

WHI TEST REPORT #633-929200
THERMAL PERFORMANCE TEST OF A
SERIES 200 NARROW STILE - SINGLE ENTRANCE DOOR
FOR CMI CRONSTROMS
EAGAN, MINNESOTA
TEST DATE: NOVEMBER 24, 1989

CMI Architectural 2800 Freeway Blvd. # 205 Minneapolis, MN 55430

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REPORT

OF A

THERMAL PERFORMANCE TEST

OF A

SERIES 200 NARROW STILE - SINGLE ENTRANCE DOOR

FOR

CMI CRONSTROMS 1045 GEMINI ROAD EAGAN, MINNESOTA 55121

BY

WARNOCK HERSEY INTERNATIONAL, INC. 8431 MURPHY DRIVE MIDDLETON, WISCONSIN 53562

TEST DATE: NOVEMBER 24, 1989
REPORT DATE: NOVEMBER 30, 1989

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INTRODUCTION

On November 24, 1989 Warnock Hersey International, Inc. (WHI), conducted a test on a Series 200 Narrow Stile Entrance Door for CMI Cronstroms of Eagan, Minnesota. The test was conducted to determine the thermal transmission characteristics of the door under steady state 'winter' temperature conditions.

PROCEDURE

The test was conducted according to the ASTM C-236-87 standard, modified to include a 15 m.p.h. wind, blowing perpendicular to, and impinging on, the exterior (cold side) of the specimen. For a description of the guarded hot box facility, and for definitions of terms and symbols found within this report, please refer to the text of the C-236 standard. The test sample was evaluated in a vertical orientation. The error of Warnock Hersey's C-236 test facility has been established through error analysis to be less than 5%.

An ASTM round robin testing series has determined that different laboratories testing the same homogeneous sample would vary by less than 13.4% with 95% confidence at a mean temperature of 75°F. The bias of the comparison between guarded hot plate data and mean value measured by the guarded hot box method differed by -1.1% in a round robin test.

Using the temperature data collected during the thermal test, a CRF factor for the specimen was calculated using the equations given in Section 3 of the AAMA 1503.1-88 standard.

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SPECIMEN DESCRIPTION

All area dimensions below are given as (width) by (height). Directional references are from the viewpoint of a person facing the exterior of the unit. Dimensions are nominal, and in inches unless otherwise specified.

The sample under evaluation was an aluminum "Cronco-lite 200" Narrow Stile Single Swinging Entrance Door. The overall dimensions were 3' 3-1/2" wide by 7' 1-3/4" tall by 4-1/2" deep. The framing face width was 1-3/4". The stiles were 2-1/8" wide. The head rail had a 2-7/8" face width. The bottom rail had a 3-5/6" face width. The door operated on 2 hinges and could be secured by a mortise lock. The frame incorporated snap in stops with a wool pile weatherstrip. A 1/2" tall by 4" deep threshold was used. An aluminum door sweep with neoprene gasket was used at the sill.

The door was glazed with 1" insulated glass with a 1/2" air space. The exposed surface of the glass measured 30" by 75-1/2".

Drawings are on file at WHI in Middleton, Wisconsin.

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RESULTS

Specimen Area: 23.45 ft2

Cold air temperature: 16.9 °F Warm air temperature: 68.4 °F

Area weighted cold surface temperature: 21.1 °F Area weighted warm surface temperature: 44.1 °F

Specimen heat leakage: 1078.302 BTU/hr

Heat Transfer Parameters: (ASTM C-236)

'U': 0.894 BTU/hr•ft2•°F 'Ru': 1.119 °F•ft2•hr/BTU

'C': 1.992 BTU/hr•ft2•0F 'R': 0.502 OF•ft2•hr/BTU

'hc': 11.091 BTU/hr•ft2•°F 'rc': 0.090 °F•ft2•hr/BTU

'hh': 1.898 BTU/hr•ft2•0F 'rh': 0.527 OF•ft2•hr/BTU

NOTE: These are the U.S. customary thermal units; refer to the ASTM C-236 standard for SI conversions.

Condensation Resistance Factor (CRF): (AAMA 1502.7)

CRF (glazing): 62

CRF (frame): 32

CRF (overall): 32

Note: The overall CRF is given as the lower of the frame

and glazing CRF per AAMA 1502.7.

Test Conducted, and Report Written by:

Report Reviewed by:

John/McFee

Fenestration Supervisor

Rick Curkeet, P.E.

Manager - U.S. Central Region

ADDENDUM TO WARNOCK HERSEY THERMAL PERFORMANCE TEST REPORTS

(This addendum is applicable to test results on non-homogenous samples or samples which include air spaces, insulating glass etc.)

I. REPORTED VALUES

Since the unit tested does not transfer heat by purely conductive means - some heat transfer is by radiation and convection - the "C" and "R" values reported are properly termed "apparent thermal resistance" respectively. These values may not remain constant for varied conditions with respect to warm side, cold side and average temperatures. Air flow condition imposed during tests may also affect the apparent thermal properties significantly.

The conditions imposed during this test were as specified by the client. Warnock Hersey makes no claim or representation with respect to the appropriateness of these conditions for any particular application.

II. "ASHRAE" EQUIVALENTS

It is common practice in estimating thermal performance of building constructions to use standardized "Surface Conductance and Resistance" values as specified in the ASHRAE HANDBOOK FUNDAMENTALS.1 This reference lists the following values for vertical surfaces (non-flective):

	R	Н	
Still Air	0.68	1.46	Indoor Surface
15 MPH Wind	0.17	6.00	Outdoor (Winter)
7.5 MPH Wind	0.25	4.00	Outdoor (Summer)

It is impractical to recreate these conditions with respect to surface conductances during thermal tests. The actual values resulting from a test are influenced by several factors including the effects of sample profile on air flow patterns, temperature measurement and averaging technique, the surface emissivity and the apparent thermal conductance of the sample. The values contained in the Warnock Hersey test report are "measured values" for the test conditions used. These values are believed to accurately represent the effective surface coefficients under test conditions.

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It may be desirable for comparison purposes to translate the reported results to "ASHRAE EQUIVALENT" results. This is readily accomplished by adding the standard ASHRAE surface resistance (R) values to the tested R-value. The following formulae apply:

For winter condition tests:

Ru (ASHRAE) = R + 0.68 + 0.17
U = (tested)
$$\frac{1}{\text{Ru (ASHRAE)}}$$

For summer condition tests:

Ru (ASHRAE) = R tested + 0.68 + 0.25
U (ASHRAE) =
$$\frac{1}{\text{Ru (ASHRAE)}}$$

ASHRAE HANDBOOK, 1985 FUNDAMENTALS; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.: Atlanta, GA., 1985; p.23.3, Table 1.