



## EVALUATION GUIDELINE FOR UNDERGROUND PLASTIC AIR DUCTS

**EG290**

**Approved March 2005**

**Effective April 1, 2005**

### PREFACE

Evaluation reports issued by ICC Evaluation Service, Inc. (ICC-ES), are based upon performance features of the International family of codes and other widely adopted code families, including the Uniform Codes, the BOCA National Codes, and the SBCCI Standard 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.

Similar provisions are contained in the Uniform Codes, the National Codes, and the Standard Codes.

This document has been issued to provide all interested parties with guidelines for demonstrating compliance with performance features of the applicable code(s) referenced in the document. The guideline has been approved by the ICC-ES Evaluation Committee, and is effective on the date shown above. All reports issued or reissued on or after the effective date must comply with this guideline, while reports issued prior to this date may be in compliance with this guideline or with the previous edition. If the guideline is an updated version from the previous edition, a solid vertical line (|) in the margin within the guideline indicates a technical change, addition, or deletion from the previous edition. A deletion indicator (→) is provided in the margin where a paragraph has been deleted if the deletion involved a technical change. This guideline may be further revised as the need dictates.

ICC-ES may consider alternate guidelines, provided the report applicant submits valid data demonstrating that the alternate guidelines are at least equivalent to the guidelines set forth in this document, and otherwise demonstrate compliance with the performance features of the codes. Notwithstanding that a product, material, or type or method of construction meets the requirements of the guidelines set forth in this document, or that it can be demonstrated that valid alternate guidelines are equivalent to the guidelines 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 an evaluation report, if the product, material, or type 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 unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use of the product, material, or type or method of construction.

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## 1.0 INTRODUCTION

**1.1 Purpose:** The purpose of this evaluation guideline is to establish requirements for underground plastic air ducts to be recognized in an ICC Evaluation Service, Inc. (ICC-ES), evaluation report under the 2003 *International Mechanical Code*<sup>®</sup> (IMC), the 2003 *International Residential Code*<sup>®</sup> (IRC), and the 2003 *International Plumbing Code*<sup>®</sup> (IPC). Bases of recognition are IMC Sections 105.2 and 603, and IRC Sections R104.11 and M1601.

**1.2 Scope:** This evaluation guideline addresses low-pressure plastic air duct and fittings to be installed underground or within concrete slabs.

### 1.3 Codes and Reference Standards:

**1.3.1** ASTM D 1248-00a, Specification for Polyethylene Plastic Extrusion Materials for Wires and Cables, ASTM International.

**1.3.2** ASTM D 1784-99a, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (PVC) Compounds, ASTM International.

**1.3.3** ASTM D 2412-96a, Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-plate Loading, ASTM International.

**1.3.4** ASTM E 84-00, Test Method for Surface Burning Characteristics of Building Materials, ASTM International.

**1.3.5** 2003 *International Mechanical Code*<sup>®</sup> (IMC), International Code Council.

**1.3.6** 2003 *International Residential Code*<sup>®</sup> (IRC), International Code Council.

**1.3.7** 2003 *International Plumbing Code*<sup>®</sup> (IPC), International Code Council.

**1.4 Definitions:** Definitions are in accordance with the applicable documents listed in Section 1.3.

## 2.0 BASIC INFORMATION

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

**2.1.1 Product Description:** Complete information concerning material specifications, thickness, size and the manufacturing process.

**2.1.2 Installation Instructions:** Installation details and limitations, fastening methods, fittings, and sealing.

**2.1.3 Packaging and Identification:** A description of the method of packaging and field identification of the duct and fittings. Identification provisions shall include the evaluation report number.

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

**2.2 Testing Laboratories:** Testing laboratories shall comply with Section 2.0 of 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 METHODS AND PERFORMANCE REQUIREMENTS

**3.1 Surface Burning Comparison Tests:** Testing in accordance with ASTM E 84 shall be performed on both the product samples and the equivalent size of plastic piping conforming to cell classification 1254-B of either ASTM D 1248 or ASTM D 1784. Tests shall be conducted on the smallest and largest diameter for which recognition is sought. The maximum flame-spread and smoke-developed indices of the submitted material shall be less than or equal to the indices for equivalent-size plastic pipe conforming to the referenced standards.

**Exceptions:** No comparison tests are required for :

1. Ducts which have been shown by testing performed in accordance with ASTM E 84 to have a maximum flame-spread index of not more than 25 and a maximum smoke-developed index of not more than 50.

2. Air ducts and fittings manufactured of plastic piping conforming to cell classification 1254-B of either ASTM D 1248 or ASTM D 1784.

**3.2 Strength Testing:** Testing in accordance with ASTM D 2412 shall be performed on samples of the smallest and largest diameter for which recognition is sought. The minimum pipe stiffness shall be 8 psi (55kPa) at 5 percent deflection. Results of testing shall produce allowable loading values in pounds per linear foot for each duct diameter to be included in the report.

### 3.3 Leakage Testing:

**3.3.1 For Use above the Base Flood Elevation (BFE):** All longitudinal and transverse joints, seams and connections shall be sealed in accordance with the IMC Section 603.9.

**3.3.2 For Use below the BFE:** For recognition of installation below the BFE, a minimum of four fittings shall be attached to five lengths of straight duct sections in accordance with the manufacturer's installation instructions. The ends shall be sealed. The duct assembly noted shall be externally tested with water to a pressure equivalent to two times the pressure exerted by the depth for which recognition is sought. Water shall not enter the assembly for the 24-hour test period.

## 4.0 QUALITY CONTROL

**4.1** A quality control manual complying with the ICC-ES Acceptance Criteria for Quality Control Manuals (AC10) shall be submitted.

**4.2** Third-party follow-up inspections are not required under this guideline.

## 5.0 EVALUATION REPORT RECOGNITION

**5.1** The report shall state that the maximum temperature for air conveyed by the underground plastic duct system shall be 150°F (66°C) at the discharge of the unit entering the system.

**5.2** The report shall state that the duct evaluated under this guideline shall only be installed underground or embedded, and that the pipe shall not be used in exposed applications.

**5.3** The report shall state that duct sizing shall be in accordance with Section 603.2 of the IMC.

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**5.4** The report shall state that the installed duct shall slope to allow drainage to a point provided with access.

**5.5** The report shall state that design of concrete slabs with embedded air duct pipe is beyond the scope of this evaluation. Design of slabs with embedded air duct shall conform to accepted engineering practice. Embedded air duct pipe shall not be considered as a structural replacement for the displaced concrete in the slab design.

**5.6** The report shall state that underground air duct pipes located below the base flood elevation shall be designed and installed to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design floor elevation, in accordance with IMC Section 603.13. ■