



Standard Guide for Assessing Depressurization-Induced Backdrafting and Spillage from Vented Combustion Appliances¹

This standard is issued under the fixed designation E 1998; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide describes and compares different methods for assessing the potential for, or existence of, depressurization-induced backdrafting and spillage from vented residential combustion appliances.

1.2 Assessment of depressurization-induced backdrafting and spillage is conducted under either induced depressurization or natural conditions.

1.3 Residential vented combustion appliances addressed in this guide include hot water heaters and furnace. The guide also is applicable to boilers.

1.4 The methods given in this guide are applicable to Category I (draft-hood- and induced-fan-equipped) furnaces. The guide does not apply to Category III (power-vent-equipped) or Category IV (direct-vent) furnaces.

1.5 The methods in this guide are not intended to identify backdrafting or spillage due to vent blockage or heat-exchanger leakage.

1.6 This guide is not intended to provide a basis for determining compliance with code requirements on appliance and venting installation, but does include a visual assessment of the installation. This assessment may indicate the need for a thorough inspection by a qualified technician.

1.7 Users of the methods in this guide should be familiar with combustion appliance operation and with making house-tightness measurements using a blower door. Some methods described in this guide require familiarity with differential-pressure measurements and use of computer-based data-logging equipment.

1.8 *This guide does not purport to address all safety concerns, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.* Carbon monoxide (CO) exposure or flame roll-out may occur when performing certain procedures given in this guide. See Section 7, for precautions that must be taken in conducting such procedures.

2. Referenced Documents

2.1 ASTM Standards:

¹ This guide is under the jurisdiction of ASTM Committee E-6 on Performance of Buildings and is the direct responsibility of Subcommittee E06.41 on Air Leakage and Ventilation Performance.

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D 1356 Terminology Relating to Sampling and Analysis of Atmospheres²

E 631 Terminology of Building Constructions³

E 779 Test Method for Determining Air Leakage Rate by Fan Pressurization³

E 1827 Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door⁴

2.2 CGSB Standard:

51.71 The Spillage Test—Method to Determine the Potential for Pressure-Induced Spillage from Vented, Fuel-Fired; Space Heating Appliances; Water Heaters, and Fireplaces⁵

2.3 ANSI Standard:

Z21.47 Gas-fired Central Furnace⁶

2.4 NFPA Standard:

54 National Fuel Gas Code⁷

3. Terminology

3.1 *Definitions*—For definitions of terms used in this guide, refer to Terminologies E 631 and D 1356.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *air leakage, n*—the movement or flow of air through the building envelope which is driven by a pressure differential across the envelope.

3.2.2 *air leakage rate, n*—the volume of air movement per unit time across the building envelope.

3.2.3 *airtightness, n*—the degree to which the building envelope resists flow of air.

3.2.4 *blower door, n*—a fan pressurization device incorporating a controllable fan and instruments for airflow measurement and building pressure difference measurement that mounts securely in a door or other opening.

3.2.5 *Category 1 appliance, n*—an appliance that operates with non-positive static pressure and with a vent gas temperature that avoids excessive condensate production in the vent (see NFPA 54).

² Annual Book of ASTM Standards, Vol 11.03.

³ Annual Book of ASTM Standards, Vol 04.11.

⁴ Annual Book of ASTM Standards, Vol 04.07.

⁵ Available from the CGSB Sales Centre, Ottawa, Canada K1A 1G6.

⁶ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁷ Available from the National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269.