

FM Global Wind Design Pressures, Ratings and Approvals for IMPs in Wall Applications

The purpose of this expert analysis is to provide information regarding Factory Mutual Design Wind Loads and Wind Ratings as it relates to insulated metal panels for use with wall applications only, and how to apply them to project designs. FM Approval Classes 4880, 4881, and 4882 are being specified on a growing number of projects.

FM Global Approach to Insuring Properties

FM Global is a commercial insurance company that specializes in loss prevention services for large corporations.

FM Global takes the position of resilience when insuring properties. FM Global works closely with the customer, in an attempt to make the property resilient, or work to prevent losses and reduce risks. When working with metal wall or roof panels, this is done through the use of an FM Global Field Engineer, a Plan Review, and the FM Approvals Approval Guide. FM Approvals is a separate entity from FM Global that conducts testing, and lists the approvals for the tested assemblies. FM Global is the insurer, while FM Approvals is the testing laboratory.

FM Global Approval Classes for IMPs

There are three different FM Approval classes when discussing IMPs; FM 4880, 4881, and 4882. FM 4880 is an Interior Use only fire test, FM 4881 is an Interior and Exterior use Structural test, and FM 4882 is a Smoke Sensitive Occupancy Fire test. FM 4882 can be for either exterior or interior use depending on the following criteria. If a product has FM 4882 Approval, but does not have FM 4881 Approval, it is approved for interior use only as it has not had a structural test performed on the product assembly. If the product has FM 4882 and FM 4881 Approvals, then it is approved for exterior use as well as interior use since it has had the structural testing performed.

A product that has an FM 4880 approval only, will have panel criteria such as gauge, module, and thickness listed in the approval, but no information on required supports or a Wind Rating, as it is for interior use only. A product with an FM 4881 approval will have the same panel information listed, but will also have information on the required support spacing, support thickness, and the Wind Rating. If a product has FM 4881 and 4882 testing performed, the wind ratings will be listed under the FM 4882 Approval. In this case, all information normally listed under the FM 4881 Approval is listed under the FM 4882 Approval.



Walls and Ceilings (FM Approval Class Numbers 4411, 4650, 4651, 4840, 4880, 4881, 4882)

Under this section an FM Approved product/assembly will only be located/reference for its' Primary Class of Work as detailed below:

Primary Class of Work	Subsections/ Approval Guide Location(s)	Approval Includes
4880	Interior Use Only (Class 4880)	4880
4881	Interior and Exterior Use (Class Number 4881)	4880 and 4881
4882	Smoke Sensitive Occupancies Interior Use Only (Class 4882)	4880 and 4882
	Smoke Sensitive Occupancies Interior and Exterior Use (Class 4882)	4880, 4881, and 4882
4651	Suspended Plastic Ceilings	4651

FM Global in the Cladding Design Process

FM Global Field Engineers are tasked with overseeing projects in the field, and ensuring that installations are performed in accordance with FM Global approved designs. Plan Reviews are completed by the Field Engineer to determine the FM Global Design Wind Pressure, required FM Global Wind Rating, and that the cladding installation is acceptable for these loads and ratings. The Field Engineer has ultimate responsibility for approving the installation of the cladding system.

Determining FM Global Design Wind Loads

FM Global Design Wind Loads are determined by using FM Global Property Loss Prevention Data Sheets 1-28. Wind loads determined per Data Sheet 1-28 are generally approximately 10% greater than those determined by using ASCE 7. However, these loads can diverge higher from ASCE 7 if the building is over 60 feet tall or partially enclosed. It should also be noted that Data Sheet 1-28 has different requirements for a building to be considered partially enclosed than ASCE 7. A building may be considered partially enclosed by Data Sheet 1-28, but be considered enclosed by ASCE 7.

Determining FM Global Wind Rating

There are some common misconceptions and mistakes made when determining FM Global Wind Design Pressures and FM Global Wind Ratings. First, we will define some terms to avoid this confusion. The term FM Design Wind Pressure refers to the wind pressure loading determined in accordance with FM Global Property Loss Prevention Data Sheets 1-28. This pressure is then multiplied by a safety factor of 2.0 to determine the FM Global Wind Rating. This FM Global Wind Rating is then taken into the FM Approvals Listings, and used to select an assembly with an Approval for a Wind Rating that bounds the required FM Global Wind Rating previously calculated. For example, an FM Global Design Wind Pressure of 35 psf, determined in accordance with Data Sheet 1-28, would convert to an FM Global Wind Rating of 70 psf.

FM Wind Ratings are not compared to CENTRIA span tables, but instead are compared to the FM Approvals listings. If looking for FM acceptance, which will be discussed later, the FM Design Wind Pressure could be compared to a CENTRIA span table.

What to do with the required FM Global Wind Rating

Once the FM Global Wind Rating has been determined, a product with an FM Approval that meets the required Wind Rating must be selected. FM Approval listings are on the FM Approvals website under the Approval Guide. Once a product has been selected from the Approval Guide, it must be exactly installed in accordance with the approved assembly tested by FM Global. The Approval guide will list the product specifications and the installation requirements. For IMP's, the product specifications will include panel thickness, core material, panel width, as well as minimum interior and exterior gauges. The installation requirements will list, panel thickness, fastening method, maximum support spacing, and minimum support thickness. The installation must meet all the requirements listed in the Approval in order to be considered FM approved.

FM Global Acceptance versus FM Global Approval

As previously discussed, if an installation meets all requirements of the FM Approval Guide, it is considered FM approved. If the installation does not meet all of the requirements of the FM Approval, an FM acceptance may be sought. The path to FM acceptance consists of submitting documentation to the FM Field Engineer to show that the installation meets or exceeds the requirements for the specific installation. This is generally done by submitting calculations for the IMP's and any FM Approvals that are similar to the installation, which allows the FM Global Field Engineer to make a judgement as to the acceptability of the installation. FM acceptance is not guaranteed, but is an option used at the discretion of the FM Global Field Engineer.

Material Packaging for FM Global Installations

All material supplied for an FM Global approved installation must have specific labeling, usually in the form of a sticker, stating that it complies with the FM Approval requirements for the manufacturing process approved for the specific material manufacturer. Manufacturers are routinely audited to verify that the manufacturing process is kept in compliance with FM Global standards. If the materials supplied do not have the correct FM Approval labeling, the product may be rejected. In addition to all products being labeled, the FM Approval Document must be provided on every project.