(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

One of the most important predictors of a building's energy efficiency is its HVAC system. There are a number of ways to measure the performance of HVAC systems—energy efficiency ratings being one of the most common—but the airtightness of the equipment is obviously an important factor as well. Air that is not delivered to areas as specified in the building design is air that is not being used efficiently. With this in mind, ASHRAE Standard 193 was created to test the airtightness of HVAC equipment.

Targeted at systems that move less than 3000 cfm (1400 L/s), Standard 193 will provide results that may be used by cognizant authorities who wish to regulate the air leakage of HVAC equipment and by contractors and installers that wish to specify and install equipment with known leakage characteristics.

The approach taken in this method of test is to determine the air leakage rate of HVAC equipment at a fixed reference pressure difference. In this way Standard 193 is similar to other rating standards that perform evaluations at a single condition for comparison purposes rather than attempting to estimate performance for an individual installation. Because this test method can be applied to a wide range of equipment, it is beyond the scope of this standard to fully specify detailed test arrangements.

Currently the need for minimizing air leakage in HVAC systems is reflected in various ASHRAE standards. ASHRAE Standard 62.2 limits allowable air leakage between garages and houses due to leaks in forced-air HVAC systems. ASHRAE Standard 152 includes HVAC system air leakage in estimates of distribution system efficiency for residential buildings. But while these standards aim to reduce the overall air leakage found in HVAC systems, neither provides a way to determine the effectiveness of specific components in an HVAC system in preventing air leakage. Although ASHRAE Standard 130 includes a test method for measuring air leakage of air terminal units, it does not specify a fixed test pressure suitable for airtightness ratings.

1. PURPOSE

This standard prescribes a method of test to determine the airtightness of forced-air HVAC equipment prior to field installation.

2. SCOPE

2.1 This standard applies to the following:

a. Equipment intended for installation in ducted systems, including furnaces, heat pumps, air conditioners, coil boxes, filter boxes, and associated components.
b. Equipment that moves less than 3000 cfm (1400 L/s) of air.

2.2 This standard does not apply to ducts, plenums, or other field-constructed components.

3. DEFINITIONS

Where the following terms occur in this standard, the definitions provided in this section apply.

air-handling unit (AHU): any device that includes a fan or blower for moving air through ductwork. Examples include furnaces, fan-coil units, energy or heat recovery units, and exhaust fans.

cased coil: a heating or cooling coil that is mounted in a cabinet and contains no fan or blower.

duct-mounted air cleaner: a media air filter or other air-cleaning device that is mounted in a cabinet and has no fan or blower.

standard conditions: for the purposes of this standard, standard conditions are defined as follows: 68°F (20°C) for temperature, 0.07517 lb/ft^3 (1.2041 kg/m^3) for air density, and 29.92 in. Hg (101.325 kPa) for barometric pressure.

variable-air-volume (VAV) box: a terminal air control device that regulates the amount of air entering a space; usually contains a damper but no fan or blower.

4. NOMENCLATURE

P_{baro}	=	barometric pressure, in. Hg (kPa)
Q_{leak}	=	air leakage of equipment under test adjusted to standard conditions and corrected for background leakage, cfm (L/s)
Q_{bg}	=	background air leakage rate of the test apparatus, cfm (L/s)
$Q_{bg,std}$	=	background air leakage rate of the test apparatus adjusted to standard conditions, cfm (L/s)
Q_{meas}	=	measured air leakage rate, cfm (L/s)
$Q_{meas,std}$	=	measured air leakage of equipment under test adjusted to standard conditions, cfm (L/s)
T_{meas}	=	temperature of air flowing through the air flowmeter, °F (°C)

5. TEST APPARATUS AND SPECIFICATIONS

This method of test requires the depressurization and/or pressurization of HVAC equipment to a specified test pressure. The airflow rate required to maintain the applied pressures is the air leakage rate of the equipment under test, Q_{leak}. Schematics of typical test apparatuses are shown in Figures 1 and 2.

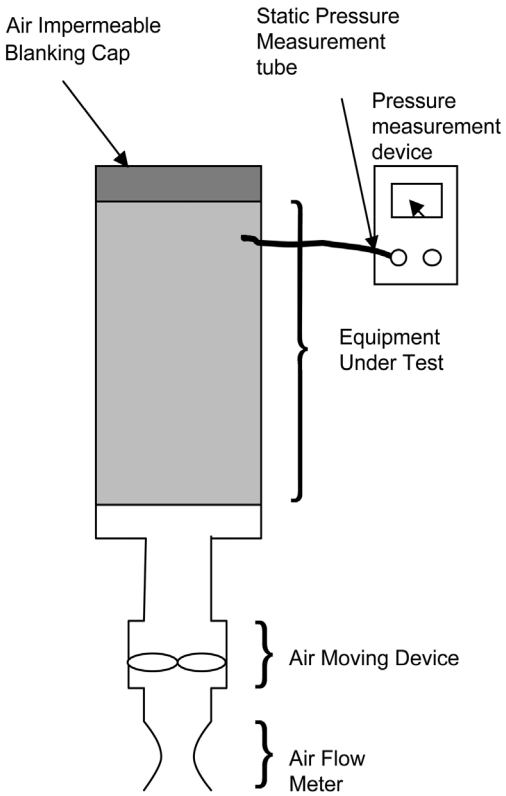

Figure 1 Schematic of test apparatus and equipment under test for pressurization or depressurization testing.

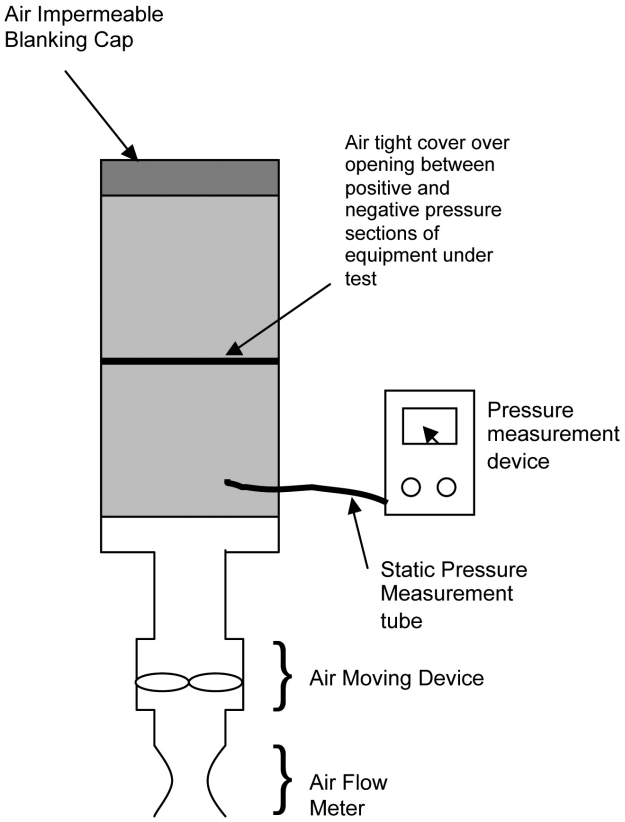

Figure 2 Schematic of test apparatus and equipment under test for split-test procedure.