

July 14<sup>th</sup>, 2023

EcoFasten

4141 West Van Buren St.

Phoenix, AZ 85009

Attn.: John Hudson, Senior Director of Engineering, EcoFasten

**Re: EcoFasten *RockIt Comp Slide GF1 Assembly* Roof Attachment with *RockIt Mount* Allowable Capacities**

This letter provides details on the mechanical load tests and certifies the structural capacities of the RockIt Comp Slide GF1 Assembly for use as a roof attachment with the EcoFasten RockIt Rail-less Racking System. The RockIt Comp Slide GF1 Assembly includes an extruded aluminum slide for attachment of the RockIt Mount, with a single lag screw hole, and a metal flashing. The RockIt Mount includes a pedestal which attaches to the slide and allows for horizontal system adjustment while a leveling bolt provides vertical adjustment of the PV module. The RockIt Comp Slide GF1 Assembly is secured to the rafter using a 5/16" x 4" lag screw with 3" of thread. The tested RockIt Comp Slide GF1 Assembly with RockIt Mount, simplified as RockIt Comp Slide going forward in this letter, details and component dimensions are shown in Appendix A.

The structural capacities of the *RockIt Comp Slide* were determined from mechanical load testing along three respective load directions including uplift, lateral parallel to the rafter, and lateral perpendicular to the rafter. The capacity ratings are based on structural load tests performed using a Universal Instron Test Unit according to ASTM D1761-20 "Standard Test Methods for Mechanical Fasteners in Wood and Wood Based Materials". This certification conforms to the structural requirements of the following reference documents:

1. 2015/2018/2021 International Building Code, by International Code Council, Inc
2. Aluminum Design Manual 2020, by the Aluminum Association, Inc.
3. ASTM B 557-15, Standard Test Method for Tension Testing Wrought and Cast Aluminum and Magnesium-Alloy Products
4. ASTM A370-21, Standard Test Methods and Definitions for Mechanical Testing of Steel Products
5. 2018 National Design Specification for Wood Construction
6. American Institute of Steel Construction (AISC) 360-16-Specification for Structural Steel Buildings
7. ASTM D7147-21 Standard Specification for Testing and Establishing Allowable Loads of Joist Hangers

For each load test, a RockIt Comp Slide was installed on a sample roof deck constructed from 2x4 rafters and 7/16" OSB sheathing. The moisture content and the specific gravity of the rafters were measured per ASTM D2395-17 "Standard Test Methods for Density and Specific Gravity (Relative Gravity) of Wood and Wood-Based Materials". The recorded moisture content of the rafters among all sample roof decks is between 11% and 12% and the specific gravity was 0.42. The tested *RockIt Comp Slide* was affixed to the rafter with a 5/16" x 4" lag screw with 3" of thread per the requirements specified by the EcoFasten RockIt Installation Guide. The loads were applied to the assembly via the RockIt mount. Uplift loads were applied directly to the vertical adjustment (leveling) bolt. Lateral tests were performed by applying load to the RockIt clamp with an aluminum spacer and load applied using a v-block and pin to simulate eccentricity of the mount in field application.

The failure observed under the uplift load was lag screw withdrawal from the rafter. A safety factor of 3 applied shall be applied to the peak load, found from the average of five (5) tests per ASTM D7147 to the wood screw withdrawal failure. The peak failure load was 2005 lbs, which provides an **allowable uplift capacity of 668 lbs.**

For the lateral load tests, the *RockIt Comp Slide* was tested with loading parallel to the rafter as this was anticipated to be the worst case. For the lateral load, the critical failure mode which results in the lowest allowable capacity was observed to be flexural yielding of the mount leveling bolt. The average of the bending loads from five (5) lateral load tests is 237 lbs and with a safety factor of 1.67 per AISC 360-16 for the bolt yielding, **the allowable capacity for a lateral load parallel to the rafter is 142 lbs.** It was noted that with this failure mode, the same capacity can be used in the perpendicular to rafter direction.

Please note the test investigation and its results described herein were based on the load tests performed on the *RockIt Comp Slide* as a stand-alone roof attachment. It is not the intention of the letter to rate or certify *RockIt* system level performance or structural components other than those mentioned in this letter. This evaluation excludes the structural adequacy of the chosen PV modules, or underlying roof supporting members. For those, it shall be the responsibility of the system designer or engineer to verify the structural capacity and adequacy regarding the applied or resultant loads of the chosen array configuration.

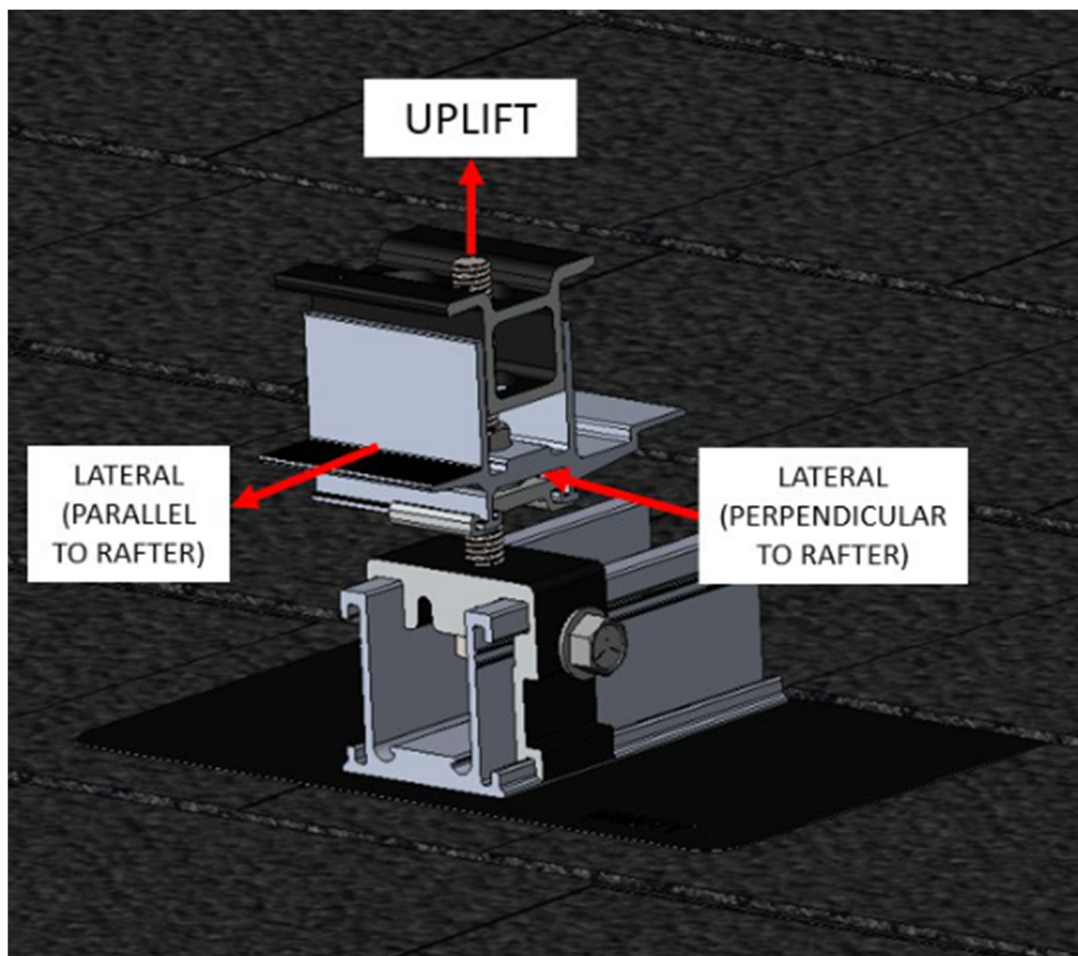


Figure 1: RockIt Comp Slide and Applied Loading Directions

Table 1: EcoFasten RockIt Comp Slide GF1 Assembly Allowable Capacities <sup>(1)</sup>						
Load Direction	Test Quantity	Critical Failure Mode	Safety Factor <sup>(4)</sup>	Avg Ultimate Capacity (lbs.)	Max deviation from mean <sup>(3)</sup>	Allowable Capacity (lbs) <sup>(5)</sup>
Uplift <sup>(2)</sup>	5	Fastener Withdrawal	3.0	2005	6.0%	668
Lateral Parallel and Perpendicular to Rafter	5	Stainless Bolt Yielding	1.67	237	3.3%	142

Table 1 Notes:

- (1) Capacities apply to rafter size of 2x4 or greater and a deck thickness of 7/16" or greater. The lag screw should be secured within the center 1/3 of the rafter. The rafters and roof deck should be in sound structural condition with no sign of rot, decay, previous installation, or pre-existing damages.
- (2) The uplift direction is upward perpendicular to the roof surface. The uplift capacity shall be used when the direct supporting rafter has a specific gravity 0.42 or greater.
- (3) Deviation reflects the variance of the highest or the lowest test value from the group mean for the respective load direction.
- (4) Safety Factor is associated with the respective failure mode recorded and determined per NDS 2018, ADM-2015, AISC 360 and ASTM-7147.
- (5) Allowable capacity is equal to Average Peak Load at Failure divided by its associated Safety Factor.
- (6) The certified capacities in Table 1 shall be used when all EcoFasten provided components are used with no generic replacement parts.

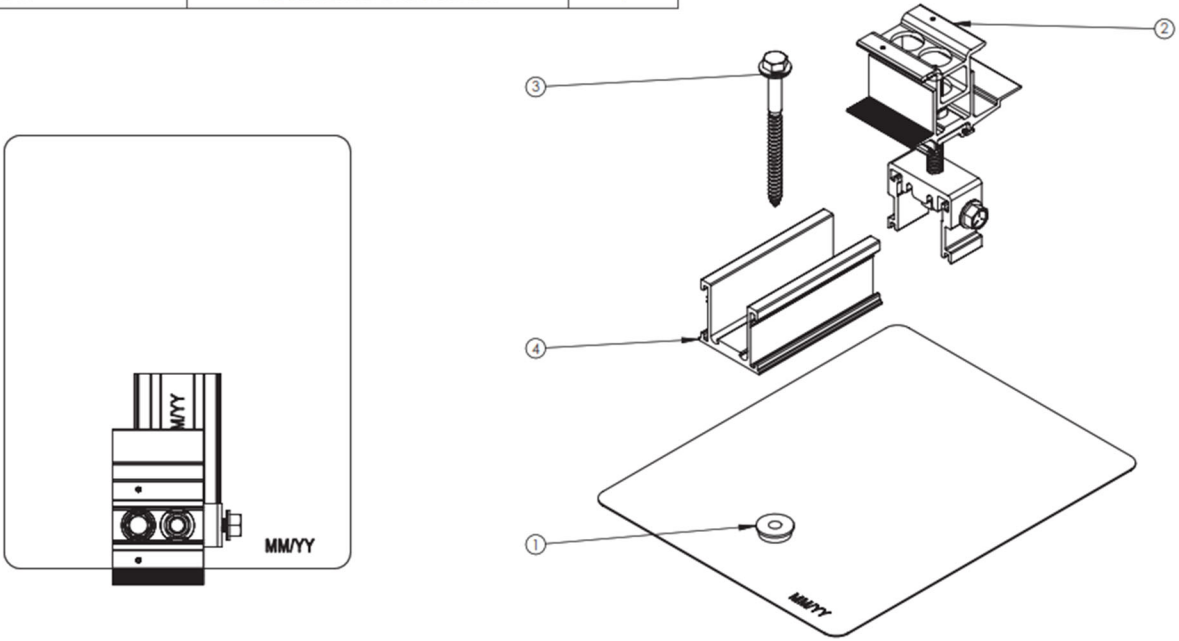
Sincerely,

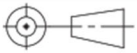

Matthew S Kuzila PE

Digitally Signed 7.14.2023  
Expires 09.30.2025

## APPENDIX A: ENGINEERING DRAWING

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	750044-01	GF1M-GAL-BLK-810	1
2	750101	ROCKIT V3 MOUNT ASSEMBLY	1
3	53-100-010	SS LAG BOLT AND EPDM WASHER, 5/16 X 4.00", THREAD 3", EPDM BACKED WASHER	1
4	450092-01	ROCKIT SLIDE COMP BLACK	1

THIRD ANGLE PROJECTION 	DRAWN	TR	01/07/2022	 <b>INNOVATIVE MOUNTING SYSTEMS</b>
	CHECKED	-	-	
DO NOT SCALE DRAWING	ENG APPR.	-	-	<b>ROCKIT V3 COMP ASSEMBLY</b>
	MFG APPR.	-	-	
<b>PROPRIETARY AND CONFIDENTIAL</b> <small>THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ESDEC INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ESDEC INC. IS PROHIBITED. COPYRIGHT © 2020 ESDEC INC.</small>	INTERPRET DIM AND TOLERANCE PER ASME Y14.5[M]-2009		SIZE	DWG. NO.
	DIMENSIONS TOLERANCES ARE IN:		A	EX-1
	INCHES	(MILLIMETERS)	SCALE:1:3	WEIGHT:
	.XX: +/- .030	X: +/- .75		SHEET 1 OF 1
.XXX: +/- .010	XX: +/- .25			
ANGLES: +/- 1°				