ROLLING DOOR DIVISION
DASMA TECHNICAL DATA SHEET
Door & Access Systems Manufacturers Association International

1300 Sumner Avenue
Cleveland, Ohio 44115-2851
Phone: 216-241-7333 • Fax: 216-241-0105
E-mail: dasma@dasma.com

Rolling Door Wind Load Determination - Effective Wind Area

Introduction

Determination of wind load on a rolling door involves a number of factors. One of these factors is the effective wind area on the door. This Technical Data Sheet will give recommended effective wind areas in terms of door width ("span length" in ASCE 7) and door height ("width" in ASCE 7.) The content of this Technical Data Sheet is also applicable to rolling sheet doors (see Photo #2), which feature curtains consisting of formed metal sheets seamed together.

ASCE 7 Definition

The definition of effective wind area is "the area used to determine GCp", where GCp is a coefficient used in the calculation of wind pressure. In that definition, the calculation for effective wind area is described as "the span length multiplied by an effective width that need not be less than one third the span length". As applied to rolling doors, whether connected of interlocking slats or a continuous sheet, this language implies that the effective wind area can vary.

Factors Affecting Rolling Door Effective Wind Area

Three prominent factors influence the determination of rolling door effective wind area:

1. Door Size - This is a general statement that is further qualified by certain width and height limitations.
2. Width-to-Height - This is a consideration when a door exceeds certain width and/or height limitations.
3. Door Construction - The main influence is a concept known as "two-way load sharing". For rolling doors, this means that wind loads are distributed both horizontally and vertically. Rolling doors act more like a diaphragm (See Photo #1) supported on three sides, rather than a series of independent slats simply supported at each end. The door is actually a curtain made up of a series of slats. The slats are interconnected such that they move relative to each other but the relative movement is limited. The result is that the slats act together, not separately. They share the load.

The whole curtain assembly transmits loading horizontally to each jamb and vertically to the barrel at the top of the door where the curtain is securely attached.

This load transmission occurs whether or not "windlocks" (built into the end of slats to enhance wind load capability) are in the door design. "Two-way load sharing" has been proven via full-scale testing to a nationally recognized standard such as ANSI/DASMA 108. This testing has shown that a properly engineered rolling door acts as a membrane.

Since all rolling doors are designed for two-way load sharing, the following guidelines apply for door areas up to 200 square feet (Note: 20' width and 10' height limitations are based on maximum test laboratory capabilities currently within the industry).

- Rolling doors up to 20' width by 10' height. The effective wind area is the area of the door.
- Rolling doors greater than a 20' width by up to a 10' height. The effective wind area is the height of the door multiplied by 20'.
- Rolling doors up to a 20' width by greater than a 10' height. The effective wind area is the width of the door multiplied by 10'.

For door areas greater than 200 square feet:

- The effective wind area should be the greater of 200 square feet or the door width multiplied by a height equal to one-third the door width (not to exceed the area of the door), which is the maximum effective wind area permitted per the ASCE 7 definition.

Conclusion

Since 2001, the Florida Building Code has included a table showing effective wind areas for certain common rolling door sizes as the area of the door itself. Investigations of door performance in the wake of hurricanes since that time have shown superior performance for rolling doors installed 2002 and later, where all doors were also required to be traced to testing in order to obtain required product approval throughout the state. This evidence supports determining effective wind area as one aspect of successful wind resistance.

Photo #1

Photo #2