

Many in the industry have questions concerning the use of polyurethane and polyisocyanurate insulation in roof assemblies. To answer some of these questions the Roof Insulation Committee of the Thermal Insulation Manufacturers Association (RIC/TIMA) presented a program titled "Insulation: R's, U's, Do's and Don'ts" at last year's NRCA Convention.

During the program, representatives of the Committee presented the findings of a recently conducted study on the amount of thermal resistance polyurethane and polyisocyanurate insulation boards lose over time. Session panelists also fielded questions from the audience. Time ran out too soon, however, and many good questions went unanswered.

RIC/TIMA has requested space in this column to respond to some of the concerns that weren't addressed at the Convention program. The following questions, along with RIC/TIMA's answers, represent what the Committee believes are the most important issues raised by program attendees.

Regarding long-term, in-place testing, how long before the next results are available, and will test results for phenolic foam insulation be included?

The RIC/TIMA in-place test program is an ongoing project. The first in-place test roof project, located in the Atlanta area, is scheduled to end in 1987. It is expected that a formal report will be issued at that time. Meanwhile, additional testing is proceeding on a second test roof located in another region of the country. Plans for this project do include the testing of phenolic foam insulation.

RIC/TIMA tested five panels, yet disclosed the test results of only three of the panels. What were the results of the other two? How did polyurethane perform?

One board—a fiber glass/polyurethane composite—was lost due to test equipment failure. Test results of the other board—a perlite/polyurethane composite—were not reported due to inadequate pre-installation product data. However, in the

latest inspections the board has been providing a C-value of 0.10, which is equal to its original rated value. From the data generated to date, polyurethane has performed with an average k-value of 0.16. This is exactly what has been discovered in laboratory-aged thermal value tests.

Why are samples aged at room temperature? Six months at room temperature seems inadequate to predict five- or ten-year performance at the high temperatures seen in the field.

Room temperature was selected only to establish an average mean within extreme rooftop conditions. It is believed that the more critical criteria is the length of time it takes the boards to reach a state of equilibrium (six months) within the cell structure of the polyurethane and polyisocyanurate. Once this equilibrium is established, there is only minimum fluctuation, depending on actual ambient conditions.

What is the difference between polyurethane and polyisocyanurate?

Technically speaking, pure polyurethane is a chemical compound containing equal amounts of polyol and isocyanurate. The chemicals react with each other to form polyurethane foam. Pure isocyanurate is made of isocyanurates that react with each other to form polyisocyanurates. However, it is extremely difficult to classify products on the market today as pure polyurethanes or polyisocyanurates. Modern chemical technology has produced polyurethane-modified isocyanurates that combine the best physical properties of both into a single product. These insulations should more properly be referred to as modified polyisocyanurates.

Does the gas polyurethane and polyisocyanurate insulation manufacturers use as a blowing agent have anything to do with blistering?

Probably not. Extensive gas analyses conducted in the laboratory and in actual field applications have revealed only trace quantities of freon. If the gas were responsible for the blistering phenomenon, it would have been found in much higher levels in the blisters that were examined.

RIC/TIMA
responds
to
unanswered
questions

By Bob Goss



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The following
 questions were
 asked by readers
 of the magazine
 and answered
 by the author of
 the article on
 polyisocyanurate

If all RIC/TIMA members use the same conditioning procedure, why aren't all R-values the same? Also, TIMA's two-year test showed the k-values of aged polyurethane and polyisocyanurate to be 0.16 (an R-value of 6.2 per inch). Why don't all members use this value?

Because each member company is free to develop its own foam formulation, the physical characteristics that ultimately affect aged R-values vary from product to product. Therefore, manufacturers achieve the same R-value with slightly different insulation thicknesses.

Have you checked the in-place R-value of sprayed-in-place foam?

No, RIC/TIMA is an association of rigid polyurethane and polyisocyanurate board manufacturers. It does not involve itself with spray-on products.

What requirements must a manufacturer meet to be a RIC/TIMA member?

RIC/TIMA's bylaws state that membership is limited to manufacturers or those engaged in the sale of rigid polyurethane and polyisocyanurate roof insulation boards. An associate membership has recently been established to include manufacturers of polyurethane and polyisocyanurate raw materials.

What can RIC/TIMA do about non-TIMA members' R- or k-value claims?

Legally there is nothing that the Roof Insulation Committee can do. RIC/TIMA is not a policing organization. However, they have corresponded with all non-TIMA insulation manufacturers, all relevant roofing and architectural associations and more than 900 roofing products distributors. In addition, RIC/TIMA has been waging an extensive publicity and advertising campaign to educate architects, specifiers and roofing contractors on the aged thermal value concept.

What is being done to provide stronger attachment of the facer to the core of the foam board stocks?

The Committee believes this question refers to products developed in the mid-1970s that are no longer produced. Today, this phase of the manufacturing process is not RIC/TIMA's responsibility. It is up to the individual manufacturers to develop foam facers and warrant their performance.

Would the use of a thicker mat facer on polyisocyanurate foam preclude the use of an additional layer of insulation or a venting base sheet?

It is not the function of RIC/TIMA to dictate facer standards to its membership because there is no ASTM standard or acceptable test method to reproduce or simulate the venting phenomenon. It is the individual manufacturers' responsibility to test and warrant their products and back their claims.

What research and testing has been done to evaluate the ability of new glass facers to stay laminated to polyisocyanurate over long-term moisture and thermal-cycle exposure?

Again, product performance is the responsibility of individual manufacturers.

What are TIMA's guidelines for torching membranes to polyurethane and polyisocyanurate insulation?

RIC/TIMA developed a position statement on torching that has been publicized in the trade media. The statement reads in part: "RIC/TIMA does not endorse torching directly to the foam insulation material. Rather, it is recommended that an interim base ply or layer of roof insulation, acceptable to the membrane manufacturer, be used to separate the foam roof insulation from the modified sheet and torch."

Does a mopped or nailed base sheet preclude the use of overlay board?

Assuming that this question refers to built-up roofing applications, the answer may be found in the joint RIC/TIMA-NRCA Bulletin #9, dated July 1981, which says either an overlay board or a venting base ply may be used.