Factory Mutual

by **Mark S. Graham**

Because project specifications, contracts and building codes often require roofing products or roof systems to comply with Factory Mutual Research (FMR) standards, you should be familiar with the FMR approval process.

FMR is a nonprofit scientific research and testing organization managed by FM Global (FM), the world's largest commercial and industrial property insurance organization. FMR tests and provides approvals for building products, including roof systems, to mitigate losses in buildings FM insures.

FMR approval

To be considered for FMR approval, roof assemblies must conform to one or more of the following standards:

FM 4470, "Approval Standard for Class 1 Roof Covers," provides a basis for the evaluation of membrane-type (e.g., built-up, single-ply) roof systems. Specific criteria evaluated include fire, wind-uplift, hail, water-leakage, foot-traffic and corrosion resistances.

FM 4450, "Approval Standard for Class 1 Insulated Steel Roof Decks," provides criteria for evaluating roof assemblies with steel roof decks. By this standard, a steel roof deck is qualified by FM 4451, "Approval Standard for Steel Roof Deck," and the roof system is evaluated by FM 4470.

FM 4471, "Approval Standard for Class 1 Panel Roofs," provides criteria for evaluating panel-type roof systems, including metal and plastic panel roof systems. Specific criteria evaluated include fire, wind-uplift, foot-traffic, hail and water-leakage resistances.

For roof assemblies to be considered for approval, all roof assembly components must meet the performance criteria of applicable approval standards. Approval standards provide the technical basis for FMR classifications for fire and wind-uplift resistances (e.g., 1-60, 1-75, 1-90).

As part of the approval process, FMR also examines manufacturing facilities and audits quality-control procedures to evaluate manufacturers' abilities to produce tested products. Manufacturers' product marking and labeling procedures also are examined.

Products' or roof systems' continued approval by FMR depends on production or availability of the products or roof systems as approved, continued use of acceptable quality-control procedures, satisfactory field experience and compliance with the terms stipulated in FMR's approval agreement. As a condition of the approval agreement, manufacturing facilities and services are subject to periodic, unannounced audits by FMR representatives. These audits are intended to ensure product quality is consistent.

Roofing products and roof systems and assemblies that meet FMR approval standards and successfully pass FMR's audit procedures are eligible to be listed in FMR's *Approval Guide* and bear FMR approval labels. Roof systems and assemblies are approved only when assembled as listed for each specific roof covering (e.g., membrane, panel), insulation fastener, deck or structural substrate. Substituting other products—whether approved or not—into listed roof systems or assemblies is not allowed unless specifically indicated in an approval listing.

FMR acceptance

FMR distinguishes between an "approval" and "acceptance." An approval is a confirmation and a subsequent listing by FMR that a product, roof system or roof assembly has been examined according to FMR's applicable requirements and found suitable for use in all instances subject to any limitations stated in the approval. An acceptance confirms materials installed at a specific location are suitable for their intended uses. In a sense, an approval applies to multiple locations, and acceptance is considered on a case-by-case basis.

FMR's acceptances typically are limited to properties FM insures. FMR typically does not provide acceptances to buildings FM does not insure.

Closing thoughts

For roofing projects where specifications, contracts or applicable building codes require FMR compliance, project designers and contractors should work closely with roofing materials manufacturers to ensure the products and roof systems specified comply with FMR requirements.

When procuring roofing materials for projects requiring FMR approval, include language in purchase orders or contracts with distributors or manufacturers that specifies a project must comply with FMR requirements and the materials delivered for the project need to comply with applicable FMR approvals.

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