

# INDUSTRY INFORMATION BULLETIN



**To: Commercial Roofing Roof System and Component Suppliers  
Commercial Roofing Roof System Specifiers**

**From: Mike Ennis, SPRI Technical Director**

**Date: 11/05/12**

**No: 1-12**

## *Industry Alert*

### **SPRI would like you to be aware that:**

- Significant changes have been made by Factory Mutual to FM 4470 with regard to steel deck stresses on FM insured buildings;
- Changes will be effective as of 12/31/2012; and
- Changes will effect FM insured building specifications.

## *What are the changes?*

### **Changes to FM 4470 include:**

- "Stresses induced to steel roof decking shall be determined by rational analysis and shall not exceed the allowable stresses per the latest addition of the North American Specification for the Design of Cold-Formed Steel Structural Members AIAI S100-2001"; and
- "Limits on roof deck fastener stress have also been added".

## *FM review of steel deck assemblies*

### **A FM review of all RoofNav Approved steel deck assemblies that "over stress the deck" will be revised to:**

- Reduce the deck span;
- Increase the deck thickness and/or;
- Increase the grade of steel; or
- Create new assemblies with a reduced wind rating.

## *FM Spreadsheet (attached)*

### **FM has provided the attached spreadsheet for both 33- and 80 ksi decking:**

- Delineates what an "FM Approved Steel Deck Attachment" will be by fastener row spacing by deck type (ksi) and maximum wind uplift classification.

## *Recommendations for FM insured buildings*

### **For projects quoted/bid before 12/31/12, you may want to contact the local FM Field Office to:**

- Confirm that the proposed roofing system is still acceptable;
- Seek guidance if reroofing project is a recover; and
- Identify acceptable "Rigid Cover Boards".

## *Recommendations for Non-FM insured buildings*

### **For Non-FM insured buildings:**

- Designers do not use the new FM 4470 as the basis for specifications; and
- Contact the roofing system manufacturer and component supplier for wind uplift resistance performance to comply with local building code.

### **Attached to this bulletin:**

- October 2012 letter from FM Approvals announcing these changes;
- Excel worksheet "FM Approved Steel Deck Attachment"; and
- A detailed recommendation from SPRI regarding FM 4470.

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October 18, 2012

All 4470 Manufacturers

Subject: FM Approval Standard 4470

This letter is to provide you with highlights of changes recently made to Approval Standard 4470. Some of these changes (such as steel deck stress limitation) were included in the previous version of 4470. They are also included here for reference. The standard was updated to include all testing required in Standard 4450. In addition, several other changes have been made as outlined below. The revised standard refers to existing consensus standards where available and FM Approvals test procedures for others.

You will find a copy of the Approval Standard at our RoofNav website. Go to [www.roofnav.com](http://www.roofnav.com) and select Reference Materials followed by Approval Standards. [4470](#) and all [Approval Standards](#) are also available on the FM Approvals website.

The title of the standard has been changed to reflect the various types of Class 1 roof covers available today:

*Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction*

The following new requirements have been added to the standard:

- Stresses induced to steel roof decking shall be determined by rational analysis and shall not exceed the allowable stresses per the latest edition of the North American Specification for the Design of Cold-Formed Steel Structural Members, AISI S100-2007. Limits on roof deck fastener stress have also been added.

FM Approvals will review all steel deck assemblies to determine which currently Approved assemblies overstress the deck. After identifying the overstressed assemblies, FM Approvals will make the following changes:

- For the existing RoofNav assemblies, reduce the deck span, increase the deck thickness and/or the grade of steel to provide the maximum number of steel deck options available while maintaining the qualified wind rating of the assembly.
- Create new RoofNav assemblies from the existing assemblies with the wind rating reduced to a level where the roof deck is not overstressed while maintaining all parameters of the assembly (i.e. deck span, grades and thicknesses).

We anticipate the above changes being completed by the effective date of the Standard which is 12/31/12. A request for Proposal, sent to your project engineer, is needed for any ratings or FM Approvals you wish to pursue beyond the above. Any request for a proposal must include details of the Approvals desired along with Project ID Numbers for all supporting information.



- Screening tests may be used to identify critical components for use in full scale testing or to evaluate components as alternate to those already tested and found to be satisfactory via the full scale tests. Alternate components must perform to an equal or higher level than the component qualified via large scale testing.
- The revised standard also includes three optional ratings shown below. Send correspondence to your Approvals Engineer if you wish to pursue recognition with either of these ratings.
  1. Dynamic Puncture Resistance Rating of Roof Covers
  2. NCC (Noncombustible Core) Rated Roof Insulation
  3. Solar Reflectance of Roof Surfaces

Please contact your Approvals Engineer with any questions.

Very truly yours,



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## MAX DECK SPANS (FT.) BY WIND RATING/FASTENER SPACING, SHEET GAUGE for 33 ksi

Fastener Row Spacing (ft.)	Gauge	MAX DECK SPANS (FT.) BY WIND RATING/FASTENER SPACING, SHEET GAUGE for 33 ksi																		
		330	315	300	285	270	255	240	225	210	195	180	165	150	135	120	105	90	75	60
3.5	18	4.5	5.5	5.5	5.5	5.5	5.5	6	6	6	6	6	6	6	6	6	6	6	6	6
	20	-	4	4	4.5	4.5	4.5	5	5.5	5.5	5.5	6	6	6	6	6	6	6	6	6
	22	-	-	-	-	-	4	4	4.5	4.5	4.5	5.5	5.5	6	6	6	6	6	6	6
4	18	4.5	4.5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	20	-	-	-	-	4	4.5	4.5	5	5	5.5	6	6	6	6	6	6	6	6	6
	22	-	-	-	-	-	-	-	4	4.5	5	5	6	6	6	6	6	6	6	6
4.5	18	-	4	4	4.5	5	5	5.5	6	6	6	6	6	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	4	4	5	5	5.5	6	6	6	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	4	4.5	5	5.5	6	6	6	6	6	6	6
5	18	-	-	-	4	4	4.5	5	5	5.5	6	6	6	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	4	4.5	5	5.5	6	6	6	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	4	4.5	5	6	6	6	6	6	6	6
5.5	18	-	-	-	-	-	-	4	4.5	5	5.5	6	6	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	4	4.5	5	6	6	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	4.5	5	6	6	6	6	6	6
6	18	-	-	-	-	-	-	-	4	5	5.5	6	6	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	-	-	4.5	5.5	6	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	5.5	6	6	6	6
6.5	18	-	-	-	-	-	-	-	-	4	4.5	5.5	6	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	-	-	-	4.5	5.5	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	5.5	6	6	6
7	18	-	-	-	-	-	-	-	-	-	-	4	5.5	6	6	6	6	6	6	6
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	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	6	6	6
7.5	18	-	-	-	-	-	-	-	-	-	-	-	4	5.5	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	6	6	6	6
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	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	6	6
8.5	18	-	-	-	-	-	-	-	-	-	-	-	-	4	4.5	6	6	6	6	6
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	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	6	6
9	18	-	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5	6	6	6	6
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	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	6
9.5	18	-	-	-	-	-	-	-	-	-	-	-	-	4	4	4.5	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	6
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	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4.5	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4.5	6
10.5	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5	6	6
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	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	6
11	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	5	6	6	6
	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	5.5	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	6
11.5	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5.5	6	6
	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	5	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6
12	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5	6	6
	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6
Wind Rating		330	315	300	285	270	255	240	225	210	195	180	165	150	135	120	105	90	75	60

## MAX DECK SPANS (FT.) BY WIND RATING/FASTENER SPACING, SHEET GAUGE for 80 ksi

Fastener Row Spacing (ft.)	Gauge	330	315	300	285	270	255	240	225	210	195	180	165	150	135	120	105	90	75	60
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	22	5.5	5.5	5.5	5.5	5.5	6	6	6	6	6	6	6	6	6	6	6	6	6	6
4	18	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	20	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	22	4.5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
4.5	18	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	20	5.5	5.5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	22	4	4	4.5	5	5	5.5	5.5	6	6	6	6	6	6	6	6	6	6	6	6
5	18	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
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	22	-	-	4	4	4.5	4.5	5	5.5	6	6	6	6	6	6	6	6	6	6	6
5.5	18	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	20	4	4.5	4.5	5	5.5	5.5	6	6	6	6	6	6	6	6	6	6	6	6	6
	22	-	-	-	-	-	4	4.5	5	5.5	6	6	6	6	6	6	6	6	6	6
6	18	5	5.5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	20	-	-	-	4	4.5	5	5.5	6	6	6	6	6	6	6	6	6	6	6	6
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6.5	18	4.5	5	5	5.5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
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7	18	-	4	4	4.5	5.5	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	4	4	5	5.5	6	6	6	6	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	4	4.5	5.5	6	6	6	6	6	6	6
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	22	-	-	-	-	-	-	-	-	-	-	-	4	5	6	6	6	6	6	6
8.5	18	-	-	-	-	-	4	4	4.5	5	5.5	6	6	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	4	4	4.5	5.5	6	6	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5	6	6	6	6	6
9	18	-	-	-	-	-	-	4	4	4.5	5	5.5	6	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	4	4.5	5	5.5	6	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5.5	6	6	6	6	6
9.5	18	-	-	-	-	-	-	4	4	4	4.5	5	5.5	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	4	4	4.5	5	6	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5	6	6	6	6	6
10	18	-	-	-	-	-	-	-	4	4	4.5	4.5	5	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	-	4	4.5	4.5	5.5	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	4	4	4.5	5.5	6	6	6
10.5	18	-	-	-	-	-	-	-	4	4	4.5	4.5	5	5.5	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	-	4	4	4.5	5	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5.5	6	6	6
11	18	-	-	-	-	-	-	-	-	4	4	4.5	5	6	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	-	4	4.5	5	5.5	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5	6	6	6	6
11.5	18	-	-	-	-	-	-	-	-	4	4	4.5	5	5.5	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	-	4	4.5	5	5.5	6	6	6	6	6
	22	-	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5	6	6	6	6
12	18	-	-	-	-	-	-	-	-	4	4	4.5	5	5.5	6	6	6	6	6	6
	20	-	-	-	-	-	-	-	-	-	-	-	4	4.5	5	6	6	6	6	6
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Wind Rating		330	315	300	285	270	255	240	225	210	195	180	165	150	135	120	105	90	75	60



## **SPRI Bulletin RE: FM Approval Standard 4470**

On October 18, 2012, FM Approvals (FM) officially notified “All 4470 Manufacturers” (roofing system manufacturers and component suppliers) that FM had revised FM Approval Standard 4470 (FM 4470), *“Single-Ply, Polymer-Modified Bitumen Sheet, Built-UP Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction.”*

Attached is a copy of that notification. FM 4470 may be found on line at [www.roofnav.com](http://www.roofnav.com). The effective date of the revised FM 4470 is December 31, 2012. Some details and the anticipated impact of the changes were included in this letter. FM stated that all changes to RoofNav Assemblies will be completed by this effective date.

It should be noted that FM Global/FM Approvals requires FM 4470 be used when FM insured buildings are having roof systems installed. Neither the existing nor revised FM Standard 4470 is a consensus standard that is included in the current International Building Code (IBC) editions 2009 and 2012.

The letter states that the following new requirements have been added to the Standard:

- *“Stresses induced to steel roof decking shall be determined by rational analysis and shall not exceed the allowable stresses per the latest edition of the North American Specification for the Design of Cold-Formed Steel Structural Members, AISI S100-2001.”*
- *“Limits on roof deck fastener stress have also been added.”*

FM will conduct a full review of all current RoofNav Approved steel deck assemblies that, in its opinion, “overstress the deck”. **The following changes will ensue:**

- *“For the existing RoofNav assemblies, reduce the deck span, increase the deck thickness and/or the grade of steel to provide the maximum number of steel deck options available while maintain the qualified wind rating of the assembly.”*
- *“Create new RoofNav assemblies from the existing assemblies with the wind rating reduced to a level where the roof deck is not overstressed while maintaining all parameters of the assembly (i.e. deck span, grades and thicknesses).”*

FM has provided an Excel spreadsheet (copy attached) which provides two tabs (spreadsheets), one for 33 ksi decking, and the other for 80 ksi decking, that delineate what an “FM Approved

Steel Deck Attachment” will be and the maximum membrane fastener row spacing allowed per deck type and span.

### **SPRI RECOMMENDATIONS:**

With these abrupt changes taking place before year end, what can the design and contractor communities do when they are designing or bidding on **a FM insured project?**

Even more importantly, what can one do when designing a building (including the roof system) on projects that are **not FM insured?** Below are SPRI’s Recommendations:

### **FM Insured Projects**

Neither FM Approvals nor FM Global has provided a transition plan or any guidance when incorporating these changes on FM insured roofing projects that have bid prior to these changes becoming effective on RoofNav.

On FM insured projects, if a contract or a quote for work will start after the RoofNav constructions have been revised (12-31-12), you will likely want to bring the change in the FM 4470 Standard to the attention of all parties who are involved in the projects. This would include the building owner, architect, general contractor, etc., so that all are informed of the changes and the possible cost increases to the project.

For FM insured projects, consider printing off the “Contractor Package” from RoofNav, as these ratings may not be available after December 31, 2012. The Contractor Package is a pdf document that is date stamped and is expected to provide all of the details of the assembly including, e.g., fastener row spacing, wind uplift rating, the deck strength (ksi), the gauge of the deck, as well as maximum span of the decking.

On FM insured projects, you will likely want to confirm: the specific characteristics of the steel decking for the project; gauge; strength (ksi); how the decking is to be supported on 5’ or 6’ spans, etc.; and how the decking is, or will be, attached to the supports, fasteners, welds, etc. Also consider:

- Table 1 is located in FM Loss Prevention Data Sheet 1-29 *“Roof Deck Securement and Above –Deck Roof Components.”* This table is referenced in the FM Contractor Package

to provide the recommended rating in the field, perimeter and corner based off a field design pressure.

- Though not stated in the FM letter, reportedly the maximum wind uplift rating on 22 gauge, 33 ksi decking supported on 6' spans will be limited to a FM 1-165. Table 1 shows that even for a FM 1-90 rating, a FM 1-150 and FM 1-225 rating is required in the perimeter and corner zones. This could require changes to the building structure if you are following FM 4470 requirements.

You are also advised to contact the local FM Global office that will be handling the particular project. SPRI encourages you to make sure FM provides direction on the steel decking, and confirms that your proposed steel decking is acceptable for the project. This would be particularly true for buildings that are located in coastal areas-where higher wind uplift ratings are needed at the perimeters and corners of the building.

Furthermore, SPRI recommends that you confirm with the applicable FM field office if a recover application is acceptable, or if the roofing system will have to be removed down to the steel deck. The new revised FM 4470 allows for the following prescriptive enhancement under section 4.3.1.1.6. This enhancement is **only applicable for a reroof condition.**

In view of the foregoing, it is advisable for you to confirm with the applicable FM field office what products are considered "Rigid Cover Board." Also, keep in mind that FM Approvals has not provided a list of these acceptable products, and FM 4470 has a new definition for "Rigid Cover Board."

### **Non-FM Insured Projects**

SPRI recommends that you do not use the new FM 4470 as the basis for specifications.

As stated previously, FM 4470 is not codified. The IBC 2009 and 2012 editions state that roof coverings shall be tested in accordance with UL 1897 or FM 4474 Standards. This does not mean that the testing must take place at either UL or FM Approvals but rather that these two Standards and their stated protocols are used to conduct the wind uplift testing. Accordingly, you may wish to refer to the specific "roofing system manufacturers and component supplier" for wind uplift resistance performance to comply with your local building code.



**SPRI Bulletin: FM Approval Standard 4470**

Page 4

The IBC allows wind uplift testing to be conducted at ICC-ES certified and approved test laboratories. If a design pressure is specified for the project, 3<sup>rd</sup> party certification from the roofing system manufacturer can be provided in the form of a test report from an accredited lab, ICC ES report, Florida Product Approval, Miami Dade County *Notice of Acceptance* or UL online certification directory. Unlike the new FM 4470, however, these other entities document Building Code compliance using codified standards. By not referencing FM 4470 and FM Approvals nomenclatures (FM 1-90, 1-120), you may well avoid ambiguous specifications between the requirements of the Building Code and FM recommendations and/or requirements.

FM Approvals has confirmed that they have no loss history with mechanically fastened single-ply membranes (8', 10' or 12' wide panels) causing damage to the decking or structure. These mechanically attached systems, which have been tested for wind uplift performance at various accredited laboratories, will continue to be offered in the market place.

In short, you are encouraged to identify and comply with the IBC along with the designer of record and/or AHJ (Authorities Having Jurisdiction) specifications. When the building or tenant is FM insured, SPRI recommends that the appropriate FM field office be contacted prior to your starting any work to re-confirm acceptance of the roofing system to FM requirements.

Sincerely,



Mike Ennis  
SPRI Technical Director

Enclosed: 4470 letter Oct2012 –George Smith

Enclosed: Excel Spreadsheet MF Cover deck thk\_span\_rating\_summary