

Report No. ETC 01-741-11004.0  
DC Notification Number ETC 01037 - Date: July 11, 2001  
ETC Certification # 99-0416.01  
Test Start Date: July 6, 2001  
Test End Date: July 9, 2001

**Test Requested By:** THERMA-TRU CORP  
108 Mutzfeld Rd.  
Butler, IN 46721  
Phone 219 - 868 - 5811  
Facsimile 219 - 868 - 5190

**Tests Conducted:** PA 201, PA 202 & PA 203 (with no deviations)

<b>Design Pressures -</b>	Specimen 1	(PA 202)	Out-swing	+ 60.0 psf.	- 60.0 psf.
	Specimen 2	(PA 202)	In-swing	+ 60.0 psf.	- 60.0 psf.
	Specimens 3 & 4	(PA 201 & 203)	Out-swing	+ 63.0 psf.	- 63.0 psf.
	Specimen 5	(PA 201 & 203)	In-swing	+ 63.0 psf.	- 63.0 psf.

**Section 1 - DESCRIPTION OF SERIES:**

**Model Designation** - Therma Tru Construction Series Double Opaque Door w/ sidelites

**Overall Size:**

Specimens 1, 3 & 4 Out-swing Bumper Threshold - 105.5 in. W x 80.5 in. H x 4.5625 in. D  
Specimens 2 & 5 In-swing Saddle Threshold - 105.5 in. W x 82.0 in. H x 4.5625 in. D

**Configuration:** All Specimens (OXXO)

**No. & Size of Doors:**

All Specimens 1 active leaf - 36.0 in. W x 79.25 in. H  
All Specimens 1 in-active leaf w/ astragal 36.625 in. W x 79.25 in. H  
Specimens 1, 3 & 4 2 sidelite sash - 14.0 in. W x 78.25 in. H  
Specimens 2 & 4 2 sidelite sash - 14.0 in. W x 80.5 in. H

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## **Section 2 - MATERIAL CHARACTERISTICS:**

**Frame and Door Material:** Finger jointed pine jambs and steel panels.

### **Frame Construction -**

The head jambs and side jambs are finger jointed pine measuring 4.575 in. x 1.245 in.. The head jamb and side jambs are mortised, butted and joined using (3) 0.5 in. crown x 2 in. 16 ga. wire staples at each end. The following thresholds were tested, specimens 1, 3 & 4 - Therma-Tru Aluminum Out-swing Bump measuring 4.625 in. x .837 in. and attached to the jamb with (2) 0.5 in. crown x 2.5 in. 16 ga. wire staples at each end. Specimen 1A was affixed with an add-on high dam sill that increased the height of the original bump threshold to 1.875 in. at the inner most plane of the frame system. Specimens 2 & 5 - Self-adjusting In-swing saddle threshold (Alum/Wood/Vinyl) measuring 5.75 in. x 1.548 in. and attached to the jamb with (2) 0.5 in. crown x 2.5 in. 16 ga. wire staples at each end. The hinge jamb was mortised to receive Therma-Tru 4.0 in. x 4.0 in. self-locating hinges located at 9.25 in., 38.5 in. and 67.75 in. from the top of the door jamb.

### **Panel Construction -**

The panel is constructed from 25 Ga. (0.018 in. min. thick) galvanized and prime-coated steel face sheets. The interior cavity of each door is filled with BASF polyurethane foam. The face sheet edges are roll formed to form a mechanical interlock with the hinge stile (1.234 in. thick x 1.625 in. wide). and latch finger jointed pine stiles (1.242 in. thick x 1.659 in. wide). The stiles are machined to interlock with the steel face sheets. The top rail is finger jointed pine (0.789 in. thick x 1.625 in. wide) and the bottom rail is wood composite (0.831 in. thick by 1.625 in. wide) and kerfed to receive a door sweep (sweep used on in-swing models only). The stiles and rails are pressure fitted and adhesively bonded to the steel face sheets. The hinge stile was mortised at 8.375 in., 37.625 in. and 66.875 in. from the top of the door panel to receive (3) Therma-Tru 4.0 in. x 4.0 in. butt type hinges. The inactive door panel was attached with an extruded aluminum astragal (WJII) kerfed to receive weather-stripping. The astragal has integral extruded channels to receive (2) cold rolled steel rods at the top and (2) cold rolled steel rods at the bottom. The rods are 0.312" diameter x 8.0" long. The bolts extend 2.0" beyond the end of the astragal when engaged. The astragal is attached to the panel with (9) #8 x 1.0" Phillips Pan Head screws, located at 1.0 in., 3.0 in., 5.0 in., 18.25 in., 40.5 in., 59.25 in., 74.25 in., 76.25 in. and 78.25 in..

### **Sash Construction -**

The sidelite panel is constructed from 24 Ga. (0.021 in. min. thick) galvanized and prime-coated steel face sheets. The interior cavity of each sidelite panel is filled with BASF polyurethane foam. The face sheet edges are roll formed to form a mechanical interlock with the sidelite stile (0.670 in. thick x 1.527 in. wide). The stiles are machined to interlock with the steel face sheets. The top and bottom rails are finger jointed pine (0.789 in. thick x 1.625 in. wide). The stiles and rails are pressure fitted and adhesively bonded to the steel face sheets. The steel sidelite panels are cut out to receive the glass retaining lip lite surrounds.

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**Section 2 – MATERIAL CHARACTERISTICS (Cont.):**

**Glazing:**

Specimens 1, 2 & 4 contained two (2) sidelite sashes –

Left sash – Therma-Tru BTS lip lite

(0.5 in. insulated glass – 0.125 in. tempered glass – 0.25 in. air space - 0.125 in. tempered glass)

Right sash – Therma-Tru PVC lip lite

(0.5 in. insulated glass – 0.125 in. tempered glass – 0.25 in. air space - 0.125 in. tempered glass)

Specimens 3 & 5 contained two (2) sidelite sashes –

Left sash – Therma-Tru BTS lip lite (0.125 in. tempered glass)

Right sash – Therma-Tru PVC lip lite (0.125 in. tempered glass)

**Glazing Method:** The sash panels are attached to the sidelite panels with (14) #6 x 1.75 in. long tek screw spaced as follows, top and bottom rail at the center of span, side stiles from the top down at 3.0 in., 14.75 in., 26.5 in., 38.25 in., 50.5 in. and 62.25 in..

**Daylight Opening:** Left and right sash – 7.125 in. wide x 63.125 in. high

**Weather-stripping:**

Specimens 1, 3 & 4 Hinge Jamb 1 pc Therma-Tru short reach foam compression weather-strip.  
Latch Jamb 1 pc Therma-Tru short reach foam compression weather-strip.  
Head Jamb 1 pc Therma-Tru short reach foam compression weather-strip.  
Astragal - 1 pc Therma-Tru short reach foam compression weather-strip.  
Corner pad seals 3 – 1 at each side jamb and astragal at threshold

Specimens 2 & 5 Hinge Jamb 1 pc Therma-Tru long reach foam compression weather-strip.  
Latch Jamb 1 pc Therma-Tru long reach foam compression weather-strip.  
Head Jamb 1 pc Therma-Tru long reach foam compression weather-strip.  
Astragal - 1 pc Therma-Tru long reach foam compression weather-strip.  
Corner pad seals 3 – 1 at each side jamb and astragal at threshold

Specimens 1, 3 & 4 - Out-swing Bump threshold 1 row Therma-Tru foam compression weather-strip.

Specimens 2 & 5 - Therma-Tru vinyl fixed door bottom sweep.

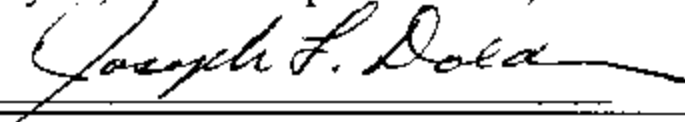
**Hardware:**

All Specimens

- (1) Kwikset 700 Series Latchbolt (ANSI Grade II) at 44.0 in. from top of panel  
(The strikeplate was attached to the inactive door through the astragal with (2) #8 x 2.5 in. PFH WS.)
- (1) Kwikset 700 Deadbolt (ANSI Grade II) at 38.5 in. from top of panel  
(The strikeplate was attached to the inactive door through the astragal with (2) #8 x 2.5 in. PFH WS.)
- (3) Therma-Tru 4 in. butt type hinges  
(The hinge was fastened to the door panel with (4) #10 x 0.75 in. PFH WS and fastened to the jamb with (3) #10 x 0.75 in. PFH WS and (1) # 10 x 1.75 in. PFH WS.)

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**Section 2 – MATERIAL CHARACTERISTICS (Cont.):**

**Weepholes:**                      None

**Muntins:**                        None

**Reinforcement:**                None

**SEALANT:**      Latex caulking as needed to seal unit into rough opening.

**ADDITIONAL DESCRIPTION:**

All specimens were installed in a wood test buck.

**Section 3 - INSTALLATION:**

**Screws and Method of Attachment:**

Specimens 1, 2, 3, 4 & 5 used the following screw types and numbers to secure the door frame system into the test buck.

**22 - # 8 x 2.5 in. Flat Head Phillips wood screws.**

- (10) from the left side of the test specimen on the head jamb the screws are located at 3.0 in., 12.5 in., 18.5 in., 34.0 in., 46.5 in., 59.0 in., 71.5 in., 87.0 in., 93.0 in. and 102.5in..
- (6) from the top down on the left side of the test specimen the screws are located at 6.0 in., 20.0 in., 34.0 in., 48.0 in., 52.0 in. and 66.0 in.
- (6) from the top down on the right side of the test specimen the screws are located at 6.0 in., 20.0 in., 34.0 in., 48.0 in., 52.0 in. and 66.0 in.

**4 - # 8 x 3.0 in. Flat Head Phillips wood screws**

- (4) from the left side of the test specimen on the sill the screws are located at 3.0 in., 12.5 in., 93.0 in. and 102.5 in.

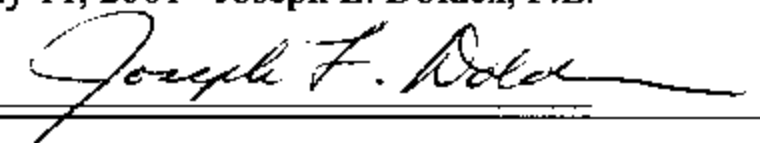
**8 - # 10 x 2.0 in. Flat Head Phillips wood screws**

- (8) from the left side of the test specimen on the sill the screws are located at 18.5 in., 21.5 in., 34.0 in., 46.5 in., 59.0 in., 71.5 in., 84.0 in. and 87.0 in.

**6 - # 10 x 3.0 in. Flat Head Phillips wood screws**

- (4) from the left side of the test specimen on the head jamb the screws are located at 9.5 in., 18.5 in., 84.0 in. and 96.0 in.
- (2) from the left side of the test specimen on the sill the screws are located at 9.5 in. and 96.0 in.

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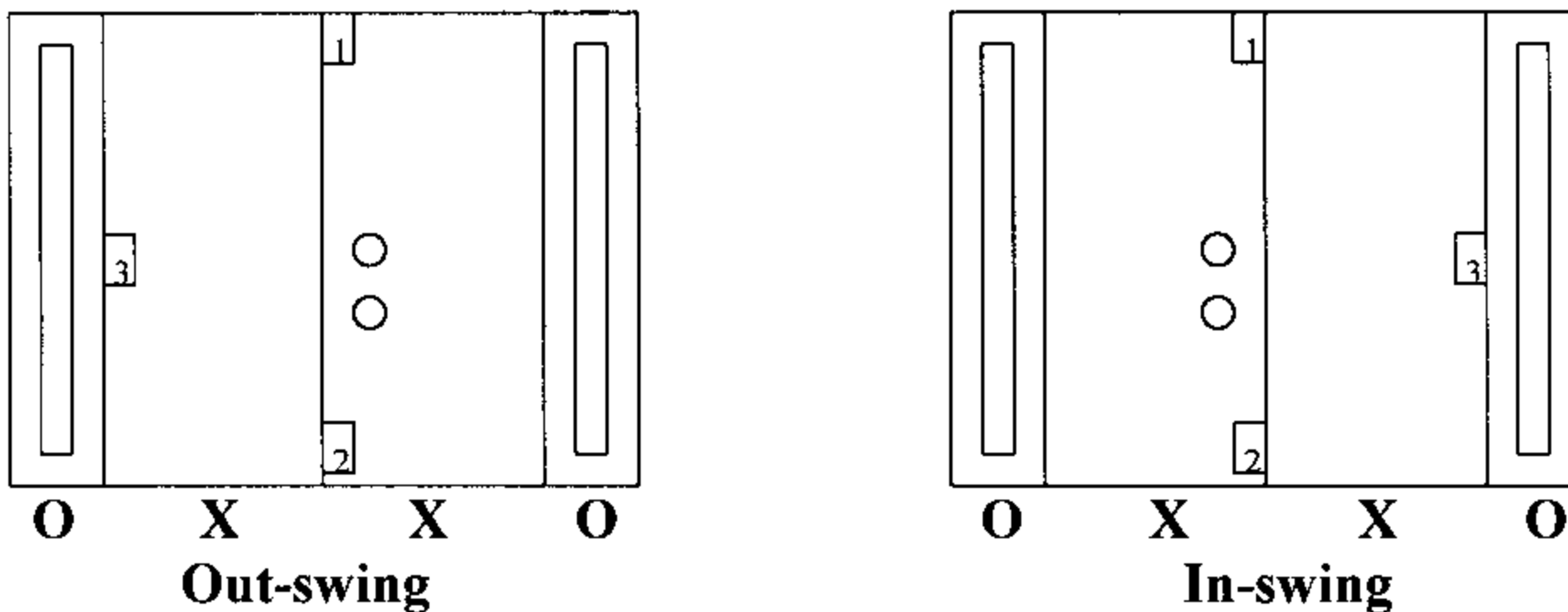
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**Section 4 - SEQUENCE OF TESTS PERFORMED:**

**Test Sequence: PA 202**

1. Air Infiltration
2. 1/2 Test Pressure Positive
3. Design Pressure Positive
4. 1/2 Test Pressure Negative
5. Design Pressure Negative
6. Water Infiltration Positive Direction
7. Full Test Pressure Positive
8. Full Test Pressure Negative
9. Forced Entry

**Deflection Gauges set at X's**



Deflection was measured with two (3) Aerospace 2.0 in. dial indicators: location # 1-SN 213293, location #2-SN 213472 and location # 3-SN213848.

**Test Results:**

**AIR INFILTRATION**

Air Infiltration Tests were conducted in accordance with DCBCCD PA 202-94

Air at 1.57 psf		Actual	Allowable
Specimen 1	Out-swing	0.00 CFM/SQ FT	0.34 CFM/SQ FT
Specimen 2	In-swing	0.07 CFM/SQ FT	0.34 CFM/SQ FT

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**Test Results (Cont.):****WATER INFILTRATION TEST**

Water Infiltration Test was conducted in accordance with DCBCCD PA 202 – 94

Specimen 1	Out-swing	Water @ 2.86 psf for 15 min.	No water penetration over sill.
Specimen 1A	Out-swing	Water @ 9.00 psf for 15 min.	No water penetration over sill.
Specimen 2	In-swing	Water @ 2.86 psf for 15 min.	No water penetration over sill.

**STATIC AIR PRESSURE TESTS**

Static Tests were conducted in accordance with DCBCCD PA 202-94

**Design Loads + 60.0 psf, - 60.0 psf. Specimen 1 (Out-swing)**

Range of test	time	actual load	deflection	perm. set
Positive loads	(seconds)	psf		
1/2 Test	30	45.00		
Design	30	60.00	Mullion (3) 0.135 in.	
Test	30	90.00	Door T (1) 0.510 in.	0.096 in.
			Door B (2) 0.365 in.	0.076 in.
			Mullion (3) 0.253 in.	0.018 in.

Range of test	time	actual load	deflection	perm. set
Negative loads	(seconds)	psf		
1/2 Test	30	45.00		
Design	30	60.00	Mullion (3) 0.105 in.	
Test	30	90.00	Door T (1) 2.500 in.	0.280 in.
			Door B (2) 2.750 in.	0.290 in.
			Mullion (3) 0.615 in.	0.051 in.

Mullion – max allowable deflection at design is  $(L / 180) 80.50 / 180 = 0.447$  in.

Mullion – max allowable set at test load is  $(04\% \times L) .004 \times 80.50 = 0.322$  in.

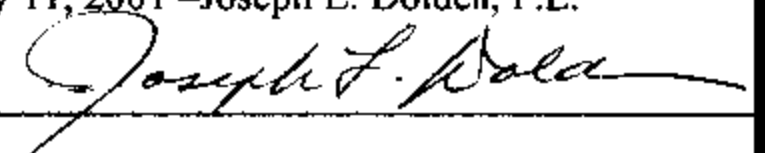
(1) Door T - Max. allowable perm. set at completion of test load (0.4% of span)  $.004 \times 79.25$  in. = 0.317 in.

(2) Door B - Max. allowable perm. set at completion of test load (0.4% of span)  $.004 \times 79.25$  in. = 0.317 in.

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## Test Results (Cont.):

### Static Air Pressure Test Cont.

**Design Loads + 60.0 psf, - 60.0 psf. Specimen 2 (In-swing)**

Range of test	time	actual load	deflection	perm. set
Positive loads	(seconds)	psf		
1/2 Test	30	45.00		
Design	30	60.00	Mullion (3) 0.418 in.	
Test	30	90.00	Door T (1) 3.000 in.	0.060 in.
			Door B (2) 3.250 in.	0.017 in.
			Mullion (3) 0.742 in.	0.123 in.

Range of test	time	actual load	deflection	perm. set
Negative loads	(seconds)	psf		
1/2 Test	30	45.00		
Design	30	60.00	Mullion (3) 0.378 in.	
Test	30	90.00	Door T (1) 1.438 in.	0.230 in.
			Door B (2) 1.231 in.	0.074 in.
			Mullion (3) 0.771 in.	0.132 in.

Mullion – max allowable deflection at design is  $(L / 180) 82.0 / 180 = 0.455$  in.

Mullion – max allowable set at test load is  $(04\% \times L) .004 \times 82.0 = 0.328$  in.

(1) Door T - Max. allowable perm. set at completion of test load (0.4% of span)  $.004 \times 79.25$  in. = 0.317 in.

(2) Door B - Max. allowable perm. set at completion of test load (0.4% of span)  $.004 \times 79.25$  in. = 0.317 in.

### FORCED ENTRY TEST

Forced Entry Test was conducted in accordance with DCBCCD PA202-94

<u>Specimen</u>	<u>Size</u>	<u>Time</u>	<u>Result</u>
Specimen 1 (active panel)	36.0 in. W x 79.25.in. H	30 seconds	(Doors remained locked & shut)
Specimen 2 (active panel)	36.0 in. W x 79.25 in. H	30 seconds	(Doors remained locked & shut)

**NOTE:** Active door panel remained engaged and was operable before and after all tests.

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**Test Results (Cont.):**

**IMPACT TEST – LARGE MISSILE**

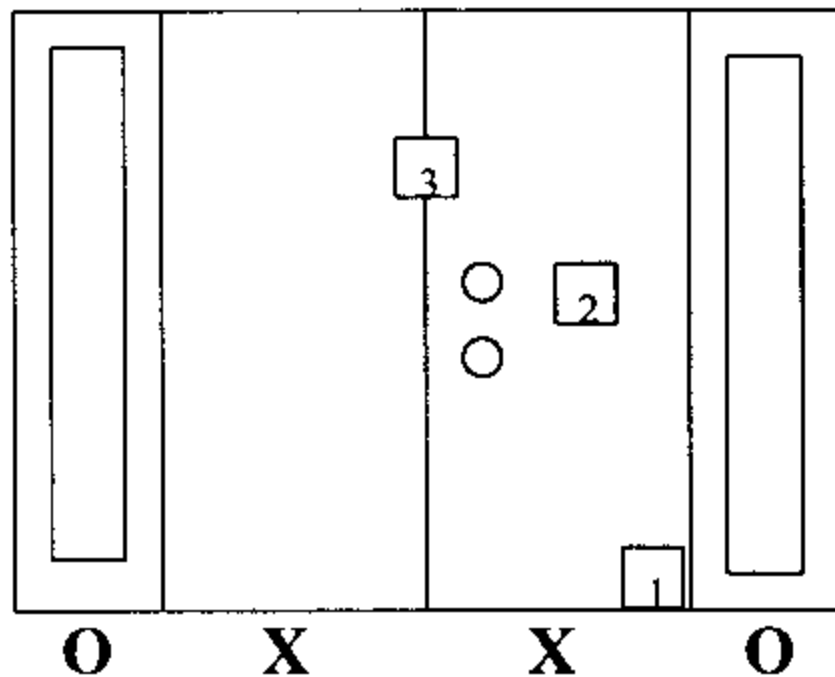
Impact tests were conducted in accordance with DCBCCD PA 201-94.

**Note:**

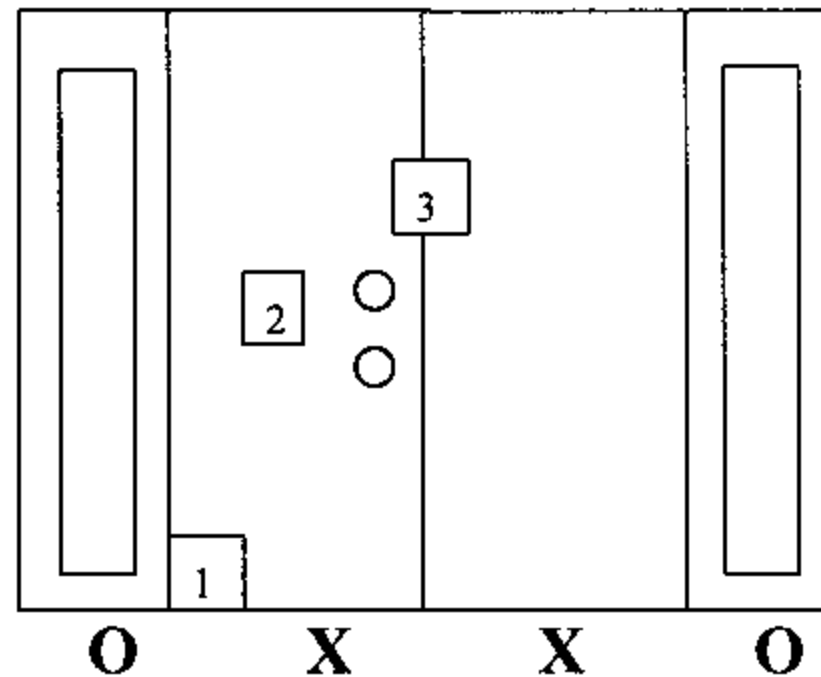
X measurement from left edge of specimen.

Y measurement from top edge of test specimen.

Type and weight of missile: # 2 Southern Yellow Pine, Nominal 2x4,  
Length approx. 88.25 in., Weight - 9 lb.



**Out-swing**



**In-swing**

**Specimen 3      Opaque Double Door (Out-swing)**

Impact No.	Impact Loc.	Speed (Ft/Sec)	X-Meas. (in.)	Y-Meas. (in.)
1.	1	50.40	82.00	73.00
2.	2	49.80	68.00	39.50
3.	3	50.10	52.25	32.25

**Specimen 4      Opaque Double Door (Out-swing)**

Impact No.	Impact Loc.	Speed (Ft/Sec)	X-Meas. (in.)	Y-Meas. (in.)
1.	1	49.80	83.50	74.00
2.	2	49.70	70.00	40.00
3.	3	50.10	52.50	32.00

None of the impacts penetrated the specimens and all locks remained engaged.

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**Test Results (Cont.):**

**Impact Test – Large Missile Cont.**

**Specimen 5      **Opaque Double Door (In-swing)****

Impact No.	Impact Loc.	Speed (Ft/Sec)	X-Meas. (in.)	Y-Meas. (in.)
1.	1	49.70	23.00	73.00
2.	2	50.20	34.00	40.50
3.	3	49.80	52.75	33.00

None of the impacts penetrated the specimen and all locks remained engaged.

**FATIGUE LOADING TEST**

Cycle tests were conducted in accordance with DCBCCD PA 203

**Specimen 3      **Opaque Double Door (Out-swing)****

**Design Load psf = + 63.0 psf, - 63.0 psf**

**Positive loads**

<u>Range of Test</u>	<u># Cycles</u>	<u>Load</u>	<u>Cycles/Min.</u>
.0 to 0.5	600	31.50 PSF	23
.0 to 0.6	70	37.80 PSF	23
.0 to 1.3	1	81.90 PSF	

671 cycles completed

**Negative Loads**

<u>Range of Test</u>	<u># Cycles</u>	<u>Load</u>	<u>Cycles/Min.</u>
.0 to 0.5	600	31.50 PSF	23
.0 to 0.6	70	37.80 PSF	23
.0 to 1.3	1	81.90 PSF	

671 cycles completed

Specimen showed no resultant failure or duress after cycle test. No failure of fasteners. Locks remained engaged. There were no cracks longer than 5 in. x 1/16 in. through which air could pass observed. The door was operable at end of test.

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**Test Results (Cont.):**

**FATIGUE LOADING TEST (Cont.)**

**Specimen 4            Opaque Double Door (Out-swing)**

**Design Load psf = + 63.0 psf, - 63.0 psf**

Positive loads

<u>Range of Test</u>	<u># Cycles</u>	<u>Load</u>	<u>Cycles/Min.</u>
.0 to 0.5	600	31.50 PSF	23
.0 to 0.6	70	37.80 PSF	23
.0 to 1.3	1	81.90 PSF	

671 cycles completed

Negative Loads

<u>Range of Test</u>	<u># Cycles</u>	<u>Load</u>	<u>Cycles/Min.</u>
.0 to 0.5	600	31.50 PSF	23
.0 to 0.6	70	37.80 PSF	23
.0 to 1.3	1	81.90 PSF	

671 cycles completed

**Specimen 5            Opaque Double Door (In-swing)**

**Design Load psf = + 63.0 psf, - 63.0 psf**

Positive loads

<u>Range of Test</u>	<u># Cycles</u>	<u>Load</u>	<u>Cycles/Min.</u>
.0 to 0.5	600	31.50 PSF	23
.0 to 0.6	70	37.80 PSF	23
.0 to 1.3	1	81.90 PSF	

671 cycles completed

Negative Loads

<u>Range of Test</u>	<u># Cycles</u>	<u>Load</u>	<u>Cycles/Min.</u>
.0 to 0.5	600	31.50 PSF	23
.0 to 0.6	70	37.80 PSF	23
.0 to 1.3	1	81.90 PSF	

671 cycles completed

Specimens showed no resultant failure or duress after cycle test. No failure of fasteners. Locks remained engaged. There were no cracks longer than 5 in. x 1/16 in. through which air could pass observed. The door was operable at end of test.

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**Section 5 - DRAWINGS TO BE SUBMITTED:**

1. L2147 sheets 1 through 13 of 13
2. Laboratory Anchoring sketches

**Comment:** Nominal 2 mil polyethylene film was used to seal against air leakage during structural loads. The film was used in a manner that did not influence the test results.

**Observers:**

Steve Kepler – Project Scientist, THERMA-TRU Corp.  
Rick Wright – Consultant, R.W. Building Consultants, Inc.

**Dade County Witness:**

Not present

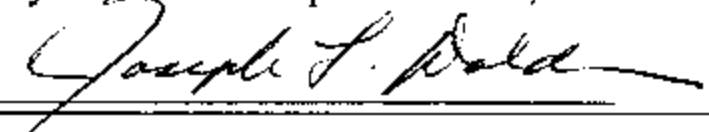
**All Tests Witnessed by:**

Joseph L. Dolden, P.E.  
Arthur Murray, ETC Laboratories  
Bill Yanda, ETC Laboratories

cc: THERMA-TRU CORP. (3)  
Rick Wright (3)  
File (1)

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**Conditions, Terms, and General Notes Regarding These Tests**

The product tested has been compared to the detailed drawings, bill of materials and fabrication information supplied by the client so named herein. Our analysis, which includes dimensional and component description comparisons, indicate the tested product and engineering information supplied by the client "Are Equivalent". The report and representative samples will be retained for four years from the date of initial test.

These test results were obtained by employing all requirements of the designated test methods with no deviations. The test results and specimen supplied for testing are in compliance with the referenced specifications.

The test results are specific to the product tested by this laboratory and of the sample supplied by the client named herein, and they relate to no other product either manufactured by the client, a Fabricator of the client or of installed field performance.

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**For ETC Laboratories**

  
Bill Yanda  
Test Technician

  
David Kehrl  
President

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