

Laboratory Report SC7110.12.14-1

Large Missile Impact Resistance Testing

of

TTR Roof Systems

in accordance with

SSTD 12-99

to meet

State of Florida Public Shelter Design Criteria

For Enhanced Hurricane Protection Areas

Prepared for:

TTR Roofing International, Inc.

115 Fairway Drive

Callander, Ontario, P0H 1H0

Canada

Date of Issuance:

December 29, 2014

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CLIENT INFORMATION: TTR Roofing International, Inc.
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Callander, Ontario, P0H 1H0, Canada
c/o: John Justice

TRINITY|ERD PROJECT: SC7110.14

SCOPE: Large missile impact testing of TTR roof assemblies.

SAMPLES:	<u>Roof cover</u>	<u>Adhesives</u>	<u>Substrates</u>
	Firestone RubberGard™ LS-FR, nominal 60 mil	TTR 007F Two Part Polyurethane adhesive	ISO 95+ GL & TTR 007F Two Part Polyfoam insulation

SAMPLE DELIVERY: A 3rd party, sponsor of the test program, arranged for shipment of said materials to TRINITY|ERD's South Carolina lab for testing, received 08/18/2014.

TEST DATE(S): 06/05/2014 through 08/22 /2014

M-D NOTIFICATION: None

TECHNICIAN: A. Holtkamp

PROPERTIES: Impact test: SSTD 12-99

STANDARDS: SSTD 12-99 – *SBCCI Test Standard Method for Determining Impact Resistance from Windborne Debris*, © 1999, ICC.

EQUIPMENT: Impact test: ERD Hurricane impactor

I. LARGE MISSILE IMPACT TEST: (SSTD 12-99)

I.1 Specimen Preparation:

I.1.1 Specimens are as described in Table 1A below, compliant with Section 302 of SSTD 12-99.

I.1.2 Steel deck in all cases was set at a 6 ft span.

TABLE 1A: SUMMARY OF SPECIMEN CONSTRUCTIONS			
Sample ID	Deck	Insulation	Roof Cover
5	22 ga., Type B steel	1-inch ISO 95+ GL, mechanically attached, followed by min. 1.5-inch thick, spray applied TTR Tri-Thermal Roofing's TTR007F Polyfoam	Firestone RubberGard™ LS-FR, nominal 60-mil, set in TTR Tri-Thermal Roofing's TTR007G Adhesive

I.2 Apparatus:

I.2.1 Pendulum Impact Apparatus per Table I of SSTD 12-99 for wind speed \geq 110 mph consisting of an approximately 7' radius sector swinging from a bearing mounted axel. The combined weight of the pendulum, with a 24 inch long 2"x4" impactor tip, is 85 pounds.

I.3 Procedure:

I.3.1 The pendulum is launched from a height to incur not less than 350 ft-lbf of impact energy on the test specimens, as determined from the pendulum weight and velocity at impact. The velocity is measured by through-beam light sensors and a computerized data acquisition system.

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- 1.3.2 Each test specimen is impacted at two locations; within a 5 inch radius circle having its center at the midpoint of the specimen and within a 5 inch radius circle on an edge having its center in a location 6 inches away from any supporting member
- 1.3.3 After each test, the impact location is carefully examined for damage defined as compromising the ability of the specimen to perform as a watertight assembly, meaning water does not pass through the membrane roof cover. Impact locations where performance is not visually discernable are subjected to a water tightness test, consisting of applying a 6 inch head of water over the impact location for a period of 5 minutes followed by membrane removal to examine for water penetration.
- 1.4 Results:

TABLE 1B: IMPACT TEST RESULTS				
Test Assembly ID	Test Data			
	Location of strike	Impact Energy (ft-lbf)	Penetration	Visual
5	Middle	353	None	Pass
	Corner	361	None	Pass

2. CONCLUSIONS:

- 2.1 Impact resistance testing of the roof systems outlined in Table 1A of this report documents compliance with the requirements of the State of Florida Public Shelter Design Criteria for Enhanced Hurricane Protection Areas (EHPAs).

Please contact our office with any questions.

Sincerely,
TRINITY|ERD



Charles Rumpeltn
Laboratory Manager



Robert Nieminen, P.E.
Vice President

REPORT HISTORY:

Date	Event
12/29/2014	Final report issued

Notes
Supplemental report at request of program sponsor

Authorized By:
RN

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