

## ACCEPTANCE CRITERIA FOR COMPOSITE FOUNDATION DRAINAGE SYSTEMS

AC243

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### PREFACE

Evaluation reports issued by ICC Evaluation Service, LLC (ICC-ES), are based upon performance features of the International family of codes. (Some reports may also reference older code families such as the BOCA National Codes, the Standard Codes, and the Uniform Codes.) Section 104.11 of the *International Building Code*® reads as follows:

The provisions of this code are not intended to prevent the installation of any materials or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.

This acceptance criteria has been issued to provide interested parties with guidelines for demonstrating compliance with performance features of the codes referenced in the criteria. The criteria was developed through a transparent process involving public hearings of the ICC-ES Evaluation Committee, and/or on-line postings where public comment was solicited.

New acceptance criteria will only have an “approved” date, which is the date the document was approved by the Evaluation Committee. When existing acceptance criteria are revised, the Evaluation Committee will decide whether the revised document should carry only an “approved” date, or an “approved” date combined with a “compliance” date. The compliance date is the date by which relevant evaluation reports must comply with the requirements of the criteria. See the ICC-ES web site for more information on compliance dates.

If this criteria is a revised edition, a solid vertical line (|) in the margin within the criteria indicates a technical change from the previous edition. A deletion indicator (→) is provided in the margin where wording has been deleted if the deletion involved a technical change.

ICC-ES may consider alternate criteria for report approval, provided the report applicant submits data demonstrating that the alternate criteria are at least equivalent to the criteria set forth in this document, and otherwise demonstrate compliance with the performance features of the codes. ICC-ES retains the right to refuse to issue or renew any evaluation report, if the applicable product, material, or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or if malfunctioning is apt to cause injury or unreasonable damage.

NOTE: The Preface for ICC-ES acceptance criteria was revised in July 2011 to reflect changes in policy.

*Acceptance criteria are developed for use solely by ICC-ES for purpose of issuing ICC-ES evaluation reports.*

# ACCEPTANCE CRITERIA FOR COMPOSITE FOUNDATION DRAINAGE SYSTEMS (AC243)

## 1.0 INTRODUCTION

**1.1 Purpose:** The purpose of this acceptance criteria is to establish requirements for composite foundation drainage systems to be recognized in an ICC Evaluation Service, LLC (ICC-ES), evaluation report under the 2009 and 2006 *International Building Code*<sup>®</sup> (IBC), the 2009 and 2006 *International Residential Code*<sup>®</sup> (IRC), the BOCA<sup>®</sup> *National Building Code/1999* (BNBC), the 1999 *Standard Building Code*<sup>®</sup>, and the 1997 *Uniform Building Code*<sup>™</sup> (UBC). Bases of recognition are IBC Section 104.11, IRC Section R104.11, BNBC Section 106.4, SBC Section 103.7 and UBC Section 104.2.8. Applicable code sections are 2009 IBC Section 1805.4 and 2006 IBC Section 1807.4 (Subsoil Drainage System); IRC Section R405 (Foundation Drainage) and Table R405.1 (Properties of Soils Classified According to Unified Soil Classification System); BNBC Section 1813.5 (Subsoil Drainage System); SBC Section 1814.3.5 (Perimeter Drainage); UBC Sections 1812 (Drainage and Moisture Control), 1812.3 (Subgrade Drainage), 1812.5 (Perimeter Drainage Control) and 1812.6 (Alternate Drainage System).

The reason for development of this criteria is that the codes do not have requirements that address these products.

**1.2 Scope:** Composite foundation drainage systems are used as alternatives to conventional sand- or gravel-covered pipe drains installed around building foundations in accordance with the applicable code.

**1.3 Codes and Reference Standards:** Where standards are referenced in this criteria, these standards shall be applied consistently with the code upon which compliance is based.

### 1.3.1 Codes:

**1.3.1.1** 2009 and 2006 *International Building Code*<sup>®</sup> (IBC), International Code Council.

**1.3.1.2** 2009 and 2006 *International Residential Code*<sup>®</sup> (IRC), International Code Council.

**1.3.1.3** BOCA<sup>®</sup> *National Building Code/1999* (BNBC).

**1.3.1.4** 1999 *Standard Building Code*<sup>®</sup> (SBC).

**1.3.1.5** 1997 *Uniform Building Code*<sup>™</sup> (UBC).

### 1.3.2 ASTM International Reference Standards:

**1.3.2.1** ASTM D 1621-00, Standard Test Method for Compressive properties of Rigid Cellular Plastics.

**1.3.2.2** ASTM D 1777-96 (2002), Standard Test Method for Thickness of Textile Materials.

**1.3.2.3** ASTM D 3786-01, Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics—Diaphragm Bursting Strength Tester Method.

**1.3.2.4** ASTM D 4491-99a, Standard Test Method for Water Permeability of Geotextiles by Permittivity.

**1.3.2.5** ASTM D 4632-91 (1996), Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

**1.3.2.6** ASTM D 4533-04, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

**1.3.2.7** ASTM D 4716-02, Standard Test Method for Determining the (in-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

**1.3.2.8** ASTM D 4751-99a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

**1.3.2.9** ASTM D 4833-01et, Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.

## 1.4 Definitions:

### 1.4.1 Composite Foundation Drainage Systems:

A two-part prefabricated geocomposite drain consisting of a formed rigid polymeric core of polystyrene, polyethylene or poly vinyl chloride (PVC) covered with a polypropylene filter fabric.

**1.4.2 Soil Strip Drain:** A composite foundation drain system as described in Section 1.4.1, 6 to 24 inches (152.4 to 609.6 mm) wide that is installed around the perimeter of the foundation wall as a foundation drain. The soil strip drains are connected together with fittings or fabric overlaps and then to an outlet pipe to discharge into an approved drainage system.

**1.4.3 Sheet Drain:** A composite foundation drain system as described in Section 1.4.1, with a standard 4-foot (1.2 m) width (custom widths by request), that is installed as sheets over the entire face of a foundation wall. The sheet drains are interconnected with the soil strip drains to provide a continuous water flow that discharges into an approved drainage system.

## 2.0 BASIC INFORMATION

**2.1 General:** The following information shall be submitted:

**2.1.1 Product Description:** Complete information concerning material specifications, dimensions, standard sizes, standard fittings (e.g., straight connector, tee connector, outlet fitting, and corner fitting), and the manufacturing process.

**2.1.2 Installation Instructions:** Installation details and limitations, fastening methods, joint materials.

**2.1.3 Packaging and Identification:** A description of the method of packaging and field identification of the composite foundation drainage system. Identification provisions must include the evaluation report number.

**2.1.4 Field Preparation:** A description of the methods of field-cutting, application and backfilling.

**2.2 Testing Laboratories:** Testing laboratories shall comply with the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports.

**2.3 Test Reports:** Test reports shall comply with AC85.

**2.4 Product Sampling:** Products shall be sampled in accordance with Section 3.2 of AC85.

## 3.0 TEST AND PERFORMANCE REQUIREMENTS

**3.1 Drainage Capability:** Testing shall be performed in accordance with Section 4.1 of this criteria. The testing

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shall document flow rates and suitability in various soil types listed in the applicable code.

**3.2 Soil Contact Exposure:** Testing shall be performed in accordance with Section 4.2 of this criteria. The testing shall document that the product will not be adversely affected by contact with soil.

**3.3 Physical Properties:** Testing shall be performed in accordance with Section 4.3 of this criteria. Testing shall be performed on the rigid core material and the filter fabric.

### 4.0 TEST METHODS

**4.1 Drainage Capability:** The drainage capability of the product shall be tested as specified in Sections 4.1.1, 4.1.2 and 4.1.3 of this criteria. An engineering analysis shall be submitted, evaluating the testing and determining the suitable soil types in which the composite foundation drain system can be installed.

**4.1.1 Permeability, Permittivity and Flow Rate:** The polypropylene fabric shall be tested for flow rate, permittivity, and permeability under ASTM D 4491.

**Conditions of Acceptance:** The fabric shall demonstrate a minimum flow rate of 95 gpm/ft<sup>2</sup> (3810 L/min/m<sup>2</sup>), a minimum permeability of 0.21 cm/sec, and a minimum permittivity of 1.6 sec<sup>-1</sup>.

**4.1.2 In-plane Flow rate:** The product (core) shall be tested for in-plane flow rate under ASTM D 4716.

**Conditions of Acceptance:** The soil strip drain product shall demonstrate a minimum in-plane flow rate of 21 gpm/ft of width with a hydraulic gradient equal to 0.1, and loading equal to 10 psi (68.9 kPa). The sheet drain product shall demonstrate a minimum in-plane flow rate of 9 gpm/ft of width with a hydraulic gradient equal to 1.0, and loading equal to 10 psi (68.9 kPa).

**4.1.3 Apparent Opening Size (AOS):** The fabric shall be tested for apparent opening size of the geotextile under ASTM D 4751.

**Conditions of Acceptance:** The fabric shall demonstrate a minimum AOS of 50 sieve (75 microns).

**4.2 Soil Contact Exposure:** The product shall be tested for fungus resistance under ASTM G 21.

**Conditions of Acceptance:** The product shall demonstrate no growth when tested for fungus resistance.

**4.3 Physical Properties:** The following testing is conducted to establish physical properties for the product: compressive strength in accordance with ASTM D 1621 (core); minimum thickness in accordance with ASTM D 1777 (core); grab tensile strength in accordance with ASTM D 4632 (fabric); puncture strength in accordance with ASTM D 4833 (fabric); trapezoidal strength in accordance with ASTM D 4533 (fabric); Mullen burst strength in accordance with ASTM D 3786 (fabric); elongation in accordance with ASTM D 4632 (fabric).

**Conditions of Acceptance:** The physical properties tested in this section shall be reported in the evaluation report. The minimum compressive strength shall be 5400 lbs/ft<sup>2</sup> (258.6 kPa); the minimum thickness shall be 0.25 inch (6.4 mm); the minimum grab tensile strength shall be 80 pounds (360 N); the minimum puncture strength shall be 40 pounds (170 N); the minimum trapezoidal strength shall be 30 pounds (132 N); the minimum Mullen burst strength shall be 145 psi (1000 kPa); and the maximum elongation shall be 60 percent.

### 5.0 QUALITY CONTROL

**5.1** Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted.

**5.2** Third-party follow-up inspections are not required under this acceptance criteria.

### 6.0 EVALUATION REPORT RECOGNITION

The following is a condition of use of composite foundation drain systems covered by this acceptance criteria: The product shall be installed in accordance with the manufacturer's published installation instructions.■