Atkinson's MIRROR & GLASS

Wind Load and Hurricane Impact

Many factors can play into what type of windows are appropriate for your home or office, one of these factors is wind load. Wind load, is the total force placed on an object as a function of the wind speed and direction the wind blows. When it comes to windows it is important to make sure they can withstand the environmental conditions they are in.

Another very important related topic is the use of safety glass is that of wind load. In the inland regions of the United States basic wind speed is around 90 mph. Everyday windows are subject to the elements. Wind is one of these powerful elements and something that needs to be given consideration.

How is windload calculated

When considering what wind load a certain window must have, design professionals will consider the thermal stress, is the entire glass edge supported or only partially, contraction and expansion due to temperature barometric pressure and altitude? Once this information has been obtained it is then entered into a computer program for analysis. Calculating the wind load of a window is a complex task. The wind load strength of glass is calculated using the minimum acceptable thickness and the assumption that the window is in perfect conditions otherwise. The maximum load, the statistical limit that represents the fraction of glass lites that would break at a certain occurrence of wind pressure, for most vertical glazing is 8 lites per 1000 or 0.8%. Depending on the design the windload requirement varies. Several factors contribute to determining the wind pressure requirement of a window. Complicating the process more is the rising popularity of insulated glass units. With the popularity of insulated glass units the ability to calculate the wind load for an IG unit has become increasingly important. Insulated glass units are even more complex to calculate a wind load for due to their structure. Many times manufactures or builders will use a computer program to calculate this.

Location:

Location can be a large determinant in terms of window pressure requirement since with varying location comes varying weather conditions. Windows that are subject to mountain settings and coastal settings are particularly vulnerable to high wind conditions.

Building Height:

The taller a building is the more intense the wind pressure becomes. Most residential homes need not worry about building height since structures of 3 stories or less do not experience this effect. It is pertinent for larger industrial structures and is something that deserves a great deal of consideration to ensure the safety of the occupants and structural integrity of the building.

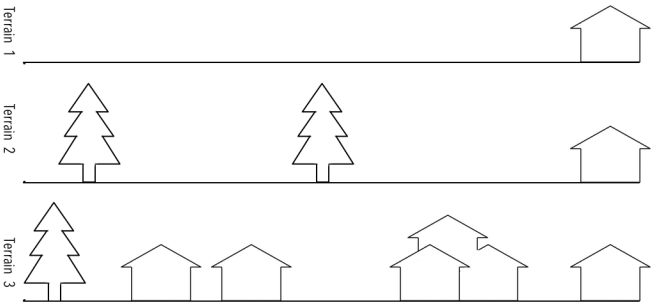
Location on the Building:

Depending on the location of the window in the building it will experience a certain wind pressure. A window located in the middle of the building upstream from the wind will be subjected to less wind exposure then a corner window downstream from the wind. Understanding the patterns of the wind around your building and how those interact with windows in various location is crucial to have windows that can handle the job.

Surrounding Terrain:

Consider two scenarios. The first is a structure located in the middle of an open field.Then consider this same building located in the middle of New York. In which location does the structure experience greater wind pressure?

The answer would be the middle of an open field. In fact wind exposure can be 2040% greater under these conditions compared to an urban setting. It is important to think about what form of protection, such as other buildings, from the wind the structure will have. The shielding of the building is also important to think about when calculating wind load. Is the building located in a valley? Where it is most likely shielded from a large amount of wind. Is it located on top of a hill where it is highly exposed to the elements?



Terrains like terrain one are defined by mostly open area meaning no trees, surrounding buildings or hills for about 6 miles. Terrains such as terrain two are defined by mostly open terrain with a few trees or surrounding homes or buildings. Terrains like terrain three would be a typical suburban neighborhood. This would include a multitude of surrounding trees and buildings.

Region is also another thing to consider. In the United States coastal areas and midwestern areas that experience hurricanes or tornados will need windows that can survive high wind loads or that are hurricane or tornado impact resistance

What about EXTREME wind load such as hurricances and tornados?

When hurricanes or tornados occur wind load is extreme! One of the most crucial safety features to make your home safe for hurricanes or tornados are the windows. The ability to withstand the large wind load is extremely important. When a hurricane or tornado occurs the wind presses against the glass. If the glass gives way and breaks out it creates an imbalance from the pressure inside the home and outside the home. This imbalance can cause the walls of the home to be compromised causing extreme damage to the home, if not harm to the occupants. When it comes to hurricane and storm areas make sure you ask about hurricane or impact resistance glass. Laminate glass is one of the best choices in regions that experience this type of weather. The PVC between the two panes of windows can typically resist winds of up to 200 mph. The great thing about impact resistant windows is not only do they protect your home or office, but they can also be energy highly efficient.

It is always important to talk to your local glass provider in order to see what types of safety precautions are necessary. By understanding the environmental stresses that will on your windows you ensure the safety and integrity of your home or office. So make sure and take the time to talk through your options before purchasing new or replacement windows.