FM 4473 TEST REPORT

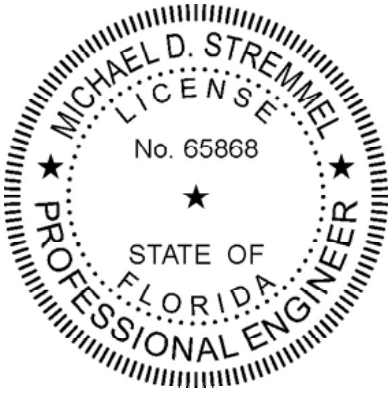
Rendered to:

KERMIT USA, INC.

SERIES/MODEL: Villa Romans Roof Tile
PRODUCT TYPE: Roof Tile

This report contains in its entirety:

Cover Page:	1 page
Report Body:	5 pages
Photograph:	1 page
Drawing:	1 page



Digitally Signed by: Michael D. Stremmel
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Report No.: E3979.01-109-44
Test Date: 01/28/15
Revision 2: 03/04/15
Report Date: 02/04/15
Test Record Retention End Date: 01/28/19

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FM 4473 TEST REPORT

Rendered to:

KERMIT USA, INC.
4620 West Bethel Avenue
Muncie, Indiana 47304

Report No.:	E3979.01-109-44
Test Dates:	01/28/15
Revision 2:	03/04/15
Report Date:	02/04/15
Test Record Retention End Date:	01/28/19

Project Summary: Architectural Testing, Inc., a subsidiary of Intertek (Intertek-ATI) was contracted by Kermit USA, Inc. to perform testing on Villa Romans Roof Tiles. The sample tested met the performance requirements set forth in the referenced test procedures for a Class 4 rating. Test specimen description and results are reported herein. The sample was provided by the client.

Test Procedures: The test specimens were evaluated in accordance with the following:

Specification Test Standard for Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls, Class No. 4473, FM Approvals *(2011)*

Test Specimen Description:

Series/Model: Villa Romans Roof Tiles

Product Type: Roof Tile

Individual Tile Weight: 1950 g (4.3 lb)

Individual Tile Size: 318 mm (12-1/2") width by 422 mm (16-5/8") length

Exposed Tile Size: 279 mm (11") width by 356 mm (14") length

Overall Assembly Size: 876 mm (34-1/2") width by 1118 mm (44") length

Number of Tiles: 9

Nominal Thickness: 13 mm (0.520")

Color: Orange/red

Test Specimen Description: (Continued)

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

Tile Description: Tile was "S" shaped, constructed from molded LDPE with a mix of LDPP and silica sand.

Installation: The roof tiles were secured to the roof deck with two #6 x 1-5/8" drywall screws, located 2' from the top of the roof tile. The tiles were then overlapped and process was repeated.

Test Results: The following results have been recorded:

FM 4473, *Ice Ball Impact Resistance*

Sample Conditioning Temperature: 20°C (68°F) for at least 4 hours
Sample Conditioning Relative Humidity: 25.4 % for at least 4 hours
Ice Ball Conditioning Temperature: -22°C (-7°F) for at least 48 hours
Muzzle Distance from Test Specimen: 914 mm (36")

Location #1:

Impact #1: Missile Velocity: 32.7 m/s (107.3 fps); orientation 15° of vertical

Missile Weight: 64 g (0.14 lbs)
Missile Diameter: 50.8 mm (2.0")
Kinetic Energy: 25.25 ft-lb
Impact Area: Center of roof tile
Observations: No visible cracking or breakage
Results: Pass

Impact #2: Missile Velocity: 32.9 m/s (107.9 fps); orientation 15° of vertical

Missile Weight: 64 g (0.14 lbs)
Missile Diameter: 50.8 mm (2.0")
Kinetic Energy: 25.53 ft-lb
Impact Area: Center of roof tile
Observations: No visible cracking or breakage
Results: Pass

Test Results: (Continued)

Sample Conditioning Temperature: 20°C (68°F) for at least 4 hours
Sample Conditioning Relative Humidity: 25.4 % for at least 4 hours
Ice Ball Conditioning Temperature: -22°C (-7°F) for at least 48 hours
Muzzle Distance from Test Specimen: 914 mm (36")

Location #2:

Impact #1: Missile Velocity: 32.0 m/s (104.9 fps); orientation 15° of vertical

Missile Weight: 63 g (0.14 lbs)
Missile Diameter: 50.8 mm (2.0")
Kinetic Energy: 23.75 ft-lb
Impact Area: Center of overlap
Observations: No visible cracking or breakage
Results: Pass

Impact #2: Missile Velocity: 32.0 m/s (104.9 fps); orientation 15° of vertical

Missile Weight: 63 g (0.14 lbs)
Missile Diameter: 50.8 mm (2.0")
Kinetic Energy: 23.75 ft-lb
Impact Area: Center of overlap
Observations: No visible cracking or breakage
Results: Pass

Location #3:

Impact #1: Missile Velocity: 32.0 m/s (104.9 fps); orientation 15° of vertical

Missile Weight: 63 g (0.14 lbs)
Missile Diameter: 50.8 mm (2.0")
Kinetic Energy: 23.75 ft-lb
Impact Area: Bottom left corner, 2" from bottom
Observations: No visible cracking or breakage
Results: Pass

Impact #2: Missile Velocity: 32.0 m/s (104.9 fps); orientation 15° of vertical

Missile Weight: 63 g (0.14 lbs)
Missile Diameter: 50.8 mm (2.0")
Kinetic Energy: 23.75 ft-lb
Impact Area: Bottom left corner, 2" from bottom
Observations: No visible cracking or breakage
Results: Pass

Test Equipment:

Cannon: Constructed from steel piping utilizing compressed air to propel the missile

Missile: 50.8 mm (2.0") diameter ice balls

Timing Device: Electronic Beam Type

Cannon Identification Number: 005118

List of Official Observers:

Name	Company
Jeremy R. Bender	Intertek-ATI
Michael D. Stremmel, P.E.	Intertek-ATI
Aaron M. Shultz	Intertek-ATI

Data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Intertek-ATI for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire.

Results obtained are tested values and were secured by using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI

Digitally Signed for: Aaron Shultz by Vicki L. McElwain

Aaron M. Shultz
Technician

Digitally Signed by: Michael D. Stremmel

Michael D. Stremmel, P.E.
Senior Project Engineer

AMS:asm

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Photograph (1)
Appendix-B: Drawing (1)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
1	02/19/15	Cover page, Page 1	Changed "Expiration Date" to "Test Record Retention End Date"
		Page 1	Corrected company name
2	03/04/15	Cover page, Page 1	Corrected company name
			Corrected Series/Model

Appendix A

Photograph

Photo No. 1
View of Tested Specimen

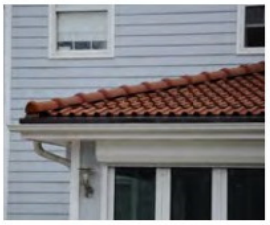
Appendix B

Drawing

Architectural Testing

Report #: e3979.01
Date: 01/29/15
Verified by:

VillaRomans



ADVANTAGES

GUARANTEE
Kermit Tiles product features are guaranteed for 50 years against water and frost. Thanks to their composite structure, our products maintain their qulaity for years to come.

HOMOGENOUS COLORS AND ALTERNATIVE MODELS
Kermit uses cutting-edge production and heating technologies to produce tiles that feature various colors in homogenous combinations. Kermit's product line includes both modern and conventional type tiles.

COMPOSITE STRUCTURE TECHNOLOGY
Thanks to the composite production technology, Kermit tiles are more durable and lighter than competitors, offering better resistance to harsh weather conditions and aiding in the ease of construction. Very low water absorption rates allow our tiles to maintain their durability for many years to come.

EASY AND ECONOMIC SHIPPING
Thanks to Kermit tiles' light weight and durable structure, product waste during shipment is avoided, lowering the cost of logistic services.

MILLIMETRIC DIMENSIONS
Molded production technology eliminates variations in the dimensions of the products. Kermit tiles easily and securely interlock one another and are laid effortlessly.

FROST RESISTANCE
Thanks to the composite production technology, Kermit tiles do not absorb water or moisture. For this reason, they are resistant to frost.

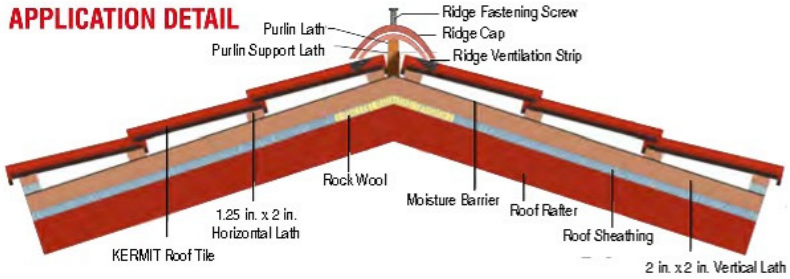
FIRE RESISTANCE
Featuring Class B1 material (Non-flammmable, non-combustible) Kermit tiles are protected against extrenal fire threats.

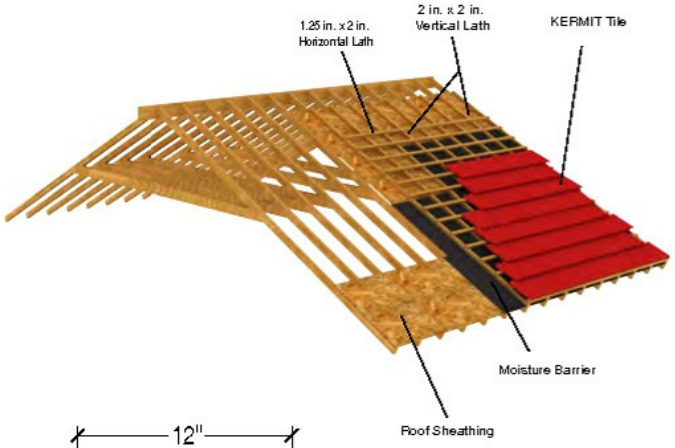
HIGH FRACTURE STRENGTH
Their composite structure allows Kermit tiles to demonstrate high endurance against impacts. Their impact resistance exceeds standards.

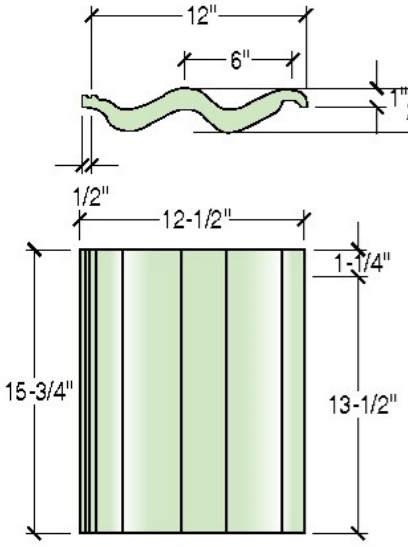
LIGHT STRUCTURE AND WIND RESISTANCE
Composite technology, which uses a combination of natural and recycled materials, ensures that Kermit tiles have a lighter structure than competitors. The unique tiling pattern increases resistance to even the strongest winds.

MAINTENANCE AND CLEANING
No more dirt! Our unique production technique and the power of sunlight prevent the formation of moss and the clinging of dirt and other matter on the surface. Rain fall easily cleans and maintains the pristine condition of our product.

APPLICATION DETAIL







SPECIFICATIONS	
Coverage	12 in. x 13-1/2 in.
Dimensions (overall)	12-1/2 in. x 15-3/4 in.
Units / 100 ft.²	10
Weight	4.4 lbs.
Weight / 100 ft. ²	44 lbs.
Units / package	10

KERMIT roof systems
www.kermitroof.com

KERMIT USA INC.
4620 W. Bethel Avenue
Muncie, In 47304

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Colors Available

Red | Glass Green | Grey | Havana Brown | Wooden Brown