



Standard Practice for Application of Heat Weldable Atactic Polypropylene (APP) Modified Bituminous Waterproofing Membranes Systems for New Building Decks¹

This standard is issued under the fixed designation D6950/D6950M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

^{ε1} NOTE—Units information was editorially corrected in January 2013.

1. Scope

1.1 This practice covers the minimum application recommendations for heat weldable atactic polypropylene (APP) modified bituminous systems used as part of a new horizontal waterproofing system over occupied spaces of buildings where covered by a separate wearing course.

1.2 For the purpose of this practice, the substrate shall be structurally sound, sloped to drain, able to accept the weight of the membrane and other system materials, and meet the local building code requirements. Similarly, all components of the waterproofing system are assumed to comply with any federal, state, and local environmental regulations that may be in effect at the time of installation. Expansion joints, insulation, drainage layers, protection boards, filter sheets, and the wearing surfaces are beyond the scope of this practice.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

¹ This practice is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.22 on Waterproofing and Dampproofing Systems.

Current edition approved July 1, 2004. Published January 2013. Originally approved in 2004. Last previous edition approved in 2004 as D6950 – 04. DOI: 10.1520/D6950_D6950M-04R12E01.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D41 Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing

D1079 Terminology Relating to Roofing and Waterproofing

D4586 Specification for Asphalt Roof Cement, Asbestos-Free

D5295 Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems

D5898 Guide for Details for Adhered Sheet Waterproofing

D5957 Guide for Flood Testing Horizontal Waterproofing Installations

D6222 Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements

D6223 Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements

D6451 Guide for Application of Asphalt Based Protection Board

D6506 Specification for Asphalt Based Protection Board for Below-Grade Waterproofing

2.2 *American Concrete Institute Standard:*

ACI 301 Specifications for Structural Concrete for Buildings³

2.3 *FMRC Standard:*

FM 4470 Approval Standard, Class Roof Covers, latest edition; where applicable for corrosion resistant components⁴

3. Terminology

3.1 Definitions:

3.1.1 For definition of terms, see Terminology D1079.

3.1.2 *construction joint*—a butt joint formed in a structural slab in order to end one pour and start another pour later. The

³ Available from American Concrete Institute (ACI), P.O. Box 9094, Farmington Hills, MI 48333-9094, <http://www.concrete.org>.

⁴ Available from Factory Mutual Research, 11511 Boston-Providence Turnpike, P.O. Box 9102, Norwood, MA 02062-9102.

joint is usually a cold joint and maybe held together with reinforcing steel in the slab, or the steel may be discontinuous by design.

3.1.3 *heat welding*—the attachment and joining of the modified bitumen membrane sheet by heating its surface with a torch, hot air, or other means of direct thermal contact.

4. Significance and Use

4.1 This practice provides general procedures, information, guidelines, and precautions for the application of heat welded modified bituminous waterproofing systems used as part of a new horizontal waterproofing system.

4.2 This practice is not all-inclusive and is intended only to supplement detailed instructions from designers and system manufacturers.

4.3 The horizontal (low sloped) deck or substrate referred to in this practice is reinforced cast-in-place structural concrete.

5. Delivery of Materials

5.1 Deliver materials in the manufacturer's original unopened packages and containers.

5.2 All materials or material packaging must be clearly marked in a weather-resistant manner with type, stock, or lot number, and other pertinent information (for example: thickness, size, weight, manufacturer's name, ASTM specification) and other related information as required by the purchaser.

6. Storage and Handling of Materials

6.1 Store materials on raised platforms or pallets. Store rolls on end with selvage ends up. Materials shall be stored in a dry, ventilated, and weatherproof location. Avoid damage or embedment of foreign materials.

6.2 Store membrane materials to prevent system supplier's markings from being destroyed.

6.3 Store primer in tightly closed original containers at temperatures recommended by the system supplier. Do not transfer contents of one container to another container. Do not mix different materials. Do not thin primer, except as directed by the system manufacturer.

6.4 Modified bituminous rolls and other materials are to be brought to the job site in good condition, handled so as not to be damaged. Materials improperly stored or that become wet or damaged shall be identified, marked, and removed from the site.

7. Environmental Conditions

7.1 Do not install sheet material during inclement weather, on wet or frost-covered surfaces, during rainfall, blowing dust, or high winds that will inhibit or interfere with sheet material adhesion.

7.2 Follow recommendations of system supplier for system application procedures when ambient temperatures are below 5°C [40°F].

7.3 Surfaces to receive the membrane shall be protected from dirt and debris.

8. Materials

8.1 *Modified Bituminous Sheet*—Prefabricated modified bituminous sheets reinforced with either polyester or glass fiber fabrics or a combination of the two which use atactic polypropylene (APP) as the primary modifier and meet the requirements of Specification **D6222** or **D6223**.

8.2 *Primer*, asphalt primer. See Specification **D41**.

8.3 *Roof Cement*, asphalt roof cement, asbestos-free. See Specification **D4586**.

8.4 *Protection Board*, asphalt based protection board. See Specification **D6506**.

8.5 *Mechanical Affixments*—The mechanical fasteners and stress distribution bars or strips specified for use in the system must meet the corrosion guidelines outlined in FMRC Standard 4470.

9. Substrate Preparation

9.1 The structural slab should have a finish of sufficiently rough texture to provide a mechanical bond for the membrane but not so rough to preclude achieving continuity of the membrane across the surface. At a minimum, ACI 301 float finish is required with ACI 301 trowel finish preferred, deleting the final troweling.

9.2 Surfaces to receive modified bituminous sheets are to be frost-free and dry, clean, and free of contaminants such as dirt, debris, loose material, cracks, voids and sharp projections which would prevent satisfactory installation. See Guide **D5295**, Sections 5, 6, and 7, for repairs, surface preparation, and evaluation.

9.3 Apply primer at the rate of 0.4 to 0.8 L/m² [1 to 2 gal/100 ft²] or as recommended by system supplier/manufacturer. Allow to dry. Minimum drying time is one hour or as recommended by manufacturer. Drying time of primer varies with temperature and humidity conditions.

9.4 After the primer is applied and has dried, the area must be covered with the modified bituminous sheets on the same day or the substrate must be reprimed.

9.5 Areas that become contaminated by dust, dirt, or other foreign material that would interfere with the satisfactory installation or performance of the system shall be cleaned and reprimed.

9.6 Seal joints with waterstop, joint filler, and sealant. Install a minimum 150-mm [6-in.] wide ply of modified bitumen sheet over joint or substrate cracks that are 2 mm [¹/₁₆ in.] in width or greater.

9.7 At construction joints, install a minimum 150-mm [6-in.] wide ply of modified bituminous sheet over the joint.

10. Membrane Installation

10.1 General:

10.1.1 Prior to installation, it is recommended that plans be prepared indicating dimensions, layout, and sheet orientation. Plans shall indicate drainage patterns, drains and other appurtenances. See Guide **D5898** for typical details.

10.1.2 Drawings shall include details at drains, penetrations, internal and external corners, and other membrane terminations.

10.1.3 Use care and diligence during installation to avoid damaging the prepared substrate.

10.1.4 Protect adjacent membrane or building components from damage including newly installed membrane from construction traffic.

10.2 *Horizontal Sheet Membrane Application:*

10.2.1 Apply membrane starting at the low point so that laps shed water. Lap edge seams 75 mm [3 in.] minimum. Lap end seams 150 mm [6 in.] minimum. When installing more than a one ply system, install the second and consecutive plies with an offset of one-half the sheet width from the immediate underlying ply. Stagger end laps 300 mm [12 in.] minimum.

10.2.2 Unroll sheets, straighten wrinkles, and remove wrappings and labels. Allow the sheet to relax for a minimum 30 min and reroll. Heat weld by directing flame or heat at lower quadrant of roll to heat substrate and liquefy bitumen on the sheet without overheating. Set membrane firmly and uniformly to substrate to minimize voids and wrinkles. Seal laps while bitumen is molten to achieve a continuous 3 to 6 mm [$\frac{1}{8}$ to $\frac{1}{4}$ in.] width of bituminous flow-out. Feathering of side or end laps is not required or accepted.

10.2.3 When installing a 2-ply or more sheet membrane system, apply heat to the previously installed sheet as well as the side and end laps to provide adhesion to the succeeding sheets.

10.2.4 Apply a 150 by 150 mm [6 by 6 in.] modified bituminous sheet as a reinforcing flashing sheet over all T-joints at the end of each workday.

10.2.5 Check laps with pointed trowel and re-fuse where opened. Seal laps while sheet is still warm by pressing with a heated blunt-nose trowel.

10.2.6 Minimize roof traffic after installation of membrane to avoid damage to the membrane.

10.3 *Corners (Treatment Prior to Installing Sheets):*

10.3.1 Prior to installation of waterproofing membrane, apply a 300-mm [12-in.] wide modified bituminous sheet as reinforcement at corners. Position sheet to extend a minimum 150 mm [6 in.] in each direction of corner.

10.4 *Flashing:*

10.4.1 Install a minimum of 2 plies of modified bituminous sheets where waterproofing membrane terminates at walls, penetrations, and curbs. Prime substrate surfaces to receive modified bituminous sheets.

10.4.2 Lap first ply of flashing sheet onto the waterproofing membrane 100 mm [4 in.] minimum. Extend the second ply 100 mm [4 in.] minimum beyond the edge of the first ply. The flashing membrane shall extend vertically 200 mm [8 in.] minimum above the finished wearing surface or grade.

10.4.3 Heat the back of the sheet to liquefy bitumen. Press into place to obtain uniform adhesion. Seal laps while bitumen is molten to achieve a continuous 3 to 6 mm [$\frac{1}{8}$ to $\frac{1}{4}$ in.] width of bitumen flow-out. Check laps with pointed trowel and re-fuse where opened. Seal laps while sheet is still warm by pressing with a heated blunt-nose trowel. Feathering of side or end laps is not required or accepted.

10.4.4 Terminate the top of the flashing sheet with appropriate fasteners, spaced 150 mm [6 in.] maximum on center. Apply asphalt roof cement to seal top of membrane edge. Cover membrane flashing with counterflashing.

10.4.5 At drains, install a 900 mm [36 in.] square modified bitumen flashing sheet. Apply asphalt primer to metal surfaces to receive sheet. Prime drain flange. Extend horizontal waterproofing membrane over sheet collar and under clamping ring.

10.4.5.1 At drains installed through a deck sleeve, install lead flashing over modified bituminous sheet collar. Prime top and bottom of lead sheet prior to installation.

11. Inspection and Repair

11.1 Inspect membrane before placement of protection board, insulation, or overburden. Repair membrane as required. Patch punctures, tears, seams, and other deficiencies with membrane. Patches shall extend 150 mm [6 in.] beyond the defect.

11.2 Flood test in accordance with Guide **D5957**. Segment the test areas with temporary containment assemblies to achieve the required water depth. Record leaks and repair after membrane has dried and retest. Submit a written report of the test.

12. Protection

12.1 Install protection board in accordance with Specification **D6451**. Apply board over horizontal and vertical surfaces to protect from damage.

12.2 Install protection board within 24 h after completion of inspection and flood test.

13. Keywords

13.1 heat weld; modified bituminous; waterproofing

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