ASPHALT ROOFING MANUFACTURERS ASSOCIATION

TECHNICAL BULLETIN

Decking Recommendations for Built-Up Roofing and Modified Bitumen Membranes

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Introduction

The Asphalt Roofing Manufacturers Association (ARMA) recommends that the structural roof deck meet certain minimum requirements to be an acceptable substrate for the specified roofing system. Generally, all decks should be clean, dry, and securely fastened to the building structure with no abrupt level changes exceeding 1/8". Roof deck deflection should never exceed 1⁄240 of the span under total design loads — including rooftop traffic. Requirements of the roofing system manufacturer, insurer and local building code must also be met when designing and applying the roofing system.

The following are suggested for various roof deck types:

I. Steel Decks

Steel decks should be installed in a way that allows the rib spacing to be uniform and straight so that: (1) the roof insulation boards may be laid with side joints parallel (with end joints perpendicular to the ribs); and (2) the roof insulation edge is supported by the flanges.

Deck specifications shall comply with all applicable code requirements. They should also meet the requirements of the Underwriters Laboratories "Building Materials Directory" and, when applicable, the requirements found in Factory Mutual Global's RoofNav and "Property Loss Prevention Data Sheet 1-28."

II. Wood Decks

(A) Wood Planks: Wood deck material should consist of kiln-dried, tongue and groove, ship-lapped, or splined boards. All boards must have a bearing on rafters at each end and be securely fastened. They should have a minimum of splits and knotholes, and under no circumstances can these boards be warped or cupped. All holes over 1⁄4" should be appropriately covered. Individual boards must not exceed 8" width and must be no less than 1" thick (nominal). There should be a 1⁄8" space between boards to allow for expansion. Wood deck preservatives and/or treatments must be compatible with the type of bitumen used.

(B) Plywood and Oriented Strand Board (OSB) Decks: Individual roofing manufacturers approve either or both plywood and OSB Performance Rated Panels for use as sheathing. These panels should be a minimum thickness of 7⁄16" for OSB and 15⁄32" for plywood. The panels must be manufactured with a water-resistant adhesive and should

be labeled “Exposure 1”. There should be a minimum of holes and voids within and on the surface. The panels should also be marked properly as “Performance Rated Panels” by either APA – The Engineered Wood Association or another recognized testing agency. Install so that all edges are supported or clipped to the adjacent sheet. *Fire treated plywood and particle boards are not recommended.

III. Concrete Decks

(A) Poured Structural Concrete Decks: These decks typically vary from 4” to 12” in thickness and must be properly cured prior to application of a roofing system (normally a minimum of 28 days). Curing agents must be checked for compatibility with the roofing system to be installed. After installation, the underside of these decks must continue to remain unobstructed and should be exposed, or they should be poured over vented metal forms to allow the escape of water vapor. A primer compatible with the bitumen or adhesive used to install the roof system should be used on these decks.

(B) Pre-cast Structural Concrete Decks: Joints must be filled with a masonry grout to correct imperfections between slabs and feathered to provide a slope of not greater than 1/8” per foot. When the membrane or roof insulation is adhered directly to the deck, use a concrete bituminous primer that meets the membrane manufacturer’s requirements and is compatible with the type of bitumen used.

(C) Pre-stressed Concrete Decks: Because of variation in camber and thickness of pre-stressed concrete decks it is recommended that a minimum 2” lightweight concrete fill be installed over these decks.

(D) Lightweight Structural Concrete Decks: Refer to ARMA’s Lightweight Structural Concrete Roof Decks Statement, which can be found here.

IV. Lightweight Insulating Concrete Decks

Lightweight insulating concrete decks, which are placed as a slurry, contain more moisture than many other roofing substrates. Retained moisture may contribute to problems with the roofing systems installed over such decks when proper precautions are not taken.

When these decks are used as a substrate for built-up or modified bitumen roofing, the following should be considered:

- When lightweight insulating concrete is poured over a galvanized metal deck, the metal deck should be perforated to provide underside venting. Topside pressure relief is also suggested.
- The base ply of the roofing system should be attached using appropriate mechanical fasteners.
- Pull-through resistance for fasteners should comply with the membrane manufacturer’s

requirements.

- The deck applicator and deck manufacturer should certify, in writing, that the roof deck was installed in accordance with the deck manufacturer's recommendations and is satisfactory to receive the roofing system.
- The roofing contractor should install the roof in accordance with the roofing manufacturer's recommendations for application over lightweight insulating concrete decks.

V. Cementitious Structural Wood Fiber Decks

These decks should be bonded by binders that are not affected by water. The units should be attached to the building structure with mechanical fasteners to prevent movement and to provide the required uplift resistance. The base ply should be attached using fasteners recommended by the structural wood fiber and base ply manufacturers.

Typically, manufacturers do not recommend that insulation or a membrane be fully adhered to these decks. The roofing contractor should install the roofing system in accordance with the roofing manufacturer's recommendations.

VI. Poured Gypsum Concrete Deck

Gypsum is a mineral, calcium sulfate, which is initially heated to remove hydrated water which it readily reabsorbs when being made into panels or being poured in the field. A more common name is plaster. Upon adding water, rehydration occurs and the gypsum sets up into a monolithic nailable substrate. Reinforcing wood chips and shavings are usually added for additional strength. Gypsum is noncombustible and nailable when fresh. Gypsum decks were manufactured as precast panels or poured in place in the field. Gypsum decks are typically a minimum of 2" thick. Most gypsum deck projects will be reroofs or tear-off.

The precast panels are generally designed with tongue and groove edges that reinforce adjacent panels and accommodate bulb-T roof truss construction. Precast panels harden significantly upon aging.

Poured deck systems contain some excess water; provisions must be made for moisture to escape so as to avoid related moisture problems for roofing systems. Roofing systems should be attached to this deck using a nailed base sheet. Special fasteners are available for this purpose. Direct solid attachment of the roof membrane to this deck is not recommended; occasional shrinkage cracks in the deck could result in splits in the roof membrane.

Typically, manufacturers do not recommend that insulation or a membrane be fully adhered to

these decks. The roofing contractor should install the roofing system in accordance with the roofing manufacturer's recommendations.