COMMERCIAL & RESIDENTIAL GARAGE DOOR DIVISION
DASMA TECHNICAL DATA SHEET
#178

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

Garage Door Wind Load Determination - Effective Wind Area

Introduction

This Technical Data Sheet is intended for architects, structural engineers, and other responsible for determining the design wind pressure requirements for garage doors, and will give recommended effective wind areas in terms of door width ("span length" in ASCE 7) and door height ("width" in ASCE 7.) [Note: Refer to either ASCE 7-10 or ASCE 7-16 for specific language.]

Determination of the required design wind pressure on a garage door involves a number of factors. One of these factors is the effective wind area of the door. In general, smaller effective wind areas result in higher design wind pressures, because small localized wind gusts can be significantly faster than average wind speed.

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 garage doors, this language implies that the way to determine the effective wind area can vary.

Factors Affecting Garage Door Effective Wind Area

Three prominent factors influence the determination of garage door effective wind area.

Door Size
This is a general statement that is further qualified by certain width and height limitations.

Width-to-Height
This is a consideration when a door exceeds certain width and/or height limitations.

Door Construction
The main influence is a concept known as "two-way load sharing". For sectional garage doors, this means that wind loads are distributed both horizontally and vertically such that the door acts like a one-piece door. This would be regardless of the number of sides of door support, which actually is similar to entrance doors in that it is three sides in one wind direction, and two sides in the opposite wind direction.

For vertical load sharing, this involves a method of interconnecting door sections such that loads can be vertically distributed throughout the entire door height. "Two-way load sharing" must be proven via full-scale testing to a nationally recognized standard such as ANSI/DASMA 108. Testing confirms that reinforcement at certain specific vertical locations (See Photo #1) provides a balanced performance against wind load.

For garage doors 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).*

- Garage doors up to 20' width by 10' height. The effective wind area is the area of the door.
- Garage 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'.
- Garage 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 greatest 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 garage 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 garage 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 suggests that using door area as effective wind area is one aspect of successful wind resistance.

Photo #1