NRCA LEGAL RESOURCE CENTER
LEGALCON VIRTUAL

Thursday, March 23, 2023
12 Noon to 1 p.m.

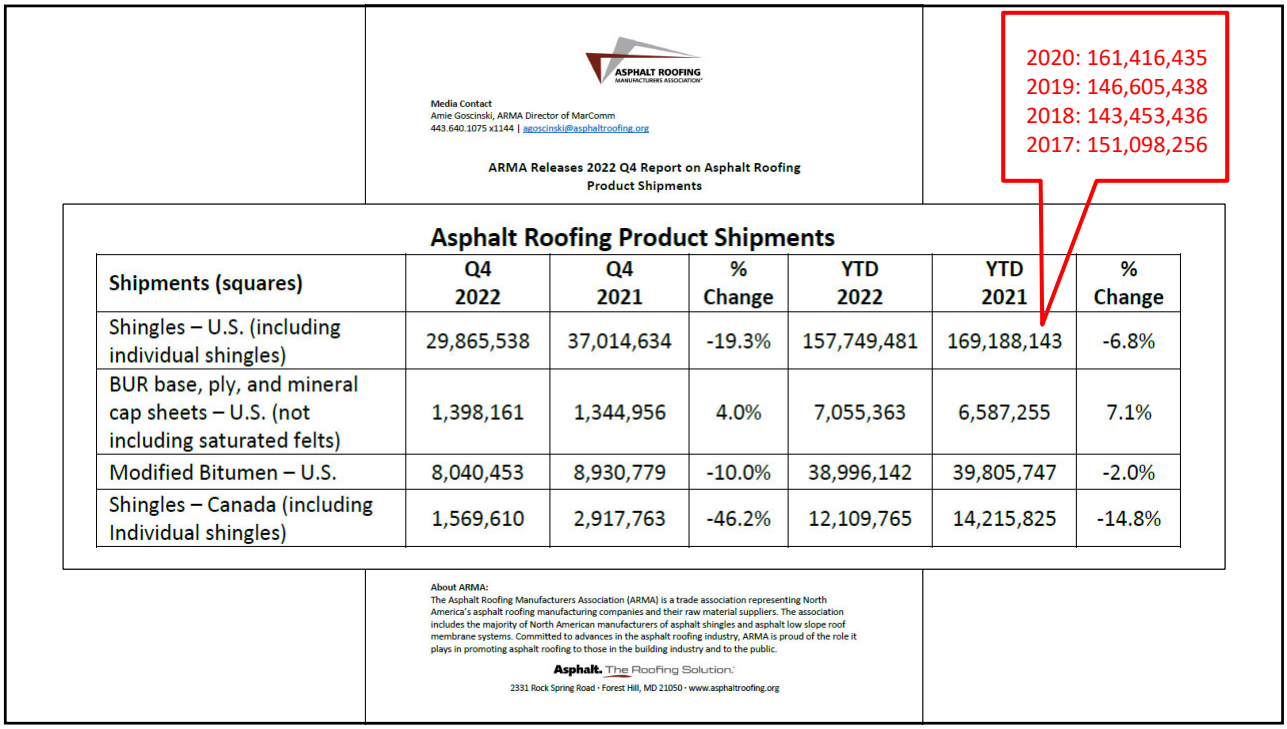
Latest technical issues affecting roofing contractors

Mark S. Graham
Vice President, Technical Services
National Roofing Contractors Association
Rosemont, Illinois

1

Market conditions and forecast

2



ASPHALT ROOFING MANUFACTURERS ASSOCIATION

Media Contact
Amie Goscinski, ARMA Director of MarComm
443.640.1075 x1144 | agoscinski@asphaltroofing.org

ARMA Releases 2022 Q4 Report on Asphalt Roofing Product Shipments

2020: 161,416,435
2019: 146,605,438
2018: 143,453,436
2017: 151,098,256

Asphalt Roofing Product Shipments

Shipments (squares)	Q4 2022	Q4 2021	% Change	YTD 2022	YTD 2021	% Change
Shingles – U.S. (including individual shingles)	29,865,538	37,014,634	-19.3%	157,749,481	169,188,143	-6.8%
BUR base, ply, and mineral cap sheets – U.S. (not including saturated felts)	1,398,161	1,344,956	4.0%	7,055,363	6,587,255	7.1%
Modified Bitumen – U.S.	8,040,453	8,930,779	-10.0%	38,996,142	39,805,747	-2.0%
Shingles – Canada (including Individual shingles)	1,569,610	2,917,763	-46.2%	12,109,765	14,215,825	-14.8%

About ARMA:
The Asphalt Roofing Manufacturers Association (ARMA) is a trade association representing North America's asphalt roofing manufacturing companies and their raw material suppliers. The association includes the majority of North American manufacturers of asphalt shingles and asphalt low slope roof membrane systems. Committed to advances in the asphalt roofing industry, ARMA is proud of the role it plays in promoting asphalt roofing to those in the building industry and to the public.

Asphalt. The Roofing Solution.

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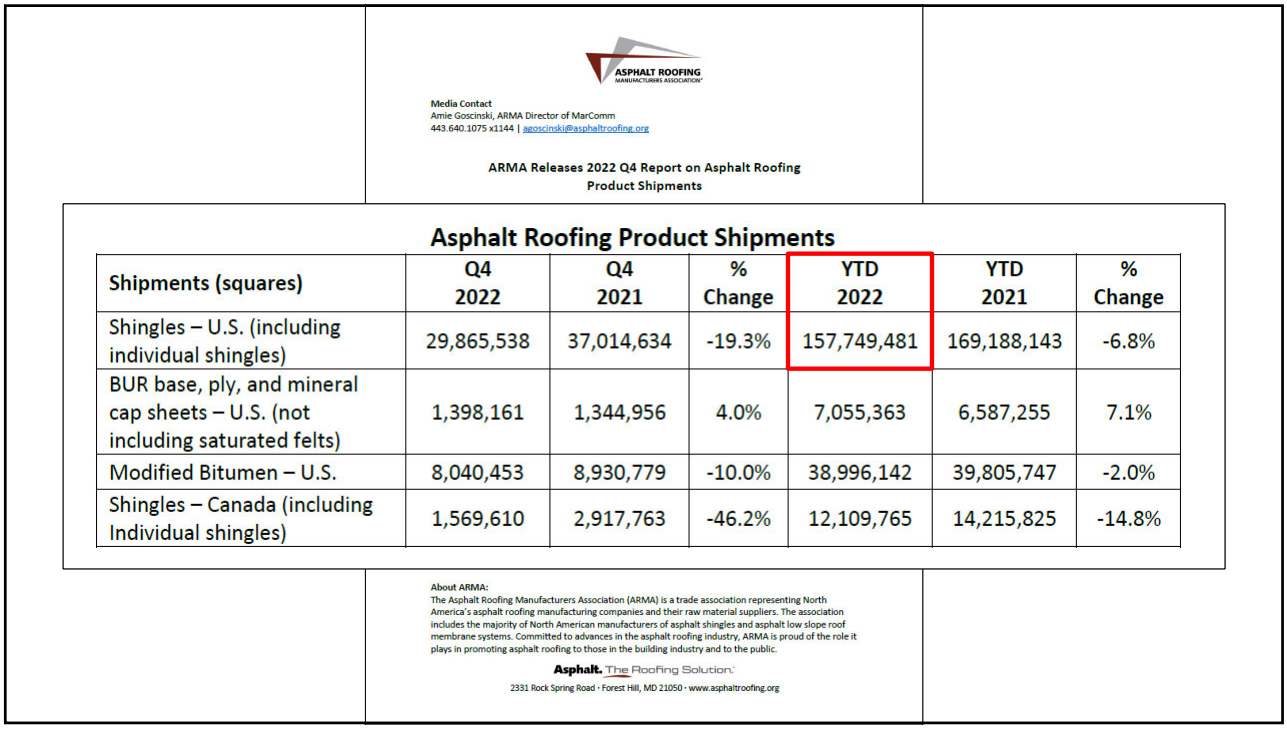

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Market Index
Survey for
REROOFING
ASPHALT ROOFING MANUFACTURERS ASSOCIATION
CFFA CHEMICAL FABRICS & FILM ASSOCIATION, INC.
CRCA CANADIAN ROOFING CONTRACTORS ASSOCIATION
ERA EPDM ROOFING ASSOCIATION
IBEC International Institute of Building Enclosure Consultants
MCA METAL CONSTRUCTION ASSOCIATION
NRCA
NWR National Women in Roofing
PIMA POLYISOCYANURATE INSULATION MANUFACTURERS ASSOCIATION
RCMA ROOF COATINGS MANUFACTURERS ASSOCIATION
SPRI SINGLE PLY ROOFING INDUSTRY

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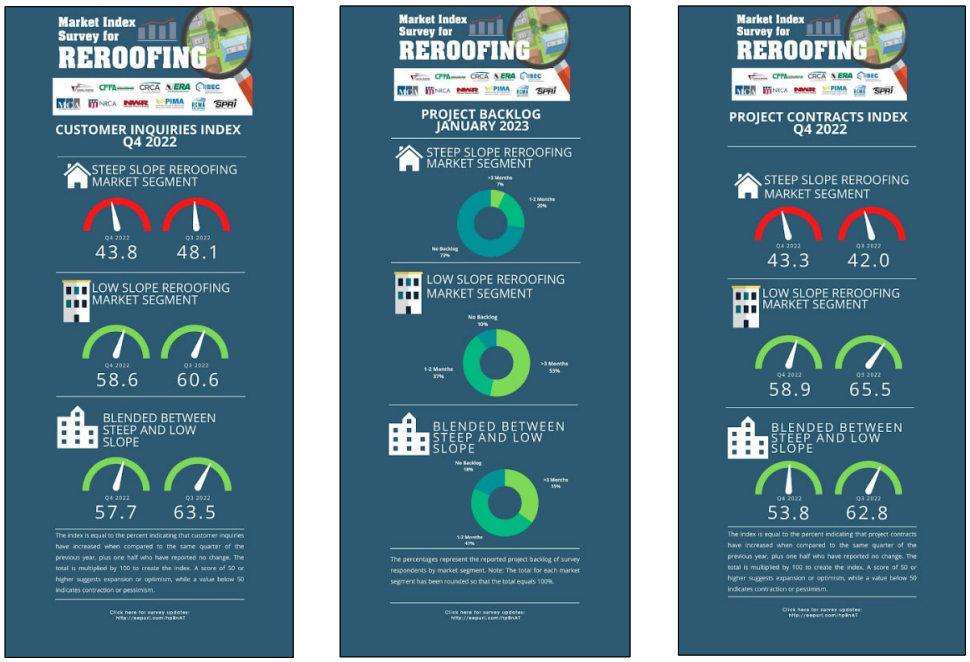
Market Index Survey for REROOFING
CUSTOMER INQUIRIES INDEX Q4 2022
STEEP SLOPE REROOFING MARKET SEGMENT
Q4 2022 43.8
Q3 2022 48.1
LOW SLOPE REROOFING MARKET SEGMENT
Q4 2022 58.6
Q3 2022 60.6
BLENDED BETWEEN STEEP AND LOW SLOPE
Q4 2022 57.7
Q3 2022 63.5
The index is equal to the percent indicating that customer inquiries have increased when compared to the same quarter of the previous year, plus one half who have reported no change. The total is multiplied by 100 to create the index. A score of 50 or higher suggests expansion or optimism, while a value below 50 indicates contraction or pessimism.
Click here for survey updates:
Market Index Survey for REROOFING
PROJECT BACKLOG JANUARY 2023
STEEP SLOPE REROOFING MARKET SEGMENT
>3 Months 7%
1-2 Months 20%
No Backlog 73%
LOW SLOPE REROOFING MARKET SEGMENT
No Backlog 19%
1-2 Months 27%
>3 Months 53%
BLENDED BETWEEN STEEP AND LOW SLOPE
No Backlog 18%
>3 Months 35%
1-2 Months 47%
The percentages represent the reported project backlog of survey respondents by market segment. Note: The total for each market segment has been rounded so that the total equals 100%.
Click here for survey updates:
Market Index Survey for REROOFING
PROJECT CONTRACTS INDEX Q4 2022
STEEP SLOPE REROOFING MARKET SEGMENT
Q4 2022 43.3
Q3 2022 42.0
LOW SLOPE REROOFING MARKET SEGMENT
Q4 2022 58.9
Q3 2022 65.5
BLENDED BETWEEN STEEP AND LOW SLOPE
Q4 2022 53.8
Q3 2022 62.8
The index is equal to the percent indicating that project contracts have increased when compared to the same quarter of the previous year, plus one half who have reported no change. The total is multiplied by 100 to create the index. A score of 50 or higher suggests expansion or optimism, while a value below 50 indicates contraction or pessimism.
Click here for survey updates:

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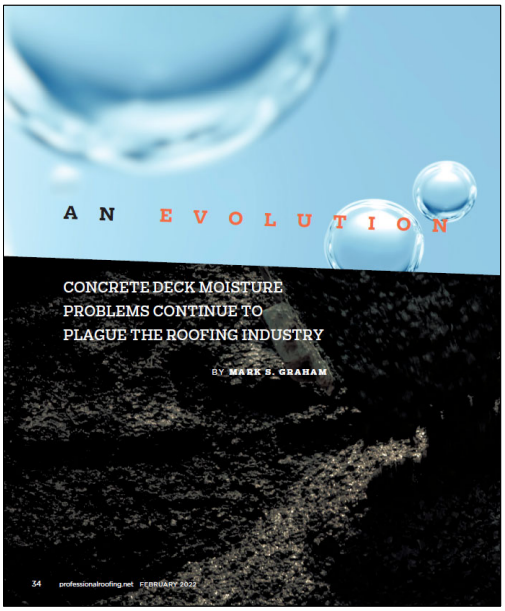
Participate in the quarterly survey…

9

Moisture-related issues with concrete roof decks

10



Professional Roofing
February 2022

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NRCA recommends designers specify an adhered vapor retarder…
but isn't adhesion of the vapor retarder still a concern?

12

Vapor retarder adhesion testing

Moisture-related issues with concrete roof decks

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What we tested…

Vapor retarder adhesion testing

- 2-ply asphalt BUR membrane
- Manufacturer A-SA vapor retarder
- Manufacturer B-SA vapor retarder
- Manufacturer C-SA vapor retarder
- Manufacturer D-SA vapor retarder

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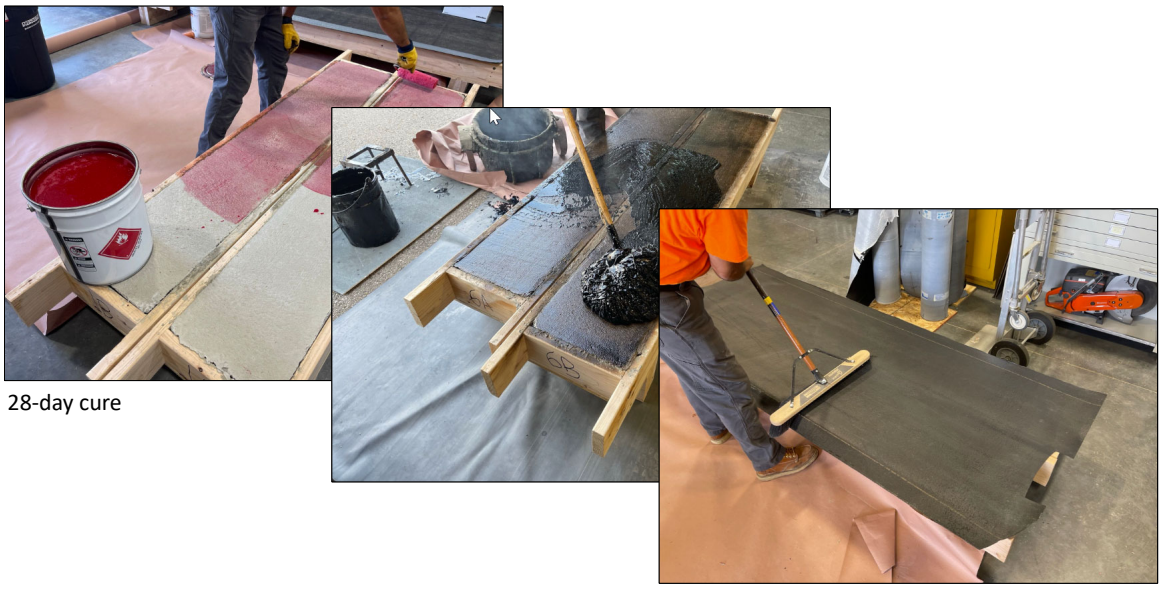

28-day cure

15

Sample conditioning

After vapor retarder application; 28 days after concrete placement

- Conditioned for 60-days
- One set of each at standard laboratory conditions
- Other set of each at a 30 F temperature differential
  - The temperature differential creates an upward vapor pressure drive

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Test results

Vapor retarder adhesion

Sample	Tested pull resistance		Difference	
	Lab. conditions 60-day conditioning (Average of 5 specimens)	Vapor drive 60-day conditioning (Average of 5 specimens)	Differential	Percent differential
2-ply built-up membrane	1,421 psf	833 psf	-588 psf	-41%

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Conclusions

Vapor retarder adhesion

- Results vary
- For 4 of 5 samples, vapor drive conditioning resulted in lower values, but Manufacture 3-SA VR is higher
- All results greater than 90 psf (i.e., FM 1-90)

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Recommendations

Vapor retarder adhesion

- Designers should specify vapor retarders after considering vapor retarder adhesion both at the time of application and in-service.
- Manufacturers should incorporate some form of vapor drive conditioning assessment in their product development and assessment, and make that information available to specifiers.
- The vapor drive conditioning used in this testing is one possible assessment method.

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RESEARCH+TECH

Better understanding of adhesion

Recent research shows vapor retarder adhesion to new concrete roof decks varies

by Mark S. Graham

In "An evolution of knowledge," February 2022 issue, I discussed NRCA's research examining roofing-related problems with moisture in concrete roof decks. One area where NRCA considered additional research to be necessary was addressing the adequacy of vapor retarder adhesion to newly placed concrete roof decks.

NRCA has since undertaken this research, which provides designers with some guidance for proper vapor retarder selection.

Adhesion research

NRCA contracted with SRI Consultants Inc., Waunakee, Wis., to oversee test specimen preparation and conduct vapor retarder adhesion testing.

Ten 6-inch-thick concrete roof deck specimen sets were poured using normal-weight structural concrete. The top surfaces of the concrete specimens were float-finished.

After 28 days of curing at standard laboratory conditions, a two-ply built-up membrane was applied to two of the concrete roof deck specimens and four different manufacturers' self-adhering vapor retarder products were applied to the remaining concrete roof deck specimens in two specimens sets. For each of the self-adhering vapor retarder types, the manufacturer's recommended primer was used, and installations

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March 2023

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Field uplift testing

ASTM E907 or FM 1-52

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INDUSTRY ISSUE UPDATE

NRCA Member Benefit

Field-uplift testing

ASTM E907 and FM 1-52 tests continue to be problematic

June 2015

NRCA continues to receive a significant number of reports from roofing contractors, manufacturers and designers regarding the use of and problems associated with field-uplift tests as post-installation quality assurance measures for membrane roof systems. NRCA has addressed these testing issues a number of times during the years. Following is a summary of NRCA's previous discussions, as well as updated information and recommendations.

ASTM E907/FM 1-52

There are two recognized field test methods for determining adhered membrane roof systems' uplift resistance: ASTM E907, "Standard Test Method for Field Testing Uplift Resistance of Adhered Membrane Roofing Systems," and FM Global Loss Prevention Data Sheet 1-52 (FM 1-52), "Field Verification of Roof Wind Uplift Resistance."

An example of a test chamber used for negative-pressure uplift testing

Both test methods are similar and provide for affixing a 5- by 5-foot dome-like chamber to a roof surface's topside and applying a defined negative (uplift) pressure inside the chamber to the roof system's exterior-side surface using a vacuum pump (see photo). During the test, membrane surface deflection inside the chamber is visually monitored and measured to determine whether a roof system passes or is "suspect."

Using ASTM E907, a roof system is considered to be suspect if the deflection measured during the test is 25 mm (about 1 inch) or greater. During FM 1-52 testing, a roof system is suspect if the measured deflection is between ¼ of an inch and $^{3}/_{16}$ of an inch depending on the maximum test pressure: 1 inch where a thin topping board (cover board) is used; or 2 inches where a thin cover board or flexible, mechanically attached insulation is used.

If an ASTM E907 or FM 1-52 test yields a suspect result, a test cut should be taken in the test area to determine whether failure has occurred and the specific failure mode.

ASTM E907 and FM 1-52 differ notably in their test cycles and maximum test pressures for determining roof system deflections and whether a roof system passes or is suspect. ASTM E907 testing is conducted in 15-pounds per square foot (psf) pressure intervals up to the calculated design wind (uplift) pressure for the specific roof system being evaluated. FM 1-52 testing is conducted using an initial 15-pounds psf pressure followed by 7.5-pound psf increments up to a maximum test pressure of 1.25 times the design uplift pressure for the specific roof system being evaluated.

Considering maximum test loading and allowable test deflections in combination, FM 1-52 requires 25 percent higher test loads, yet only allows as little as ¼ the test deflection of ASTM E907. That said, FM 1-52 is a significantly more stringent test than ASTM E907.

ASTM E907 originally was published as a recognized consensus standard in 1983, and it was revised in 1996. In 2013, ASTM withdrew ASTM E907 because a consensus could not be reached regarding necessary revisions—most significantly, defining the test method's precision and bias (accuracy). ASTM E907-96 still is available for use and can be obtained directly from ASTM's website, www.astm.org.

FM 1-52 is an FM Global-promulgated evaluation method and not a recognized industry-consensus test standard. FM 1-52's scope indicates it only is intended to confirm acceptable wind-uplift resistance on completed roof systems in hurricane-prone regions, where a partial blow-off has occurred or where inferior roof system construction is suspected or known to be present.

FM 1-52 originally was published by FM Global in October 1970. The negative-pressure uplift test was added in August 1980 and has been revised several times. The current edition is dated July 2012 and includes an option for "visual construction observation (VCO)" as an alternative to negative-pressure uplift testing. VCO provides for full-time, third-party monitoring of a roof system application to verify roof system installation in accordance with contract documents.

NRCA Industry Issue Update

June 2015

Link

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RESEARCH+TECH

Revisiting field uplift testing

NRCA's long-standing concerns continue with this issue

by Mark S. Graham

I has been a while since I have written about NRCA's concerns with field uplift testing, which sometimes is inappropriately used as a way to assess the quality of an adhered membrane roof system installation. Despite the time that has passed, NRCA continues to have reservations about field uplift testing, and the test procedure has not yet been revised to address NRCA's concerns.

ASTM E907

In 2013, ASTM International withdrew its consensus-based test method for field uplift testing, ASTM E907, "Standard Test Method for Field Testing Uplift Resistance of Adhered Membrane Roofing Systems."

ASTM International requires its test method standards to include a precision statement addressing two things.

"…NRCA is participating in this interlaboratory study program..."

Professional Roofing

December/January 2022-23

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In the ASTM ILS, two-thirds of the FM 1-90 specimens tested "failed" the field uplift test below the 90 psf test level.

Field uplift test results did not correlate with FM Approvals' classification; field uplift testing showed lower results.

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Watch for more information on this after the June ASTM Committee D08 meeting…

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Revisions to PIMA's QualityMark^{CM} program

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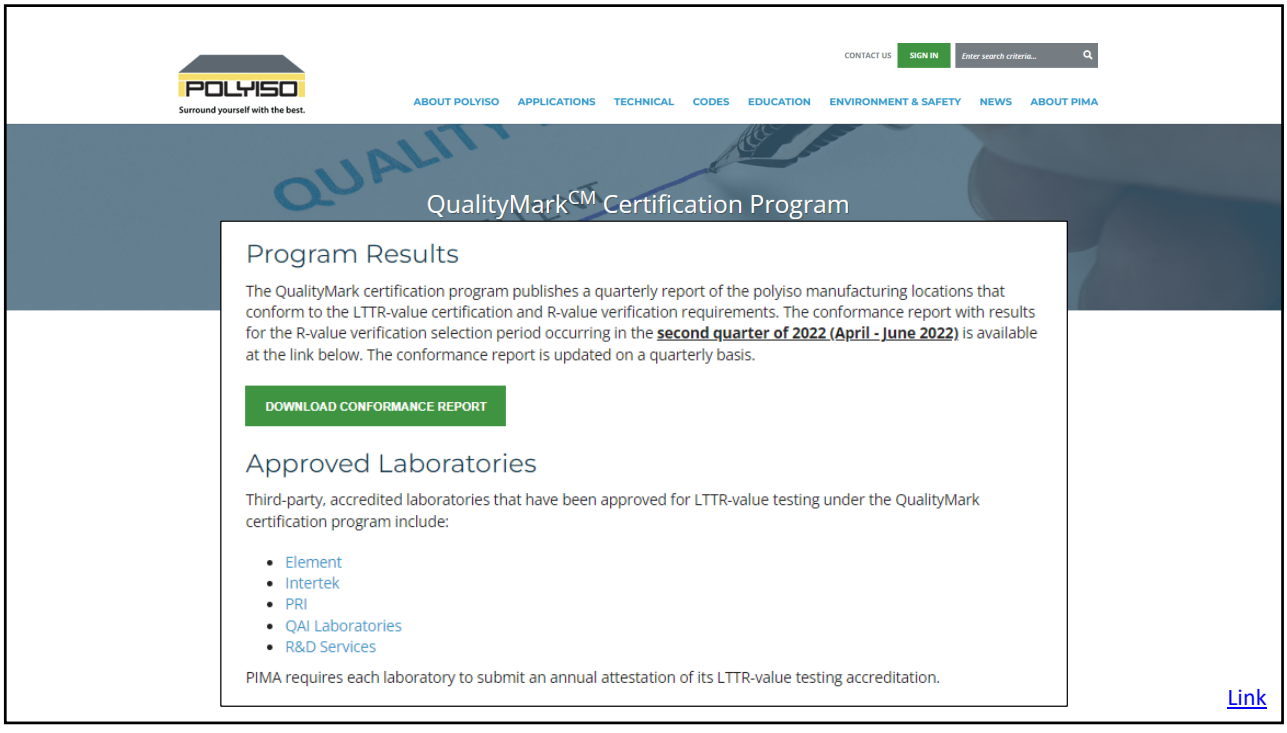

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PIMA
POLYISOCYANURATE INSULATION MANUFACTURERS ASSOCIATION

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QualityMark℠ Program Quarterly Conformance Report

Reporting Period: Q2 2022 (April – June 2022)
Last revised on February 20, 2023

About:
The QualityMark Program is a voluntary program for manufacturers of polyisocyanurate roof insulation (ASTM C1289, Type II, Class I, Grade 2) in Canada and the United States. The program enables participants to obtain third-party certification of long-term thermal resistance (LTTR) values for insulation products independently selected from manufacturing locations. Additionally, the program provides third-party verification of thermal resistance values (R-values) tested in accordance with the ASTM C518 standard for full

PIMA QualityMark™

LTTR-value Certification for Products Selected from Manufacturing Locations:
Samples for LTTR-value certification are selected from manufacturing locations by independent third parties. The testing is performed by approved laboratories to obtain LTTR-values for 2.0", 3.0", and 4.0" product. Participating manufacturers are required to obtain an initial certification for each manufacturing location, which are then recertified every 3 years. The certification is used to validate the LTTR-values published by participating manufacturers.

R-value Verification for Products Selected from Distribution:
Samples for R-value verification (ASTM C518) are selected on a quarterly basis from distribution locations by an independent third party. A sample is selected for each participating manufacturing location. After selection, the samples are held at laboratory conditions and tested at full thickness 180-days after the date of manufacture. A manufacturing location is deemed to conform to the program requirements when the measured R-value at 180-days is equal to or greater than the published LTTR-value for the product at the same labeled thickness. Manufacturing locations that receive non-conforming R-value verification results in consecutive quarters (inclusive of the current reporting period) are not in compliance with the program requirements.

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QualityMark Program Quarterly Conformance Report[1]
Reporting Period: Q2 2022 (April – June 2022)

Manufacturing Location		Manufacturer
City	State/Province	
High River*	Alberta	IKO Industries Ltd.
Phoenix	Arizona	Atlas Roofing Corporation
Vancouver	British Columbia	Atlas Roofing Corporation
Northglenn	Colorado	Atlas Roofing Corporation
Bristol	Connecticut	Holcim Building Envelope
Jacksonville	Florida	Holcim Building Envelope
Jacksonville*	Florida	Johns Manville
Lake City	Florida	Carlisle Construction Materials
LaGrange	Georgia	Atlas Roofing Corporation
Statesboro	Georgia	GAF
Florence	Kentucky	Holcim Building Envelope
East Moline	Illinois	Atlas Roofing Corporation
Franklin Park	Illinois	Carlisle Construction Materials
Bremen*	Indiana	Johns Manville
Fernley*	Nevada	Johns Manville
Montgomery	New York	Carlisle Construction Materials
Cornwall*	Ontario	Johns Manville
Toronto	Ontario	Atlas Roofing Corporation
Camp Hill	Pennsylvania	Atlas Roofing Corporation
Hazleton*	Pennsylvania	Johns Manville
Smithfield	Pennsylvania	Carlisle Construction Materials
Youngwood	Pennsylvania	Holcim Building Envelope
Drummondville	Quebec	SOPREMA
Corsicana	Texas	Holcim Building Envelope
Diboll	Texas	Atlas Roofing Corporation
Gainesville	Texas	GAF
Terrell	Texas	Carlisle Construction Materials
Cedar City	Utah	GAF
Tooele	Utah	Carlisle Construction Materials
Puyallup	Washington	Carlisle Construction Materials

Last revised on February 20, 2023. Current report available at www.polyiso.org/QUALITYMARK.

*This manufacturing location has a pending result for its LTTR-value certification. The table above will be periodically updated as LTTR-value certifications are completed.

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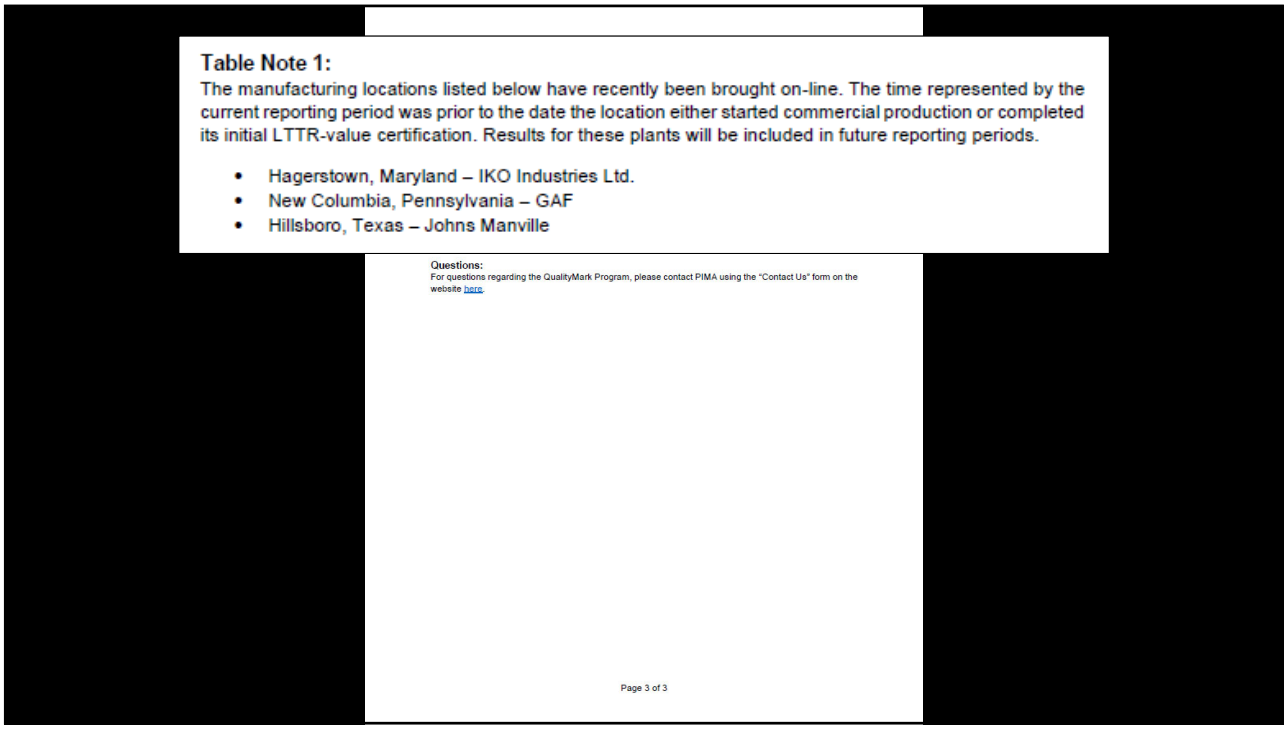

Table Note 1:
The manufacturing locations listed below have recently been brought on-line. The time represented by the current reporting period was prior to the date the location either started commercial production or completed its initial LTTR-value certification. Results for these plants will be included in future reporting periods.

- Hagerstown, Maryland – IKO Industries Ltd.
- New Columbia, Pennsylvania – GAF
- Hillsboro, Texas – Johns Manville

Questions:
For questions regarding the QualityMark Program, please contact PIMA using the "Contact Us" form on the website here.

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Recommendations

- Watch for updates to PIMA's Quarterly Conformance Report
- Consider asking polyiso. manufacturers to certify their current compliance

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New gutter testing requirements

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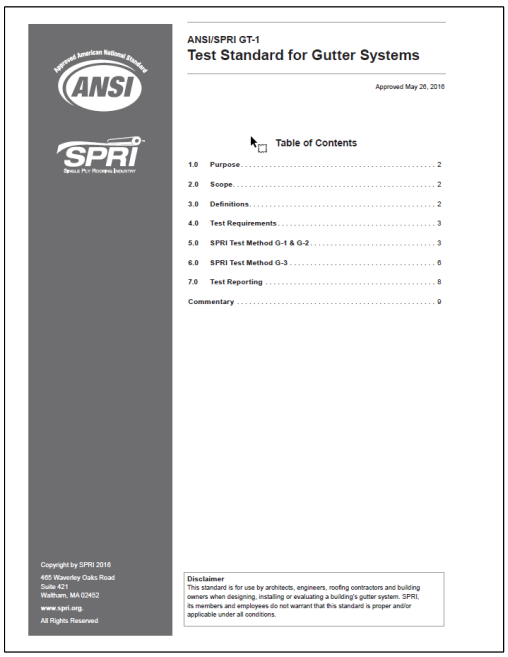

ANSI/SPRI GT-1, "Test Standard for Gutter Systems"

Link

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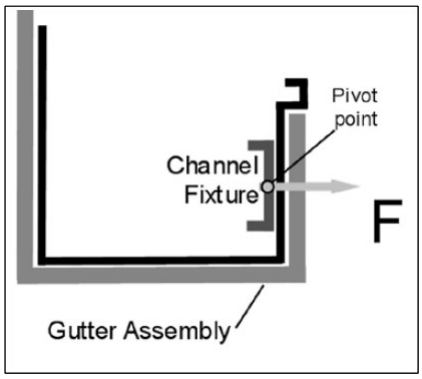
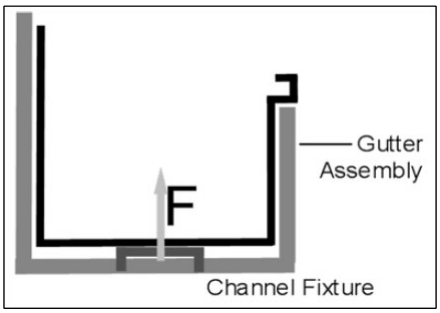


SPRI Test G-1 (Outward load)



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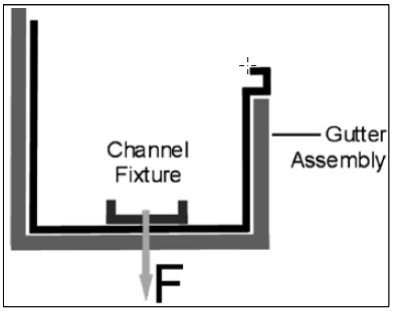

SPRI Test G-3 (Downward load)

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International Building Code, 2021 Edition

Link

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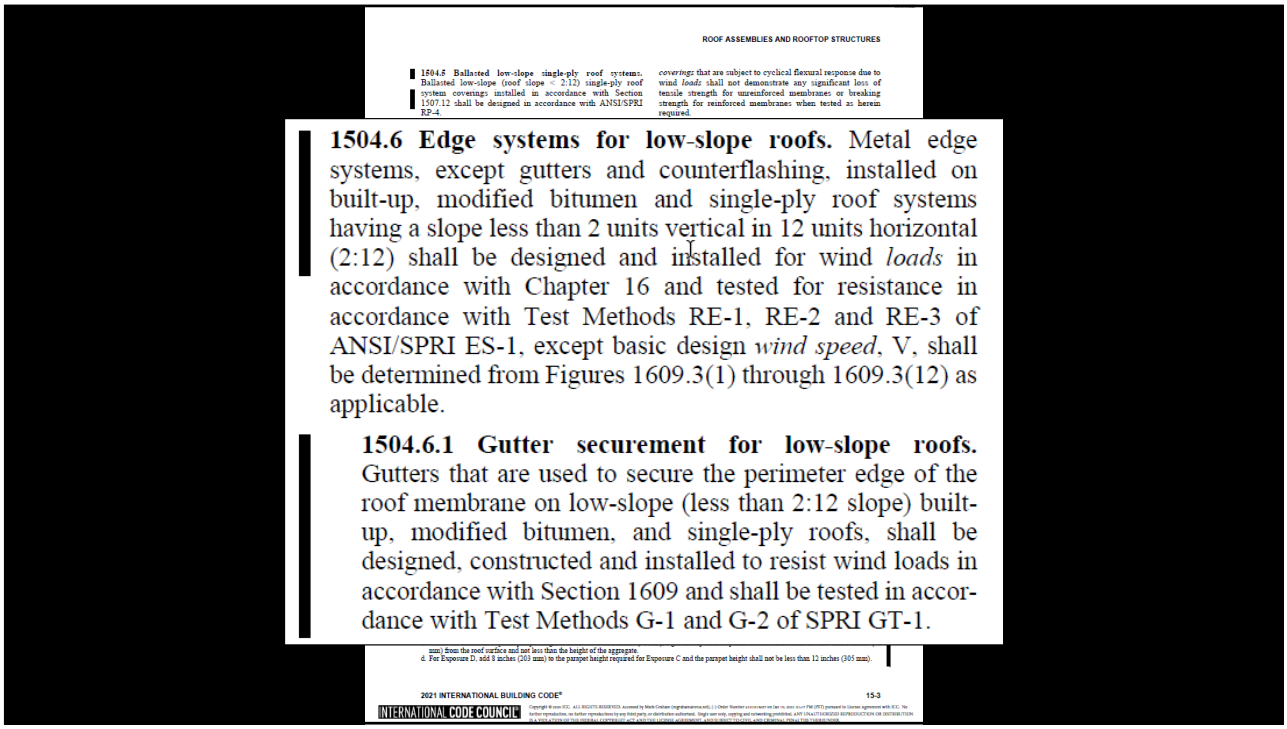

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NRCA has completed GT-1 testing of gutters and just launched GT-1 certification programs as companions to our UL Solutions and Intertek certification programs for shop-fabricated edge metal

Contact Andrea Khalil at NRCA for more information
akhalil@nrca.net

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Closely review newly-revised applicator agreements, warranties and other documents as they are received.

Seek legal review and assistance, if necessary.

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Contractor-reported problems…

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Questions… and other topics

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