

**Standard Practice
for Determining
the Steady State
Thermal Transmittance
of Steel Door
and Frame Assemblies**



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Standard Practice for Determining the Steady State Thermal Transmittance of Steel Door and Frame Assemblies

1 Purpose

1.1 The purpose of this practice shall be to establish a standard test specimen size and test conditions for determining the thermal transmittance of operable steel door and frame assemblies.

1.2 This practice refers to the thermal transmittance, U , thermal conductance, C , and the corresponding thermal resistance, R , of an operable steel door and frame assembly installed vertically in the absence of solar and air leakage effects.

1.3 This practice employs the use of ASTM E1423, Standard Practice for Determining the Steady State Thermal Transmittance of Fenestration Systems and ASTM C1199, Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods.

2 Test specimen

2.1 Specimen sizes

Single doors and pairs of doors shall be tested as nominal 3'0" (914mm) wide x 7'0" (2134mm) high and 6'0" (1828mm) wide x 7'0" (2134mm) high sizes, respectively. The test specimens shall consist of door, frame and hardware and be fully operable.

Note: ASTM C1199 permits the sealing off of all potential air leakage sites on or around the test specimen.

3 Test conditions

3.1 The specimen shall be tested in accordance with ASTM C1199 under the following set of conditions:

$$t_1 = 21 \pm 1^\circ\text{C} (70 \pm 2^\circ\text{F})$$

$$t_{11} = -18 \pm 1^\circ\text{C} (0 \pm 2^\circ\text{F})$$

3.1.1 Room side

The air velocity shall be less than 60 ft/min (0.3 m/s).

3.1.2 Weather side

Wind Speed = 15 mph (6.7 m/s) (perpendicular or parallel).

4 Calculation

4.1 Standardized thermal transmittance

It shall be calculated as follows:

$$1/U_{ST} = (1/h_{ST1}) + (1/C_s) + (1/h_{ST11})$$

U_{ST} = Standardized thermal transmittance – Btu/(h·ft·°F)

C_s = Thermal conductance of specimen – Btu/(h·ft·°F)

h_{ST1} = Standardized surface conductance, room side – Btu/(h·ft·°F)

h_{ST11} = Standardizes surface conductance, weather side – Btu/(h·ft·°F)

The following standardized surface conductances shall be used to calculate the standardized thermal transmittance:

$$h_{ST1} = 1.46 \text{ Btu}/(\text{h} \cdot \text{ft} \cdot ^\circ\text{F}) [8.3 \text{ W}/(\text{m}^2 \cdot \text{K})]$$

$$h_{ST11} = 5.1 \text{ Btu}/(\text{h} \cdot \text{ft} \cdot ^\circ\text{F}) [30 \text{ W}/(\text{m}^2 \cdot \text{K})]$$

5 Report

5.1 Report shall contain the following information:

5.1.1 A detailed description of the test specimen components, ie. Door, frame, hardware and weatherstrip that includes model or series numbers.

5.1.2 If the test specimen is of a size other than that specified in Section 2.1, the reason for the deviation should be noted.

5.1.3 All of the information specified in Section 9 of test method C-1199.

5.1.4 A statement affirming that the test was conducted in accordance with this standardized practice.