# Report on fire testing

*by* Mark S. Graham

In January, NRCA and the Midwest Roofing Contractors Association (MRCA) issued a report about a fire-testing research program they conducted. The research revealed some findings that should be of concern to roofing professionals.

## Background

In 1996, MRCA undertook a limited series of fire tests intended to determine the fire resistance of "aged" roof membrane systems. Half the specimens tested passed the tests, and the other half failed.

In 2001, MRCA conducted an additional series of fire tests on aged roof membrane systems. Again, only half the specimens passed the fire tests.

MRCA conducted yet another series of fire tests in 2002. NRCA and several other interested parties assisted MRCA in conducting these tests; NRCA's involvement was based largely on concerns with the outcome of the previous years' testing.

In the 2002 test series, 34 new (unweathered) and aged EPDM and TPO membrane roof systems were tested. EPDM and TPO systems specifically were selected because the results for these systems exhibited the widest variability in the previous testing. Both new and aged systems were tested to determine whether they exhibited similar characteristics when exposed to fire. Only 13 of the 34 specimens tested in the 2002 series passed the fire tests.

## HAI testing

In late 2002, NRCA and MRCA retained Hughes Associates Inc. (HAI), Baltimore, a widely recognized, independent fire consulting firm, to develop and oversee an additional series of fire tests.

HAI developed a "basic matrix" fire test series that called for testing identical, mechanically attached EPDM and TPO membrane roof systems at four recognized fire test laboratories. All systems tested were listed and approved by Underwriters Laboratories (UL) Inc. and FM Approvals. Testing was conducted according to the spread-of-flame portion of ASTM E108, "Standard Test Methods for Fire Tests of Roof Coverings."

Only seven of the 28 specimens tested in the basic matrix series passed the fire test. This is of concern because all systems tested were Class A-rated and should have passed the fire test.

At two laboratories, additional fire tests also were conducted to investigate the effects of different roof slopes, insulation components and thicknesses, and test specimen edge termination methods.

Fifty-two fire tests were conducted as part of the HAI testing program. Only 13 specimens exhibited Class A results.

HAI has concluded the ASTM E108 spread-of-flame method is problematic, has significant shortcomings and potentially can provide misleading results for low-slope membrane roof systems. Also, the method may not be appropriate for evaluating the exterior fire performance of mechanically attached single-ply membrane roof systems.

## Recommendations

NRCA and MRCA have serious concerns with the results of the fire testing and HAI's conclusions. We have shared these with ASTM International, UL, FM Approvals, the testing laboratories involved and roof system manufacturers whose products we tested.

Until ASTM E108 is revised to address the research findings, NRCA and MRCA recommend roof system designers ensure their designs and specific components comply with an appropriate exterior fire-resistance rating determined by a code-approved testing agency. UL's *Roofing Materials and Systems Directory* or FM's RoofNav application can be consulted for specific compliance information.

Also, NRCA and MRCA recommend designers who specify low-slope membrane roof systems include a suitable cover board consistent with an appropriate listing or approval from a code-approved testing agency.

Furthermore, for mechanically attached single-ply membrane roof systems, designers should include a noncombustible cover board consistent with an appropriate listing or approval, such as glass-mat-faced gypsum boards and gypsum roof boards.

NRCA and MRCA remain committed to keeping the roofing industry informed about additional developments relating to this issue.

Mark S. Graham is NRCA's associate executive director of technical services.

WEB EXCLUSIVE

For links to the joint MRCA/NRCA report, UL's certifications directory and FM Approvals' RoofNav, log on to www.professionalroofing.net.