Wind speed is not directly reflected by FM designation

by **Mark S. Graham**

Q: *Does a roof system with a Factory Mutual (FM) I-90 classification mean that the roof will withstand a 90 mph (145 kph) windstorm?*

A: When determining the active (actual) uplift force in the field of a roof, Factory Mutual Research Corp.'s (FMRC) wind-design procedure takes into account not only wind speed, but also roof height, ground terrain, extreme local winds and the size of roof and wall openings.



Where the active uplift pressure is calculated to be less than 30 pounds per square foot (psf) (150 kg/m²), securement of the roof in accordance with FM's I-60 criteria is appropriate to achieve an FM approval. If the active uplift pressure is between 30 and 45 psf (150 and 220 kg/m²), securement in accordance with FM's I-90 requirements is necessary. Where the active uplift pressure is more than 45 psf (220 kg/m²), special roof securement design is necessary.

FM's I-60 and I-90 classifications provide a minimum safety factor of two; this is considered to be comparable with the usual safety factor in building construction.

FMRC's wind-design procedure for roof systems is explained in detail in its Loss Prevention Data Sheets 1-7, 1-28 and 1-28S. However, it should be noted that design uplift pressures calculated from these data sheets may be less than those derived from the model building codes and the American Society of Civil Engineers (ASCE) 7-93.

Specific roof systems tested to comply with FM's I-60 and I-90 requirements are listed in FMRC's *Approval Guide.*

A collection of FMRC's loss prevention data sheets applicable to roof design and application is compiled in FMRC's *Loss Prevention Data for Roofing Contractors.* This publication, and FMRC's *Approval Guide* and *Approval Guide—Roofing Products Reprint* can be purchased by contacting FMRC, Order Processing Department, 1151 Boston-Providence Turnpike, P.O. Box 9102, Norwood, Mass. 02062; telephone (617) 255-4681.

Q: *I realize that NRCA has a minimum height recommendation of 8 inches (200 mm) above the surface of a roof for composition base flashing, but is there also a maximum height recommendation?*

A: In the *Handbook of Accepted Roofing Knowledge (HARK)* section of *The NRCA Roofing and Waterproofing Manual,* a maximum height recommendation for composition base flashing is indicated as "...not higher than (a nominal) 14 inches [350 mm] above the finished roof surface. Walls requiring flashings higher than 14 inches [350 mm] should receive special moisture-proofing."

This recommendation is based on the concern that the added weight of taller composition flashing details may cause slippage of the flashing material from the flashing substrate.

In some instances, composition base flashing heights above 14 inches (350 mm) have proven to be successful; however, detailing and attachment are crucial.

The special moisture-proofing referred to in the *HARK* recommendation may include composition base flashing installed in a strapped (vertical) manner, a suitable liquid-applied coating, or metal or another type of wall cladding material.

Selection of the specific moisture-proofing depends greatly on the type, condition and configuration of the vertical flashing substrate. Generally, the use of water vapor impermeable sealing methods, such as composition base flashing and some liquid-applied coatings, are not recommended for special moisture-proofing applications over masonry substrates.

For lighter-weight, flexible, single-ply membrane flashing systems, the maximum height recommendation does not necessarily apply. Roofing contractors and designers should consult the roof system material manufacturer for recommendations specific to its material, the applicable fire ratings and any guarantee requirements.

Q: *In the "Q & A" article in the May issue of* Professional Roofing, *reference is made to the Roofing Insulation Committee of the Thermal Insulation Manufacturers Association (RIC/TIMA) 281-1 conditioning procedure for use in determining the R-value of polyisocyanurate insulation. Where can I obtain a copy of this technical bulletin?*

A: RIC/TIMA disbanded in 1988; therefore, its Technical Bulletin 281-1 is no longer in publication.

However, that same year, the Polyisocyanurate Insulation Manufacturers Association (PIMA) was formed, and its membership includes many of the same roof insulation manufacturers who were members of RIC/TIMA. PIMA Technical Bulletin Number 101 addresses the issue of a conditioning procedure for polyisocyanurate insulation and endorses the continued use of the same conditioning procedure contained within RIC/TIMA 281-1.

Technical Bulletin Number 101 is available from PIMA, 1001 Pennsylvania Ave. N.W., 5th Floor North, Washington, D.C. 20004; telephone (202) 624-2709. PR

Each month in this column, Terrance R. Simmons, RRC, or Mark S. Graham, both NRCA deputy directors of technology and research, will answer readers' technical questions. If you have a specific question that you would like answered in this column, send it to Professional Roofing, *10255 W. Higgins Road, Suite 600, Rosemont, Ill. 60018-5607.*