

An Interesting fact about Florida Product Approved Roofing Materials and the Florida Building Code

One of the most important things we need to know when we are trying to get a permit to roof or re-roof a building in Florida is: What is The Florida Product Approval Number – commonly known as “The FL #”, for the new roofing material we intend to use?

Once we have our FL # we present it to our local building department, they verify the number is valid and..... voilà’, in a few minutes, we often have our permit.....There is just one thing – **Just because you have an FL #, it does not automatically mean that that product meets the Florida Building Code (FBC)!**

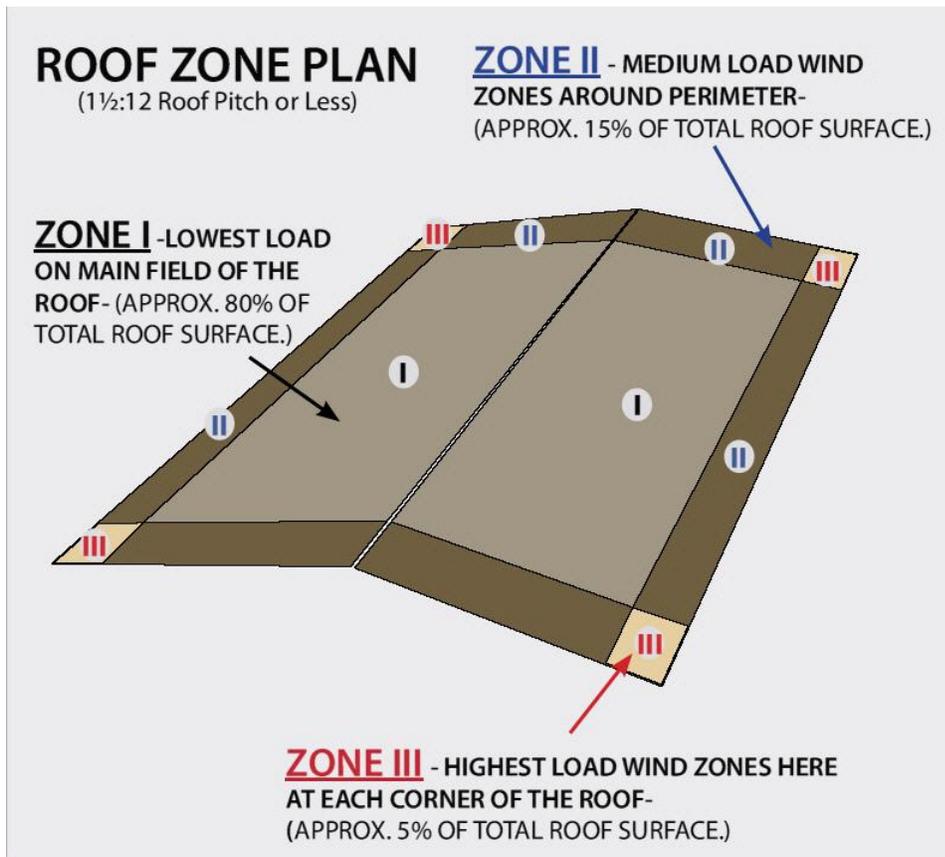
What ????.that can't be right!!!aaah Grasshopper.....sorry; but that is correct! Florida Product Approvals for roofing products give you the “limits of use” defining maximum wind uplift pressure capacity for each tested product, installed in a particular way, on a particular roof substrate. Well ok, but if the product has a FL # **and** it is also UL-90 rated, then at least it is good for -90 psf wind uplift – right? **WRONG AGAIN.** A UL-90 test places a particular roofing product in a vacuum chamber, draws vacuum up to a maximum of -105 psf and if the product stays together, it passes the test and can be UL-90 rated. Since Florida requires a minimum “Factor of Safety” of 2.0 the product will typically have a maximum usable uplift load capacity of -52.5 psf (1/2 the -105 psf). There are other product tests; each roofing material has its’ own particular test protocol; for structural metal roof panel systems, the most commonly accepted industry tests are UL-90 and E-1592. E-1592 tests are much more stringent since it is a larger test sample and takes the roof panels to failure. Failure is typically fastener pull out, seam/joint disengagement, deflection or roof clip failure. The sustained pressure prior to the point of failure is then divided in half and that is the maximum working uplift pressure you can use in design calculations. So if the panel system fails at -120 psf you can use a maximum of -60 psf as your design load.

So what does this all mean for designing and permitting a new roof or a re-roofing project? This part is pretty straight forward: **If the FBC required wind uplift loads on a roof exceed the tested capacity of the roofing material, even if the material is Florida Product Approved, it does not meet FBC.**

So how do we know what the loads are? It all starts with the American Society of Civil Engineering’s ASCE-7 published design criteria, which is an FBC Code approved engineering method that identifies the areas of the roof by several critical “Zones”. The size of these zones and a minimum uplift pressure for each zone must be resisted is established by ASCE-7. On a simple low slope gable building, there are 3 zones: The Corners (Zone III) are where the loads

are typically highest, The Perimeter or Edges (Zone II) are where the loads are higher but less than the corners, and The Field (Zone I) are where the loads are the lowest.

A typical low slope roof plan would look like this:



The ASCE-7 loads for an 80' wide x150' long x20' tall building in Orlando Florida with a 136 mph wind speed and general occupancy are approximately:

- Zone I: -25 psf
- Zone II: -42 psf
- Zone III: -64 psf

Let's look at this same building comparing two different FBC approved metal roof panel systems installed on a pre-engineered building with 5'-0" purlin spacing.

Sample PSF Values of Florida Product Approved Panels

Purlin /Clip Spacing	Panel "A" 24" Trap-Snap Together System	Panel "B" 16" Mechanically Seamed System
5'-0"	-22.5	-47.0
4'-0"	-30.0	-66.5
3'-0"	-37.5	-86.0
2'-0"	-45.0	-105.5
1'-0"	-52.5	-125.0

Table A

Review of Panels vs. Required Capacity

Roof Zone	Code Required Min. PSF Capacity	Panel "A" Req. Purlin/Clip Spacing	Panel "B" Req. Purlin/Clip Spacing Panel "B"
Zone I	-25.0	4'-0" o.c.	5'-0" o.c.
Zone II	-42.0	2'-0" o.c.	5'-0" o.c.
Zone III	-64.0	Beyond Limits	4'-0" o.c.

Table B

Panel System "A" is a new 24" Trapezoidal Standing Seam with snap-together seams. When we look up the "Limits of use" in the Florida Product Approval we find the following test values:

Maximum allowable load -22.5 psf when attached to purlins 5' o.c.

Maximum allowable load -52.5 psf when attached to purlins 1' o.c.

Values between 1'-0" and 5'-0" can be interpolated per Table A.

This roof panel can only meet the lightest loads in Zone I of the roof if additional framing is added to reduce the clip/attachment spacing to 4'-0", similarly for Zone II except the panel must now be attached 2'-0" o.c. The bigger problem here is that in Zone III the required load of -64 psf is beyond the tested capacity of the panel; -52.5 psf attached 1'-0" o.c. This panel cannot be used on this project even though it is Florida Product Approved. See Table B

For Panel System "B", the "Limits of Use" using a mechanically seamed, standing seam panel with 16" o.c. vertical ribs we find the following:

Maximum allowable load -47.0 psf when attached to purlins 5' o.c.

Maximum allowable load -125.0 psf when attached to purlins 1'-0" o.c.

This panel can meet the -25 psf Zone I loads on 5' attachment.

This panel can meet the -42 psf Zone II loads on 5' attachment.

It can also meet the -64 psf Zone III loads in Zone III but the panel's clip attachment /purlin spacing must be reduced from the existing 5'-0" spacing. Adding the needed structure to reduce the purlin spacing to 4'-0" provides -66.5 psf capacity; making the product fully FBC compliant.

This is probably more detail than you ever wanted to know about roof design, but the important point here is that although both roof panels in these examples have Florida Product Approval, only one meets the FBC Requirements and is acceptable for use on this project.

All roofing materials, conventional and metal, have similar limitations on their use and simply selecting a product that is "Approved" does not mean it is appropriate or will meet the code required loadings.

When you are selecting a material for a new or re-roofing project I recommend the following:

1. Find out what the required roof loads are in each zone as well as the zone size and shape. Different shaped roofs will have different zone configurations. Many suppliers will assist you with an estimate of these loads, but consulting a professional engineer is the easiest way to assure compliance.
2. Understand the 'Limits of Use' for the roofing product you want to install. Make sure it exceeds the code minimums. Remember each product, although similar to another, will have its own specific limits.
3. Make sure your building is within the parameters of the Product Approval. If the building is outside those parameters, consult an engineer to determine how to proceed.
4. Finally when installing the Product, make sure you install it exactly as stated in the Product Approval Documents. Failure to follow the installation guidelines may result in a non-code compliant assembly.

Florida's Building Code and the related Product Approvals have set a high bar to insure strong, durable, high quality roofs, understanding and following the details and limitation of the Approvals' is key to achieving the intended result and keeping you in compliance with the FBC.

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