Concerns with perlite board insulation

by **Mark S. Graham**

Rigid perlite board roof insulation has been used in the United States since the 1950s, and generally, it has performed quite well. However, in a limited number of instances, blistering associated with its use in hot-applied roof membrane applications has been—and continues to be—reported to NRCA.

Following is a brief overview of the history of NRCA's concern and research relating to this issue.

Background

As early as 1988, citing possible blistering concerns, NRCA began limited testing of perlite board insulation's moisture absorption and release properties.

In April 1991, NRCA surveyed its contractor members regarding blistering over perlite board insulation. In "Contractors report on corrosion, blisters, coatings," August 1991 issue, page 12, NRCA made specific recommendations regarding the use and application of ½-inch- (12-mm-) and ¾-inch- (19-mm-) thick or thicker perlite board insulation.

In 1992, NRCA commissioned a series of laboratory evaluations of perlite board insulation and participated in a field research project with the Midwest Roofing Contractors Association (MRCA) and the two manufacturers of the product at that time. In an October 1992 letter to NRCA members, NRCA's Technical Operations Committee cautioned users to be alert for significant bubbling or frothing while performing hot-mopped applications to perlite board.

In "What's going on with perlite board in the field and lab?" February 1993 issue, page 30, Rene Dupuis, president of Structural Research Inc., Middleton, Wis., suggested cellulose fibers used in perlite board insulation are the likely cause of the reported blistering and moisture absorption problems associated with the product.

In a 1994 research paper presented at an ASTM International technical symposium, Dupuis recommended ASTM review its material standard for perlite board insulation, ASTM C728, "Standard Specification for Perlite Thermal Insulation Board," and consider adding appropriate testing to attempt to quantify the product's short-term moisture gain and release behavior.

Recent NRCA testing

In 2003 and 2004, NRCA conducted limited testing of perlite board insulation. Samples were obtained by NRCA technical committee members through typical distribution sources and shipped to NRCA for testing.

NRCA submitted the samples to a recognized, independent testing laboratory for testing in accordance with ASTM C728.

The results of this testing reveal a majority of the perlite board insulation tested did not meet the requirements of ASTM C728. Although all the material tested easily complied with the standard's density, compressive, tensile and flexural strength requirements, the results for water absorption testing for 10 of the 15 lots of material tested exceed ASTM C728's maximum allowable values. This result is viewed as significant because high water absorption values typically are associated with a potential for blistering.

NRCA also tested the perlite content for the procured lots of perlite board insulation. The results of these tests revealed perlite content values in the ranges found in the 1992 testing.

Closing thoughts

Although perlite board insulation has been used successfully for years, the longstanding concern of NRCA and others with regard to potential blistering when perlite board insulation is used in hot-applied roof membrane applications still is unresolved.

ASTM Committee C16 on Thermal Insulation, which is responsible for maintaining ASTM C728, still has not taken action on Dupuis' 1994 recommendations.

NRCA recently has met with representatives of Johns Manville, Denver, the sole remaining U.S. manufacturer of perlite board insulation, to review its concern of blistering and results of its latest testing. The company has committed to help NRCA work with ASTM to address these issues.

Until the concern relating to blistering is addressed adequately, I encourage installers of perlite board insulation to allow an "open time" of a minimum of about 10 minutes before hot-applied membrane application to allow for top-side moisture venting (drying) of the boards. This suggestion is consistent with the recommendations of the NRCA/MRCA research report.

Also, as indicated in TOC's 1992 letter, installers of perlite board insulation should be alert for significant bubbling or frothing while hot mopping to perlite board insulation. If significant bubbling or frothing is observed, contact NRCA and the supplier of the perlite board insulation to notify them of the condition.

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