

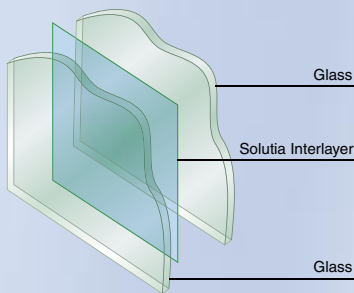
Hurricane Resistant Laminated Glass

protecting people & property

SOLUTIA INC.

Solutia Inc. is the world leader in manufacturing polyvinyl butyral interlayers for laminated glass. Solutia provides these high performance interlayers to laminators who fabricate laminated glass for the glazing industry.

Solutia has two brands of interlayers for use in automotive, architectural and specialty applications -- Saflex® protective interlayer and Vanceva™ Advanced Solutions For Glass™. Product selection is based upon performance needs.



Laminated glass is formed by permanently bonding an interlayer between two pieces of glass



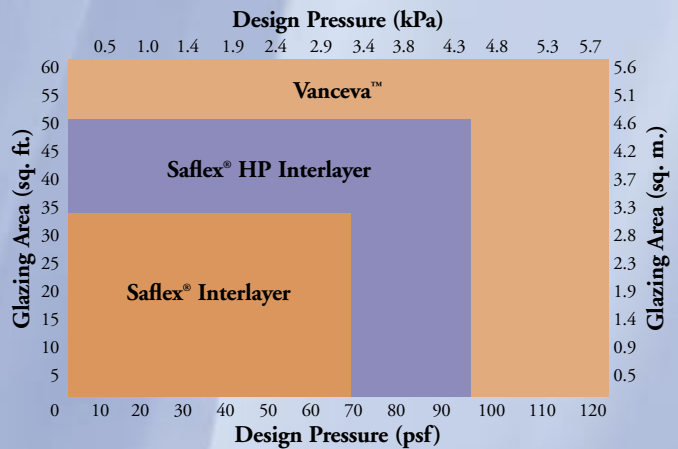
Butterfly House • St. Louis, Missouri

CHOOSING THE RIGHT WINDOWS FOR YOUR PROJECT

The key elements in hurricane resistant windows are the framing system, laminated glass and sealant. They all must work together to resist both the structural, impact and cycling loads. Different interlayers and thicknesses have a direct effect on the performance during impact and cycling loads. Solutia recommends different interlayers based on window type, glass size, geometry and performance pressure (see Figure 2). A typical large missile system (or window system below 30 feet) utilizes laminated glass that has a polyvinyl butyral (PVB) interlayer that is 0.090 inches thick. Specialty interlayers are available with composite technology that can be thinner (Vanceva Storm is 0.075 inches thick). A typical small missile system (or window system above 30 feet) utilizes laminated glass with PVB interlayer that is 0.060 inches in thickness.

The chart below indicates some of the typical ranges for acceptable performance for the large missile impact testing and are only a guideline for fenestration systems.

Figure 2
Typical Glass Performance for Standard Four Side Glazing Using Recommended Conditions.



Solutia has glass component notice of acceptance (NOA) on all the above interlayers. Please note that a laminated glass NOA is different than a fenestration system NOA in that it simply indicates that the component used (interlayer) in the construction of the laminated glass has been subjected to the prescribed tests and deemed to pass the requirements set forth by Dade County. It does not indicate that this glass is acceptable for use in an untested system. Look for the system NOA or test report to verify system compliance to prescribed test requirements

SOLUTIA IMPACT RESISTANT WINDOWS: WHAT DO THEY OFFER?

High performance windows made with impact resistant glass offer architects and builders a multitude of design benefits which include:

- Invisible protection for building occupants and neighbors from storm related flying debris
- Quieter interiors due to inherent acoustical damping properties
- UV screening to protect interior furnishings from rapid fading
- Flexibility to maintain natural lighting during a storm
- Aesthetic design benefits over other forms of window protection
- Widespread pricing options and availability



Rock and Roll Hall of Fame • Cleveland, Ohio

THE TEST METHODS AND SPECIFICATIONS

There are two basic test methodologies utilized in hurricane testing; HVWZ TAS 201 and TAS 203 (Florida Building Code) and ASTM E 1886. These documents describe the technique used to propel the timber through the air and impact the fenestration system, and also provide the specifics for subjecting the glazing to the required repetitive cyclical loads.

The ASTM test method has a corresponding specification, ASTM E 1996, that indicates what missile size shall be used depending upon application and wind speed (see figures 3 and 4), location of impact, pass/fail criteria and substitution limitations. For example, below 30 feet from grade is typically the zone for impact by a timber (large missile), whereas above 30 feet from grade is the zone for impact by 2 gram steel ball bearings (small missile).

Figure 3
Missile Type and Wind Zone

Missile Level	Missile	Impact Speed feet/sec (mph)	Typical Use
A	2 gram steel ball	130 (89)	Above 30 ft. Wind Zone 1 through 4 FBC & HVWZ Area
B	2 lb. Lumber	50 (34)	Skylights ≤ 30 ft. Wind Zone 2 (Basic)
C	4.5 lb. Lumber	40 (27)	Less than 30 ft. Wind Zone 1 & 2 (Basic)
D	9 lb. Lumber	50 (34)	Less than 30 ft. Wind Zone 3 & 4 (Basic) Wind Zone 1 & 2 (Enhanced) HVWZ Area
E	9 lb. Lumber	80 (55)	Less than 30 ft. Wind Zone 3 & 4 (Enhanced)

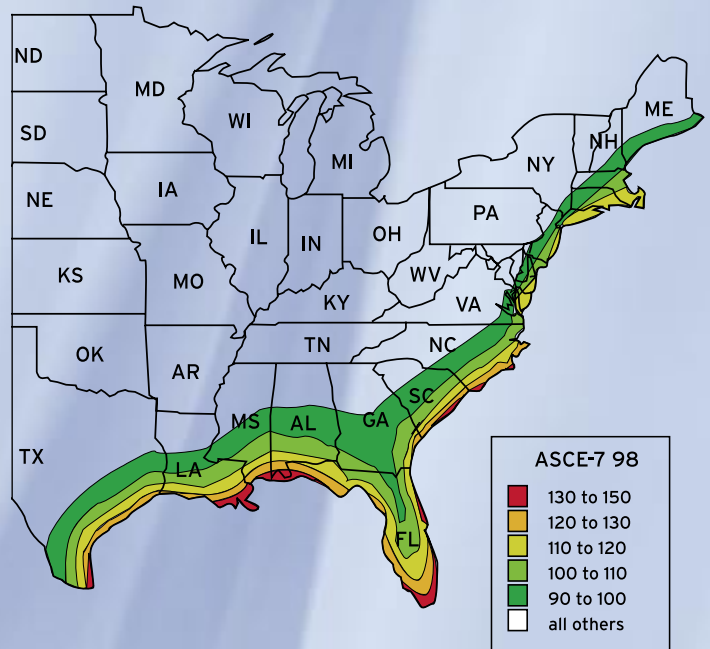
Figure 4
Wind Speed and Missile Chart for Basic Level Protection

Wind Zone	Wind speed mph (km/hr)	HVWZ Missile Level ≤ 30 ft (9m)	ASTM Basic Missile Levels ≤ 30 ft (9m)	ASTM & FBC Small Missile > 30 ft (9m)
1	110 (177)	D	C (B for Skylights)	A
2	120 (193)	D	C	A
3	130 (209)	D	D	A
4	140 (225)	D	D	A

HOW THE STANDARDS ARE APPLIED

The map below indicates the wind speeds in the ASCE 7 standard that tend to govern the ASTM impact standards.

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There are several companies that are either currently selling or designing hurricane resistant windows with Solutia's interlayers. For further information please contact the Architectural Glazing Solutions Centre:

Call: 1-877-674-1234
Click: www.solutia.com
Email: glazin@solutia.com

