Are fire ratings permanent?

by **Mark S. Graham**

In October, the Midwest Roofing Contractors Association (MRCA) held its 52nd Annual Convention and Trade Show in Nashville, Tenn. As part of the convention, MRCA's Technical & Research (T & R) Committee provided a report about its testing of fire resistance properties of aged roof membrane assemblies. The testing provides some insightful information.

Fire testing

MRCA's T & R Committee collected 10 sets of samples for testing from aged roof membrane assemblies in Illinois, Iowa, Kansas, Minnesota and Missouri. The 10 sets consisted of APP- and SBS-polymer-modified bitumen sheets and EPDM, PVC and TPO roof membrane systems complete with their original insulation. The roof samples, which ranged in age from four to 15 years at the time of testing, were taken from roof assemblies that originally were fire-rated.

The samples were shipped to an independent testing laboratory for limited testing in accordance with ASTM E108, "Standard Test Methods for Fire Tests of Roof Coverings." ASTM E108 evaluates the relative fire characteristics of roof assemblies under simulated fire originating on the outsides of buildings and is the technical basis for Class A, B and C fire-resistance ratings for roof assemblies. For MRCA's testing, only the spread-of-flame and burning-brand tests from ASTM E108 were performed.

MRCA's testing revealed only four of the 10 aged roof assemblies passed the spread-of-flame test and four passed the burning-brand test. Two of the aged roof assemblies passed both tests. Only these two roof assemblies likely have maintained their fire-resistance ratings in their aged conditions.

MRCA's testing illustrates a significant point—roof assemblies do not necessarily maintain their fire-resistance ratings throughout their lives.

Code requirements

A review of building code requirements reveals model building codes generally require fire-resistance properties and ratings for roof assemblies to be maintained throughout buildings' lives.

For example, in the *International Building Code, 2000 Edition's* (IBC's) Section 3401.2—Maintenance, it states "... devices and safeguards which are required by this code shall be maintained in conformance with the code edition under which installed."

The code also indicates "the owner or the owner's designated agent shall be responsible for maintenance of buildings and structures."

A need for data

The results of MRCA's testing illustrate a need in the roofing industry for additional data regarding the fire-resistance properties of aged roof assemblies.

The U.S. roofing industry has only limited data regarding which roof assemblies adequately maintain fire-resistance ratings and which have fire-resistance properties that degrade with time or weathering. It is reasonable to assume, for example, that aggregate-surfaced roof membrane assemblies likely will maintain fire-resistance ratings unless there is significant scouring or blow-off of the aggregate surfacing. This is because aggregate largely provides for these roof assemblies' fire resistances. However, the fire resistances of aged mechanically attached and fully adhered single-ply roof membrane assemblies, for example, are largely unknown.

Also, at what age or under what conditions will a particular roof assembly's fire-resistance properties degrade to the point that it no longer maintains its fire rating? Once at that point, what extent of maintenance or repair is necessary to return a roof assembly to its original fire rating?

Currently, roofing professionals do not have adequate information to share with building owners regarding how to properly maintain aging roof assemblies in a building code-compliant, fire-resistance-rated condition.

I encourage those that the U.S. roofing industry relies upon for fire-resistance information—namely FM Global, Underwriters Laboratories Inc. and roofing product manufacturers—to provide additional information regarding the fire-resistance properties of aged roof membrane assemblies. If necessary, additional research should be conducted to develop data for specific roof membrane assemblies.

Until such information is available, I encourage roofing contractors to be cautious of any representations made or that they make regarding the current fire resistances of existing roof assemblies.

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