

WORLDWIDE DOOR COMPONENTS, INC. TEST REPORT

SCOPE OF WORK

UL 1784-2015 TESTING ON SAFEGUARD WEATHERSTRIP, MODEL OF WS-STD

REPORT NUMBER

191129008SHF-001

TEST DATE(S)

2019-12-13 - 2019-12-20

ISSUE DATE

2020-01-07

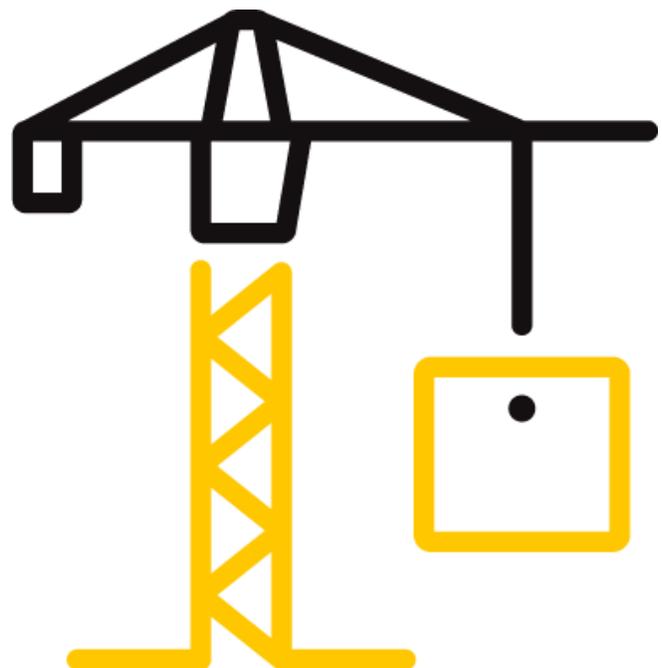
PAGES

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DOCUMENT CONTROL NUMBER

LFT-APAC-SHF-OP-10p (May 1, 2019)

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TEST REPORT

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REPORT ISSUED TO

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SECTION 1

SCOPE

Intertek has conducted an evaluation for WORLDWIDE DOOR COMPONENTS, INC. to determine the air leakage characteristics of the SafeGuard Weatherstrip, Model of WS-STD in Single Leaf Single Action Composite Fire Door. This evaluation began on November 29, 2019 and was completed on December 20, 2019. The test was conducted on December 13, 2019 and December 20, 2019

The test was conducted in accordance with UL 1784-2015, Air Leakage Tests of Door Assemblies and Other Opening Protectives.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

For INTERTEK B&C:

| | |
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SECTION 2

SUMMARY OF TEST RESULTS

Product Name: SafeGuard Weatherstrip

Series/Model: WS-STD

| Configuration | Test Pressure ("H ₂ O) | Chamber Temperature (°F) | Sample Leakage (SCFM) | Leakage Rate (SCFM/ft ²) |
|-------------------------------|-----------------------------------|--------------------------|-----------------------|--------------------------------------|
| Outswing Ambient Temperature | 0.10 | 59 | 1.18 | 0.05 |
| | 0.20 | 59 | 2.02 | 0.08 |
| | 0.30 | 59 | 2.75 | 0.11 |
| Inswing Ambient Temperature | 0.10 | 55 | 1.69 | 0.07 |
| | 0.20 | 55 | 2.82 | 0.11 |
| | 0.30 | 55 | 3.26 | 0.13 |
| Outswing Elevated temperature | 0.10 | 390 | 1.51 | 0.06 |
| | 0.20 | 394 | 2.08 | 0.08 |
| | 0.30 | 400 | 2.22 | 0.09 |
| Inswing Elevated temperature | 0.10 | 394 | 1.32 | 0.05 |
| | 0.20 | 400 | 1.51 | 0.06 |
| | 0.30 | 405 | 1.36 | 0.05 |

Note: All tests were conducted with a threshold incorporating a weather strip.

SECTION 3

TEST METHOD

The specimens were evaluated in accordance with the following:

UL 1784-2015, Air Leakage Tests of Door Assemblies and Other Opening Protectives

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MATERIAL SOURCE/INSTALLATION

Test specimens were provided to Intertek directly by the client and were not independently selected for testing. Test specimens were received at the Evaluation Center on November 29, 2019.

A description of the test assembly is given in the table below. The description of the specimen is based on a survey of the specimen and information provided by the sponsor of the test. All values quoted below are nominal, unless tolerances are given.

| TESTED ASSEMBLY DESCRIPTION | | | | | | | |
|-----------------------------|----------------|---|---|----------------------|---------|---------|-------------------|
| Door | Type | Single Leaf Single Action Composite Fire Door | | | | | |
| | Nominal Size | Single Door | 908 | mm wide | 2413 | mm high | 44.5 mm thickness |
| | Facing | Material | 1.8 mm thick SMC (sheet molding compound), model of RXSMC5005, density of 1600 kg/m ³ | | | | |
| | Core | Material: | 40.9 mm thick PU (portfolio polyether polyols), density of 60 kg/m ³ | | | | |
| | Rail | Material | 40.9 x 30 mm LVL (laminated veneer lumber), density of 570 kg/m ³ | | | | |
| | Stile | Material | 40.9 x 60 mm LVL (laminated veneer lumber), density of 570kg/m ³ | | | | |
| | Block for lock | Material | 40.9 x 30 mm LVL (laminated veneer lumber), density of 570kg/m ³ | | | | |
| | Lipping | Material | 40.9 x 10 mm PVC (polyvinyl chloride), density of 1410 kg/m ³ , at two vertical edges and top edge of door; 40.9 x 20 mm PVC (polyvinyl chloride), density of 1410 kg/m ³ , at bottom edge of door | | | | |
| Frame | Nominal Size | 953 | mm wide | 2458 | mm high | 116 | mm deep |
| | Material | PVC (polyvinyl chloride), density of 1410 kg/m ³ | | | | | |
| Threshold | Material | Aluminum, PVC, Composite, Screw fix | | | | | |
| Hardware | Lock 1 | Lock type: | Tubular lock, Model: Olympic FLG series | | | | |
| | | Backset: | 60 mm | Latch throw: 12.7 mm | | | |
| | | Latch Operation | Latch: | Engaged | | | |
| | Lock 2 | Lock type: | Classroom Deadbolt with single cylinder, model: FD71 | | | | |

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| | | | | |
|------------------------|--|----------------|---------------------------------------|--------------------|
| | | Backset: | 60 mm | Latch throw: 25 mm |
| | | Bolt Operation | Engaged | |
| | Hinge | Material: | SUS304, model of SS454034-2BB | |
| | | Size: | 4.5 in. x 4 in. x 3.4 mm, Quantity: 4 | |
| SafeGuard Weatherstrip | Model: WS-STD; | | | |
| | Size: 26 x 15 mm; | | | |
| | Component: PE film + PU foam + PP + TPE; | | | |
| | Location: One strip mortise mounted along header, frame stop of strike jamb and threshold stop (Brown color); One strip mortise mounted along frame stop of hinge jamb (White color) | | | |

The sample ID number assigned by the test lab is S191129008SHF.001~002.

The drawings of the SafeGuard Weatherstrip, test door assembly and test wall construction can be found in Section 5, 6 and 7 respectively.

The test assembly was installed in the test chamber opening. The test assembly was built into a steel stud gypsum board wall system. The door clearances were adjusted so that they complied with installation instruction provided by the customer. Prior to the commencement of air leakage test, the specimen to be tested was checked for operability in the test chamber opening by operating for five full-stroke close and reopen operations. The test measurement data was shown in Section 8.

The test door assembly was tested from both directions. The testing was conducted on two separate, identical test door assembly. One test door was oriented to open away from the test chamber (outswing) and the other open into the test chamber (inswing).

The nominal dimensions of the test wall were 3 m high by 3 m wide.

After the cycling test, the air flow was to be adjusted in the test chamber to provide a positive test pressure differential of 0.10 inch water (25 Pa), 0.20 inch water (50 Pa), and 0.30 inch water at 75±20°F (24±11°C) of the temperature of the exposed face of the test sample. After the test conditions were stabilized, the extraneous chamber leakage and the total metered air flow for ambient temperature exposure test were measured and recorded.

After ambient temperature exposure test, the temperature of test chamber was started to increase by heating device and the timer was started. Temperatures within the chamber were monitored using thermocouples and the data was recorded. The heating device were controlled

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to keep the chamber temperatures within the allowable limits specified in the test standards. The air flow was to be adjusted in the test chamber to provide a positive test pressure differential of 0.10 inch water (25 Pa), 0.20 inch water (50 Pa), and 0.30 inch water at $400\pm 10^{\circ}\text{F}$ ($204\pm 5^{\circ}\text{C}$) of the temperature of the exposed face of the test sample. After the test conditions were stabilized, the total metered air flow for elevated temperature exposure test was measured and recorded. Periodic observations were made of the surfaces of the test assembly during the air leakage test. The extraneous chamber leakage after the elevated temperature exposure test was measured after the temperature at the faces of the door assembly returned to $75\pm 5^{\circ}\text{F}$ ($24\pm 11^{\circ}\text{C}$).

A full set of test data is included in section 9, and photographs have been presented in section 10.

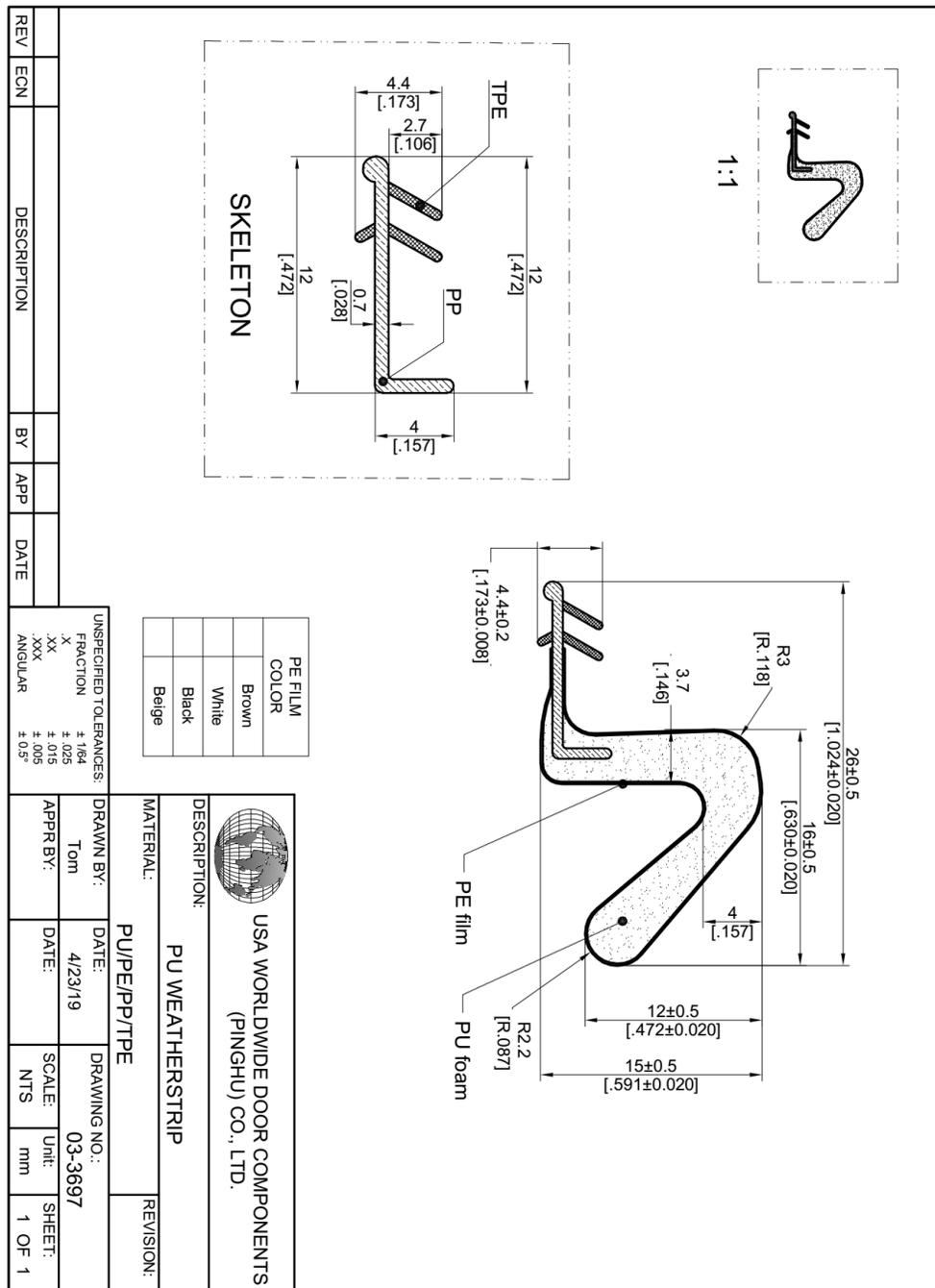
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SECTION 5

TEST SAMPLE DRAWING



Product Drawing of SafeGuard Weatherstrip, model of WS-STD

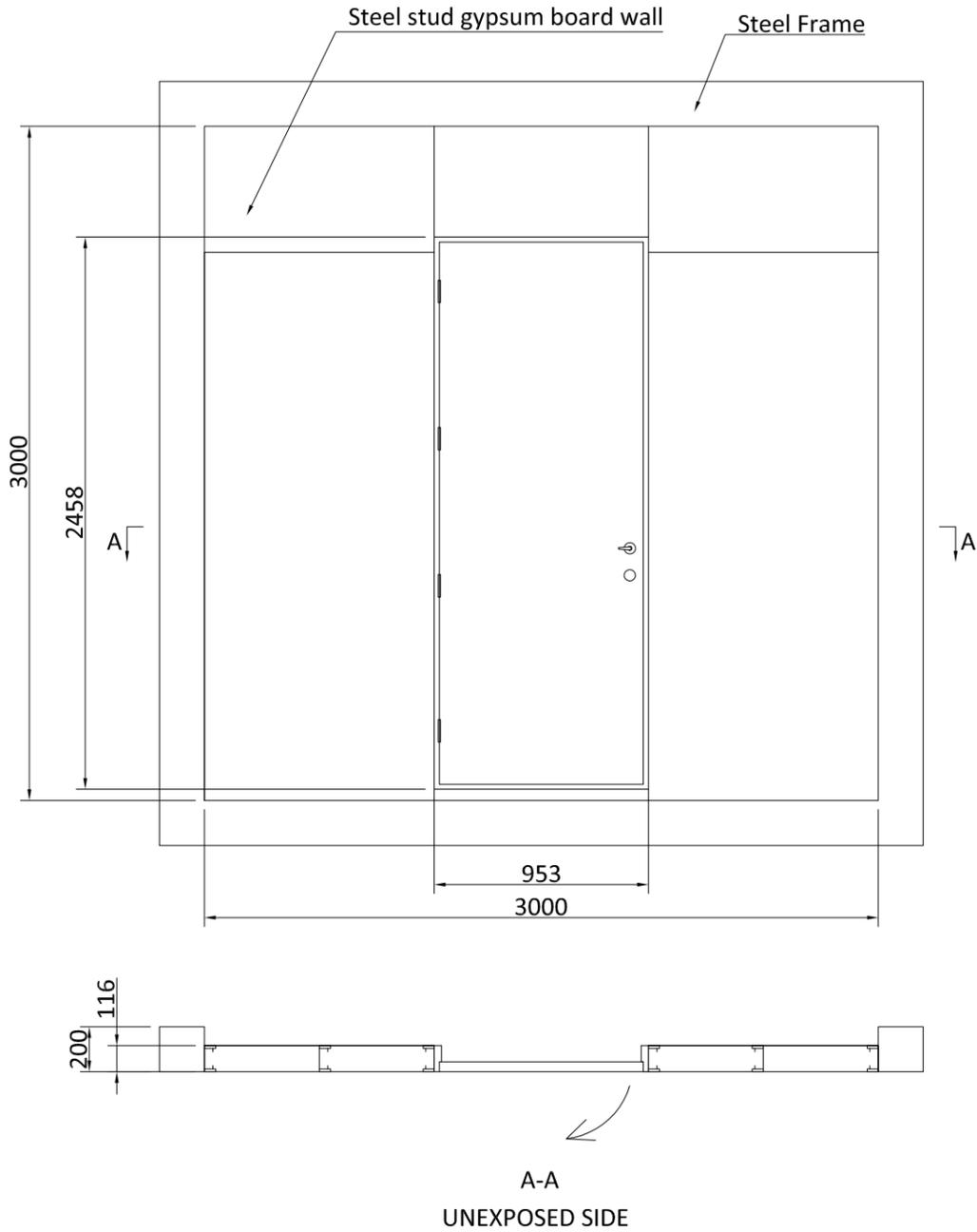
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SECTION 7

TEST WALL CONSTRUCTION FOR OUTSWING TEST DOOR ASSEMBLY

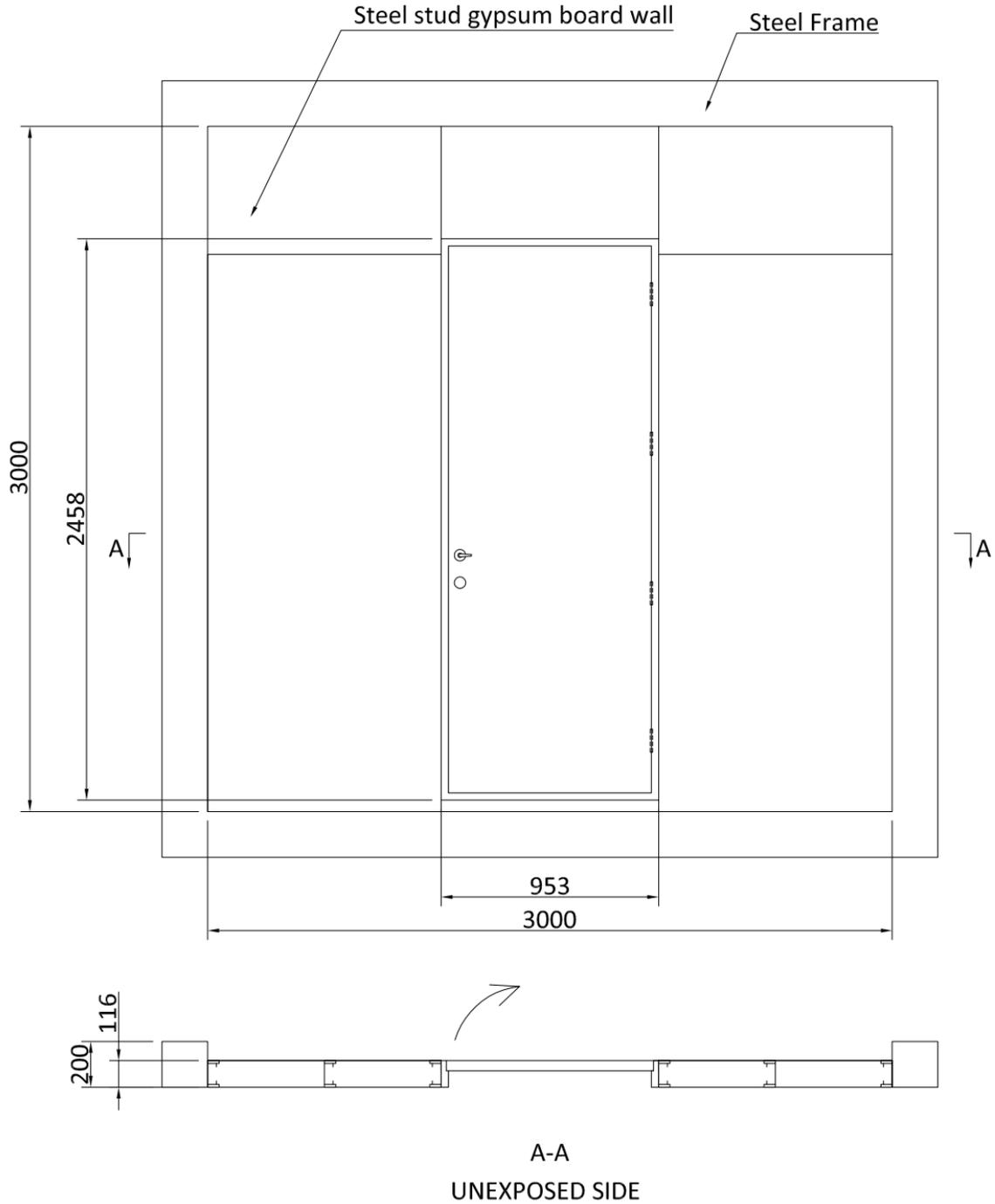


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TEST WALL CONSTRUCTION FOR INSWING TEST DOOR ASSEMBLY



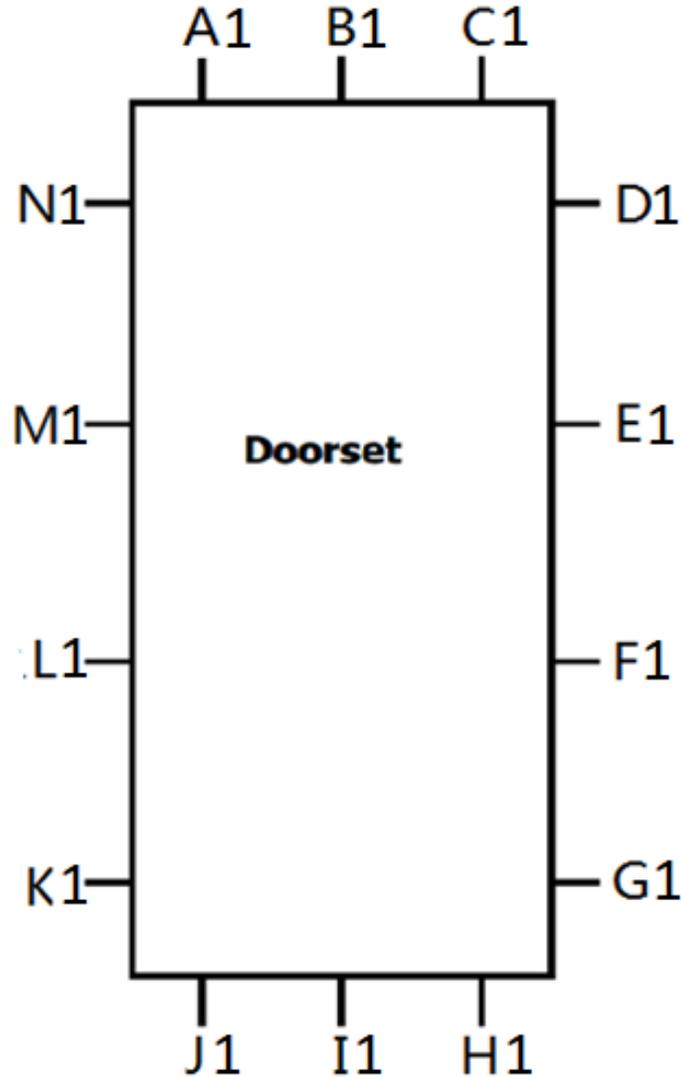
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SECTION 8

TEST MEASUREMENT DATA



UNEXPOSED SIDE

| Clearance dimension in mm at each position of the outswing door | | | | | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| A1 | B1 | C1 | D1 | E1 | F1 | G1 | H1 | I1 | J1 | K1 | L1 | M1 | N1 |
| 0.8 | 0.1 | 1.5 | 3.4 | 2.8 | 1.9 | 1.0 | 4.8 | 4.8 | 4.9 | 1.7 | 1.1 | 1.8 | 1.9 |

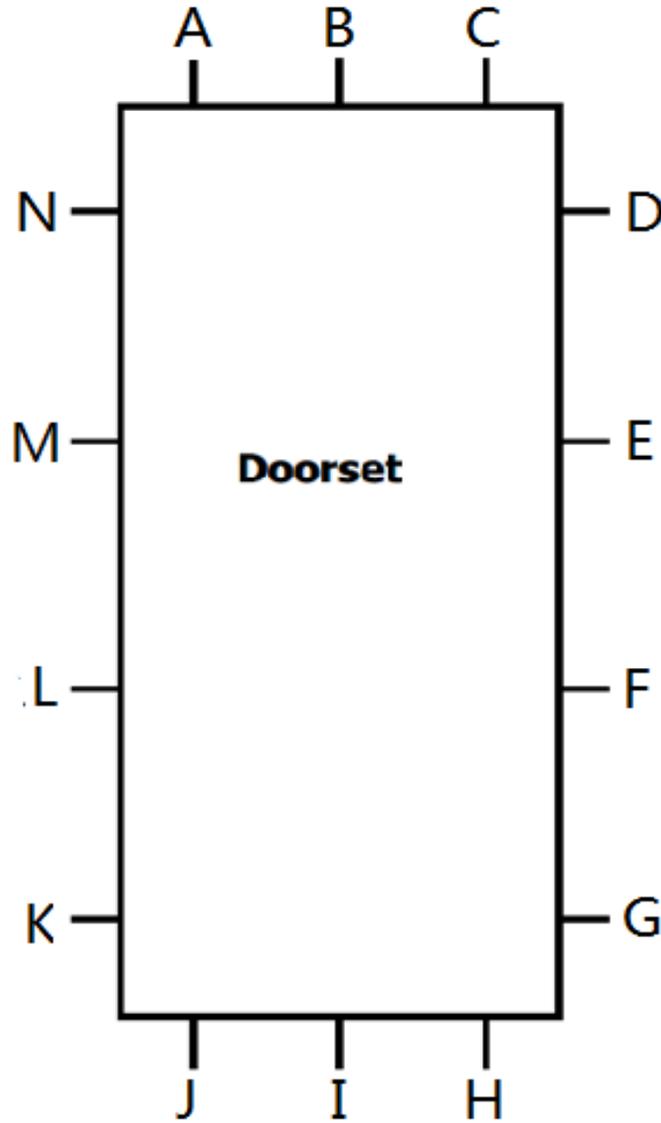
DO NOT SCALE

DOOR ASSEMBLY INITIAL CLEARANCES

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EXPOSED SIDE

| Clearance dimension in mm at each position of the inswing door | | | | | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N |
| 1.2 | 1.4 | 2.6 | 2.7 | 2.7 | 3.1 | 3.1 | 4.3 | 4.1 | 4.1 | 1.2 | 2.2 | 1.8 | 1.2 |

DO NOT SCALE

DOOR ASSEMBLY INITIAL CLEARANCES

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SECTION 9

TEST DATA

Standards: UL 1784-2015 "Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives"

Conditioning: According to UL 1784, section 5.2

Equipment:

| ITEM | ID |
|------------------------|--------------|
| Vertical furnace | SH1346 |
| Chamber thermocouple | SH1097-12~14 |
| Pressure Gauge | SH1175 |
| Air Flow Gauge | |
| Hygrothermograph | SH1336 |
| Air Pressure Gauge | SH1062 |
| Clearance Measurements | SH1057-1 |
| Test Clock | SH1042 |

Test equipment: According to UL 1784, Section 5.3
Test Specimen: According to UL 1784, Section 5.1
Condition: According to UL 1784, Section 5.2
Test setup: According to UL 1784, Section 4 and Section 5.4
Test Procedure: According to UL 1784, Section 6 and Section 7

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Test Observations:

The outswing test door assembly

| Time | | All observations are from the unexposed face unless noted otherwise. |
|------|------|---|
| Mins | Secs | |
| 00 | 00 | Air leakage test started. |
| 06 | 50 | There were no significant changes during the measurements of extraneous chamber leakage and total metered air flow at test pressure differentials of 0.10 inch water, 0.20 inch water and 0.30 inch water of ambient temperature exposure test. |
| 07 | 50 | Ambient temperature exposure test was completed. |
| 08 | 50 | Elevated temperature exposure test started, and the heating system started to work. |
| 37 | 00 | The chamber temperature adjacent to exposed face of test sample reached to 209 °C and then started to measure total metered air flow at test pressure differentials of 0.10 inch water, 0.20 inch water and 0.30 inch water. |
| 42 | 00 | The measurement of total metered air flow was completed and then started to cool in the chamber. |
| 165 | 00 | The temperature at the faces of test sample had returned to 13 °C and started to measure extraneous chamber leakage at test pressure differentials of 0.10 inch water, 0.20 inch water and 0.30 inch water. |
| 172 | 00 | Elevated temperature exposure test was completed. There was no significant deflection on the unexposed face of test sample. |

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The inswing test door assembly

| Time | | All observations are from the unexposed face unless noted otherwise. |
|------|------|---|
| Mins | Secs | |
| 00 | 00 | Air leakage test started. |
| 06 | 10 | There were no significant changes during the measurements of extraneous chamber leakage and total metered air flow at test pressure differentials of 0.10 inch water, 0.20 inch water and 0.30 inch water of ambient temperature exposure test. |
| 07 | 10 | Ambient temperature exposure test was completed. |
| 08 | 10 | Elevated temperature exposure test started, and the heating system started to work. |
| 38 | 00 | The chamber temperature adjacent to exposed face of test sample reached to 209 °C and then started to measure total metered air flow at test pressure differentials of 0.10 inch water, 0.20 inch water and 0.30 inch water. |
| 43 | 00 | The measurement of total metered air flow was completed and then started to cool in the chamber. |
| 163 | 00 | The temperature at the faces of test sample had returned to 13 °C and started to measure extraneous chamber leakage at test pressure differentials of 0.10 inch water, 0.20 inch water and 0.30 inch water. |
| 170 | 00 | Elevated temperature exposure test was completed. There was no significant deflection on the unexposed face of test sample. |

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Test results of the Ambient temperature exposure test and Elevated temperature exposure test

Ambient Condition: 15°C, 65% R.H

Barometric pressure: 103.8 kPa; **Opening area:** 25.21 ft²

| Configuration | Test pressure (" H ₂ O) | Chamber temp. (°F) | Measured Q _m (CFM) | Normalized Q _m (CFM) | Measured Q _L (CFM) | Normalized Q _L (CFM) | Normalized Q (CFM) | Leakage Rate (CFM/ft ²) |
|-------------------------|------------------------------------|--------------------|-------------------------------|---------------------------------|-------------------------------|---------------------------------|--------------------|-------------------------------------|
| Outswing Ambient temp. | 0.10 | 59 | 3.05 | 3.22 | 1.93 | 2.04 | 1.18 | 0.05 |
| | 0.20 | 59 | 4.89 | 5.17 | 2.98 | 3.15 | 2.02 | 0.08 |
| | 0.30 | 59 | 6.65 | 7.03 | 4.05 | 4.28 | 2.75 | 0.11 |
| Outswing Elevated temp. | 0.10 | 390 | 3.39 | 3.58 | 1.96 | 2.07 | 1.51 | 0.06 |
| | 0.20 | 394 | 5.13 | 5.42 | 3.16 | 3.34 | 2.08 | 0.08 |
| | 0.30 | 400 | 6.22 | 6.57 | 4.12 | 4.35 | 2.22 | 0.09 |

Ambient Condition: 13°C, 65% R.H

Barometric pressure: 103.8 kPa; **Opening area:** 25.21 ft²

| Configuration | Test pressure (" H ₂ O) | Chamber temp. (°F) | Measured Q _m (CFM) | Normalized Q _m (CFM) | Measured Q _L (CFM) | Normalized Q _L (CFM) | Normalized Q (CFM) | Leakage Rate (CFM/ft ²) |
|------------------------|------------------------------------|--------------------|-------------------------------|---------------------------------|-------------------------------|---------------------------------|--------------------|-------------------------------------|
| Inswing Ambient temp. | 0.10 | 55 | 3.62 | 3.85 | 2.03 | 2.16 | 1.69 | 0.07 |
| | 0.20 | 55 | 5.86 | 6.23 | 3.21 | 3.41 | 2.82 | 0.11 |
| | 0.30 | 55 | 7.30 | 7.77 | 4.24 | 4.51 | 3.26 | 0.13 |
| Inswing Elevated temp. | 0.10 | 394 | 3.48 | 3.70 | 2.24 | 2.38 | 1.32 | 0.05 |
| | 0.20 | 400 | 4.95 | 5.27 | 3.53 | 3.76 | 1.51 | 0.06 |
| | 0.30 | 405 | 6.25 | 6.65 | 4.97 | 5.29 | 1.36 | 0.05 |

Note: Test sample leakage rate, $Q = Q_m - Q_L$

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SECTION 10 PHOTOGRAPHS



Fig. 1 Unexposed Side of outswing test door assembly during air leakage test



Fig. 2 Unexposed Side of inswing test door assembly during air leakage test

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SECTION 11 REVISION LOG

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| 0 | 2020-01-07 | N/A | Original Report Issue |