Updating PIMA's QualityMark℠

Revisions provide increased credibility

by Mark S. Graham

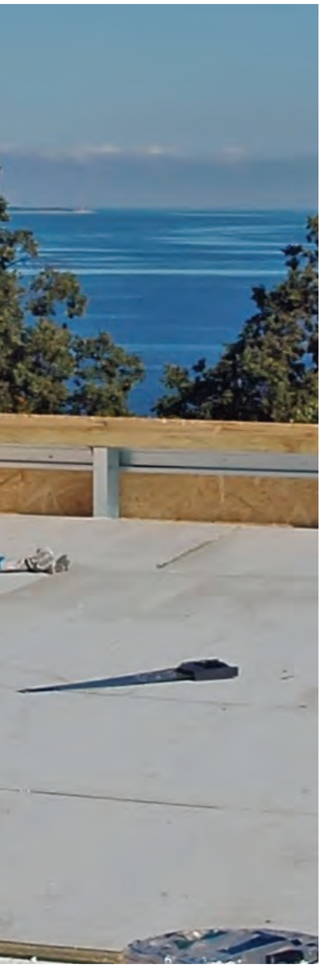
The Polyisocyanurate Insulation Manufacturers Association recently updated its QualityMark program, which has been in existence since 2004 and addresses the long-term thermal resistances of polyisocyanurate insulation used in low-slope roof systems.

What it is

PIMA's QualityMark is a voluntary program for manufacturers of rigid board polyisocyanurate roof insulation manufactured in the U.S. and Canada. The program allows manufacturers to obtain and use third-party certification of long-term thermal resistance values, commonly referred to as LTTR, for their products. Additionally, the program provides third-party verification of R-values.

The following polyisocyanurate insulation manufacturers participate in the program:

- Atlas Roofing Corp., Meridian, Miss.
- Carlisle Construction Materials, Carlisle, Pa.
- GAF, Parsippany-Troy Hills, N.J.
- Holcim Building Envelope, Nashville, Tenn.



- IKO, Calgary, Alberta
- Johns Manville, Denver
- SOPREMA Inc., Drummondville, Québec

Rmax, Dallas, is not participating.

Testing and conformance

In the QualityMark program, samples for LTTR certification are selected from each participating manufacturer's manufacturing plant locations. LTTR testing is conducted on 2-, 3- and 4-inch-thick products by PIMA-approved, third-party testing laboratories. The manufacturers are required to obtain initial LTTR certification for each of their manufacturing plant locations. Retesting and recertifying is done every three years. These certifications are the basis for manufacturers' published LTTR values.

Also, samples for R-value verification are selected quarterly from normal distribution sources by a third-party testing laboratory. A representative sample is selected for each participating manufacturer's manufacturing plant locations. After selection, samples are held and conditioned at standard laboratory conditions for 180 days. Then, the full thickness samples are tested for R-value according to ASTM C518, "Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus."

A plant location is deemed to comply with the QualityMark program when its tested R-value at 180 days is equal to or greater than the LTTR-certified value for the same thickness of product. Plant locations receiving nonconforming R-value results in two consecutive quarters are not in conformance with the program.

> "It remains unclear how manufacturers currently complying with the QualityMark program can be readily identified by polyisocyanurate insulation users"

This 180-day, R-value verification testing is a noteworthy update to the QualityMark Program.

In February, PIMA published its first quarterly QualityMark conformance report for April through June 2022. The lag between the reporting period and February publication date largely is attributable to the 180-day conditioning period for the R-value verification samples.

The report identified 30 manufacturing plants from seven polyisocyanurate insulation manufacturers that conformed with QualityMark. Six of these plants from two different manufacturers are identified as having a pending result for their LTTR certifications. This reportedly means they only have one quarter of successful R-value verifications under the current program procedures.

Also, three manufacturing plant locations from three manufacturers are identified as recently having been brought online; the reporting period occurred before the specific locations started commercial production, and they could not complete initial LTTR certification.

It is worth noting in addition to the manufacturer that is not participating in the program, plants from several manufacturers are not included in the list of plants and manufacturers complying with the QualityMark program. This omission indicates these specific locations did not conform with QualityMark during the reporting period.

In April, PIMA published its quarterly conformance report for July through September 2022. This report identifies 30 manufacturing plants from seven manufacturers as complying; however, these 30 plants are not the same as those identified as conforming in the previous 2022 quarterly report. One manufacturing plant location has been added, and one has been removed from the list.

Also, only two of the manufacturing plant locations from one manufacturer on the July-September 2022 conformance report are identified as having pending results for their LTTR certifications.

The status of the three manufacturing plants that recently had been brought online remain unchanged from the April-June 2022 conformance report.

My thoughts

PIMA's revisions to its QualityMark program, including the public availability of the quarterly conformance reports, brings added credibility to the program and the participating (and conforming) manufacturers. I applaud these efforts.

However, it is unclear how manufacturers and manufacturing plant locations currently complying with the QualityMark program can be readily identified by polyisocyanurate insulation users. Use of the QualityMark designation identifies manufacturer participation in the program not manufacturer or specific manufacturing plant location conformance. Participating nonconforming manufacturers and manufacturing plant locations are still permitted to use the QualityMark label. Current conformance information should be more readily available.

Also, it is unclear how conformance can be applied to polyisocyanurate insulation procured through private-label sources. In these

Additional information about the QualityMark program can be found at professionalroofing.net.

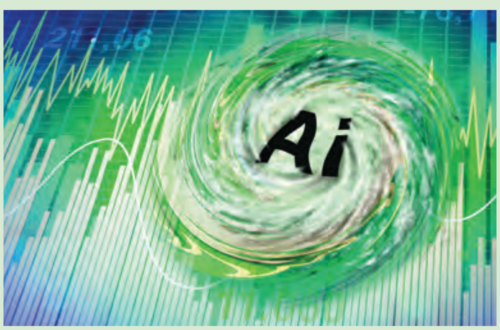
situations, the manufacturing plant location and original manufacturer is not readily known by users.

NRCA maintains its long-standing recommendation that rigid board insulation, including polyisocyanurate insulation, be specified and procured based on its ASTM International designation, board size and thickness and not its LTTR or R-value.

Additional information about polyisocyanurate insulation used in low-slope membrane roof systems is available in Chapter 4-Rigid Board Insulation of *The NRCA Roofing Manual: Membrane Roof Systems—2023*. NRCA members can download this manual free; hard copies can be purchased at shop.nrca.net.

MARK S. GRAHAM is NRCA's vice president of technical services.
@MarkGrahamNRCA

AI-based digital hurricane simulations could help improve building codes



Researchers at the National Institute of Standards and Technology have devised a new method of digitally simulating hurricanes using 100 years of hurricane data and modern artificial intelligence.

The results of a study published in *Artificial Intelligence for the Earth Systems* demonstrate the simulations accurately can represent the trajectory and wind speeds of a collection of actual storms. The authors suggest simulating numerous realistic hurricanes can help develop improved building code guidelines for buildings in hurricane-prone regions.

Wind speeds in standardized maps used in building codes are derived from scores of hypothetical hurricanes simulated by computer models, which are based on real-life hurricane records.

Researchers developed current maps by simulating the complex inner workings of hurricanes, which are influenced by physical parameters such as sea surface temperatures and the Earth's surface roughness. However, necessary data regarding these specific factors is not always readily available.

More than a decade later, advances in AI-based tools and years of additional hurricane records have made possible the new method, which could result in more realistic hurricane wind maps.

NIST postdoctoral researcher Rikhi Bose, NIST mathematical statistician Adam Pintar and NIST fellow Emil Simiu used these new techniques and resources to take a new approach. Rather than having their model mathematically build a storm from the ground up, the researchers taught it to mimic actual hurricane data with machine learning, Pintar says.

With enough quality information to study, machine-learning algorithms can construct models based on patterns they uncover within datasets other methods may miss. Those models can then simulate specific behaviors, such as the wind strength and movement of a hurricane.

Study material used in the new research came from the National Hurricane Center's Atlantic Hurricane Database, which contains 100-year-old information about hurricanes.

The researchers split data on more than 1,500 storms into sets for training and testing their model. When tested, the model successfully could concurrently simulate the trajectory and wind of historical storms it had not previously seen.

The team also used the model to generate sets of 100 years' worth of hypothetical storms. It produced the simulations in a matter of seconds, and the authors saw a large degree of overlap with the general behavior of recorded storms, suggesting the model could rapidly produce collections of realistic storms.

However, there were some discrepancies, such as in the Northeastern coastal states. In regions with sparse data, the model generated less realistic storms.

As a next step, the team plans to use simulated hurricanes to develop coastal maps of extreme wind speeds as well as quantify uncertainty in those estimated speeds.

Because the model's understanding of storms currently is limited to historical data, it cannot simulate the effects climate change will have on future storms. The traditional approach of simulating storms from the ground up is better suited to that task. However, at this time, the authors are confident wind maps based on their model would better reflect reality. Within the next several years, the team aims to produce and propose new maps for inclusion in building codes.