

Testing and Approvals

ASTM E-1592 TESTING OVER 16 GA HUGGERS

McElroy Metal & Architectural Building Components 24 GA x 18" JSM200 DL

- Test A – Hugger and purlin spacing @ 5'-0"
- Test B – Purlins @ 5'-0", Sub-rafters @ 24" and Huggers @ 2'-6" over 26 GA "PBR"
- Test C – Purlins @ 5'-0", Sub-rafters @ 12" and Huggers @ 1'-3" over 26 GA "PBR"

Custom-Bilt Metals 24 GA x 16" CB-2000

- Test A – Hugger and purlin spacing @ 5'-0"
- Test B – Hugger and purlin spacing @ 1'-0"
- Test C – Purlins @ 5'-0", Sub-rafters @ 24" and Huggers @ 2'-6" over 26 GA "PBR"

Englert, Inc. 24 GA x 16" Series S-2500

- Test A – Hugger and purlin spacing @ 5'-0"
- Test B - Hugger and purlin spacing @ 2'-6"

Englert, Inc. 0.040" x 16" Series S-2500

- Test A – Hugger and purlin spacing @ 5'-0"
- Test B - Hugger and purlin spacing @ 2'-6"

Firestone Building Products 24 GA x 18" UC-6

- Test A – Hugger and purlin spacing @ 5'-0"
- Test B – Hugger and purlin spacing @ 1'-0"
- Test C – Purlins @ 5'-0", Sub-rafters @ 24" and Huggers @ 2'-6" over 26 GA "PBR"

Firestone Building Products 22 GA x 18" UC-6

- Test A – Hugger and purlin spacing @ 5'-0"
- Test B – Hugger and purlin spacing @ 1'-0"
- Test C – Purlins @ 5'-0", Sub-rafters @ 24" and Huggers @ 2'-6" over 26 GA "PBR"

MBCI 24 GA 16" SuperLok™

- Test A – Hugger and purlin spacing @ 5'-0"
- Test B - Purlins @ 5'-0", Sub-rafters @ 1'-0" and Huggers @ 2'-6" over 26 GA "PBR"
- Test C – Purlins @ 5'-0", Sub-rafters @ 24" and Huggers @ 2'-6" over 26 GA "PBR"

MBCI 24 GA "PBR over 26 GA "PBR"

- Test 06B – Hugger and purlin spacing @ 5'-0" fastened at 12"-12"-12"
- Test 06C - Hugger and purlin spacing @ 5'-0" fastened 7"-5"-7"-5"
- Test 06D – Purlins @ 5'-0", Sub-rafters @ 24" and Huggers @ 2'-6" fastened 7"-5"-7"-5"
- Test 06E – Purlins @ 5'-0", Sub-rafters @ 12" and Huggers @ 2'-6", fastened 7"-5"-7"-5"

Notes:

- All Testing per ASTM E-1592-01 - TAS 125-03
- Refer to Installation Section, pages 27 & 28 for Sub-rafter/Hugger details of construction
- Existing purlins spaced @ 5'-0" for all tests unless noted otherwise
- Dade County Lab Certification: No. 05-1122.13

AISI GRAVITY AND WIND UPLIFT LOAD BASE TESTING *(Refer to Special Note no. 5 at end of this testing information for disclaimer)*

Standard Model "C" 16 GA Hugger with ¼" bridge above panel rib notch for 12" o.c. "R" Panel – Refer to Detail HL-01-G on page 63

Purlin Depth and Gauge	Existing Purlin Span FT	Wind Uplift % Increase	Gravity Load % Increase
8"X16	25'-0"	85%	42%
8"X14		50%	37%
8"X12		0.2%	25%

Special 16 GA Hugger with 1" bridge above panel rib notch for 12" o.c. "R" Panel – Refer to details HL-02-/16-14 and HL-03-R/12 on pages 59 and 60.

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Purlin Depth and Gauge	Existing Purlin Span FT	Wind Uplift % Increase	Gravity Load % Increase
8"X16	25'-0"	94%	79%
8"X14		65%	66%
8"X12		22%	37%

AISI Testing Notes:

1. Dade County Laboratory Certification: No. 05-1122.13
2. All roof assemblies were tested with LGSI standard Purlins with 26 GA roof panels attached to top flange
3. All roof assemblies were tested with bottom flanges completely unbraced
4. All tests were conducted in compliance with AISI TS-8-02 Base Test Method for Purlins supporting a standing seam roof.
5. **Special Note:** *It is the responsibility of the owner or general contractor to hire a design professional to do a thorough investigation of the existing metal building system to ensure that the design is adequate for the additional loading. Our testing has confirmed that the additional loads of the Roof Hugger System were more than compensated by the existing system for purlins depths up to 8-inch. However, existing purlin laps where combined shear and bending occurs were not evaluated due to the limitations of the AISI Base Test Method. Our engineering design only addresses the performance of the Roof Hugger System, its attachment to existing purlins, and the interaction of the new metal roof system.*

Roof Hugger Sub-Purlin Rollover Testing

Testing on various height Sub-Purlins and various profiles to determine rollover limitations to control panel drag loads.

Factory Mutual Standard 4471 Approval

Approval No. 3033681, Architectural Building Components 15-7/8" wide 24 Ga. JSM 238T as provided by McElroy Metal of Bossier City, LA. with various clips over several Roof Hugger profiles @ 5'-0" O.C. met Classes 1-75, 1-120 and 1-195, Visit www.mcelroymetal.com for details.

APPROVALS WITH NEW THRU-FASTENED/SCREW-DOWN METAL ROOFING – 2015 Master 9352-R3

Product Approval – FL 9352.2

This product approval is for buildings with an existing 12" O.C. "PBR" panel 26 Ga. or heavier through-fastened roof with a new roof panel 12" O.C. "PBR" 26 Ga. as provided by MBCI of Houston, TX (Panels with equivalent properties are acceptable). The Product Approval includes a table indicating several retrofit framing options and sub-frame spacing's. Each assembly having varying capacities from -40 PSF to -140 PSF at the noted deflection levels.

Product Approval – FL 9352.3

This product approval is for buildings with an existing 12" O.C. "PBR" panel 26 Ga. or heavier through-fastened roof with a new roof panel 12" O.C. "PBR" 24 Ga. as provided by MBCI of Houston, TX (Panels with equivalent properties are acceptable). The Product Approval includes a table indicating several retrofit framing options and sub-frame spacing's. Each assembly having varying capacities from -40 PSF to -145 PSF at the noted deflection levels.

Product Approval – FL 9352.4

This product approval is for buildings with an existing 12" O.C. "PBR" panel 26 Ga. or heavier through-fastened roof with a new roof panel 12" O.C. "PBR" 22 Ga. as provided by MBCI of Houston, TX (Panels with equivalent properties

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are acceptable). The Product Approval includes a table indicating several retrofit framing options and sub-frame spacing's. Each assembly having varying capacities from -48.1 PSF to -124.9 PSF at the noted deflection levels.

APPROVALS WITH NEW STANDING SEAM METAL ROOFING

Product Approval - FL 9352.1

This product approval is for buildings with an existing 12" O.C. "PBR" panel 26 Ga. Or heavier through-fastened roof with a new 238-T 18" O.C., 22 Ga., vertical rib standing seam roof as provided by McElroy Metals of Bossier City, LA. The Product approval includes a table indicating several retrofit framing options and sub-frame spacing's. Each assembly having varying capacities from -55 PSF to -125 PSF at differing sub-purlin spacing's.

Product Approval - FL 9352.5

This product approval is for buildings with an existing 12" O.C. "PBR" panel 26 GA. or heavier through-fastened roof with a new 16" SuperLok, vertical rib standing seam roof as provided by MBCI of Houston, TX. The Product Approval includes a table indicating several retrofit framing options and sub-frame spacing's. Each assembly having varying capacities from -47.5 PSF to -80 PSF at differing sub-purlin spacing's.

Product Approval - FL 17626

This product approval is for buildings with an existing 12" O.C. "PBR" panel 26 GA. or heavier through-fastened roof with a new 24 GA 18" x

2" vertical rib 238-T standing seam roof as provided by McElroy of Bossier City, LA. The Product Approval includes a table indicating several retrofit framing options and sub-frame spacing's. Each assembly having varying capacities from -123.5 PSF to -161 PSF at differing sub-purlin spacing's over structural steel decking.

NOTES FOR LISTED APPROVALS:

All Existing Purlin Spacing = 5'-0" O.C. max

All New PBR Panel is 36" wide with 1¼" tall rib

- 26 GA = 80 KSI
- 24 GA = 50 KSI

Hats = Special Hugger Sub-rafters

ROOF HUGGER COMPOSITION & MATERIALS
Roof Hugger Sub-purlin System's base materials is G-90 galvanized finished steel sheet per ASTM A-446 or A-570 with 50 ksi minimum yield strength. Material thickness is available to meet design loads in 16 and 14 gauges.

PROFILES AND CHARACTERISTICS

The profile used for Florida Product Approval is the Roof Hugger standard roll-formed Type "C" model, manufactured to accommodate existing ribbed metal roofing with maximum 1½" high major ribs spaced at 12" on center. In addition, other standard types include Hugger profiles manufactured to accommodate the following popular panel types:

- 12" to 24" O.C. Trapezoidal Rib SSR
- 12" to 20" O.C. Vertical Rib SSR
- 6"-10" O.C. Ribbed Panel
- 2.5", 2.67", 2.75" and 4.2" Corrugated
- 7.2" Industrial Rib

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All Roof Hugger Sub-purlins are zee shaped steel members with 1.06" minimum bottom flange and 2.0" minimum top flange plus a .25" minimum lip. The web depth varies based on the existing panel profile dimension or desired insulation thickness. The die-stamped web window that allows nesting over the existing roof system ribs also may vary per job application and requirements. All are shipped in 10'-0" lengths plus or minus to fit existing panel rib or seam modules.

Roof Hugger Sub-purlins are intended to attach directly above and to the existing building secondary support members. These members are most commonly zee shaped purlins, steel bar joist or other types of framing. When these members exceed the maximum spacing as dictated by the new roof panel system, the Roof Hugger Sub-purlins must employ "sub-rafter" hats and/or "struts" that span over the existing purlin. By doing this, the Roof Hugger Sub-Purlins can be installed at mid-span conditions (between existing purlins).

OTHER ROOF HUGGER TESTING

Many other metal roof panel manufacturers have tested their systems in accordance with ASTM E-1592 Standard Test Method for Structural Performance of Metal Roof and Siding Systems by Uniform Static Air Pressure Difference. Please visit our website for the most current reports on these tests.

BUILDING CODES

Current data on building code requirements and product compliance may be obtained from ROOF HUGGER technical support specialists. Installation must comply with the requirements of Chapters 15, 16 and 22 of the FBC 2010 Code.

FLORIDA PRODUCT APPROVAL LIMITATIONS AND CONDITIONS OF USE FOR NON-HIGH VELOCITY HURRICANE ZONES (NON-HVHZ)

DESIGN PROCEDURE: Based on the dimensions of the structure, appropriate loads are determined using Chapter 16 of the Florida Building Code (FBC) for roof cladding wind loads. These component wind loads for roof cladding are compared to the allowable negative/positive pressures listed in the load table. The design professional shall select the appropriate erection details to reference in his/her drawings for proper fastener attachment to the structure and analyze the panel fasteners for pullout and pullover. Support framing must be in compliance with FBC Chapter 22 for steel and Chapter 16 for structural loading.

OTHER CONDITIONS:

Minimum Roof Slope Limitation: ½:12

Existing Purlin Spacing: Maximum 5'-0" O.C. designed by a Florida P.E.

Existing Roof Panel: Based on 26 GA R-Panel or "PBR", 80 KSI with 12" O.C. x 1¼" tall ribs and 36" coverage

Substrate Attachment: Designed by a Florida P.E.

Fire Barrier: Class B fire exposure rating in accordance with FBC Section 1505.3

Underlayment: Vinyl or reflective foil faced fiberglass batt insulations that have a flame spread rating of no more than 25 and a smoke development rating of not more than 450 assumed under the existing roof

Shear Diaphragm: Shear diaphragm values were outside the scope of the Approval reports

MAXIMUM ROOF COMPONENT UPLIFT PRESSURES:

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Product Approval – FL 9352.1 (238T Panel System over Roof Huggers)

238T Panel Clip	16 GA Fixed	24 GA Continuous Clip	22 GA Continuous Clip
Maximum Design Pressure	-55.0 PSF	-100.0 PSF	-125.0 PSF
Roof Hugger	Standard Model "C"	Standard Model "C"	Gusseted Model "C"
Roof Hugger Spacing	5'-0" O.C.	5'-0" O.C.	5'-0" O.C.
Roof Hugger # of Fasteners	(2) per Foot	(2) per Foot	(4) per Foot

*Design Pressure includes a Safety Factor = 2.0

Product Approval – FL 9352.2 (PBR Panel System over Roof Huggers)

System No.	Maximum Allowable Pressures (Psf)			
	Allowable Test Value	Controlled by Panel Deflections		
		L/120	L/180	L/240
1	40.0	40.0	40.0	38.8
2	65.0	65.0	45.7	33.8
3	110.0	110.0	110.0	110.0
4	140.0	140.0	140.0	116.7

Product Approval - FL 9352.3 (PBR Panel System over Roof Huggers)

System No.	Maximum Allowable Pressures (Psf)			
	Allowable Test Value	Controlled by Panel Deflections		
		L/120	L/180	L/240
1	35.0	35.0	31.44	26.42
2	60.0	60.0	60.00	58.14
3	116.0	116.0	111.77	85.14
4	145.0	145.0	120.41	92.24

Product Approval – FL 9352.4 (PBR Panel System over Roof Huggers)

Maximum Allowable Pressures (PSF)				
Roof System	Allowable Design Pressure (PSF)	Based on Panel Deflections		
		L/120	L/180	L/240
1	48.1	48.1	46.0	35.2
2	88.5	58.1	40.6	32.7
3	124.9	124.9	124.9	124.9

*Design Pressure includes a Safety Factor = 2.0

Product Approval – FL 9352.5

(Super Lok 16-24 Panel System over Roof Huggers)

Negative Design Loads (PSF)		
Roof Hugger spacing	E-1592 load	Allowable Design load
2.50 FT	160.0	80.0
5.00 FT	95.0	47.5

Product Approval - FL 17626 (238T Panel System over Roof Huggers)

Maximum Design Pressure	-125.3 PSF	-161.0 PSF
Roof Hugger Spacing	4'-0" O.C.	2'-0" O.C.
Roof Hugger # of Fasteners	(3) #14-13 per 36"	(3) #14-13 per 16"

Design Pressure includes a Safety Factor = 2.0

INSTALLATION REQUIREMENTS:

Please contact Roof Hugger to obtain specific FL Product Approval erection details.