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Standard Guide for the Use of Sodium Bentonite Needle-Punched Geotextile Waterproofing Systems with Cast-in-Place Concrete Below- Grade Foundation Construction¹

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1. Scope

1.1 This guide covers general installation guidelines of waterproofing membranes produced as a composite of sodium bentonite contained within two interlocked needle-punched geotextiles for designers to consider when developing project-specific drawings and specifications. This guide covers construction applications where the waterproofing is applied to the positive side of below-grade cast-in-place concrete foundation walls, both backfilled and support of excavation (SOE) construction, and under concrete pressure slabs. This guide does not cover plaza deck construction applications, either split-slab construction or pavers on pedestals, or vegetated green roof waterproofing applications.

1.2 This guide does not cover sodium bentonite waterproofing membranes produced with a corrugation paper carrier, bentonite bonded to a geomembrane, and spray-applied bentonite systems.

1.3 For the purpose of this guide, concrete is assumed to be cast-in-place with a surface profile as recommended in Guide **D5295/D5295M**, consolidated in accordance with applicable guidelines in ACI 309, structurally sound, able to accept the weight of anticipated loads, and meets the local building code requirements. 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, and drainage layers are beyond the scope of this guide.

1.4 This guide does not cover sodium bentonite geotextile membranes installed on below-grade foundation walls and slabs constructed with masonry materials, precast concrete, or pneumatically applied concrete (that is, shotcrete).

1.5 The values stated in SI units are to be regarded as standard. The unit values given in parentheses are for reference information only.

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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1.6 Different sodium bentonite geotextile membranes have different materials of composition and construction which can affect physical properties. The procedures contained in this guide, therefore, may not be universally applicable to all sodium bentonite geotextile membranes under all field conditions.

1.7 This guide does not purport to assign responsibilities of quality assurance or quality control. Specific quality assurance and quality control items should be addressed in project specifications and contract documents.

1.8 This guide does not purport to include requirements for warranties associated with the waterproofing materials or installation.

1.9 This guide does not purport to include all detailing techniques to address various conditions that can be encountered on construction projects.

1.10 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.11 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

D1079 Terminology Relating to Roofing and Waterproofing

D4439 Terminology for Geosynthetics

D5295/D5295M Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems

D6294/D6294M Test Method for Corrosion Resistance of

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.

Ferrous Metal Fastener Assemblies Used in Roofing and Waterproofing

2.2 ACI Standards:³

ACI 309 Guide for Consolidation of Concrete

ACI 506.2-13(18) Specification for Shotcrete

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this guide, refer to Terminologies **D1079** and **D4439**.

3.1.2 *needle-punched geotextile composite membrane*—sodium bentonite waterproofing manufactured using needles that punch fibers from a nonwoven geotextile through the bentonite layer and then through the woven geotextile to bond the geotextiles together by means of interlocked geotextile fibers.

3.1.3 *shotcrete*—concrete or mortar conveyed through a hose and pneumatically projected at high velocity onto a surface to achieve compaction.

3.1.4 *sodium bentonite*—a natural clay mineral consisting mostly of montmorillonite (aluminum silicate) that is processed and typically treated with polymer additives. Sodium bentonite is a highly expansive mineral having characteristics of cohesion, binding, sealing, and upon hydration forms a barrier to liquid water.

3.1.5 *support of excavation (SOE) construction*—refers to the construction of a temporary or permanent wall assembly to retain soil during the excavation of the building foundation to which the waterproofing is applied prior to the building's structural foundation wall, consisting of cast-in-place reinforced concrete placed directly in contact with the waterproofing system.

4. Classification

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

4.1.1 *Type I*—Needle-punched bentonite geotextile membranes consisting of minimum 4.8 kg of granular sodium bentonite per m² (1 lb per ft²) contained between two geotextiles, one woven and one nonwoven. The two geotextiles are interlocked together by means of nonwoven geotextile fibers needle-punched through the bentonite layer and woven geotextile throughout the membrane surface area.

4.1.2 *Type II*—Needle-punched bentonite geotextile membranes consisting of minimum 4.8 kg of granular sodium bentonite per m² (1 lb per ft²) contained between two geotextiles (one woven and one nonwoven) and an integral geomembrane bonded to the exterior surface of one geotextile, covering the entire surface area of the membrane. The two geotextiles are interlocked together by means of nonwoven geotextile fibers needle-punched through the bentonite layer and woven geotextile throughout the membrane surface area.

5. Significance and Use

5.1 This guide outlines general installation procedures and precautions for the application of sodium bentonite needle-punched geotextile waterproofing systems.

5.2 This guide is not all inclusive and is intended only to supplement detailed drawings and specifications from designers and the installation guidelines of manufacturers. Manufacturers of some of the systems addressed by this guide require proprietary products and special procedures not described in this guide. Manufacturers' guidelines and details applicable for each site construction condition encountered on a project should therefore be considered in the application of this guide.

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 product name, production lot code, manufacturer's name, and other pertinent information as required by federal, state, and local regulations.

7. Storage and Handling of Materials

7.1 Store materials on raised platforms or pallets. Store rolls vertically or horizontally, as recommended by the manufacturer. Store materials in a dry, ventilated, and weatherproof location in a manner recommended by the manufacturer. 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 mastic and other applicable accessory products in tightly closed original containers at temperatures within the temperature range guidelines of the manufacturer. Protect products from sources of ignition.

8. Environmental Conditions

8.1 Installation can proceed when environmental conditions agreed upon by the owner, specifier, and installer are within the guidelines of the material manufacturer.

8.2 Conditions that may interfere with the installation and performance of the waterproofing include: precipitation prior to covering the membrane with concrete or backfill, wet or frost-covered substrate surfaces, dirty or contaminated substrate surfaces, high winds, and temperatures above or below a workable range for the products to be installed.

8.3 Product use is acceptable for both hydrostatic and non-hydrostatic project site conditions within the guidelines established by the manufacturer.

8.4 Prior to installation, groundwater or soil conditions should be tested for contaminants in accordance with the material manufacturer's guidelines.

8.5 Product hydrated by groundwater infiltration into the excavated site or precipitation, prior to confinement by concrete or backfill, should be inspected for damage. Per the manufacturer's guidelines, product determined to be damaged should be documented, repaired, or replaced, and the repair documented.

³ Available from American Concrete Institute (ACI), 38800 Country Club Dr., Farmington Hills, MI 48331-3439, <http://www.concrete.org>.