



## **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 by the Built-Up Roofing Committee of the Asphalt Roofing Manufacturers Association. 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.

#### **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.

#### **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 Nailite 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 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). 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 nonventing 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



## 4.5 METAL DECKS (CONTINUED)

Mutual Loss Prevention Data 1-28.

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.

**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.

## 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.

## 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. 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, and modified systems are acceptable to receive a TAMKO Roofing System Limited Warranty.



#### **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.

### **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.**