Evaluation Report

Top Notch "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3"

Roof Solar Pedestal

Manufacturer:

Ridged Systems LLC

1071 SW 30th Avenue

Deerfield Beach, Florida 33442

for

Florida Product Approval

 # FL 21074.2 R6

Florida Building Code 7th Edition (2020)

Method:	**2 - B**
Category:	**Roofing**
Sub - Category:	**Roofing Accessories that are an Integral Part of the Roofing System**
Product Name:	"SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3"
Product Description:	Roof Solar Pedestal

Prepared by:

James L. Buckner, P.E., SECB

Florida Professional Engineer # 31242

Florida Evaluation ANE ID: 1916

Project Manager: Diana Galloway

Report No. 20-230-DD-G3-HVHZ-ER *(new)*

(Revises 18-192-SS-DD-G3-HVHZ-ER (R1), FL21074.6 R4)

Date: 9 / 04 / 20

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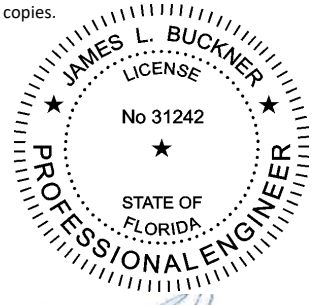

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Contents:

1.0 Manufacturer: **Ridged Systems LLC**
1071 SW 30th Avenue
Deerfield Beach, Florida 33442
(561) 276-9745
http://topnotchridge.com/

2.0 Product:

2.1 **Product Name:** "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3"
2.2 **Product Description:** Roof Solar Mounting Pedestal

3.0 Evaluation Scope:

3.1 **Compliance with the following**
Florida Building Code 7th Edition (2020), High Velocity Hurricane Zone (HVHZ)
Florida Building Code 7th Edition (2020), Outside High Velocity Hurricane Zone (Non-HVHZ)

3.2 **Evaluation Method:**
Florida Product Approval Rule 61G20-3.005 (2) (b)

3.3 **Evaluation Classification:**
Category: Roofing
Sub Category: Roofing Accessories that are an Integral part of the Roofing System

3.4 **Properties Evaluated**
Structural (Wind Resistance) Properties

3.5 **Limits of Evaluation:**
This product assembly evaluation is limited to compliance with section 3.1 to section 3.4 of this report.

4.0 Evaluated Uses:
Ridged Systems "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" is used as a roof solar mounting pedestal.

5.0 Product Assembly Description:

5.1 General:
The Ridged Systems "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" roof solar mounting pedestals are roof solar mounting system consisting of steel plates and "TOP NOTCH" HDPE plastic core. "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" pedestals are adhered to the top of foam adhesive.

6.0 General Assembly as Evaluated:
"SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" pedestal
Adhered to Foam Adhesive

7.0 Assembly Structural Performance:

7.1 Uplift Resistance:

Table 7.1
Uplift Resistance Loads/Pressure[2]

Uplift Load applied to the Top of DOUBLE DOWN GEN 3 Assembly (90° To Roof Surface)

Adhesive Type:	GEN 3 Pedestal Size:	Paddy Dimensions:	Paddy Weight:	Ultimate Load[1]:
ICP Polyset® AH-160	12"	16-5/8" x 8-7/8"	79.9 grams	**-833 LBF**
ICP Polyset® AH-160	8"	12-3/8" x 8"	62.6 grams	**-658 LBF**
DOW Tile Bond	8"	10-1/2" x 7"	55 grams	**-383 LBF**
DOW Insta-Stik	8"	10-1/2" x 7"	59.8 grams	**-400 LBF**
DAP Stormbond	8"	10-1/2" x 7"	52.1 grams	**-500 LBF**

Notes:
1. Ultimate Loads with 0 margin of safety applied to the test loads.
2. Assembly was tested for vertical up.

8.0 Performance Standard:

The product described herein has demonstrated compliance with the following:

8.1 TAS 114-11 **–** *Test Procedure for Static Uplift Resistance of Mortar of Adhesive Set Tile Systems*

9.0 Properties Standard:

The product described herein has demonstrated compliance with the following:

9.1 ASTM D 1929-16 – *Standard test Method for Ignition Properties of Plastics*

9.2 ASTM D 635-14 **-** *Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position*

10.0 Test Standards Equivalency:

Table 10.1
Test Standards Equivalency

The following test standard versions used to test the product meets the prescribed standards as adopted by the current Florida Building for use as evaluated in this report.

Test Standard per Current Code	Test Standard as Tested:
TAS 114-11	TAS 114-95
ASTM D 1929-16	ASTM D 1929-96
ASTM D 635-14	ASTM D 635-98

11.0 Code Compliance:

11.1 The product assembly described herein has demonstrated compliance with the Florida Building Code 7th Edition (2020), Section 1708.2.

12.0 Limitations and Conditions of Use:

12.1 This report evaluates the solar pedestal adhered to top of foam adhesive. This report in intended to be part of a complete load path design. Structural capacities of the bottom side of adhesive patty, other components and systems need to be combined for code wind design. Attachment to the top plate of the "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" pedestal is outside the scope of this report.

12.2 Design of the roof adhesive to the building structure is outside the scope of this report.

12.3 Assembly was not tested for lateral loads.

12.4 <u>Scope of "Limitations and Conditions of Use" for this evaluation:</u>

This evaluation report for "State Approval" contains technical documentation, specifications and installation method(s) which include "Limitations and Conditions of Use" throughout the report in accordance with Rule 61G20-3.005. Per Rule 61G20-3.004, the Florida Building Commission is the authority to approve products under "State Approval".

12.5 <u>Option for application outside "Limitations and Conditions of Use"</u>

Rule 61G20-3.005(1)(e) allows engineering analysis for "project specific approval by the local authorities having jurisdiction in accordance with the alternate methods and materials authorized in the Code". Any modification of the product as evaluated in this report and approved by the Florida Building Commission is outside the scope of this evaluation and will be the responsibility of others.

12.6 This report is a building code product evaluation per FLPE rule (FAC) 61G15-36 to comply with Florida product approval rule (FAC) 61G20-3. This evaluation report is part of the Florida Building Commission approval for the listed code related criteria. This report by James Buckner, P.E. and CBUCK Engineering is not a design certification of code compliance construction submittal documentation, per FBC section 107, for any individual structure, site specific or permit design.

12.7 All metal components and fasteners shall be corrosion resistant in accordance with FBC, including but limited to Sections 1504.6.5, 1506.6, 1506.7 and 1507.4.4.

12.8 Fire Classification is outside the scope of Rule 61G20-3 and is therefore not included in this evaluation.

12.9 All pedestals shall be permanently labeled with the manufacturer's name and/or logo, and/or model.

12.10 This report approves the use of this product assembly as described in this report for use in the High Velocity Hurricane Zone code section. (Dade & Broward Counties)

13.0 Quality Assurance:

The manufacturer has demonstrated compliance of products in accordance with the Florida Building Code and Rule 61G20-3.005 (3) for manufacturing under a quality assurance program audited by an approved quality assurance entity through Keystone Certifications, Inc., (FBC Organization #QUA ID:1824).

14.0 System/Components

14.1 "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Solar Pedestal Models

Attachment of solar panels to DOUBLE DOWN GEN 3 solar pedestals is outside the scope of this evaluation and shall be designed by others.

14.1.1 8 in. "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Solar Pedestal

Overall Product Dimensions:

Length:	8.00 in.
Width:	5.00 in.
Height:	4.75 in.

14.1.1.1 8 in. "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Units

Dimensions:	8" (l) x 4" (h)
Material:	Extruded Polypropylene
Thickness:	1/8" (min.)
Standard:	ASTM D638

14.1.1.2 8 in. "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Top Plate

Dimensions:	8" (l) x 5" (w)
Material:	Aluminum
Thickness:	0.075" (min.)
Alloy Type:	H14 3003

14.1.1.3 8 in. "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" End Caps

Dimensions:	5.860" (l) x 3" (w)
Material:	Aluminum
Thickness:	0.030" (min.)
Alloy Type:	H14 3003

14.1.2 12 in. "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Solar Pedestal

Overall Product Dimensions:

Length:	12.00 in.
Width:	5.00 in.
Height:	4.75 in.

14.1.2.1 12 in. "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Units

Dimensions:	12" (l) x 4" (h)
Material:	Extruded Polypropylene
Thickness:	1/8" (min.)
Standard:	ASTM D638

14.1.2.2 12 in. "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Top Plate

Dimensions:	12" (l) x 5" (w)
Material:	Aluminum
Thickness:	0.075" (min.)
Alloy Type:	H14 3003

14.1.2.3 12 in. "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" End Caps

Dimensions:	5.860" (l) x 3" (w)
Material:	Aluminum
Thickness:	0.030" (min.)
Alloy Type:	H14 3003

15.2 Roof Foam Adhesive:

Adhesion of "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" system to top of foam adhesive shall have the following minimum characteristics and be in compliance with this report, FBC Chapter 15, applicable code sections, product approvals, and in accordance with roof adhesive manufacturer's limitations and recommendations.

15.2.1 Adhesive Option 1:

Product Name:	Polyset® AH-160
Manufactured by:	ICP Adhesives and Sealants, Inc.
Type:	Two-Component Adhesive
Material:	Polyurethane froth
Current Approvals:	Florida Building Code: FL#6332.1, Miami-Dade County: NOA# 17-0322.03

15.2.2 Adhesive Option 2:

Product Name:	Insta Stik
Manufactured by:	DuPont de Nemours, Inc.
Type:	Single-Component Adhesive
Material:	Polyurethane froth
Current Approvals:	Florida Building Code: FL#720.1, Miami-Dade County: NOA# 20-0701.09

15.2.3 Adhesive Option 3:

Product Name:	Tile Bond
Manufactured by:	DuPont de Nemours, Inc.
Type:	Single-Component Adhesive
Material:	Polyurethane froth
Current Approvals:	Florida Building Code: FL#22525.1, Miami-Dade County: NOA# 20-0701.07

15.2.4 Adhesive Option 4:

Product Name:	Touch 'N Seal Storm Bond
Manufactured by:	DAP Foam, Inc.
Type:	Single-Component Adhesive
Material:	Polyurethane froth
Current Approvals:	Florida Building Code: FL#22609.2, Miami-Dade County: NOA# 17-0306.06

15.0 Installation Method:

"SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Pedestal to Top of Roof Adhesive:

Install the "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Solar Pedestal into the paddy of roof foam adhesive per above Table 7.1. (Refer to Table 7.1 and drawings at the end of this evaluation report.)

1. **Apply Roof adhesive:**
   Adhesive Type: **Refer to Table 7.1**
   Paddy weight: **Refer to Table 7.1**
   Adhesive Size: **Refer to Table 7.1**
   Paddy placement of roof tile adhesive shall be applied on clean, dry approved surface.
2. **"SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Solar Pedestal**
   Install the "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Solar Pedestal into the paddy of Adhesive.
   Pedestal Size: **Refer to Table 7.1**

The Ridged Systems, LLC "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" solar roof pedestal shall be installed in compliance with the installation method listed in this report and applicable code sections of FBC 7th Edition (2020). The installation method described herein is in accordance with the scope of this evaluation report. Refer to manufacturer's installation instructions as a supplemental guide for attachment.

16.0 Evaluation Reference Data:

16.1 Modified TAS 114-95 Appendix D Uplift Test
By American Test Lab of South Florida (ATL) (FBC Organization #TST ID: 3782)
Report #: 0504.01-17, Dated: 5/10/17

16.2 Quality Assurance
By Keystone Certifications, Inc., (FBC Organization #QUA ID:1824)
Ridged Systems, LLC, Licensee #: 448
(FBC Organization #QUA ID:1824)

16.3 Engineering Analysis
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)

16.4 Test Standard Equivalency
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)

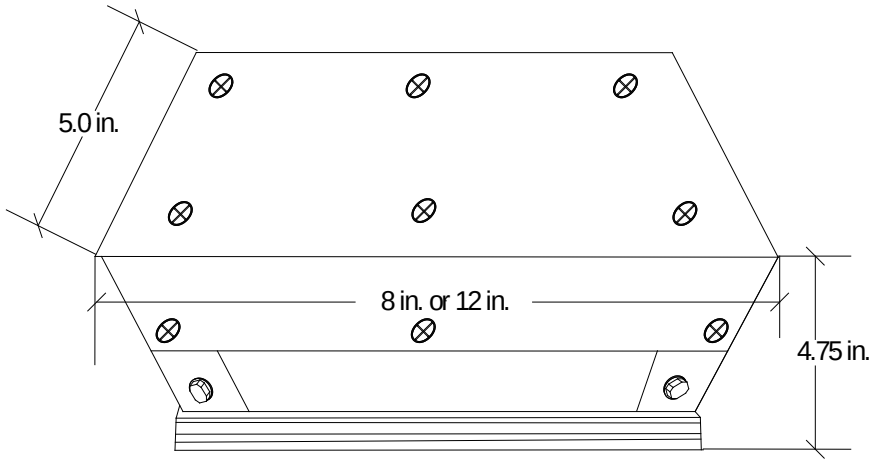
16.5 Certification of Independence
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)

17.0 Additional Standards Tests:

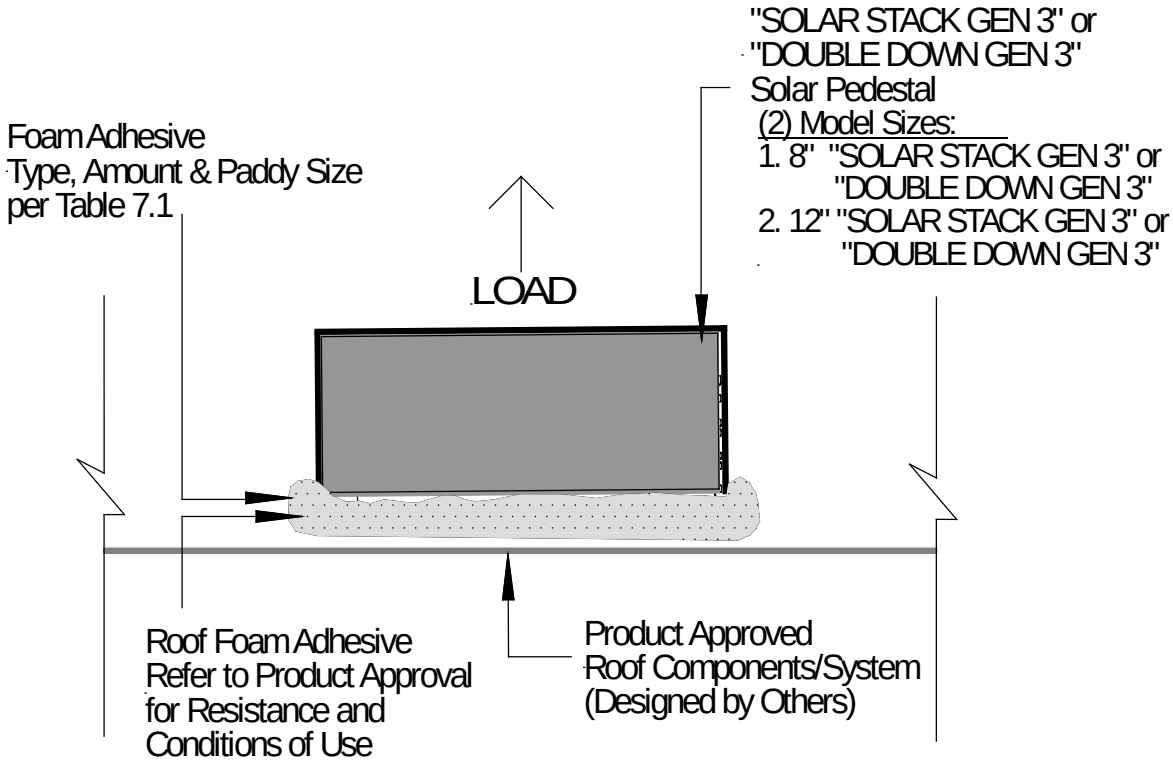
Additional Tests performed for Ridged Systems, LLC "SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" solar roof mount components but not evaluated in this report.

17.1 ASTM D 1929-96 & ASTM D 635-98 Tests
ETC Laboratories (FBC Organization #TST ID: 2411)
Report # ETC-08-718-20993.0, Dated 5/09/08

Installation Method
Ridged Systems LLC
"SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3" Roof Pedestal



"SOLAR STACK GEN 3" or "DOUBLE DOWN GEN 3"
Typical Profile View



Typical Assembly
Section View