolls of: AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN VERSA-SMOOTH, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSAFLEX, or AWAFLEX where the splice exists, the splice is marked with a tag. This splice should be cut out before the roll is applied to the roof. Where the splice has been removed, the material should be lapped 6 in. in the same fashion as the normal end lap. An alternative method is to cover the splice with a full-width piece of AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN VERSA-SMOOTH, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSAFLEX, or AWAFLEX that extends at least 6 in. on both sides of the splice.

During winter conditions, it will be necessary to preheat the mastic/adhesive and the membrane to room temperature conditions prior to installation. Cold weather application temperatures should be a minimum of 40 degrees F and only if material is stored at room temperature for 24 hours prior to use. Spray application of mastic may require preheating of material immediately prior to spraying depending on the type of equipment used. Material temperature should be 100 degrees F at the spray tip for best application. Do not allow material temperature to exceed 180 degrees F.

TAMKO®
BUILDING PRODUCTS

8.5 SELF-ADHERED POLYESTER SBS MODIFIEDS

This section applies to the following TAMKO SBS modified products: **AWA NAILBASE, AWABASE SA, AWA-PLAN SA FR** and **AWASTAR SA FR**. These products are intended to be used together. These products are not intended for use with hot asphalt or heat welding (torch) application methods.

These products are for application only in limited geographic regions. Consult the Zone Map for region 4.

On jobs where accessibility make it difficult to deliver hot asphalt to the point of application or heat weld application is not allowed, TAMKO's self-adhered roofing products may be suitable alternatives to hot asphalt or heat welding.

TAMKO's Self-Adhered Roofing Systems can only be installed over mechanically fastened AWA NAILBASE base sheet. Begin all plies of roofing membrane at the low points. Application will not be acceptable if at any point the flow of water is against the laps.

AWA NAILBASE

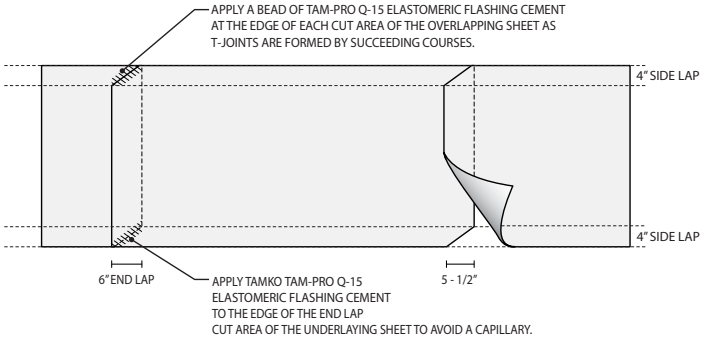
The AWA NAILBASE should be mechanically fastened in accordance with the metric base sheet fastening pattern as shown in Section 10. The base sheet should be installed with side laps of 2 inches and end laps of 4 inches.

AWABASE SA

The AWABASE SA self-adhered membrane is to be installed with side laps of 4 inches and end laps of 6 inches. Align the roll and pull both pieces of the split release film from the back of the membrane to expose one to two feet of adhesive. Apply pressure to adhere the exposed adhesive to the top surface of the base sheet to assure solid contact. Pull both pieces of the split release film off the membrane as you unroll the roll. Once the entire sheet is in place, use a roller of adequate size and weight to ensure solid contact with the base sheet. Install the next roll of membrane using the same method.

An alternative installation method involves unrolling the entire roll and aligning it. Apply the down slope half of the sheet first by removing the split release film from the entire length of the roll on the down slope side and pressing the membrane into place. Then remove the release film from the up slope half of the roll and press it into place. Roll the entire sheet with a roller of adequate size and weight to ensure solid contact with the base sheet.

At all endlaps of AWABASE SA, cut and remove the lower corner of the underlying sheet and the upper corner of the overlapping sheet to provide a tapered transition at the T-joints. Cut on a diagonal angle 5-1/2 in. long from the end of the roll to the outside edge. The width of the cut should be 4 in. - the same width as the side lap. (See illustration below).



Apply a 1/8 in. thick layer of TAM-PRO Q-15 Elastomeric Flashing Cement in the end lap cut area of the underlying sheet. Remove the release film and press the top sheet into the mastic. Apply a bead of TAM-PRO Q-15 Elastomeric Flashing Cement at each cut area of the overlapping sheet as T-joints are formed by succeeding courses.

Once the products have had a chance to bond, check all laps and joints for full adhesion. If the membrane can be lifted at any area it is not properly adhered. A seam probing tool can be used to check from small voids at the laps. If necessary, use a hand-held hot air welding tool and seam roller to heat the lap and press into place to ensure proper adherence at the lap.

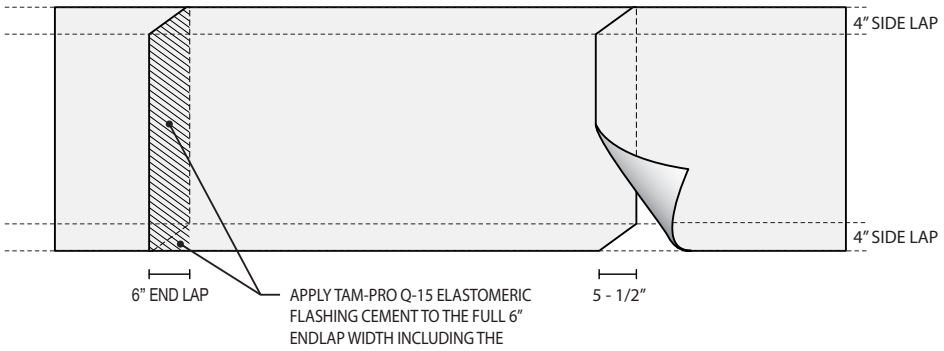
8.5 SELF-ADHERED POLYESTER SBS MODIFIEDS (CONTINUED)

AWAPLAN SA FR and AWASTAR SA FR

These self-adhered membranes are to be installed with side laps of 4 inches and end laps of 6 inches. Align the roll and pull both pieces of the split release film from the back of the membrane to expose one to two feet of adhesive. Apply pressure to adhere the exposed adhesive to the top surface of the base sheet to assure solid contact. Pull both pieces of the split release film off the membrane as you unroll the roll. Once the entire sheet is in place, use a roller of adequate size and weight to ensure solid contact with the base sheet. When installing subsequent rolls of AWAPLAN SA FR or AWASTAR SA FR, the clear release liner must be removed from the selvedge edge of the previously installed membrane. Install the next roll of membrane using the same method.

An alternative installation method involves unrolling the entire roll and aligning it. Apply the down slope half of the sheet first by removing the split release film from the entire length of the roll on the down slope side and pressing the membrane into place. Then remove the release film from the up slope half of the roll and press it into place. Roll the entire sheet with a roller of adequate size and weight to ensure solid contact with the base sheet. When applying the down slope half of subsequent rolls, simultaneously remove the clear selvedge release liner and the down slope half of the release film.

At all end laps of AWAPLAN SA FR and AWASTAR SA FR, cut and remove the lower corner of the underlying sheet and the upper corner of the overlapping sheet to provide a tapered transition at the T-joints. Cut on a diagonal angle 5-1/2 in long from the end of the roll to the outside edge. The width of the cut should be 4 in. - the same width as the side lap. (See illustration below)



Apply a 1/8 in. thick layer of TAM-PRO Q-15 Elastomeric Flashing Cement in the 6 in. wide lap area including the end lap cut area of the underlying sheet. Remove the release film and press the top sheet into the mastic. Be sure to apply TAM-PRO Q-15 Elastomeric Flashing Cement in the cut side lap area at each of the T-joints as the succeeding courses are applied. All end laps and T-joints adhered using TAM-PRO Q-15 Elastomeric Flashing Cement should be lightly rolled to ensure complete contact of the lap. Care should be taken to avoid too much pressure that might result in displacing the adhesive. All exposed adhesive in excess of 1/4 in. width should be covered with granules for AWAPLAN SA FR. For AWASTAR SA FR, all exposed adhesive in excess of 1/4 in. width should be covered with AWASTAR Touch-up.

Once the products have had a chance to bond, check all laps and joints for full adhesion. If the membrane can be lifted at any area it is not properly adhered. A seam probing tool can be used to check for small voids at the laps. If necessary, use a hand-held hot air welding tool and seam roller to heat the lap and press into place to ensure proper adherence at the lap.

Wrinkles, fishmouths, or other defects that occur must be cut out and repaired. The defect should be cut out and replaced with a full width piece that extends 6 in. on each side of the cut out area and is placed in a 1/8 in. thick layer of TAM-PRO Q-15 Elastomeric Flashing Cement to extend 6 in. beyond the cut out area.

Factory Splices: All factory splices must be cut out prior to installation. If inadvertently installed, factory splices must be cut out and replaced with a full-width piece of like material that extends 6 in. on each side of the splice and placed in a 1/8 in. thick layer of TAM-PRO Q-15 Elastomeric Flashing Cement.

Application of AWABASE SA, AWAPLAN SA FR and AWASTAR SA FR in temperatures below 60 degrees F requires hot air welding of the side laps to improve adhesion.

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8.6 HOT-ASPHALT APPLIED FIBERGLASS SBS MODIFIEDS

This section applies to the following TAMKO fiberglass reinforced SBS modified product: **VERSA-CAP FR**.

Interply moppings of asphalt will consist of approximately 23 lb. (+or-15%) per square for VERSA-CAP FR. The asphalt must be a minimum of 400 degrees F at the point of application. Asphalt meeting ASTM D 312 Type IV should be used for application of VERSA-CAP FR.

Side laps of the VERSA-CAP FR membrane should be 3 in. (consistent with the factory selvedge). The entire sheet, including the side lap must be totally adhered in hot asphalt with no void areas. A small amount of asphalt protruding from the side lap is acceptable and assists in the inspection when determining proper application. Care should be taken to avoid excessive amounts of asphalt at the lap. All exposed asphalt in excess of 1/4 in. width should be covered with granules. End laps of the VERSA-CAP FR membrane should overlap the underlying sheet by a minimum of 4 in. The protrusion of asphalt at the end lap is acceptable and provides a checkpoint for the proper application of the material. All end laps should be staggered or a full width modified cap sheet installed over each row of end laps.

VERSA-CAP FR should not be applied with asphalt that is below 400 degrees F at the point of application. Do not mop the asphalt more than 4 ft. in front of the roll. Immediately press the roll into the hot asphalt by applying pressure to the factory core in the roll.

To insure satisfactory performance, the VERSA-CAP FR can be unrolled and allowed to relax prior to the application. Alternatively, VERSA-CAP FR can be unrolled, cut into lengths of 12 to 18 ft. and allowed to relax and flatten prior to application.

8.7 BUILT-UP ROOFING

This section applies to the following TAMKO fiberglass ply sheet products: **TAM-GLASS PREMIUM or TAM-PLY IV.**

Interply moppings of asphalt should consist of approximately 23 lb. (+or-15%) per 100 sq. ft. of roof area. **Excessive interply moppings should be avoided as slippage may result.** Allow time for the asphalt to set up before walking on completed plies of glass felts. Displacement is inversely proportional to the set time.

The flood coat should be uniformly applied at the rate of approximately 60 lb. (+or-15%) per sq. ft. of roof area. Recommendations for weights as stated are based upon application under average conditions. Application at extremely low or high temperatures can result in variations from the prescribed limits. For roof deck surfaces or insulating material that absorb asphalt, the asphalt must be applied in a quantity sufficient to assure adequate adhesion.

The base ply in all specifications should not be allowed to remain open without surface protection. **Phased application of TAMKO commercial roofing materials is not acceptable.**

Application of surface coatings on the finished plies of fiberglass systems may be delayed up to 60 days without a glaze coat. Before the surfacing is applied, the roof must be dry and clean. **All roof drain areas should be glazed immediately upon installation.** When a felt laying machine is used, all felts and coated rolls should be rolled and broomed in place to firmly embed the sheet into hot asphalt. Care should be exercised to avoid heavy brooming of fiberglass ply sheets.

Sheets should not be “dropped” or nailed and turned back. End laps should not be less than 4 in. Excessive traffic on any roof is discouraged.

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9.0 SLOPE NAILING REQUIREMENTS

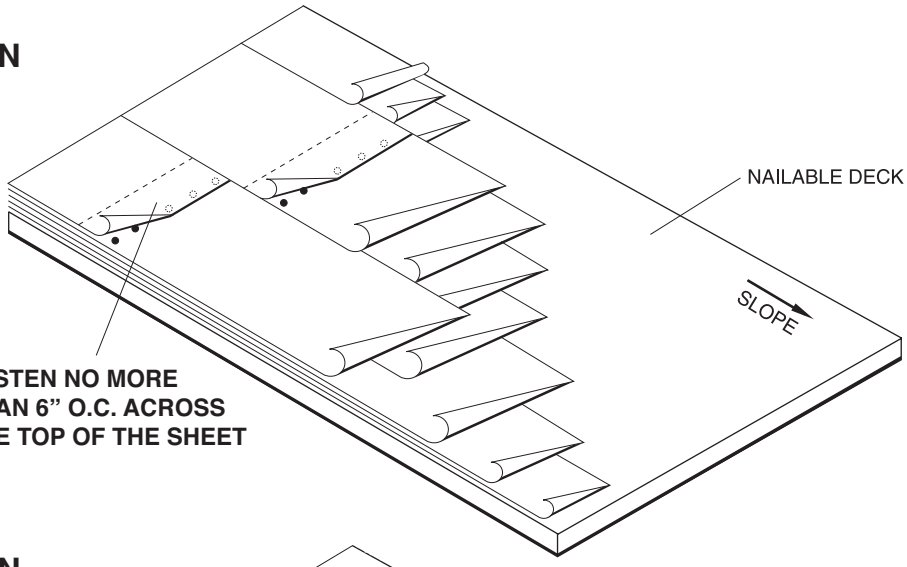
All nailing should be done through flat metal caps or with nails with attached caps of a minimum of 1 in. in diameter. Gravel surfacing on slopes exceeding 1-1/2 in. per 12 in. may experience movement of the M3 Adhesive and the designer may wish to choose an alternate surfacing method.

On nailable decks, all plies of roofing membrane on slopes exceeding 1 in. per ft. should be backnailed approximately 4 in. down from the upper edge at intervals not to exceed 24 in.

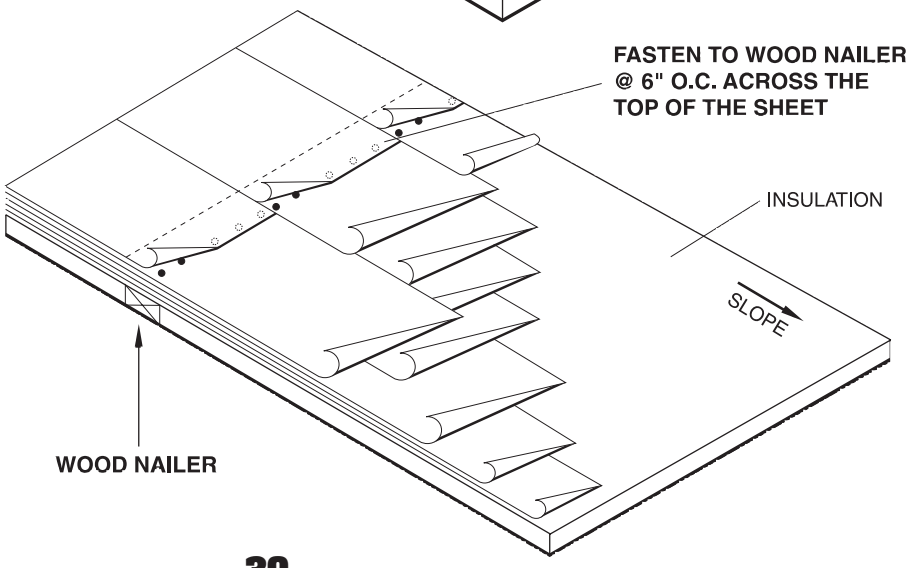
On non-nailabe decks or insulation, treated wood nailers should be provided on slopes exceeding 1 in. per ft. These nailers should be installed horizontally. Roofing felts are installed parallel to the slope. Roofing felts and all end laps are fastened in intervals of 6 in. across the width of the sheet to the nailer (see section 10.0). Spacing of wood nailers should not exceed the recommendations of the roof insulation manufacturer.

AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, AWAFLEX, AWAPLAN SA FR, AWASTAR SA FR or VERSA-CAP FR:
Fastening of the membrane is required at intervals of 6 in. across the top of the sheet on slopes above 3/4 in. per ft. The membrane should be applied parallel (i.e., strap) to the slope of the roof.
Fastening requirements for slopes over 3 in. per ft. should be obtained from the Technical Services Department.

SLOPE NAIL PATTERN NAILABLE DECK



SLOPE NAIL PATTERN NON-NAILABLE DECK



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BUILDING PRODUCTS

10.0 BASE PLY FASTENING

10.1 NAILING PATTERN

The standard nailing pattern for standard size base sheets applied to nailable type decks is illustrated below in diagram A. Nail the sheets along the lap at intervals of no more than 9 in. Stagger-nail on centers 18 in. along two lines located 12 in. from each edge of the standard size base sheet.

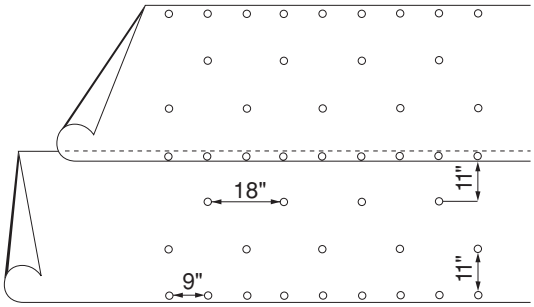

Diagram A Standard Base Sheet Nailing Pattern

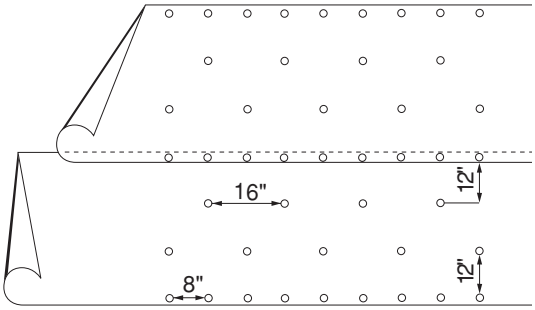

Diagram B Metric Base Sheet Nailing Pattern

The standard metric nailing pattern for metric size base sheets applied to nailable type decks is illustrated above in diagram B. Nail the sheets along the lap at intervals of no more than 8 in. Stagger-nail on centers 16 in. along two lines located 13 in. from each edge of the metric size base sheet .

When mechanically fastening AWA NAILBASE over a loose laid insulation board, the base sheet should be fastened in accordance with Diagram B Metric Base Sheet Nailing Pattern. Use appropriate insulation fasteners to mechanically fasten the base sheet through the insulation.

Wind conditions in some geographical locations may require increased fastening at critical areas of roof coverings, or the use of 3 in. plates. Factory Mutual data sheets 1-7, 1-28, 1-47, and 1-49 contain specific information regarding fastener and insulation pattern requirements. The responsibility for determining adequate fastening is that of the architect and/or engineer. Staple fastening systems are acceptable on wood decks when they comply with code requirements. Contact the Technical Services Department at 1-800-641-4691 for more information on base ply fastening.

10.2 FASTENER RECOMMENDATIONS

The following is a guide for fasteners to secure roofing sheets to nailable decks. TAMKO assumes no liability for the performance of the fastener or deck material.

Type of Roof Deck	Applicable Fasteners
Wood tongue-and-groove sheathing	Roofing nail, 1” cap minimum, ring shank
APA rated sheathing	Roofing nail, 1” cap minimum, ring shank
Gypsum-poured (1-7days)	Nail-Tite Type A
Gypsum poured (aged)	Tube-Loc or Do-All Nail Hardened, 1” cap minimum
Precast-metal edge plank	Do-All Nail hardened, 1” cap minimum
Lightweight insulating concrete	Insuldeck-Loc, Tube-Loc, or Es-Nail; 1” - 3” cap minimum
Structural wood fiber	Insuldeck Loc, Es-Nail or Tube-Loc Nail,; 1” cap minimum

For more information about fasteners, refer to the Sheet Membrane and Component suppliers to the Commercial Roofing Industry’s (SPRI) Fastener Selection Guide.

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11.0 ASPHALT

All asphalt, including modified mopping-grade asphalts, must meet ASTM D 312.

TAMKO endorses and recommends an identification system for mopping-grade asphalts and the use of such identification information. This information should be printed on the asphalt packages or bills of lading covering bulk asphalt should include:

1. ASTM D 312 Type I, II, III, IV
2. Flash point
3. Equiviscous temperature

TAMKO recommends that all asphalt be applied at the EVT temperature specific to the application method as printed on the asphalt cartons or bills of lading (For asphalt temperature requirements see Section 8.2 for AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, and AWAFLEX, or Section 8.6 for VERSA-CAP FR.)

Where a TAMKO specification calls for Type II asphalt and Type II is not available in the local area, Type III may be substituted.

Asphalt temperature should not be held above the finished blowing temperature for more than 4 hours. Temperature measurement equipment should be checked at periodic intervals to insure proper thermal treatment of the asphalt. Excessive heating can cause degradation of the asphalt.

Refer to individual specifications for asphalt type requirements.

ASTM D 312		Max-Slope	
Type	**Kind of Asphalt**	**BUR**	**Modified**
Type I	Dead-Level Asphalt	N/A	N/A
Type II	Flat Asphalt	up to 1/2"*	N/A
Type III	Steep Asphalt	up to 3"	up to 1/4"
Type IV	Special Steep Asphalt	up to 3"	up to 3"

* Except in FL, TX, NM, AZ, CA.

12.0 ROOFING CEMENTS, COATINGS, AND PRIMER

TAMKO offers TAM-PRO® products, a complete line of asbestos-free professional grade cements and coatings to further meet your roofing requirements. TAMKO also offers TAM-STAR and TAM-GUARD white elastomeric coatings, cement, and primer for jobs that require a bright white reflective surface. (see Section 3.1 for a complete list of products, descriptions, and certifications).

TAM-PRO, TAM-STAR or TAM-GUARD cements, coatings, and primers are required for use in all systems to be eligible to receive a TAMKO Roofing System Limited Warranty.

BECAUSE OF HEALTH CONCERNS OVER THE USE OF PRODUCTS CONTAINING ASBESTOS, TAMKO DOES NOT RECOMMEND, NOR ENDORSE THE USE OF SUCH PRODUCTS IN ITS SPECIFICATIONS. HOWEVER, SUCH CEMENTS AND COATINGS ARE COMPATIBLE WITH OUR SYSTEMS.

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13.0 APPLICATION OF SURFACING

Surfacing of the finished plies of fiberglass systems may be delayed up to 60 days without a glaze coat. Before the surfacing is applied, the roof must be dry and clean.

Aggregate: Approximately 400 lb. of gravel or 300 lb. of slag should be applied in approximately 60 lb. (+ -15%) of asphalt or 5 gal of M3 Adhesive per 100 sq. ft. of roof area. No more asphalt or adhesive should be spread or poured at one time than can be immediately covered with gravel or slag. Gravel or slag or other acceptable surfacing material should be 1/4 to 3/4 in. in size, substantially opaque, dry, and free from dust, loam or other foreign materials (comply with ASTM D 1863).

Smooth: Application of the surface coating for smooth-surfaced roofs shall follow TAMKO's recommendation for the particular specification used. The recommended product application rates are:

Fibered aluminum coating	1-1/2 to 2 gal./sq.
Emulsion coating	3 gal./sq.
Asphalt surface	20 - 25 lb./sq.
White elastomeric coating	2 gal./sq.

Granules or chopped fiberglass may be added to an emulsion coating at the option of the designer.

A waiting period of 30 to 60 days must be observed prior to applying aluminum or white elastomeric roof coating over an emulsion coating or streaking of the final surfacing may occur.

Asphalt glaze coating prior to the application of aluminum or emulsion coating is not recommended except in drain areas.

Smooth-surfaced roofing systems do require routine maintenance and periodic resurfacing. Frequency may vary depending on climatic and environmental conditions. Coating resurfacing is the responsibility of the building owner. TAMKO is not responsible for maintaining the roof, including maintaining the roof coating.

14.0 FLASHING

A flashing system is used to seal membrane edges at walls, expansion joints, drains, gravel stops, and other places where the membrane has been interrupted or terminated. TAMKO requires that the flashing materials for both modified and built-up roofing systems be a TAMKO polyester-reinforced modified asphalt flashing material.

Approved Flashing Materials: Because of their elasticity and toughness, AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, AWAFLEX and AWAPLAN SA FR are well suited for use as flashing materials.

AWAPLAN VERSA-SMOOTH with an accepted coating is a suitable alternate flashing material for AWAPLAN 170 FR, AWAPLAN 170, or AWAFLEX (see Sections 3.1 and 12.0 for coatings). Maintenance of the coating is required (see Section 33.0)

AWASTAR SA FR is acceptable for use as a flashing material for 1600 series specifications only.

VERSA-CAP FR, and AWAPLAN VERSAFLEX ARE NOT ACCEPTABLE FLASHING MATERIAL.

In situations where punctures or inordinate amounts of building movement are anticipated AWAPLAN PREMIUM or AWAPLAN PREMIUM FR should be used as the flashing material. For example: TAMKO details AWP-16 and AWP-18 must be constructed with granule-surfaced AWAPLAN PREMIUM or AWAPLAN PREMIUM FR only (see Section 31.0).

Consult the Technical Services Department regarding flashing details for 15-and 20-year System Limited Warranties. See Section 31.0 for more information on TAMKO Flashing and Construction details.

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15.0 COLD-WEATHER APPLICATION

Roof application below 40 degrees F can result in problems. Special measures must be taken to insure proper performance of the roofing system. Coated rolls may require additional handling as described below to relax the sheets during cold weather.

Any moisture that could cause poor adhesion, skips in mopping, or entrapment within the system must be removed from the substrate.

Since bitumens tend to chill quickly on a cold deck, components of the roofing system **must be installed rapidly**, close to the mop, well imbedded, and completely broomed. Bitumen must not be overheated to compensate for rapid cooling. All hoses, hoppers, and buggies should be insulated.

To insure satisfactory performance, TAMKO TAM-CAP mineral-surfaced cap sheet must not be applied if the ambient temperature is below 60 degrees F. TAMKO TAM-CAP must be unrolled, cut into lengths of 12 to 18 ft. and allowed to flatten and warm up prior to application.

AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, AWAFLEX, or VERSA-CAP FR installation at material temperatures below 50 degrees F requires precautions to insure satisfactory performance.

Moppings cool very quickly when applied to a cold roof deck or insulation, and cold AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, AWAFLEX, OR VERSA-CAP FR should not be applied with asphalt that is below 400 degrees F at the point of application.

Do not mop the asphalt more than 4 ft. in front of the roll. Immediately press the roll into the hot asphalt by applying pressure to the factory core in the roll.

AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, AWAFLEX, or VERSA-CAP FR may need to be unrolled and cut into lengths of 12 to 17 ft. to allow it to flatten and warm up prior to application. Storage in a heated area immediately prior to application is recommended.

Wrinkles in the field of the sheet are not uncommon occurrences with AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, or AWAFLEX application in cold weather. Wrinkles that are not fishmouths and are fully adhered should be left alone; this type of wrinkle will generally relax and disappear over time.

Do not apply AWABASE SA, AWAPLAN SA FR, or AWASTAR SA FR in temperatures below 45 degrees F. Membranes should be applied when temperatures are 45 degree F and rising.

AWABASE SA, AWAPLAN SA FR and AWASTAR SA FR may need to be unrolled and cut into lengths of 12 to 17 ft. to allow it to flatten and warm up prior to application. Storage in a heated area immediately prior to application is recommended.

Application of AWABASE SA, AWAPLAN SA FR and AWASTAR SA FR in temperatures below 60 degrees F requires hot air welding of the side laps to improve adhesion.

For further information concerning cold-weather application, contact the Technical Services Department at 1-800-641-4691.

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I6.0 EXPANSION JOINTS / ROOF AREA DIVIDERS / CONTROL JOINTS

Expansion Joints are designed into buildings to prevent the buildup of destructive stresses caused by expansion and contraction of the structural elements. The responsibility for determining the exact location and the number of roof expansion joints remains with the architect and/or engineer.

Expansion joints should be provided when the following conditions occur:

1. Whenever roof structures change direction, such as in L-shaped and U-shaped buildings or rectangles with interior courts.
2. Whenever the direction of the steel framing changes.
3. Whenever the deck material changes, as from steel to concrete.
4. Whenever additions are made to an existing building.
5. Whenever there is a difference in elevation of two adjoining decks.
6. Whenever a building's length exceeds 200 ft.
7. Wherever expansion or contraction joints are provided in the structural system.

This guide does not exhaust all possible conditions requiring expansion joints and is, therefore, not all-inclusive.

An effective waterproof seal must be provided to bridge the gap between areas of roofing separated by the joints. Expansion joint covers must provide continuity for the waterproofing membrane, and also accommodate the movement that occurs due to expansion and contraction (see Section 31.0 for construction details.)

Roof Area Dividers/Control Joints are designed to help relieve stress in areas of the roof system that do not feature the necessary expansion joints in the original building design. Roof Area Dividers/Control Joints are not the same as an expansion joint and should not be considered as such. If a Roof Area Divider/Control Joint is to be used, it should be raised and not interfere with proper drainage away from the joint. Contact the TAMKO Technical Services Department at 1-800-641-4691 for more information regarding this type of construction.

I7.0 ROOF WALKWAYS

On commercial roofs subjected to rooftop traffic (such as servicing of air conditioning units, and cleaning the roof drains), TAMKO recommends the use of AWAPLAN PREMIUM or AWAPLAN PREMIUM FR for walkway material to protect the commercial roofing membranes.

AWAPLAN walkways should be installed prior to the final surfacing on gravel-surfaced and smooth-coated built-up roofs, and final surfacing held back from the AWAPLAN walkway.

Walkway material on TAMKO limited-warranty jobs must be AWAPLAN PREMIUM or AWAPLAN PREMIUM FR.

Elevated walkways (with sleepers) should have a pad of AWAPLAN PREMIUM or AWAPLAN PREMIUM FR underneath each sleeper to protect the roof membrane from damage due to movement.

I8.0 TEST CUTS

Should cuts for testing purposes be required, such cuts should be taken before the final surfacing is installed so that proper and adequate repairs can be accomplished **(see ASTM procedures ASTM D 2829, ASTM D 3617).** TAMKO will not comment on any test cuts that cannot be shown to be statistically significant and representative of the roofing membrane construction.

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19.0 WATER CUTOFFS

Water cutoffs, consisting of 1 ply of TYPE 43 Coated Base Sheet or 2 plies of felt installed in moppings of asphalt extending onto the deck and insulation a minimum of 6 in., should be applied at the end of each day's work over all exposed edges of insulation.

On AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, AWAFLEX, or VERSA-CAP FR specifications, the finish ply of the membrane should be held back 12 in.; water cutoffs must not lap onto AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, AWAPLAN VERSA-SMOOTH, AWAPLAN VERSAFLEX, AWAFLEX, OR VERSA-CAP FR.

For TAMKO's Self-Adhered Roofing Systems the finish ply of the membrane should be held back 12 in. and a water cutoff consisting of a ply of AWABASE SA should be applied at the end of each day's work over all exposed edges of insulation. Water cutoffs may not lap onto the AWAPLAN SA FR or AWASTAR SA FR. The water cutoffs should extend a minimum of 6 in. onto the deck and over the field roofing. The AWABASE SA should be set in TAM-PRO Q-15 Elastomeric Flashing Cement when extending onto the deck or existing substrate.

These temporary protective measures must be removed cleanly from the insulation (top surface and vertical joint) and from the deck to insure tight insulation joints and level insulation surfaces before continuing the roof application.

20.0 COAL TAR BITUMEN PRODUCTS

CAUTION: TAMKO MODIFIED ASPHALT PRODUCTS MUST NOT BE ALLOWED TO COME INTO CONTACT WITH COAL TAR PITCH OR TARRED FELT AT ANY POINT.

21.0 PROTECTED ROOF MEMBRANE ASSEMBLIES (PRMS)

For information regarding TAMKO's acceptance of and/or requirements for protected roof membrane systems, please contact the Technical Services Department at 1-800-641-4691.

22.0 REROOFING: COMPLETE TEAR-OFF

A complete tear-off is always the preferable method of reroofing. It allows the inspection of the substrate and the correction of any damaged or decayed areas. In addition, drainage can be improved as needed.

When a complete tear-off is chosen, all requirements for a new structure should be followed (see Sections 4.0-24.0), and a suitable roofing system specified for the situation (see Sections 25.0-30.0). New flashing must also be installed.

23.0 REROOFING: RE-COVER SYSTEMS

23.1 GENERAL

Several factors enter into the decision to reroof over the existing membrane. In general, re-covering may be accomplished if the original roofing system is securely attached to the deck and is not badly deteriorated, and if the deck and insulation are in good condition and do not contain moisture. Installation of a re-cover system over an existing system that contains moisture may result in blistering of the re-cover system. TAMKO assumes no responsibility for the performance of a re-cover system installed over an existing system that contains moisture.

TAMKO will not be responsible for any cost related to the removal or abatement of any asbestos present in the existing roofing system to which the TAMKO roofing system is applied.

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23.1 GENERAL (CONTINUED)

Proper and adequate drainage of the roof surfaces is critical to insure good roof performance. The addition of a tapered insulation system or additional drains may be necessary to insure adequate drainage of the new roofing system. Positive drainage is required (see Section 4.1).

The decision to roof over or remove an existing roofing system should be based on a complete survey of the existing roof assembly, the condition of the underlying deck and support structure, and any extenuating circumstances that might preclude a complete tear-off.

A re-cover system can be used if some form of separation of the existing and new systems is used to prevent transmission of stress from the old roof to the new roof. A re-cover system cannot be used if there is more than one existing roof in place.

All limited warranties on re-cover systems will be limited to fixed dollar amount limited warranties. Contact the Technical Services Department for more information at 1-800-641-4691. TAMKO WILL NOT ISSUE A LIMITED WARRANTY ON A RE-COVER SYSTEM WITHOUT PRIOR ACCEPTANCE OF THE EXISTING ROOF AND THE RE-COVER SYSTEM TO BE USED. QUESTIONS REGARDING THIS REQUIREMENT SHOULD BE DIRECTED TO THE TECHNICAL SERVICES DEPARTMENT.

Self-Adhered Roofing Systems are not eligible to be installed over a recover system.

23.2 PREPARATION REQUIREMENTS FOR RE-COVER

The following procedures for roofing over existing membranes are recommended by TAMKO to prepare for the re-cover:

1. If the existing roofing system is gravel surfaced, spud it clean until the surface is smooth. All surfaces must be free of dirt, dust and debris, and primed with asphalt primer at the rate of approximately 3/4 gal. per 100 sq. ft. when hot asphalt is to be used. Do not prime if existing system is a coal tar pitch system.
2. All wet or deteriorated insulation and/or roofing plies must be removed and replaced with new material.
3. All insulation materials must be vented by making random cuts in the existing membrane prior to the application of new roofing materials.
4. All buckles, ridges, folds, blisters, etc., must be cut out and a smooth, even surface provided.
5. All old flashing must be torn out and stripped from all walls, curbs, and objects which shall then be cleaned, repaired, primed, or otherwise conditioned to conform with the flashing requirements of the new construction. All old edge detail work should be removed and a new edge detail installed above the new waterline. If possible, a low-profile metal edge detail (see Section 31.0, AWP-9 or AWP-10) should be used in lieu of a gravel stop detail, as this design shows far better overall performance. Remove existing lead flashings and install new lead flashings at all plumbing vent stacks and roof drains. Any flanged units such as heater vents should receive flashing with flanges resting on new membrane, stripped in with either AWAPLAN PREMIUM, AWAPLAN PREMIUM FR, AWAPLAN 170 FR, AWAPLAN 170, or AWAFLEX FR.
6. Roof insulation stops and wood nailers must be installed as required in flashing details.

23.3 RE-COVER <u>WITH</u> ADDITIONAL INSULATION / RE-COVER BOARD

1. Over the existing membrane that has been prepared for re-cover as detailed in Section 23.2, either mechanically attach or embed one layer of fiberboard, perlite reroof board, or a fiberglass re-cover roof board in a full pour of hot steep asphalt. Alternatively, isocyanurate insulation may be used when overlaid with a layer of fiberboard, perlite, or fiberglass roof insulation. **Any insulation board greater than 4' x 4' must be mechanically attached**. When reroofing over an existing APP modified roofing system, the first layer of insulation must be mechanically fastened.
2. The appropriate modified asphalt roofing specification should be applied over reroof insulation board (see roofing specifications in Sections 25.0-30.0). For possible exceptions contact the Technical Services Department at 1-800-641-4691.

23.3 RE-COVER WITH ADDITIONAL INSULATION / RE-COVER BOARD (CONTINUED)

3. New flashing must be installed (see Section 31.0)
4. For a U.L. rating, an insulated system may be installed over an existing U.L. Classified system only when the existing insulation is listed as acceptable with the new system and the total insulation thickness of both systems (existing and new) does not exceed the maximum thickness allowed by the new system.

23.4 RE-COVER WITHOUT ADDITIONAL INSULATION / RE-COVER BOARD

1. Over the existing membrane that has been prepared for re-cover as detailed in Section 23.2, install the appropriate re-cover specification (see Section 25.0). When reroofing over an existing APP modified roofing system, the base sheet must be mechanically fastened.
2. One-way roof vents may be installed to relieve the buildup of vapor pressure at a minimum of one vent for each ten squares of roof area.
3. New flashings must be installed (see Section 31.0).
4. **CAUTION: TAMKO MODIFIED ASPHALT PRODUCTS MUST NOT BE ALLOWED TO COME INTO CONTACT WITH COAL TAR PITCH OR TARRED FELT AT ANY POINT.**

24.0 LIMITED WARRANTIES

24.1 PRODUCT LIMITED WARRANTIES

TAMKO offers no-cost Product Limited Warranties to protect the owner against leaks that result from manufacturing defects on many TAMKO products. The length of coverage will vary from 5 to 15 years, depending on the specific product (see Section 3.0)

24.2 ROOFING SYSTEM LIMITED WARRANTIES

For a fee, TAMKO offers Roofing System Limited Warranties covering leaks that result from either material or workmanship defects. The length of coverage will vary from 5 to 20 years, depending on the product and specification. For Self-Adhered Roofing Systems, TAMKO offers a Premium Roofing System NDL Guarantee (A Limited Warranty) covering leaks that result from either material or workmanship defects. The length of coverage ranges from 5 to 12 years, depending on the product and specification. TAMKO Building Products, Inc. will issue a Roofing System Limited Warranty for a roof, but only if the roof is approved by TAMKO, conforms to the current published TAMKO requirements and recommendations, and is installed by a **TAMKO APPROVED ROOFING CONTRACTOR (TARC)** or a **TAMKO REGISTERED CONTRACTOR (TRC)**. Specimen copies of Roofing System Limited Warranties are available from TAMKO Building Products, Inc., P.O. Box 1404, Joplin Missouri 64802 or by visiting our **Web site at www.tamko.com.**

TAMKO offers Premium Coverage Roofing System Limited Warranties covering leaks that result from either material or workmanship defects, including insulation. The length of coverage will vary from 5 to 20 years, depending on the product and specification. The Premium Coverage Roofing System Limited Warranties are offered for a fee and only through TAMKO APPROVED ROOFING CONTRACTORS (TARC). Contact the TAMKO Technical Services Department at 1-800-641-4691 for more information or a list of approved insulations included in this program.

All 20-year Roofing System Limited Warranties apply to new construction and/or complete tear-off. **All insulated decks for 15- and 20-year systems require a minimum of two layers of insulation. The top layer of insulation must be mopped or adhered with insulation adhesive.** For 15- and 20-year Roofing System Limited Warranties, flashing details must be completed with AWAPLAN PREMIUM or AWAPLAN PREMIUM FR. For further information, contact the Technical Services Department.

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24.3 EXCEPTIONS

TAMKO will not issue Roofing System Limited Warranties on the following: Individual residences, cooperative apartments, heated tanks, storage silos, dry kilns, car wash buildings, swimming pools, and other structures with abnormally high humidity conditions.

Cold-Storage and Cooler Buildings:

Roofing System Limited Warranties will not be issued on roofs applied over cold-storage or cooler-building areas when the freezer or cooler insulation is used as a base to receive the roof. Complete separation of the freezer or cooler units from the roof deck construction is necessary, and ventilation between the two must be provided.

Cooling Towers:

Areas under and around cooling towers can be damaged by chemicals and other agents that are placed in the water that circulates through the cooling tower. TAMKO Roofing System Limited Warranties do not cover leaks or damage resulting from chemical attack. To reduce chemical attack to the roofing membrane, install an additional ply of granule-surfaced AWAPLAN PREMIUM or AWAPLAN PREMIUM FR in hot asphalt and a flood coat of asphalt and gravel on top of the new membrane. This ply of AWAPLAN PREMIUM or AWAPLAN PREMIUM FR can serve as a sacrificial sheet to help protect the waterproofing membrane from damage.

24.4 ROOF MAINTENANCE

Regular maintenance is critical to the performance of a roof. Leaks caused, in whole or in part, by failure to perform proper roof maintenance are not covered under, and may result in cancellation of, the TAMKO Roofing System Limited Warranty. Costs associated with investigation and/or repairs of leaks which are the result of a failure to properly maintain a roof shall be the responsibility of the building owner. For further information about proper roof maintenance see Section 33.0.

24.5 ROOFING SYSTEM SPECIFICATIONS QUICK REFERENCE CHART

Beginning on the next page is the Roofing System Specifications Quick Reference Chart designed to provide a quick overview of the TAMKO SBS Modified and Built-up roofing system specifications including limited warranty periods, product and attachment components, additional surfacing requirements, and the number of plies in the roofing system. The specs are grouped by construction type and nailable or insulated substrate type.

TAMKO Roofing System Limited Warranty charges are also listed on the final page of this reference chart (See page 37). For more information contact the TAMKO Technical Services Department at 1-800-641-4691.