

A new consideration

FM 1-28 has been updated, further complicating wind designs

by Mark S. Graham

FM Global recently updated its Property Loss Prevention Data Sheet 1-28, “Wind Design” (FM 1-28). The data sheet provides general guidance to building designers regarding wind considerations for highly protected buildings insured by FM Global.

FM 1-28’s revisions

The new edition of FM 1-28 is dated October 2015 and was first publicly distributed in late November 2015. The document’s previous edition was published in April 2011.

FM 1-28 typically results in higher design wind pressures and recommended resistance ratings

FM 1-28 has been completely revised and reformatted and expanded. The current edition consists of 103 pages; the previous edition had 72 pages.

FM 1-28’s wind design guidance continues to be based on ASCE 7-05, “Minimum Design Loads for Buildings and Other Structures,” though FM 1-28 contains some enhancements that typically result in higher design wind pressures and recommended resistance ratings. Conversely, the 2012 and 2015 editions of the International Building Code® (IBC) reference ASCE 7’s 2010 edition, which can result in notably different design wind loads from those derived using FM 1-28.

FM 1-28 recommends roof field, perimeter and corner design wind pressures be determined

using the ratings calculator in FM Approvals’ RoofNav® online application (www.RoofNav.com). FM 1-28’s previous editions included specific calculation procedures and tables for determining design wind pressures.

Not included in FM 1-28’s new edition is Table 8 from FM 1-28’s previous edition, which provided FM Global’s recommended resistance ratings based on design wind pressures. When determining recommended resistance ratings, FM 1-28 now directs users to multiply basic uplift pressures by the applicable pressure coefficients, apply a 2.0 safety factor and round up the resulting values to the next highest 15-pound-per-square-foot increment. This procedure likely will cause some user confusion. The RoofNav ratings calculator already includes the recommended safety factor and rounding.

FM 1-28’s recommendations for roof overhangs have been reworked, and some roof overhang factors (Table 7) have been increased, which will result in higher design wind pressures at roof overhangs with roof slopes of 1.5:12 and greater.

FM 1-28’s Section 3.7-Designing for Windborne Debris includes a specific calculation procedure for determining separation distances between buildings in locations prone to tropical storms where aggregate roof surfacings are used.

FM 1-28’s Section 3.8-Roof-mounted Equipment adds guidance to determine resistance to uplift, sliding and overturning in high winds for rooftop equipment. The guidelines for roof-mounted equipment generally are consistent with ASCE 7-10.

FM 1-28’s Appendix D-Optional Guidance for Tornado-resistant Design and Construction provides optional guidance for important

facilities that may warrant additional property protection in locations subject to tornadoes.

FM 1-28 and ASCE 7-10

FM 1-28 includes a discussion and example comparisons of the differences in design wind pressures using FM 1-28 and ASCE 7-10 (as well as IBC 2012 and IBC 2015).

FM 1-28 uses basic wind speeds based on a 50-year mean recurrence interval (MRI) and approaching a 100-year MRI along coastal areas, as well as an importance factor of 1.15 and recommended safety factor of 2.0. Conversely, ASCE 7-10’s strength design method for components and claddings uses ultimate wind speeds based on 300-, 700- and 1,700-year MRIs.

ASCE 7-10 also provides a method for converting strength design method results to allowable stress design (ASD) method values, which are more comparable to FM 1-28’s results.

FM 1-28 typically results in higher—sometimes notably higher—design wind pressures and recommended resistance ratings than those derived using ASCE 7-10’s strength design or ASD methods.

Closing thoughts

The revision of FM 1-28 has resulted in changes to FM Global’s recommendations to designers of highly protected buildings insured by FM Global.

Designers using FM 1-28 need to realize it typically results in higher design wind pressures and recommended resistance ratings than when using ASCE 7-10, IBC 2012 and IBC 2015. 🌩️🌪️

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ON the WEB

For a link to download FM 1-28 and example calculations comparing the differences between FM 1-28 and ASCE 7-10, log on to www.professionalroofing.net.