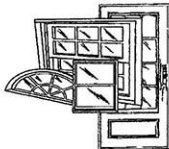


Certified Testing Laboratories

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(407) 438-2019 _ Toll Free (800) 381-7744 _ Fax (407) 438-4064
E-mail: certifiedtestinglaboratories.com



Report No.: CTLA-3073W
Report Date: October 12th, 2015

Client: Tornado SafeRoom, Inc.
3325 Lascassas Pike
Murfreesboro, TN 37130

STRUCTURAL PERFORMANCE TEST REPORT

Product Type and Series: Galvanized Steel Tornado SafeRoom® Modular Four Person Room

Test Specifications: ASTM E330-02: "Test Method For Structural Performance Of Exterior Windows, Curtain Walls and Doors By Uniform Static Air Pressure Difference."
ASTM E 1886-05 "Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials." (With deviations only one specimen was cyclic tested)
ASTM E 1996-09 "Standard Specification for Performance of Exterior Windows, Glazed Curtain Walls, Doors, and Storm Shutters Impacted by Windborne Debris in Hurricanes." (With deviations, only one specimen was impact tested)

Project Scope: Mr. Floyd Arnold contacted Certified Testing Laboratories (CTL) with regards to conducting testing on one (1) Tornado SafeRoom. The test method requested is described in the test specifications listed above.

Overall Size: 48.00" wide x 108.00" long x 76.00" high (Overall).

Test Specimen Fabrication: The Tornado SafeRoom was fully assembled at Certified Testing Lab. facility by the client. The specimen was secured at the base and tested on a solid concrete foundation with 1/2" x 4" Ram-set Red Head LDT anchor bolts, with a 3.500" min. embedment.

Additional Description: The Tornado SafeRoom side panels, back panels, front panels and door were constructed of 10 gage galvanized steel. The roof plate was constructed of 1/4" thick black carbon steel. Each panel was bolted together with 1/2" x 1.250" hexagon bolts, and nylox nuts. The door was mounted to the Tornado Safe room with four (4) steel custom pin hinges. Four (4) 2 1/2" x 2 1/2" x 1/4" thick x 37 1/2" long, steel angles were secured to the exterior face of the door. Each angle measured 1/4" thick x 37 1/2" long, two (2) of which are located at 2 1/4" centerline from the top and bottom of the door. The Tornado Safe room measured 48" wide x 108" deep x 76" high. One (1) operable hinged door measured 36" wide x 76" high. Three (3) 1/2" x 35" long "sliding bolts" cold rolled steel rods were utilized to latch the door. The steel door utilized two (2) upper door brace hinge angles and two (2) lower door brace hinge angles. Reference drawing # Modular Rm Assy. Sheet 1 of 1 signed and sealed by this laboratory.

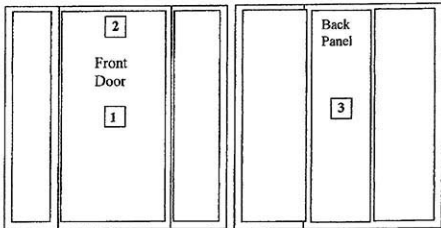


PERFORMANCE TEST RESULTS

Measurement locations

Test Sequence: ASTM E330-02
Deflection Gauge Set at boxes 1, 2, and 3

1. ½ Test Pressure Positive
2. ½ Test Pressure Negative
3. Test Pressure Positive
4. Test Pressure Negative



Deflection / Permanent Set was measured with three (3) dial indicator Mitutoyo control #A069, A070 & A101.

Measurements were taken at:

- Location 1 Center mid-span of the front door
- Location 2 Center mid-span of the front door 2.00" from the top
- Location 3 Center mid-span of back center panel

ASTM E330-02

Uniform structural load was conducted to ASTM E330-02 with no deviations to test method. Unit was tested to a Design Pressure of +/-385.0 psf

Range of test	time	load		<u>Perm. set</u>	<u>Allowable</u>
Positive loads	(seconds)	psf			
½ test load	30	385.0			
Test load	30	577.5	Location 1	0.037"	N/A
			Location 2	0.048"	N/A
			Location 3	0.057"	N/A
Range of test	time	load		<u>Perm. set</u>	<u>Allowable</u>
Negative loads	(seconds)	psf			
½ test load	30	385.0			
Test load	30	577.5	Location 1	0.010"	N/A
			Location 2	0.015"	N/A
			Location 3	0.012"	N/A



PERFORMANCE TEST RESULTS-Large Missile Test

ASTM E 1996-09 (Note: With deviations, only one specimen was impact tested)

Specimen was tested to ASTM E 1886-05 and 1996-09 with no deviation to the test specifications. The specimen was tested to the Wind Zone 4 requirements stated in section 5 of ASTM E 1996-09. Missile level D. The missile orientation was perpendicular to the metal surface at impact. Each specimen was impacted with an 8' ft., 15 lb. #2 southern yellow pine 2" x 4" at the following locations.

Note:

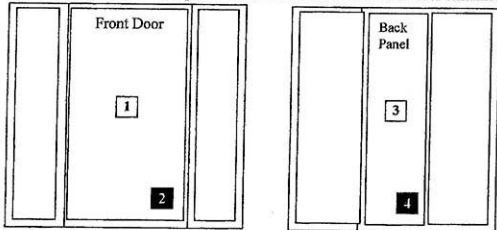
X- Measurement from left edge of test specimen.

Y- Measurement from top edge of test specimen.

Type and weight of missile: # 2 Southern Yellow Pine 2 x 4, Length approx. 96" & 15 lb.

Impact No.	Speed Ft/Sec.	Speed Mph	X Meas.	Y Meas.
1.	148.3	100.0	23.500"	35.000"
2.	148.1	100.0	36.250"	55.750"
3	148.3	100.0	22.875"	36.500"
4	148.2	100.0	26.125"	67.250"

None of the impacts penetrated the specimen and the Tornado SafeRoom door remained operable.



Note: At the conclusion of this test there were no signs of damage. Reference 100mph impact locations on front door: Figure #1.



PERFORMANCE TEST RESULTS- Cyclic Static Air Pressure Loading

ASTM E 1886-05

Specimen was tested to ASTM E 1886-05 and 1996-09 with no deviation to the test specifications. The specimen was tested to the requirements of section 5.4 table 1 in ASTM E 1996-09.

Note: (With deviations only one specimen was cyclic tested)

Positive loads (Design Pressure) +385.0 psf, - 385.0 psf

<u>Range of Test</u>	<u>Actual Load psf</u>		<u># of Cycles</u>	<u>Cycles/min.</u>
0.2 - 0.5	77.0	192.5	3500	55
0.0 - 0.6	0.00	231.0	300	55
0.5 - 0.8	193.0	308.0	600	55
0.3 - 1.0	116.0	385.0	100	55

4500 cycles

Deflection taken center mid-span

<u>Deflection</u>	<u>Set</u>
.500"	.000"

Negative loads

<u>Range of Test</u>	<u>Actual Load psf</u>		<u># of Cycles</u>	<u>Cycles/min.</u>
0.3 - 1.0	116.0	385.0	50	55
0.5 - 0.8	193.0	308.0	1050	55
0.0 - 0.6	0.00	231.0	50	55
0.2 - 0.5	77.0	192.5	3350	55

4500 cycles

Deflection taken center mid-span

<u>Deflection</u>	<u>Set</u>
.875"	.125"

9000 cycles completed

Specimen showed no resultant failure after cycle test.

Remarks: At the conclusion of the test there was no damage to the Tornado SafeRoom and no visible signs of failure observed. All the locks were operable and the door opened and closed without any pressure being applied. The Tornado SafeRoom was tested to 450 miles per hour = Design Pressure of 385psf = 577.5 pounds per square foot full/ultimate test load positive and negative.

Test Dates: September 8, 2015 thru September 10, 2015



Remarks: Detailed drawings were available for laboratory records and comparison to the test specimen at the time of this report and will be retained by CTL for a period of ten (10) years. The results obtained apply only to the specimen tested.

Certified Testing Laboratories certified that the Tornado SafeRoom 48" wide x 108" long x 76" high SafeRoom when manufactured to the specifications called out on the drawings signed and sealed by this laboratory, will meet the criteria established by this test report.

Certified Testing Laboratories assumes that all information provided by the client is accurate and that the physical and chemical properties of the components are as stated by the manufacturer.

Certified Testing Laboratories, Inc.

Client Present:

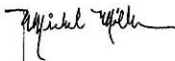
Floyd Arnold- Tornado SafeRoom, Inc.

Testing Performed & Witnessed by:

Sam Fatula- Certified Testing Lab.

Washington Romero- Certified Testing Lab.

Michael Miller- Certified Testing Lab.



Michael Miller
Senior Lab. Technician
Architectural Division



cc: Tornado SafeRoom, Inc. (2)
Ramesh Patel P.E. (1)
File (1)