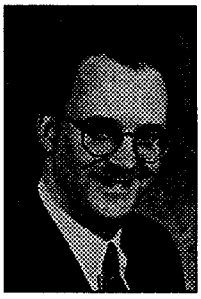
Wind resistance of contractor-fabricated metal panel systems

by **Mark S. Graham**

Contractor-fabricated, architectural metal panel roof systems have been used successfully in the United States for years. Recently, however, there has been increased scrutiny of some of these roof systems' wind-resistance capabilities, particularly in regions susceptible to high winds.



This column will explain the processes necessary for these metal roof systems to comply with building codes' wind-resistance requirements.

Product manufacturer?

For most roofing products used in the United States, roofing professionals rely on product manufacturers to perform any testing and provide the necessary documentation for products' compliance with building codes.

However, because there are not product manufacturers for contractor-fabricated, architectural metal panel roof systems, the responsibility for providing the product's code compliance information lies largely with the contractor who fabricates and installs the metal panels.

Code requirements

Building codes typically require that roof assemblies comply with minimum fire classifications and wind-resistance requirements, and certain building codes have additional requirements.

The model building codes generally exempt metal panel roof assemblies from fire testing. Fire classifications for these systems typically are prescribed based on the panel material type.

For wind resistance, the model building codes generally require metal panel roof assemblies be designed to resist design wind-load pressures without any damage to roof assemblies. The codes prescribe methods for determining design wind-load pressures; these mainly are based on a building's location, height and occupancy type.

Because there is not an industry-accepted method for determining specific metal panel assemblies' wind resistances to design wind loads, some codes require and many building officials interpret the need for testing to verify metal panel roof systems' wind-resistance capabilities. Although there are several industry-recognized test methods available for this purpose, for contractor-fabricated, architectural metal panel roof systems, Underwriters Laboratories Inc.'s (UL's) Standard UL 580, "Tests for Uplift Resistance of Roof Assemblies," is the most common.

UL 580

The UL 580 test method subjects a 10- by 10-foot (3- by 3-m) roof assembly sample to various static and oscillating pressures; these are intended to represent the uplift forces imposed on a roof assembly exposed to high winds. For architectural metal panel roof assemblies, the test evaluates the metal panels' wind-resistance integrity, their attachment to the substrate, and the substrate's attachment to the roof deck and framing.

Roof assemblies passing this test are assigned classifications of Class 15, 30, 60 or 90, which represent nominal static uplift pressures of 15, 30, 60 or 90 pounds per square foot (0.72, 1.4, 2.9 or 4.3 kPa), respectively, depending on the specific uplift capacity tested.

Roof assemblies that pass the test are eligible to be listed in the "Metal Roof Deck Panels" section of UL's annual *Roofing Materials and Systems Directory*. Listings typically reference a construction number in the directory's "Roof Deck Constructions" section, which provides specific descriptions of the roof assemblies.

Roll formers

Many manufacturers of roll-former equipment used by roofing contractors for architectural metal panel roof system fabrication are listed in the current UL directory's "Metal Roof Deck Panels" section. Specific roll-former machines purchased from these manufacturers bear UL certificates, which means the machines can produce panels that comply with UL requirements. A certificate is issued for a six-month period from the date in which a roll former was purchased. After the six-month period, the machine will require recertification by UL.

UL recertification

For a roll-former owner to obtain equipment recertification, he must apply in writing to UL, pay the minimal fees associated with recertification and enter into an agreement for UL follow-up service. With follow-up service, a UL representative visits the owner every six months to verify the roll former still is capable of fabricating panels in accordance with the listing. The follow-up service facilitates an ongoing certification.

Closing thoughts

Review of the current UL directory's "Metal Roof Deck Panels" section reveals several roofing contractors have obtained UL certifications; these contractors are capable of fabricating and installing their own UL-classified, architectural metal panel roof systems. Other contractors who frequently install contractor-fabricated, architectural metal panel roof systems are encouraged to consider certification of their roll-former equipment. PR

Editor's note: *Those interested in more information about UL's certification and follow-up service should contact Jim Hatcher, UL staff engineer, at (847) 272-8800, ext. 42688. UL's* Roofing Materials and Systems Directory *may be purchased from UL by calling (847) 272-8800, ext. 42899.*

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