Windborne Debris - Impact Resistant Glazing Requirements

(*Residential Code Only*)

Question: *Is impact resistant glazing required in the Ninth Edition of the Massachusetts Residential Building Code which is based on the 2015 version of the International Building Code (IRC).*

Answer: **No.** In explanation, Massachusetts has ***amended*** the IRC definition of **WINDBORNE DEBRIS REGION** to read:

Areas within hurricane-prone regions located in accordance with one of the following:

1. Within one mile (1.61 km) of the coastal mean high water line where the ***nominal*** design wind speed, V_{asd}, is 130 mph (58 m/s) or greater.
2. In areas where the ***nominal*** design wind speed, V_{asd}, is 140 mph (63.6 m/s) or greater.

Since Massachusetts has modified the definition by referring to ***nominal*** speed, the code user needs to convert V_{ult} to V_{asd}. Values of V_{ult} are found in Table R301.2(4), a portion of which is appended below. The highest V_{ult} identified in the table is 140 mph (*see Eastham*).

TABLE 301.2(4) SNOW LOADS AND WIND SPEEDS

	SNOW LOADS		
City/Town	**Ground Snow Load, P_g (psf)**	**Minimum Flat Roof Snow Load, P_f[1] (psf)**	**Basic Wind Speed, V_{ult} (mph)**
Dover	40	35	128
Dracut	50	30	122
Dudley	50	35	126
Dunstable	50	35	121
Duxbury	30	30	135
E. Bridgewater	35	30	133
E. Brookfield	50	35	122
E. Longmeadow	35	35	121
Eastham	25	25	140

To convert V_{ult} to V_{asd} the code user must refer to **Table R301.2.1.3** of the IRC (*see table on next page*).

TABLE R301.2.1.3
WIND SPEED CONVERSIONS[a]

V_{ult}	110	115	120	130	140	150	160	170	180	190	200
V_{asd}	85	89	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.447 m/s.

a. Linear interpolation is permitted.

As identified in **Table 301.2(4)** above, Eastham has a V_{ult} of 140 mph. The associated V_{asd} in **Table R301.2.1.3** is 108 mph.

According to Section **R301.2.1.2 Protection of openings.** Exterior glazing in buildings located in ***windborne debris regions*** shall be protected from windborne debris. Glazed opening protection for windborne debris shall meet the requirement of the Large Missile Test of ASTM E 1996 and ASTM E 1886 as modified in Section 301.2.1.2.1. Garage door glazed opening protection for windborne debris shall meet the requirements of an *approved* impact-resisting stander or ANSI/DASMA 115.

Exception: Wood Structural panels with a thickness of not less than 7/16 inch (11 mm) and a span of not more than 8 feet (2438 mm) shall be permitted for opening protection. Panels shall be precut and attached to the framing surrounding the opening contain the product with glazed opening. Panels shall be predrilled as required for the anchorage method and shall be secured with the attachment hardware provided. Attachments shall be designed to resist the component and cladding loads determined in accordance with either Table R301.5(2) or ASCE 7, with the permanent corrosion-resistant attachment hardware provided and anchors permanently installed on the building. Attachment in accordance with Table R301.5.4.5 is permitted for buildings with a mean roof height of 45 feet (13,728 mm) or less when the ultimate design wind speed, Vult, is 180 mph 9290 kph) or less.

Since Massachusetts modified the definition of **WINDBORNE DEBRIS REGION**, the highest value for V_{ult} anywhere in the commonwealth is 140 mph and converting to V_{asd} reduces this value to 108 mph. Therefore, windborne debris protection is not triggered.

Although recent data, research and modeling have indicated slightly less wind speeds than historically predicted in\around the Cape and other high-wind areas, the IRC 2015 increased the geographical area requiring windborne debris protection. Further investigation suggested that new wind speeds in the extended windborne area are actually less than the wind speed that triggered windborne debris requirements in the 2009 IRC. With that consideration, and not finding any historical evidence indicating that windborne debris has been a primary cause of major structural damage in single- and two-family homes, the Board decide to revise windborne debris requirements in the ninth edition code; thereby simplifying design and construction and significantly reducing costs.

However, please note that, due to the nature of buildings designed under the International Building Code (IBC), the definition of **WIND-BORNE DEBRIS REGIONS** was not revised in the ninth edition ***base code***. Therefore, protection requirements for other building types would apply as specified in the 2015 IBC (*portions of which are provided below*).

WHEELCHAIR SPACE. A space for a single wheelchair and its occupant.

[BS] WIND-BORNE DEBRIS REGION. Areas within hurricane-prone regions located:

1. Within 1 mile (1.61 km) of the coastal mean high water line where the ultimate design wind speed, V_{ult}, is 130 mph (58 m/s) or greater; or
2. In areas where the ultimate design wind speed is 140 mph (63.6 m/s) or greater.

For *Risk Category* II buildings and structures and *Risk Category* III buildings and structures, except health care facilities, the wind-borne debris region shall be based on Figure 1609.3.(1). For *Risk Category* IV buildings and structures and *Risk Category* III health care facilities, the wind-borne debris region shall be based on Figure 1609.3(2).

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1609.1.2 Protection of openings.

In *wind-borne debris regions*, glazing in buildings shall be impact resistant or protected with an impact-resistant covering meeting the requirements of an *approved* impact-resistant standard or ASTM E1996 and ASTM E1886 referenced herein as follows:

1. Glazed openings located within 30 feet (9144 mm) of grade shall meet the requirements of the large missile test of ASTM E1996.
2. Glazed openings located more than 30 feet (9144 mm) above grade shall meet the provisions of the small missile test of ASTM E1996.