

**HAZUS Building Attribute Rulesets - Wind - SPMBs-M-L**

**Note: Defaults should be assigned to all SPMBs-M-L Buildings as defined below; then rulesets should be applied to override those defaults as informed by available data.**

<b>shutters</b>			
<b>Valid Entries</b>	yes, no	<b>Input Variable</b>	YearBuiltNJDEP, WBD
<b>Default</b>	no	<b>Input Variable Source</b>	Custom Inventory
<b>Years Ruleset Applies</b>	<b>Ruleset</b>	<b>Notes</b>	<b>Possible Extensions</b>
YearBuiltNJDEP > 2000	IF WBD = yes, shutters = yes IF WBD = no, shutters = no	<p>1609.1.2 in 2015 IBC: 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 covering meeting the requirements of an approved impact-resistant standard.</p> <p>Exceptions: Wood structural panels with a minimum thickness of 7/16 of an inch and a maximum panel span of 8 feet shall be permitted for opening protection in buildings with a mean roof height of 33 feet or less that are classified as a Group R-3 or R-4 occupancy.</p> <p>1609.1.2 Protection of Openings in the 2006 NJ IBC. 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 covering meeting the requirements of an approved impact-resistant standard.</p> <p>Exceptions: Wood structural panels with a minimum thickness of 7/16 of an inch and a maximum panel span of 8 feet shall be permitted for opening protection in buildings with a mean roof height of 33 feet or less that are classified as a Group R-3 or R-4 occupancy.</p> <p>1609.1.4 Protection of Openings in the 2000 NJ IBC. In wind-borne debris regions, glazing in the lower 60 feet in buildings is required to be impact-resistant or meet standards of the Large and Small Missile Test.</p> <p>Exceptions: Wood structural panels with a minimum thickness of 7/16 of an inch and a maximum panel span of 8 feet shall be permitted for opening protection in one or two story buildings.</p>	
YearBuiltNJDEP ≤ 2000	IF WBD = yes, Assign as Random Variable (RV): shutters = yes (RV = 46%) shutters = no (RV = 54%)	<p>Shutters were not required by code until the 2000 IBC. Before 2000, the percentage of commercial buildings that have shutters is assumed to be 46%. This value is based on a study on preparedness of small businesses for hurricane disasters, which says that in Sarasota County, 46% of business owners had taken action to wind-proof or flood-proof their facilities. In addition to that, 46% of business owners reported boarding up their businesses before Hurricane Katrina. In addition, compliance rates based on the Homeowners Survey data hover between 43 and 50 percent.</p> <p>Source: <a href="https://www.sciencedirect.com/science/article/pii/S2212420916303855">https://www.sciencedirect.com/science/article/pii/S2212420916303855</a></p>	Further refine if more specific data is available
<b>RDage</b>			
<b>Valid Entries</b>	new/avg, old	<b>Input Variable</b>	Roof Deck Age
<b>Default</b>	new/avg	<b>Input Variable Source</b>	YearBuiltNJDEP
<b>Years Ruleset Applies</b>	<b>Ruleset</b>	<b>Notes</b>	<b>Possible Extensions</b>
YearBuiltNJDEP ≥ (Current Year - 50)	RDage = new/avg	<p>Average lifespan of a steel joist roof is roughly 50 years according to the source below. Therefore, if constructed 50 years before the current year, the roof deck should be considered old.</p> <p><a href="https://www.metalroofing.systems/metal-roofing-pros-cons/">https://www.metalroofing.systems/metal-roofing-pros-cons/</a></p>	
YearBuiltNJDEP < (Current Year - 50)	RDage = old	<p>Average lifespan of a steel joist roof is roughly 50 years according to the source below. Therefore, if constructed 50 years before the current year, the roof deck should be considered old.</p> <p><a href="https://www.metalroofing.systems/metal-roofing-pros-cons/">https://www.metalroofing.systems/metal-roofing-pros-cons/</a></p>	Any information on roof replacements on individual homes should be used to specify further
<b>Metal-RDA</b>			
<b>Valid Entries</b>	standard, superior	<b>Input Variable</b>	Metal Roof Deck Attachment
<b>Default</b>	standard	<b>Input Variable Source</b>	YearBuiltNJDEP, DSWII
<b>Years Ruleset Applies</b>	<b>Ruleset</b>	<b>Notes</b>	<b>Possible Extensions</b>

YearBuiltNJDEP > 2000	IF DSWII ≤ 142 mph, Metal-RDA = standard IF DSWII > 142 mph, Metal-RDA = superior	<p>Present to 2006:</p> <p>1507.2.8.1 High Wind Attachment. Underlayment applied in areas subject to high winds (Vasd greater than 110 mph as determined in accordance with Section 1609.3.1) shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap not more than 36 inches on center. Underlayment installed where Vasd, in accordance with section 1609.3.1 equals or exceeds 120 mph shall be attached in a grid pattern of 12 inches between side laps with a 6-inch spacing at the side laps.</p> <p>1507.2.8.1 High Wind Attachment. Underlayment applied in areas subject to high winds (Vasd greater than 110 mph as determined in accordance with Section 1609.3.1) shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap not more than 36 inches on center. Underlayment installed where Vasd, in accordance with section 1609.3.1 equals or exceeds 120 mph shall be attached in a grid pattern of 12 inches between side laps with a 6-inch spacing at the side laps.</p> <p>1507.2.8.1 High Wind Attachment. Underlayment applied in areas subject to high winds (Vasd greater than 110 mph as determined in accordance with Section 1609.3.1) shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap not more than 36 inches on center. Underlayment installed where Vasd, in accordance with section 1609.3.1 equals or exceeds 120 mph shall be attached in a grid pattern of 12 inches between side laps with a 6-inch spacing at the side laps.</p> <p>2000-2006:</p> <p>1507.2.8.1 High Wind Attachment. Underlayment applied in areas subject to high winds (greater than 110 mph) shall be applied with corrosion-resistant fasteners in accordance with the manufacturer's instructions. Fasteners are to be applied along the overlap not more than 36 inches on center. According to Figure 1609, this is basic wind speed.</p> <p>convert Vasd to Vult using <math>Vasd = \sqrt{0.6} Vult</math> --- 110 -&gt; 142</p>	
YearBuiltNJDEP ≤ 2000	Metal-RDA = standard	<p>There is no mention of straps or enhanced tie-downs of any kind in the BOCA codes, and there is no description of these adoptions in IBHS reports or the New Jersey Construction Code Communicator.</p> <p>Although there is no explicit information, it seems that hurricane straps really only came into effect in Florida after Hurricane Andrew (1992), and likely it took several years for these changes to happen. Because Florida is the leader in adopting hurricane protection measures into codes and because there is no mention of shutters or straps in the BOCA codes, it is assumed that New Jersey did not adopt these standards until the 2000 IBC.</p> <p><a href="https://www.insurancejournal.com/news/southeast/2007/05/18/79827.htm">https://www.insurancejournal.com/news/southeast/2007/05/18/79827.htm</a>  <a href="https://forum.nachi.org/t/hurricane-straps/4617">https://forum.nachi.org/t/hurricane-straps/4617</a>  <a href="http://www.floridaretrofits.com/service/hurricaneStrapsClips">http://www.floridaretrofits.com/service/hurricaneStrapsClips</a></p> <p>Thus, all connections before 2000 are assumed to be standard.</p>	