For many years the United States had numerous model building codes, all of which had differing criteria for the calculation of wind loads for low slope roofing. The lack of continuity created confusion driving specifiers to rely on the insurance industry, and in particular, Factory Mutual Research Corp. (‘FMRC’), the primary entity in the United States testing and approving roof assemblies with ratings related to wind uplift, fire and hail resistivity. FMRC became the default specification for wind uplift criteria whether the building was insured by FMRC or not. The objective of this document is to provide perspective around specifying wind uplift requirements.

In 1994 the South Florida Building Code published a new revision of the building code following Hurricane Andrew that required roof assemblies to meet the uplift resistance requirements as calculated using ASCE-7, the new wind load standard published by The American Society of Civil Engineers and the successor of ANSI A58.1. The South Florida Building Code began approving laboratories to run uplift resistance testing using the FMRC test criteria, Test Standards 4450 and 4470 as the test protocol. All projects submitted for permit had to include wind load calculations and evidence of successful testing at approved laboratory. Over time, these tests were incorporated into a ‘Notice of Acceptance’ that listed the testing at approved laboratories and the published testing from both FMRC and Underwriter’s Laboratories.

For the rest of the country, the practice of specifying a FMRC rating, such as FM Class 1-60 or FM Class 1-90, was commonplace, providing a specifier with some level of assurance that the system had been tested for wind uplift resistance. In essence, FMRC became the de facto national standard for wind uplift requirements.

During the development of the International Building Code (‘IBC’), this issue was addressed and clarified by adopting ASCE-7 as the wind load standard for roofing. Laboratories certified by the International Code Council (‘ICC’), the successor to BOCA, UBC and SBC, began testing roofing assemblies for uplift resistance for publication in ICC Evaluation Reports and for evaluation by local building officials. Of course, testing at FMRC (now FM Global) and at Underwriter’s Laboratories could also be submitted for evaluation. With the fifty states adopting the majority of the IBC there was finally a standard for wind uplift testing and evaluation throughout the United States. While the South Florida Code differs, the calculation of wind loads is the same as the rest of the country. ASCE-7 is updated regularly, and at times may not be synchronized with the building code. For example, some jurisdictions may be enforcing the 2009 revision of the IBC when there is a 2010 version of ASCE-7. The code in force at the time of permitting will clearly state the version of ASCE-7 that is currently in force for that particular jurisdiction.

For non-FM Global insured projects compliance with the building code simply requires a roof design for wind loading to be in compliance with the version of ASCE-7 in force at the time of permitting, and test data to confirm the submitted system is in compliance. Note that this will not only require compliance in the field but enhanced criteria for perimeters and corners. The test data to support compliance may be in a current Evaluation Report, or may be a recent test by a certified laboratory that demonstrates performance. There are some jurisdictions that do not require building permits for re-roofing; however, the installer is still obligated to install a roof assembly that meets code, including the wind uplift resistance requirements for the specific building. The design professional responsible for the
project typically completes wind load calculations. The requirements in each jurisdiction may vary; therefore it is best to consult your local building official for specific requirements. For the current code requirements, please review Section 1504.3 of the 2012 IBC.

If FM Global insures the structure, or the specifier has used FM Global as the sole criteria for calculating wind loads, there is an additional step needed to comply with project documents. As a baseline, all projects must meet the ICC requirements noted above; in addition, the project must meet the design criteria for the structure outlined in the FM Global Loss Prevention Data Sheet 1-28. This document provides the necessary data, when read in conjunction with the FM Global Loss Prevention Data Sheet 1-29, to calculate wind uplift resistance for any project insured by, or specified under FM Global criteria. In many cases, the specifier will include in the specification the field, perimeter and corner pressures eliminating the need to complete the calculations. If the project is FM Global insured, the calculations and proposed roof system are submitted to the FM Global Design Review Desk for evaluation. The reviewer will provide any revisions or modifications in writing. It is helpful to include with the project submission the account and index numbers to insure proper building identification.

If the structure is not insured by FM Global, but has been used as the basis of design, it is the designer of record who will review the submission and compare it to systems approved or accepted by FM Global. Approved systems can be found in FM Global RoofNav, an on-line database of approved systems that can be accessed by the public after a registration process. RoofNav lists all systems currently approved by FM Global and published in their current FM Global Directory. It is important to note that FM Global lists approvals using ratings of 1-60; 1-75; 1-90 etc. The ‘1’ is a designation for a Class 1 assembly as designated in Test Standards 4450 and 4470. This ‘Class’ addresses both the roof assembly and the roof deck. The numeric designation (60, 75, 90, etc.) is the calculated wind uplift pressures with a 2:1 margin of safety applied; therefore, a system listed as a ‘60’ system can be utilized for projects where the roof field pressures are calculated to be 30 psf or less. The margin of safety is the criteria established in the test protocol, which acknowledges the differences between the laboratory and field environments.

FM Global can also assist, responding to both email and telephone inquiries. It is important to bear in mind that these services are typically provided for any project insured by FM Global.

Notwithstanding a specification requirement to comply with FM Global, the building code requirements within the jurisdiction must be met. CertainTeed has hundreds of roof assemblies tested and listed by certified testing laboratories, FM Global and Underwriter’s Laboratories. CertainTeed Technical Services can assist in identifying roof assemblies that meet specific project requirements whether built-up, modified bitumen, self adhered, or a hybrid system.

CertainTeed Commercial Roofing has designed and tested systems for over fifty years amassing approvals and listings for hundreds of systems utilizing both CertainTeed and CertainTeed accepted accessories. Our Technical Service representatives can assist in identifying the right systems for every project need.