Update on fire testing

by Mark S. Graham

In January 2006, the Midwest Roofing Contractors Association (MRCA) and NRCA released "Fire testing of membrane roof systems." This report summarizes a long-term study of fire-resistance properties of new and aged membrane roof systems and questions the variability within the fire test method used for evaluating roof systems.

Although there have been several recent developments addressing some of the test method concerns raised, unresolved issues remain.

The issues

The MRCA/NRCA study raised concern regarding the variability associated with the spread-of-flame portion of ASTM E108, "Standard Test Methods for Fire Tests of Roof Coverings." ASTM E108 and a similar standard, UL 790, "Standard for tests for fire resistance of roof coverings," serve as the technical basis for determining many roof systems' external fire-resistance properties with regard to building code compliance.

The study revealed poor reproducibility of test results among code-approved testing laboratories used in the MRCA/NRCA study. In some instances, some laboratories provided passing results while other laboratories provided failing results for roof systems constructed of the same components.

Significant differences were identified in the way the laboratories addressed test specimen edge termination and interpreted the spread-of-flame test method's pass/fail criteria.

Also, the burn patterns of similar roof system test specimens showed differences among some laboratories and sometimes even within the same laboratory over time.

Changes

ASTM E108's 2004 edition included a revision indicating passing or failing the spread-of-flame test should be interpreted as whether significant lateral flame spread reaches both edges of test specimens.

ASTM E108 was further revised in 2007 to permit the sealing of edges of test specimens to help prevent the lateral movement of air under a roof covering during testing. Before this revision, edge sealing was not specifically permitted. Also, the pass/fail criteria for significant lateral flame spread has been revised again to account for such sealing techniques.

UL 790's 2004 edition includes revisions that are somewhat similar to those contained in ASTM E108's 2004 and 2007 editions, addressing allowances for sealing the edges of test specimens and clarifying pass/fail criteria for significant lateral flame spread.

Unresolved issues

Although some changes already have been made to ASTM E108 and UL 790, additional changes still are necessary.

Air flow across test specimens has been found to be a potentially significant variable among laboratories. Currently, ASTM E108 and UL 790 require air flow calibration with the test deck positioned at a 5-in-12 (23-degree) slope. It would help if ASTM E108 and UL 790 required air flow calibration at the actual slope being tested and that air flow measurements across test specimens agree within ±4 percent.

WEB EXCLUSIVE

For a copy of the MRCA/NRCA study, log on to www.professionalroofing.net.

The recommendations remain

When evaluating the changes that have been made to ASTM E108 and UL 790, it is important to realize the *International Building Code, 2006 Edition* (IBC) is based on ASTM E108-04 and UL 790-98. Of the changes I described, only clarification of significant lateral flame spread included in ASTM E108-04 has been incorporated into the code.

Until ASTM E108 and UL 790 are further appropriately revised to address the issues raised in the MRCA/NRCA study and updated editions of these test methods are incorporated into the code, NRCA urges roofing professionals to follow the recommendations contained in the report.

Specifically, roof system designers should ensure roof system designs and specific components specified comply with an appropriate exterior fire-resistance rating determined by a code-approved testing agency. Also, when using a low-slope membrane roof system, designers should include in their designs a suitable cover board that is consistent with an appropriate listing or approval from a code-approved testing agency.

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