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Standard Guide for Application of Fully Adhered Hot-Applied Reinforced Waterproofing Systems[1]

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1. Scope

1.1 This guide covers the minimum installation recommendations for fully adhered, hot-applied reinforced waterproofing systems on vertical and low-slope (plaza deck) surfaces.

1.2 For the purpose of this guide, the substrate is assumed to be concrete or masonry, structurally sound, able to accept the weight of anticipated loads, and meets 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, and overburden are beyond the scope of this guide.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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 requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C981 Guide for Design of Built-Up Bituminous Membrane Waterproofing Systems for Building Decks
D41 Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
D43 Specification for Coal Tar Primer Used in Roofing, Dampproofing, and Waterproofing
D173 Specification for Bitumen-Saturated Cotton Fabrics Used in Roofing and Waterproofing
D226 Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
D227 Specification for Coal-Tar-Saturated Organic Felt Used in Roofing and Waterproofing
D449 Specification for Asphalt Used in Dampproofing and Waterproofing
D450 Specification for Coal-Tar Pitch Used in Roofing, Dampproofing, and Waterproofing
D1079 Terminology Relating to Roofing and Waterproofing
D1327 Specification for Bitumen-Saturated Woven Burlap Fabrics Used in Roofing and Waterproofing
D1668 Specification for Glass Fabrics (Woven and Treated) for Roofing and Waterproofing
D2178 Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
D2822 Specification for Asphalt Roof Cement, Asbestos-Containing
D4022 Specification for Coal Tar Roof Cement, Asbestos Containing
D4586 Specification for Asphalt Roof Cement, Asbestos-Free
D4990 Specification for Coal Tar Glass Felt Used in Roofing and Waterproofing
D5295 Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems
D5643 Specification for Coal Tar Roof Cement, Asbestos Free
D5726 Specification for Thermoplastic Fabrics Used in Hot-Applied Roofing and Waterproofing
D5898 Guide for Details for Adhered Sheet Waterproofing
D5957 Guide for Flood Testing Horizontal Waterproofing Installations
D6152 Specification for SEBS-Modified Mopping Asphalt Used in Roofing
D6162 Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements

[1] This guide 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.

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[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.

D6163 Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements
D6164 Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements
D6451 Guide for Application of Asphalt Based Protection Board
D6506 Specification for Asphalt Based Protection Board for Below-Grade Waterproofing

2.2 *Other Documents:*
CAN/CGSB-37.50 Hot-Applied, Rubberized Asphalt for Roofing and Waterproofing[3]
CAN/CGSB-37.51 Application for Hot-Applied Rubberized Asphalt for Roofing and Waterproofing[3]

3. Terminology

3.1 *Definitions*—For definitions of terms used in this guide, refer to Terminology D1079.

4. Classification

4.1 The following types are used to identify the waterproofing systems included in this guide.

4.1.1 *Type I*—Membranes consisting of hot-applied coal tar pitch, and two or more layers of organic or inorganic felts or fabrics.

4.1.2 *Type II*—Membranes consisting of hot-applied asphalt, and two or more layers of organic or inorganic felts or fabrics.

4.1.3 *Type III*—Membranes consisting of hot-applied asphalt or polymer-modified asphalt, and one or more polymer-modified bitumen sheets. The sheets are typically SBS-modified bitumen and may be reinforced with fiberglass, or polyester, or both.

4.1.4 *Type IV*—Membranes consisting of hot-applied polymer-modified asphalt, and fabric reinforcement.

5. Significance and Use

5.1 This guide outlines general procedures and precautions for the application of fully adhered hot-applied built-up reinforced waterproofing systems.

5.2 This guide is not all inclusive and is intended only to supplement detailed instructions from designers, and the recommendations of manufacturers. Manufacturers of some of the systems addressed by this guide require proprietary products and special procedures not described in this guide. Manufacturers' recommendations should therefore be considered in the application of this guide.

5.3 For design guidelines, consult Guide C981.

6. Delivery of Materials

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

6.2 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, size, manufacturer's name, ASTM specification, flash point, equiviscous temperature, or other application information.

7. Storage and Handling of Materials

7.1 Store materials on raised platforms or pallets. Store rolls vertically or horizontally, as recommended by the roll manufacturer. Store materials in a dry, ventilated and weatherproof location. Avoid damage or embedment of foreign materials.

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

7.3 When used as part of the system, store primer and mastic in tightly closed original containers at temperatures recommended by the system supplier.

8. Safety Precautions

8.1 Safety precautions include, but are not limited to: wear protective clothing, vent fumes especially in confined spaces, avoid contact with hot bitumen, do not use flammable materials near an open flame or near equipment that may produce sparks or open flames. Obtain and refer to MSDSs for further safety precautions.

9. Environmental Conditions

9.1 Installation can proceed when conditions agreed upon by the owner, producer or system supplier, installer, and specifier are met.

9.2 Conditions that may interfere with the installation and performance of the waterproofing include: inclement weather, wet or frost-covered surfaces, dirty or dusty surfaces, high winds, and temperatures above or below a workable range for the products to be installed.

10. Materials

10.1 *Type I:*
10.1.1 Coal-tar primer: Specification D43.
10.1.2 Coal-tar pitch: Specification D450.
10.1.3 Felts: Specification D227 or D4990.
10.1.4 Coal-tar-treated glass fabric: Specification D1668, Type II.
10.1.5 Coal-tar-saturated cotton fabric: Specification D173.
10.1.6 Coal-tar-saturated burlap fabric: Specification D1327.
10.1.7 Coal-tar flashing cement: Specification D4022 or D5643.
10.1.8 Protection board: Specification D6506.

10.2 *Type II:*
10.2.1 Asphalt primer: Specification D41.
10.2.2 Asphalt: Specification D449.
10.2.3 Felts: Specification D226 or D2178.
10.2.4 Bitumen-saturated cotton fabric: Specification D173.
10.2.5 Treated glass fabric: Specification D1668, Type I or II.
10.2.6 Bitumen-saturated burlap fabric: Specification D1327.

[3] Canadian General Standards Board, Ottawa, Canada K1A 1G6.

10.2.7 Flashing cement: Specification D2822 or D4586.
10.2.8 Protection board: Specification D6506.

10.3 *Type III:*
10.3.1 Asphalt primer: Specification D41.
10.3.2 Asphalt: Specification D6152 or D449.
10.3.3 SBS-modified-ply sheets: Specification D6162, D6163, or D6164.
10.3.4 Asphalt-treated glass fabric: Specification D1668, Type I.
10.3.5 Flashing cement: recommended by the manufacturer.
10.3.6 Protection board: Specification D6506.

10.4 *Type IV:*
10.4.1 Rubberized asphalt: CAN/CGSB-37.50.
10.4.2 Fabric reinforcement: spunbonded polyester, supplied by the rubberized asphalt manufacturer.

10.5 Mechanical fasteners and accessories: corrosion-resistant.

11. Substrate Preparation

11.1 Prepare and evaluate concrete surfaces in accordance with Guide D5295. Verify that required slopes for drainage and embedded nailers (if any) are installed.

11.2 Apply primer to all surfaces to receive waterproofing at rates recommended by the manufacturer. Allow to dry.

11.3 Areas must be covered with waterproofing on the same day as primer is applied (or within a longer period if allowed by the manufacturer) or they must be re-primed.

11.4 In areas that become contaminated by dust, dirt, or other foreign material that would interfere with the satisfactory installation or performance of the system, clean and re-prime prior to installation of the waterproofing.

12. Installation

12.1 *General:*
12.1.1 Use care during installation to avoid damaging the prepared substrate.
12.1.2 Protect adjacent membrane and building components from damage. Protect installed membrane from construction traffic.
12.1.3 Seal edge of incomplete membrane installation at the end of each day.

12.2 *Bitumen Heating and Application :*
12.2.1 Heat bitumen sufficiently to produce application temperature recommended by the manufacturer. Do not exceed the maximum heating limits.
12.2.2 Apply bitumen to achieve complete coverage, a continuous firmly bonded film of bitumen, and application rate (thickness) recommended by the manufacturer.

12.3 *Application: Type I and II :*
12.3.1 *Low Slope Membrane Application :*
12.3.1.1 Starting at the low point, install the required number of plies in the required manner, separate-layer or shingle application.
12.3.1.2 For separate-layer application, install plies with a minimum side lap of 50 mm (2 in.). Offset overlying ply laps by approximately one-half sheet width.
12.3.1.3 For shingle application, install plies with a minimum head lap of 50 mm (2 in.).
12.3.1.4 Install plies with 250 mm (10 in.) minimum end lap. Stagger end laps a minimum of 300 mm (12 in.).
12.3.2 *Vertical Sheet Membrane Application :*
12.3.2.1 Beginning at the bottom of the wall, install the required number of plies vertically in shingle application.
12.3.2.2 Mechanically attach plies at the top of each course by nail if wood nailers are present or by anchor and bar fasteners.
12.3.2.3 When the height of the membrane requires that it be installed in more than one application, install each stage to a height that the installers can safely manage. Install the second application over the first, lapping not less than 150 mm (6 in.) over the preceding application covering all nail heads. Offset the head laps of overlapping plies a minimum of 300 mm (12 in.).
12.3.3 *General:*
12.3.3.1 Treat joints, corners, penetrations, and terminations in accordance with Guide D5898.
12.3.3.2 Back-nail plies at 8 in. on-center where organic felts are installed on slopes greater than 4 % (½ in./ft) and where fiberglass felts are installed on slopes greater than 2 % (¼ in./ft).
12.3.3.3 Coat exposed felts of completed membrane with a continuous film of bitumen.

12.4 *Application: Type III:*
12.4.1 *Low Slope Membrane Application :*
12.4.1.1 Starting at the low point, install the required number of plies in the required manner, separate-layer or shingle application.
12.4.1.2 Install separate-layer plies with a minimum side lap of 100 mm (4 in.). Offset overlying ply laps by approximately one half sheet width.
12.4.1.3 Install shingled plies with a minimum head lap of 50 mm (2 in.).
12.4.1.4 Provide 150 mm (6 in.) minimum end lap. Stagger end laps minimum 900 mm (36 in.).
12.4.2 *General*—Treat joints, corners, penetrations and terminations in accordance with Guide D5898.

12.5 *Application: Type IV:*
12.5.1 Install waterproofing system in accordance with CAN/CGSB-37.51.
12.5.2 Install with membrane reinforcement.

13. Testing, Inspection, and Repair

13.1 Flood test low-slope installations in accordance with Guide D5957.

13.2 Inspect vertical installations before placement of protection board.

13.3 Repair the membrane as required. Patch punctures, tears, open seams, and other deficiencies with membrane material. Patches shall extend 150 mm (6 in.) beyond the edges of the defect.

13.4 Repeat flood testing and repair until the flood test is successful.

14. Protection

14.1 Install protection board in accordance with Guide D6451.

14.2 Some Type IV system manufacturers require that protection board be applied in a continuous operation, while bitumen is still hot.

14.3 When Type I systems are installed on vertical surfaces, install protection board; drainage layers, if any; and backfill as soon as a section is completed.

15. Quality Assurance

15.1 The manufacturer may inspect waterproofing installation during the application to verify that the system is installed in accordance with the manufacturer's specifications.

16. Keywords

16.1 application; asphalt; coal tar pitch; modified bitumen; polymer-modified bitumen sheet; rubberized asphalt waterproofing; waterproofing