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Wind Exposure Categories

Exposure Categories can have a significant effect on the design wind pressures for fenestration products such as vehicular access doors. For such doors, the design wind pressure values can vary by 30% or more, resulting in doors with a great difference in materials needed. This article will overview some easy-to-recognize conditions that would help distinguish between Exposure B and Exposure C, two common alternatives to choose from at a building site.

What are Exposures B and C?

It is important to know how ASCE 7, Minimum Design Loads for Buildings and Other Structures, describes each category. ASCE 7 is the standard by which wind pressures are determined, and is referenced in model codes adopted as base codes by most every U.S. state.

Exposure Categories are based on "surface roughness", defined as follows for buildings less than 30 feet high.

Exposure B: Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger, prevailing for a distance greater than 1,500 feet in any direction from the installation.

Exposure C: Open terrain with scattered obstructions having heights generally less than 30 feet. (Commonly associated with flat open country and grasslands).

A Word about Exposure D

Exposure D involves a structure a close distance (typically within 600 feet) from an "open waterway" one mile or more across. This category is readily distinguishable, where the locally enforced code very likely has considered this in their requirements.

Note: Technical Data Sheets are information tools only and should not be used as substitutes for instructions from individual manufacturers. Always consult with individual manufacturers for specific recommendations for their products and check the applicable local regulations.

This Technical Data Sheet was prepared by the members of DASMA's Commercial & Residential Garage Door Division Technical Committee. DASMA is a trade association comprising manufacturers of rolling doors, fire doors, grilles, counter shutters, sheet doors, and related products; upward-acting residential and commercial garage doors; operating devices for garage doors and gates, sensing devices, and electronic remote controls for garage doors and gate operators; as well as companies that manufacture or supply either raw materials or significant components used in the manufacture and installation of the Active Members' products.

How Prevalent are the Different Exposures

The International Building Code may lead to a tendency to simply assume Exposure C in many cases where Exposure B more practically applies. Commentary information in ASCE 7 indicates that as many as 60% to 80% of buildings have an Exposure Category corresponding to Exposure B. Thus, a set of simple guidelines would greatly aid in determining the most suitable Category using either model building code.

Note: Where the International Residential Code is used as the model code basis and where the first paragraph of Section R301.2.1.4 (Exposure category) is unchanged, the exposure category for multiple detached one- and two-family structures shall be based upon the site conditions that will exist at the time when all adjacent structures on the site have been constructed, provided that their construction starts within one year of the structure being evaluated.

Guidance in Determining Exposure B

The most convenient way to observationally determine Exposure B is to rule out Exposure C. This can be accomplished by answering the following questions:

1. If the building is in a residential area, is it completely surrounded by housing or wooded areas as far as I can see?
2. If the building is not in a residential area, is it surrounded by other similar buildings or wooded areas as far as I can see?
3. (One- and two-family structures built under the non-modified IRC model code) If the building is under construction in a developing area, will the building be surrounded by housing or other buildings, or by wooded areas when the development is complete?

If the answer is “Yes” to any one of the three questions above, then the home or building is probably Exposure B. If the answer is “No” to all of the questions above, then the home or building is Exposure C.

Conclusion

These guidelines can be used where a local building code does not have specific areas delineated as Exposure Categories or where a job specification does not note an Exposure Category. The guidelines can be used toward quoting a job or using due diligence to provide a customer with a door reflective of the wind conditions affecting the building. Although the Exposure Category may need to be reassessed due to future demolition and/or development surrounding the building in question, this may be better handled by a design professional if job specifications are involved.

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Examples of Wind Exposure Categories:



Exposure B Example
(Source: ASCE 7-10)



Exposure C Example
(Source: ASCE 7-10)

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