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JD METALS
TEST REPORT

SCOPE OF WORK
UL 2218 IMPACT RESISTANCE TESTING OF TUFF-RIB ROOF PANELS

REPORT NUMBER
N8964.01-801-44 R0

TEST DATE(S)
07/20/22 - 07/22/22

ISSUE DATE
09/06/22

RECORD RETENTION END DATE
07/22/26

PAGES
12

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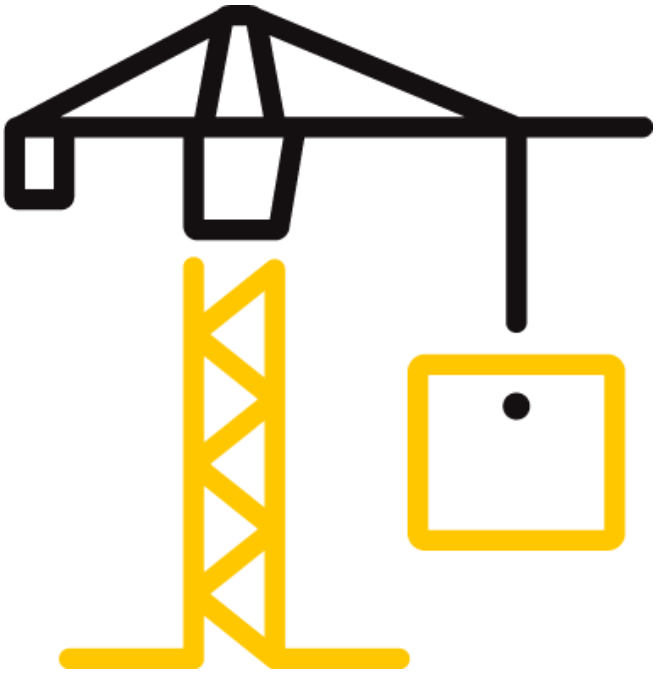

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TEST REPORT FOR JD METALS
Report No.: N8964.01-801-44 R0
Date: 09/06/22

REPORT ISSUED TO

JD METALS
3800 Hwy 11E
Limestone, TN 37681

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by JD Metals to perform impact resistance testing in accordance with UL 2218 on their Tuff-Rib roof panels. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at Intertek B&C test facility in Plano, TX This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

SECTION 2

SUMMARY OF TEST RESULTS

Product Type: Metal Roof Panels Tuff-Rib
Series/Model: Tuff-Rib 29ga
Product Classification Achieved: Class 4

For INTERTEK B&C:

COMPLETED BY:	Lucio “Fred” Muñoz	**REVIEWED BY:**	Jeffrey Crump, FMPC
TITLE:	Project Manager – Building & Construction	**TITLE:**	Laboratory Manager Building & Construction
SIGNATURE:	Digitally Signed by: Lucio Munoz	**SIGNATURE:**	Digitally Signed by: Jeffrey Crump
DATE:	09/06/22	**DATE:**	09/06/22

JC:cm

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SECTION 3
TEST METHOD(S)

The specimens were evaluated in accordance with the following:

> **UL 2218 (2010)**, *Standard for Safety for Impact Resistance of Prepared Roof Covering Materials,* Underwriters Laboratories, Inc.

SECTION 4
MATERIAL SOURCE/INSTALLATION

Test specimen was provided by the client. Representative samples of the test specimen(s) will be retained by Intertek B&C for a minimum of four years from the test completion date.

Installation of the tested product was performed by Intertek. Panels were secured to deck with provided 1.70" screws with sealing washer; Fastening pattern followed from JD Metals drawing; 3 rows 17" apart.

SECTION 5
EQUIPMENT

Drop Tube: Constructed from PVC piping with an electromagnet release mechanism
Missile: Steel balls (1.25", 1.5", 1.75", 2")
Caliper: Int01328 **Calibration due:** 2/26/2023
Scale: Int02625 **Calibration due:** 8/18/2022
Humidity/Temp Reader: 63305 **Calibration due:** 4/27/2023

SECTION 6
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Alexei Buruian	Intertek B&C
Jeffrey Crump	Intertek B&C

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SECTION 7
TEST SPECIMEN DESCRIPTION

Product Type: Metal Roof Panels Tuff-Rib
Series/Model: Tuff-Rib Panel 29ga.
Color: Red
Finish: Sherwin-Williams SMP (Silicone-Modified Polyester) WeatherXL
Overall Assembly Size: 38” width by 65” length
Nominal Thickness: 18 mm
Steel Skin Thickness: 0.42mm

Tile Description:
Individual Tile Weight: 6.25 lb
Individual Tile Size: 38” width by 38” length
Exposed Tile Size: 38” width by 27-1/4” length
Number of Tiles: 1 width by 2 length

Deck Construction
The wood test deck was 3' wide x 3' high and constructed with 2x4 pine construction lumber at the perimeter with one stud located at the midspan. The test deck was covered with 15/32" thick plywood decking secured to the test deck with #6 x 1-5/8" screws located 2" from each end and on 6" centers.

Panel Construction
The panel was ribbed with major ribs and minor ribs. Major ribs were located at 7-1/4” from each other. Minor ribs were located at 1-3/4” and 4 5/8” from major ribs. Major ribs were 3/4” tall and minor ribs were 1/8” tall. Major ribs were 1 7/8” wide and minor ribs were 13/16” wide. Joints were overlapped 10-3/4”.

Clips: No clips were utilized.

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SECTION 8

TEST RESULTS
UL 2218, *Safety for Impact Resistance of Prepared Roof Covering Materials*

Sample Conditioning Temperature: 74F
Sample Conditioning Relative Humidity: 58%
Steel Ball Weight: 130.3g
Steel Ball Diameter: 1-1/4”
Steel Ball Drop Height: 12’

The ambient temperature during testing was 74F. The results are tabulated as follows.

Test Unit #1

IMPACT POINT	IMPACT AREA	DEPRESSION DEPTH IMPACT 1 & 2	OBSERVATIONS	RESULTS
1	Edge major rib outside	0.0415” 0.0120”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
2	Edge major rib inside	0.0475” 0.0610”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
3	Flat interior	0.0235” 0.0595”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
4	Interior major rib	0.0315” 0.0605”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
5	Double skin major rib	0.0290” 0.0130”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
6	Double skin flat	0.0145” 0.0080”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass

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Sample Conditioning Temperature: 74F
Sample Conditioning Relative Humidity: 58%
Steel Ball Weight: 225.4g
Steel Ball Diameter: 1-1/2”
Steel Ball Drop Height: 15’

The ambient temperature during testing was 76F. The results are tabulated as follows.

Test Unit #1

IMPACT POINT	IMPACT AREA	DEPRESSION DEPTH IMPACT 1 & 2	OBSERVATIONS	RESULTS
1	Edge major rib outside	0.1030” 0.1600”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
2	Edge major rib inside	0.0565” 0.0710”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
3	Flat interior	0.0475” 0.1420”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
4	Interior major rib	0.2330” 0.0505”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
5	Double skin major rib	0.1755” 0.1540”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
6	Double skin flat	0.0820” 0.0430”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass

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Sample Conditioning Temperature: 74F
Sample Conditioning Relative Humidity: 58%
Steel Ball Weight: 357.9g
Steel Ball Diameter: 1-3/4”
Steel Ball Drop Height: 17’

The ambient temperature during testing was 78F. The results are tabulated as follows.

Test Unit #1

IMPACT POINT	IMPACT AREA	DEPRESSION DEPTH IMPACT 1 & 2	OBSERVATIONS	RESULTS
1	Edge major rib outside	0.1430” 0.1865”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
2	Edge major rib inside	0.1835” 0.1155”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
3	Flat interior	0.1135” 0.0825”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
4	Interior major rib	0.1530” 0.1930”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
5	Double skin major rib	0.0840” 0.0950”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
6	Double skin flat	0.0210” 0.0290”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass

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Sample Conditioning Temperature: 74F
Sample Conditioning Relative Humidity: 58%
Steel Ball Weight: 533.8g
Steel Ball Diameter: 2”
Steel Ball Drop Height: 20’

The ambient temperature during testing was 77F. The results are tabulated as follows.

Test Unit #1

IMPACT POINT	IMPACT AREA	DEPRESSION DEPTH IMPACT 1 & 2	OBSERVATIONS	RESULTS
1	Edge major rib outside	0.2395” 0.3400”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
2	Edge major rib inside	0.1890” 0.1045”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
3	Flat interior	0.0440” 0.0490”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
4	Interior major rib	0.2270” 0.2325”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
5	Double skin major rib	0.2190” 0.2665”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass
6	Double skin flat	0.0350” 0.0395”	No visible evidence of tearing, cracking, fracturing, splitting, rupture, crazing, or other evidence of opening in the prepared roof covering layer.	Pass

SECTION 9
CONCLUSION

The sample tested met the performance requirements set forth in the referenced test procedures for a Class 4.

SECTION 10
PHOTOGRAPHS

Photo No. 1
Test setup and overall impact locations.

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Photo No. 2
Impact locations detail

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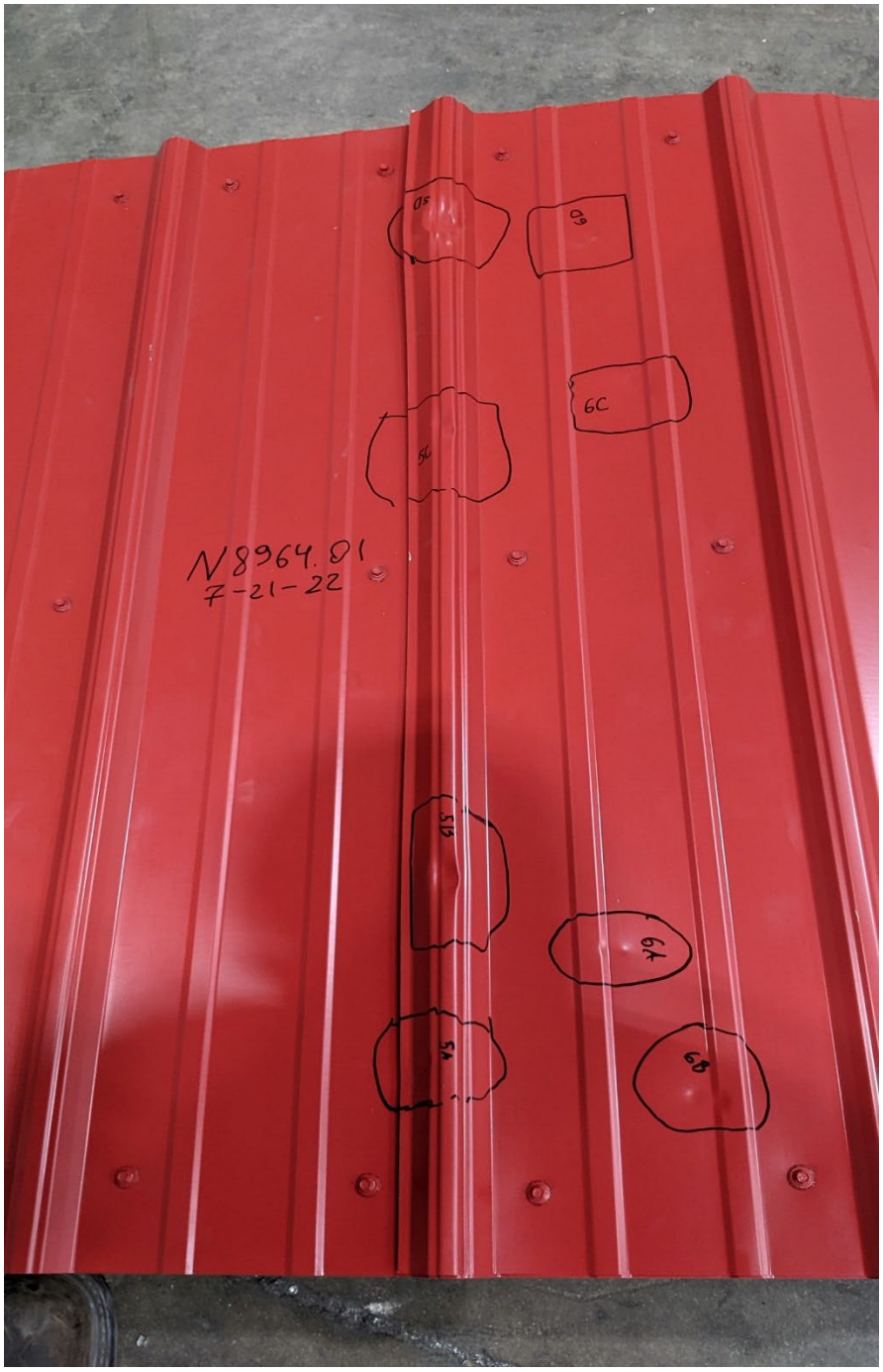

Photo No. 3
Impact locations detail

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SECTION 11
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	09/06/22	N/A	Original Report Issue