



Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

Report No: 2211-01



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WaterGuard® Sub-Floor Drainage System

Trade Secret Report Holder:
Basement Systems, Inc.

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CSI Designations:

DIVISION: 33 00 00 UTILITIES

Section: 33 46 00 - Subdrainage

1 Innovative Product Evaluated¹

1.1 WaterGuard Sub-Floor Drainage System

2 Product Description and Materials

2.1 The innovative product evaluated in this report is shown in **Figure 1**.



Figure 1. WaterGuard Sub-Floor Drainage System

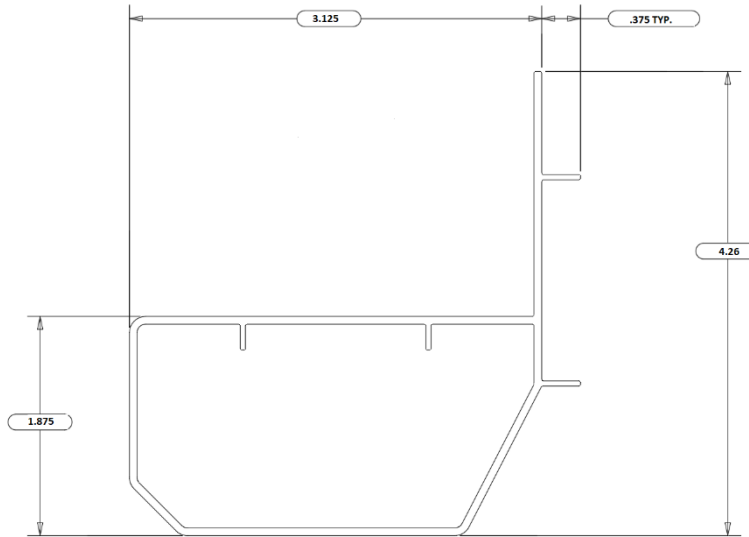


Figure 2. WaterGuard Sub-Floor Drainage System - Cross-Sectional View

2.2 WaterGuard Sub-Floor Drainage System is a sub-floor perimeter drainage system for basements and other subterranean structures. WaterGuard Sub-Floor Drainage System is a custom designed PVC extrusion and is installed below the surface of the basement floor and on top of the footing, as shown in **Figure 3**. The WaterGuard then channels water seepage from the foundation walls, the footing wall joint, and block wall cavities to the sump pump (**Figure 4**).



Figure 3. WaterGuard Sub-Floor Drainage System - Typical Installed Location

Basement Interior Drain

WaterGuard drainage pipe comes in one- and two-piece configurations. The one-piece pipe installs more quickly, but the two-piece version is needed where there isn't enough space to place the pipe between the slab and the top of the footing. Both types have a weep flange, which allows water seeping through the wall to reach the drainage pipe.

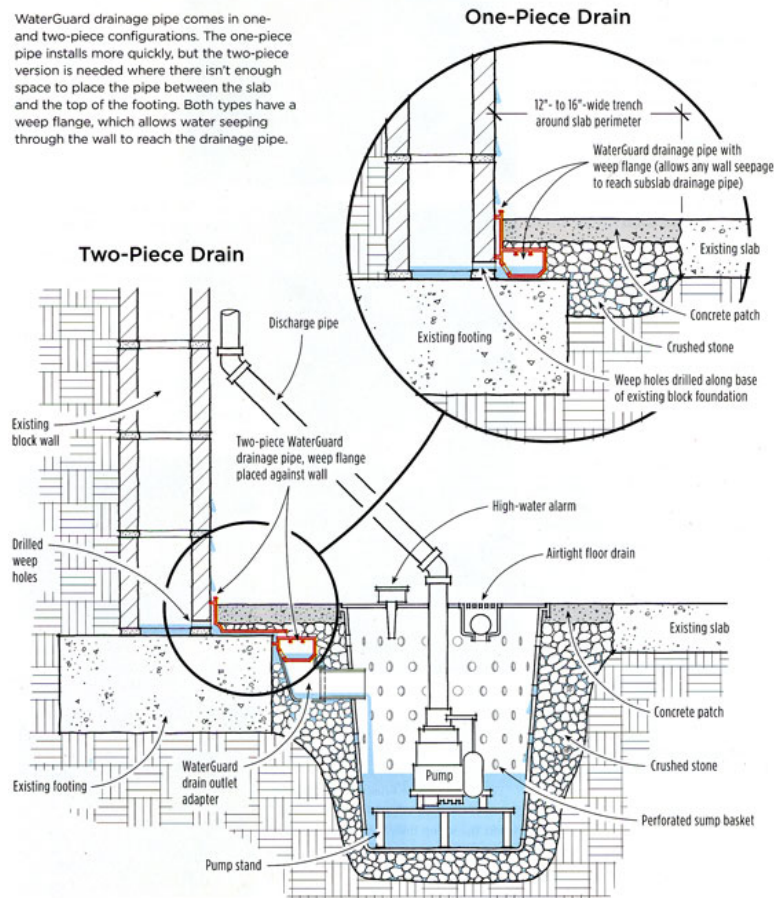


Figure 4. WaterGuard Sub-Floor Drainage System – Diagram

- 2.3 WaterGuard Sub-Floor Drainage System can be used to control water in wet basement situations with less disruption and disturbance of the basement floor, footing and subsoil. Furthermore, the conduit will not clog from infiltration of fine sediments and silt from surrounding soils.
- 2.4 1¹/₄" long x 3³/₄" wide slots every 3" on center allow free flow of water to enter the system, while the built-in wall drain on the backside allows water running down the wall to enter the system as shown in **Figure 5**.



Figure 5. WaterGuard Sub-Floor Drainage System – Conduit

- 2.5 Joints are butted together and taped to ensure no concrete is allowed into the system before it hardens.
- 2.6 A drain outlet with a 4" drain allows unrestricted water flow to a sump pump, as shown in **Figure 6**.

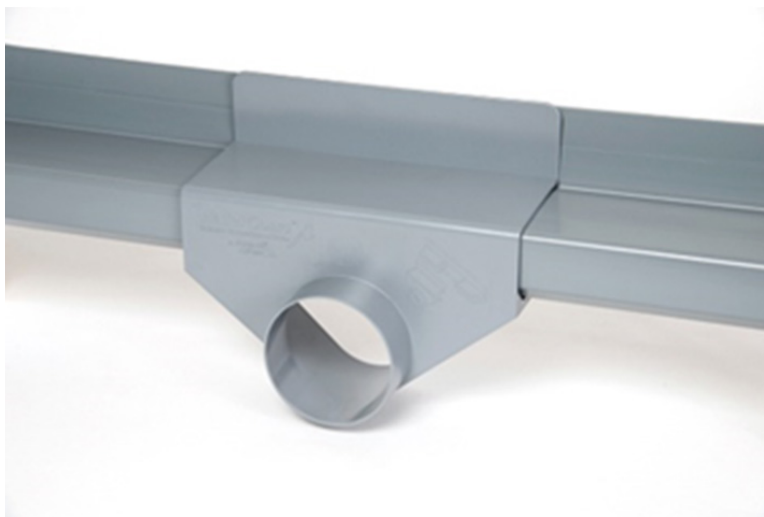


Figure 6. WaterGuard Sub-Floor Drainage System - Interlocking Drain Outlet

- 2.7 A custom fitted PVC inspection port allows visual inspection, system testing, or an intake drain from a dehumidifier or condensate line (see **Figure 7**).



Figure 7. WaterGuard Sub-Floor Drainage System – Inspection Port

- 2.8 As needed, review material properties for design in **Section 6** and the regulatory evaluation in **Section 8**.

3 Definitions²

- 3.1 New Materials³ are defined as building materials, equipment, appliances, systems, or methods of construction, not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.⁴ The design strength and permissible stresses shall be established by tests⁵ and/or engineering analysis.⁶
- 3.2 Duly authenticated reports⁷ and research reports⁸ are test reports and related engineering evaluations that are written by an approved agency⁹ and/or an approved source.¹⁰
- 3.2.1 This report utilizes intellectual property and/or trade secrets to create public domain material properties for commercial end-use.
- 3.2.1.1 This report protects confidential Intellectual Property and trade secrets under the regulation, 18.U.S.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).¹¹
- 3.3 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is accredited and listed in the ANAB directory.
- 3.4 An approved source is “approved” when a professional engineer (i.e., Registered Design Professional, hereinafter RDP) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.¹²
- 3.5 Testing and/or inspections conducted for this duly authenticated report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed RDP.
- 3.5.1 The Center for Building Innovation (CBI) is ANAB¹³ ISO/IEC 17025 and ISO/IEC 17020 accredited.
- 3.6 The regulatory authority shall enforce¹⁴ the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing¹⁵ stating the nonconformance and the path to its cure.
- 3.7 The regulatory authority shall accept duly authenticated reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.¹⁶



- 3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory. Therefore, recognition of certificates and validation statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope shall be approved.¹⁷ Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,¹⁸ and can be used in any country that is an MLA signatory found at this link: <https://iaf.nu/en/recognised-abs/>
- 3.9 Approval equity is a fundamental commercial and legal principle.¹⁹

4 Applicable Local, State, and Federal Approvals; Standards; Regulations²⁰

4.1 Local, State, and Federal

- 4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured local jurisdictions: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, St. Louis County, Texas Department of Insurance, and Wichita.²¹
- 4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured states: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.²²
- 4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14²³ and Part 3280²⁴ pursuant to the use of ISO/IEC 17065 duly authenticated reports.
- 4.1.4 Approved means complying with the requirements of local, state, or federal legislation.

4.2 Regulations

- 4.2.1 *IBC – 18, 21, 24: International Building Code®*
- 4.2.2 *IRC – 18, 21, 24: International Residential Code®*
- 4.2.3 *IECC – 18, 21, 24: International Energy Conservation Code®*

5 Listed²⁵

- 5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (e.g., CBI), an approved agency (e.g., CBI and DrJ), and/or and approved source (e.g., DrJ), or other organization(s) concerned with product evaluation (e.g., DrJ), that maintains periodic inspection (e.g., CBI) of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.



6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 Structural Applications

- 6.1.1 No less than 1^{1/2}" of concrete shall cover the WaterGuard Sub-Floor Drainage System.
 - 6.1.2 The minimum concrete slab thickness of 3^{1/2}" per [IBC Section 1907.1](#) and [IRC Section R506.1](#) shall still apply outside of the WaterGuard Sub-Floor Drainage System and gravel area.
 - 6.1.3 Per **Section 9**, when properly installed at the edge of the slab with a code-compliant water-resistance membrane, the WaterGuard Sub-Floor Drainage System provides adequate support for the slab.
- 6.2 Alternative techniques shall be permitted in accordance with accepted engineering practice and experience. These provisions for the use of alternative materials, designs, and methods of construction are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed herein. This includes, but is not limited to, the following areas of engineering: mechanics of materials, structures, building science, and fire science.

7 Certified Performance²⁶

- 7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.²⁷
- 7.2 The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.²⁸

8 Regulatory Evaluation and Accepted Engineering Practice

- 8.1 Any building code, regulation and/or accepted engineering evaluations (i.e., [research reports](#), [duly authenticated reports](#), etc.) that are conducted for this Listing were performed by DrJ, which is an [ISO/IEC 17065 accredited certification body](#) and a professional engineering company operated by [RDP](#) or [approved sources](#). DrJ is qualified²⁹ to practice product and regulatory compliance services within its [scope of accreditation and engineering expertise](#),³⁰ respectively.
- 8.2 Engineering evaluations are conducted with DrJ's ANAB [accredited ICS code scope](#) of expertise, which is also its areas of professional engineering competence.

9 Installation

- 9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.
- 9.2 In the event of a conflict between the manufacturer installation instructions and this report, contact the manufacturer for counsel on the proper installation method.
- 9.3 *Installation Procedure*
 - 9.3.1 The installation of the WaterGuard Sub-Floor Drainage System shall be installed exclusively by Basement Systems, Inc. dealers as follows:
 - 9.3.1.1 Jackhammer the concrete slab approximately 6" to 8" out from the foundation wall. Do not undermine the footing or cause damage to the footing that would compromise its structural integrity.
 - 9.3.1.2 Remove any debris from the trench.

- 9.3.1.3 Lay WaterGuard Sub-Floor Drainage System in the trench against the foundation wall. Pre-molded inside and outside WaterGuard corners should be utilized wherever possible.
- 9.3.1.4 Fill trench with $\frac{3}{4}$ " gravel per **Figure 8** and **Figure 9**. Gravel shall be a minimum $\frac{1}{2}$ " diameter crushed stone placed on side of the drain channel with the side facing the footing left free of stone to allow an air space to exist between the footing and the channel.

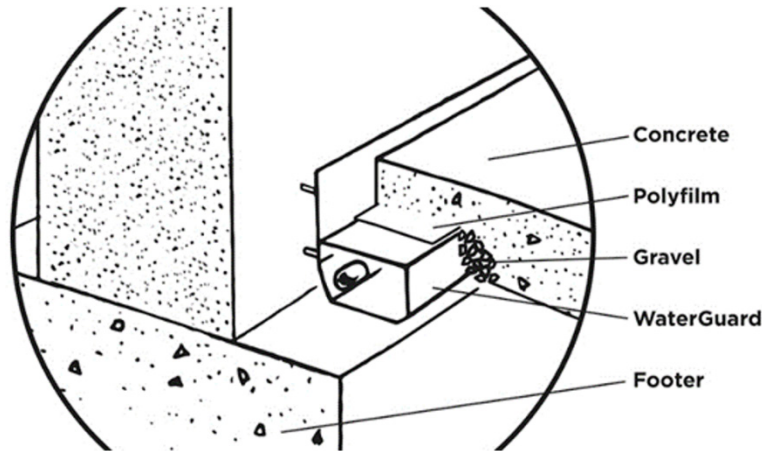


Figure 8. WaterGuard Sub-Floor Drainage System Installation Cross-Section Concrete Foundation

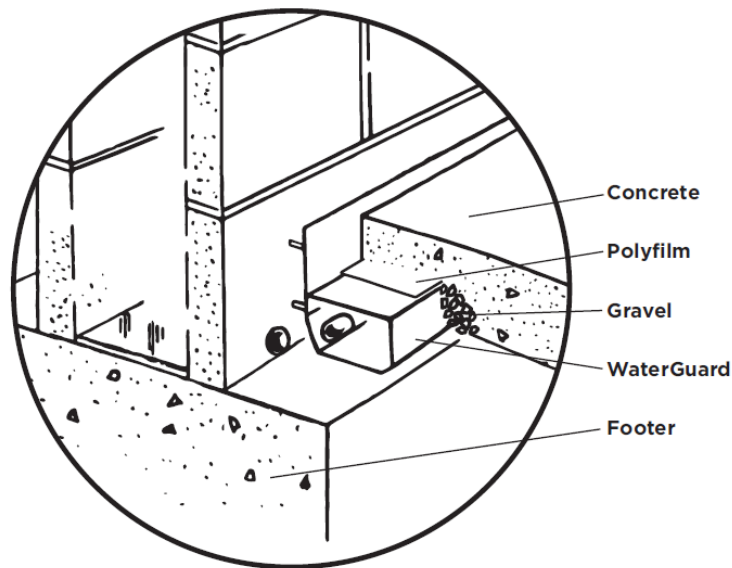


Figure 9. WaterGuard Sub-Floor Drainage System Sub-Floor Drainage System Block Foundation



- 9.3.1.5 All seam butt joints, WaterGuard Sub-Floor Drainage System corners, and sump system drain outlet joints must be sealed using WaterGuard Tape. This ensures that no wet concrete enters the WaterGuard Sub-Floor Drainage System prior to concrete setting.
- 9.3.1.6 Install code compliant water-resistant membrane per **Figure 8**, on top of the WaterGuard Sub-Floor Drainage System and on top of gravel so that it is lying flat from the WaterGuard Sub-Floor Drainage System flange to the edge of the existing slab.
- 9.3.1.7 Re-concrete the floor.
- 9.3.2 New construction installation requires the WaterGuard Sub-Floor Drainage System to be fastened to the foundation wall using a $5/16"$ x $17/16"$ nail in fastener to hold WaterGuard Sub-Floor Drainage System in the correct position until the basement slab is poured.

10 Substantiating Data

- 10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
 - 10.1.1 VTEC Laboratories, Inc. Test Report No. 100-886, dated October 22, 1998, containing results of physical testing on WaterGuard Sub-Floor Drainage Systems.
 - 10.1.2 VTEC Laboratories, Inc. Test Report No. 100-950, dated March 11, 1999, containing results of structural testing performed on concrete masonry units with and without drainage holes. Test methods of sampling and testing concrete masonry units were done in accordance with ASTM C140.
- 10.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or an RDP. Accuracy of external test data and resulting analysis is relied upon.
- 10.3 Where applicable, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.
- 10.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or duly authenticated reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this duly authenticated report, may be dependent upon published design properties by others.
- 10.5 *Testing and Engineering Analysis*
 - 10.5.1 The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.³¹
- 10.6 Where additional condition of use and/or regulatory compliance information is required, please search for WaterGuard Sub-Floor Drainage System on the DrJ Certification website.



11 Findings

- 11.1 As outlined in **Section 6**, WaterGuard Sub-Floor Drainage System has performance characteristics that were tested and/or meet applicable regulations. In addition, they are suitable for use pursuant to its specified purpose.
- 11.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, WaterGuard Sub-Floor Drainage System shall be approved for the following applications:
- 11.2.1 In basements and other subterranean structures with a minimum 3 $\frac{1}{2}$ " thick concrete slab and no less than 1 $\frac{1}{2}$ " of concrete above the WaterGuard Sub-Floor Drainage System.
- 11.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Basement Systems, Inc.
- 11.4 IBC Section 104.2.3³² (IRC Section R104.2.2³³ and IFC Section 104.2.3³⁴ are similar) in pertinent part state:
- 104.2.3 Alternative Materials, Design and Methods of Construction and Equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.
- 11.5 **Approved:**³⁵ Building regulations require that the building official shall accept duly authenticated reports.³⁶
- 11.5.1 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited.
- 11.5.2 An approved source is "approved" when an RDP is properly licensed to transact engineering commerce.
- 11.5.3 Federal law, Title 18 US Code Section 242, requires that, where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.
- 11.6 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB Accredited Product Certification Body – Accreditation #1131.
- 11.7 Through the IAF Multilateral Arrangement (MLA), this duly authenticated report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 duly authenticated reports are equivalent.³⁷

12 Conditions of Use

- 12.1 As defined in **Section 6**, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.
- 12.2 Care shall be taken during excavation and installation of WaterGuard Sub-Floor Drainage System to ensure that the load resisting capacity of the wall is not compromised.
- 12.3 When required by adopted legislation and enforced by the building official, also known as the Authority Having Jurisdiction (AHJ) in which the project is to be constructed:
- 12.3.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.
- 12.3.2 This report and the installation instructions shall be submitted at the time of permit application.
- 12.3.3 This innovative product has an internal quality control program and a third-party quality assurance program.
- 12.3.4 At a minimum, this innovative product shall be installed per **Section 9**.
- 12.3.5 The review of this report by the AHJ shall comply with IBC Section 104.2.3.2 and IBC Section 105.3.1.



- 12.3.6 This innovative product has an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.7.2, IBC Section 110.4, IBC Section 1703, IRC Section R104.7.2, and IRC Section R109.2.
- 12.3.7 The application of this innovative product in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2, and any other regulatory requirements that may apply.
- 12.4 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *“the building official shall make, or cause to be made, the necessary tests and investigations; or the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.2.3”*, all of IBC Section 104, and IBC Section 105.3.
- 12.5 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).
- 12.6 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

13 Identification

- 13.1 WaterGuard Sub-Floor Drainage System, as listed in **Section 1.1**, is identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.
- 13.2 Additional technical information can be found at www.basementsystems.com/basement-waterproofing/basement-waterproofing-products/drainage-systems/waterguard.

14 Review Schedule

- 14.1 This report is subject to periodic review and revision. For the latest version, visit www.drjcertification.org.
- 14.2 For information on the status of this report, please contact [DrJ Certification](http://www.drjcertification.org).



- 29 Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.
- 30 <https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?prgID=1&orgID=2125&statusID=4#:~:text=Bill%20Payment%20Date-.Accredited%20Scopes,-13%20ENVIRONMENT.%20HEALTH>
- 31 See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition: <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>
- 32 2021 IBC Section 104.11
- 33 2021 IRC Section R104.11
- 34 2018: <https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9> AND 2021: <https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11>
- 35 Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 (<https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#201.4>) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.
- 36 <https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1>
- 37 Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.