



File R40581
Project 4789961427

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REPORT

On

PREPARED ROOF-COVERING MATERIALS, FORMED OR MOLDED METAL, FIBER-CEMENT,
PLASTIC OR FIRE-RETARDANT-TREATED WOOD (TFXX)
ROOF-COVERING MATERIALS, IMPACT RESISTANCE (TGAM)
**PREPARED ROOF-COVERING MATERIALS, FORMED OR MOLDED METAL, FIBER-CEMENT,
PLASTIC OR FIRE-RETARDANT-TREATED WOOD CERTIFIED FOR CANADA (TFXX7)**

Under The

CLASSIFICATION PROGRAM

Montanasteel.com Inc
Gilford, MT

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PRODUCTS COVERED:

The subject of this Report is the formed metal shingle designated "Interlocking Shake Panel".

The product in this Report is Classified for use in roofing systems as to external fire exposure, impact resistance, and uplift resistance).

USE:

The products are intended for use as building material as permitted by authorities having jurisdiction.

TEST RECORD NO. 1

GENERAL:

Test results relate only to the actual prepared roof covering product evaluated under this Test Record.

INVESTIGATION:

The intent of this investigation sponsored under project 4789961427 was to establish Follow-Up Service and Certification for the formed metal shingle designated "Interlocking Shake Panel" under the UL product categories Prepared Roof-covering Materials, Formed or Molded Metal, Fiber-Cement, Plastic or Fire-retardant-treated Wood (TFXX), and Roof-covering Materials, Impact Resistance (TGAM).

It was determined that the following tests would need to be conducted to provide a basis for establishing Certification of the finished product under the requested product categories:

- ANSI/UL 790 Class A spread of flame tests
- ANSI/UL 2218 Class 4 impact resistance tests
- ASTM D3161 Class F wind resistance tests

Based upon a review of the construction details of the submitted roofing system, the following tests were waived:

- ANSI/UL 790 Class A burning brand and intermittent flame tests

Acceptable test results for the finished products covered by this Test Record would provide the basis to establish Classification of the "Interlocking Shake Panel" finished product under UL's product categories of:

- Prepared Roof-covering Materials, Formed or Molded Metal, Fiber-Cement, Plastic or Fire-retardant-treated Wood (TFXX, Class A)
- Roof-covering Materials, Impact Resistance (TGAM, Class 4)

In addition, the previously described adjunct statements would eligible to be used as part of the Certification Mark of UL.

EXAMINATION OF MATERIALS:

A representative of the UL family of organizations observed and documented the manufacture of the "Interlocking Shake Panel" finished product. The remaining constituent materials utilized in test deck assemblies described in this Test Record were produced under the Follow Up Service Program of UL as evidenced by the Classification Mark on the packaging of the finished products. The composition of all of the finished products utilized in the test deck assemblies described in this Test Record is of a proprietary nature. Data on their composition is on file at UL for use in the Follow Up Service Program.

UL 790 SPREAD OF FLAME TESTS

SAMPLES

SYSTEM # DESCRIPTION OF SYSTEM

- 1 Underlayment: One ply "Shingle-Mate® Roof Deck Protection", mechanically fastened with staples.
- Surfacing: "Interlocking Shake Panel" mechanically fastened according to the manufacturer's installation instructions.

METHOD

Class A fire tests were conducted on the above samples. These tests were conducted in accordance with the test standard ANSI/UL 790 "Tests for Fire Resistance of Roof Covering Materials".

In the spread of flame tests described in this Report, the temperature of the test flame as measured by a No. 14 gauge chromel-alumel wire thermocouple located as described in ANSI/UL 790, was found to be 1400 ±50 °F. The physical appearance of the test flame when the test apparatus was calibrated for flame temperature, was generally triangular in shape, being about 3 ft wide at the deck's leading edge and gradually narrowing to a width of approximately 6 in. at the top of the 52 in. long calibration deck, with licks of flame extending approximately another 1 ft.

The wind velocity required by UL 790 was determined by taking readings on a smooth deck (40 in. wide and 52 in. long) midway up the deck at the center and 3 in. from each vertical edge with a vane type anemometer and timer. The velocity measured at an incline of 5 in./ft was found to be 1050 ±50 ft/min (12 ± 1/2 mi./h) with the carriage in position.

Since the above system will be limited to noncombustible roof decks, only the spread of flame tests were conducted.

RESULTS

The results of these tests are summarized on the following table:

SPREAD OF FLAME TESTS

Test Code	System No.	Class	Slope of deck (in/ft)	Maximum Flame Spread (ft)	Exposure of roof deck (Yes/No)
09132103	1	A	5	4.5	No
09132104	1	A	5	4.0	No

At no time during these tests were any flying flaming brands of the roof covering material produced or did exposure of the roof deck occur. Also, there was no significant lateral spread of flame from the path directly exposed to the test flame.

ASTM D3161 WIND RESTSTANCE TESTS

SAMPLES

<u>SYSTEM</u>	<u>TEST Codes</u>	<u>DESCRIPTION</u>
1	09142102 09142103	Underlayment: One ply of UL Classified "Shingle-Mate® Roof Deck Protection" mechanically fastened with staples randomly spaced. Surfacing: "Interlocking Shake Panel" mechanically fastened with No. 14 x 1-1/2 in. long fasteners. Spaced 2" from each edge, and 9.15" on-center from each other per the pre-drilled holes in the fastening strip. 6 fasteners per panel.

METHOD

* Class F tests were conducted on the above systems in accordance with the equipment and procedures as described in ASTM **D3161/D3161M-20**.

The test panels were constructed of nominal 3/4-in. thick plywood decking material that measured 50-in. in width x 66-in. in length. Nominal 2 x 4-in. dimensional lumber provided the structural integrity required for handling. The plywood was mechanically fastened to the support lumber with appropriately sized screws.

* One ply of UL Classified "Shingle-Mate® Roof Deck Protection" underlayment was applied to the deck, utilizing a 2-in. overlap across the short dimension of the test deck mechanically fastened with staples randomly spaced. The **metal** shingles were **mechanically fastened** using **No. 14 x 1-1/2 in. long screws** by UL personnel parallel to the short dimension of the test panels while at room temperature (80 ± 15° F) and in a manner recommended by the installation instructions provided with the roofing. The panels were maintained at an incline of one vertical inch for each six horizontal inches during application of the **shingles. Before mechanically fastening the nail strip of the top panel, the interlocking channel of the top panel was tapped into place under the raised strip of the row below using a mallet.**

*

Two tests were conducted for the system.

Throughout each test, observations were made to note the condition of the shingles.

RESULTS

At no time during the 2-hour period of exposure did any test panel experience (1) the fasteners secured to the fastening flange of the shingle fail to restrain any full shingle tab from lifting nor (2), any free part of the shingle lift so as to stand upright or bend back on itself.



UL 2218 IMPACT RESISTANCE TEST

SAMPLES

SYSTEMDESCRIPTION OF SYSTEM

- 1 Underlayment: One ply "Shingle-Mate® Roof Deck Protection" utilizing a 2-in. overlap across the short dimension of the test deck, mechanically fastened with staples.
- Surfacing: "Interlocking Shake Panel" mechanically fastened according to the manufacturer's installation instructions.

METHOD

The tests were conducted in accordance with the Second Edition of the Standard Impact Resistance of Prepared Roof Covering materials, UL 2218.

This test method is intended to evaluate the effects of impact from various size steel balls at locations on the test assembly selected to be the most vulnerable.

The samples were subjected to six double impacts at various locations from a 2-in. diameter steel ball as described in the Standard. Following all the impacts, the shingles were inspected for tearing, fracturing, cracking, splitting, crazing or other evidence of opening of the shingles as a consequence of the impacts.

RESULTS

The results of the impact resistance tests were as follows:

Test Code	Impact Test No.	Ball Diameter, in.	Impact Locations	Observations
09142101	1	2	Course # 2, Not Over Center Support (Right Side), Field, Single Layer	No damage observed
	2	2	Course # 2, Not Over Center Support (Right Side), Joint (Metal Deck), Single Layer	No damage observed
	3	2	Course # 2, Not Over Center Support (Right Side), Edge, Single Layer	No damage observed
	4	2	Course # 2, Over Center Support, Head Lap, Single Layer	No damage observed
	5	2	Course # 1, Over Center Support, Field, Single Layer	No damage observed
	6	2	Course # 1, Not Over Center Support (Left Side), Edge, Single Layer	No damage observed

There was no observed tearing, fracturing, cracking, splitting, crazing or other evidence of opening of the subject shingles as a consequence of any of the above impacts.



PRACTICABILITY:

*

The construction materials used in the roofing systems were readily installed by qualified workers with tools and methods commonly used for construction work of similar nature. Materials and installation procedures in accordance with those previously described in this Report are significant factors in the exterior fire performance of the construction.

*

LISTING MARK

The following Listing Marking may be applied to the "Interlocking Shake Panel" finished product covered by this Test Record as illustrated below:

US Marking

Roofing Systems (TFXX):



PREPARED ROOF COVERING MATERIALS
DEGREE OF RESISTANCE TO EXTERNAL
FIRE - CLASS A
DEGREE OF WIND RESISTANCE
INVESTIGATED IN ACCORDANCE WITH
PROCEDURES ADAPTED FROM ASTM
D3161 AT A WIND SPEED OF 110 MPH

CERTIFICATION MARK

The following Certification Marking may be applied to the "Interlocking Shake Panel" finished product covered by this Test Record as illustrated below:

Roofing Systems (TGAM):



ALSO CERTIFIED AS TO IMPACT RESISTANCE
CLASS 4
(Control No.)

CERTIFICATION:

Montanasteel.com Inc Prepared Roof-covering Materials, Formed or Molded Metal, Fiber-Cement, Plastic or Fire-retardant-treated Wood (TFXX) Classification card will be established as indicated below. The company's Certification under UL's product category Prepared Roof-covering Materials, Formed or Molded Metal, Fiber-Cement, Plastic or Fire-retardant-treated Wood (TFXX) will include the shingles as shown below:

***Formed metal shingles**, for installation as Class A prepared roof covering. Limited to 15/32 in. plywood **or minimum 7/16 in. thick OSB decks** and one layer of minimum 1/4-in. thick Georgia-Pacific Gypsum LLC "DensDeck® Roofboard" with all joints staggered a min of 6 in. from the plywood joints covered with "Interlocking Shake Panel". May also bear the statement "Degree of wind resistance investigated in accordance with procedures adapted from ASTM D3161 at a wind speed of 110 mph". **The fasteners used with these panels are No. 14 x 1-1/2 in. long screws, screwed through the top strip spaced per the pre-drilled holes in the strip.**

Montanasteel.com Inc Roof-Covering Materials, Impact Resistance (TGAM) Classification card will be established as indicated below. The company's Certification under UL's product category Roof-Covering Materials, Impact Resistance (TGAM) will include the shingle as shown below:

Roof-covering Materials, Impact Resistance

Class 4 formed steel roofing shingles Model(s) "Interlocking Shake Panel"

*

TEST RECORD SUMMARY NO. 1:

The results of this investigation indicate that the products evaluated comply with the applicable requirements of the standards listed below, and therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

<u>Standard</u>	<u>Title</u>	<u>Edition or Publication Date</u>	<u>Latest Revision Date</u>
ANSI/UL 790	Standard Test Methods for Fire Tests of Roof Coverings	8 th	October 19, 2018
ASTM D3161/D3161M	Standard Test Method for Wind-Resistance of Steep Slope Roofing Products (Fan-Induced Method)	-	May 1, 2020
ANSI/UL 2218	Impact Resistance of Prepared Roof Covering Materials	2 nd	August 10, 2020

Any information and documentation provided to you involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Under the Follow-Up Service program of UL, the manufacturer is authorized to apply UL's Classification Mark on such products, which comply with the Follow Up Service Procedure and any other applicable requirements of UL. Only those products, that properly bear UL's Classification Mark, are considered to be Classified by UL.

Test Record No.1 By:



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TEST RECORD NO. 2

GENERAL:

The results relate only to the items evaluated under this Test Record.

INVESTIGATION:

The scope of the investigation sponsored under Project No. 4790859956 was to establish Classification of the "Interlocking Shake Panel" under the UL product category of Prepared Roof-covering Materials, Formed or Molded Metal, Fiber-Cement, Plastic or Fire-retardant-treated Wood Certified for Canada (TFXX7).

The following tests were waived as a part of this investigation:

Test	Rationale for Waived Test (See Below)
CAN/ULC-S107 Class A fire tests	1
1. Due to the equivalency of UL 790 and CAN/ULC-S107, tests conducted in accordance with UL 790 are considered to be representative of the tests described in CAN/ULC-S107.	

LISTING MARK

The following Listing Marking may be applied to the "Interlocking Shake Panel" finished product covered by this Test Record as illustrated below:

Combined US and Canadian Listing Mark (TFXX, TFXX7, TGAM)



PREPARED ROOF COVERING MATERIALS
CLASS A
AS TO DEGREE OF RESISTANCE TO EXTERNAL FIRE
AND FLAMMABILITY LIMITS
IN ACCORDANCE WITH CAN/ULC-S107
ALSO CLASSIFIED FOR DEGREE OF WIND RESISTANCE
IN ACCORDANCE WITH ASTM D3161
AT A WIND SPEED OF 110 MPH
ALSO CLASSIFIED AS TO IMPACT RESISTANCE
CLASS 4

CERTIFICATION:

Montanasteel.com Inc Prepared Roof-covering Materials, Formed or Molded Metal, Fiber-Cement, Plastic or Fire-retardant-treated Wood Certified for Canada (TFXX7) Classification card will be established as indicated below. The company's Certification will include the product as shown below:

Formed metal shingles, for installation as Class A prepared roof covering. Limited to 15/32 in. plywood **or minimum 7/16 in. thick OSB** decks and one layer of minimum 1/4-in. thick Georgia-Pacific Gypsum LLC "DensDeck® Roofboard" with all joints staggered a min of 6 in. from the plywood joints covered with "Interlocking Shake Panel". May also bear the statement "Degree of wind resistance investigated in accordance with procedures adapted from ASTM D3161 at a wind speed of 110 mph". **The fasteners used with these panels are No. 14 x 1-1/2 in. long screws, screwed through the top strip spaced per the pre-drilled holes in the strip.**

TEST RECORD SUMMARY:

The results of this investigation indicate that the products evaluated comply with the applicable requirements of the standards listed below, and therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

<u>Standard</u>	<u>Title</u>	<u>Edition or Publication Date</u>	<u>Latest Revision Date</u>
CAN/ULC-S107	Standard Methods of Fire Tests of Roof Coverings	4 th	March 2019

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CONCLUSION:

Samples of the products covered by this Report have been found to comply with the requirements covering the category, and the products are found to comply with UL's applicable requirements. The description and/or test results in this Report are only applicable to the samples investigated by UL and does not signify the products described as being covered under UL's Follow-Up Service Program. When covered under UL's Follow-Up Service Program, the manufacturer is authorized to use the UL Classification Mark on such products which comply with UL's Follow-Up Service Procedure and any other application requirements of UL LLC. The Classification Mark of UL on the product, or the UL symbol on the product and the Classification Mark on the smallest unit container in which the product is packaged, is the only method to identify products investigated by UL to published requirements and manufactured under UL's Classification and Follow-Up Service.

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