January 21, 2025

K2 Systems, LLC
4665 North Ave Suite G
Oceanside, CA 92056

RE: ***K2 Flex Foot Rafter and Deck Mounting Evaluation***

To whom it may concern:

Per your request, Moment Engineering + Design has performed a comprehensive structural review of the K2 Flex Foot in Rafter and Deck Mounting scenarios. When installed per the conditions and design criteria described herein, the K2 Flex Foot specified is compliant with the applicable sections of the design reference documents noted below.

Design Reference Documents

- ASCE/SEI 7-16 & 7-10 – *Minimum Design Loads for Buildings and Other Structures*
- AA ADM - *2018 Aluminum Design* Manual, by the Aluminum Association
- 2018 NDS – *National Design Specification for Wood Construction*
- TT-051C – *Screw Withdrawal from the Face of APA-Trademarked Structural Panels*
- Technical Bulleting #11b -*Screw Fastener Capacities in OSB,* published by Premier SIPS, dated 6/15/11

Overview

The purpose of this analysis is to provide allowable shear, compression, and tensile loads for the K2 Systems Flex Foot in various attachment configurations including rafter and deck mounting. K2 Systems has provided in-house load testing data of the K2 Flex Foot in shear, compression, and tension. Fastener analysis is required to provide accurate allowable loads for the K2 Flex Foot.

Moment Engineering + Design has reviewed the testing materials and reports provided by K2 Systems as well as applicable design codes and has derived allowable shear, compression and tensile loads per mounting configuration based on the results.

Methods & Design Parameters

Calculated allowable loads were based on the following data:

- *Section and materials data provided by K2 Systems*
- *Load/deflection test data provided by K2 Systems*

Section Properties

Tested assembly was based the following:

Property	K2 Flex Foot
Sx (horizontal axis)	0.373. in^3
Sy (vertical axis)	0.404 in^3
A (x-Section)	1.298 in^2

We appreciate the opportunity to have assisted you with this project. Should you have any further questions regarding this analysis, please feel free to contact us by phone or email.

Best Regards,

Shawn Kelley

Digitally signed by Shawn Kelley
Date: 2025.01.21 10:45:32 -05'00'

REGISTERED PROFESSIONAL ENGINEER SHAWN P. KELLEY C60695 CIVIL STATE OF CALIFORNIA

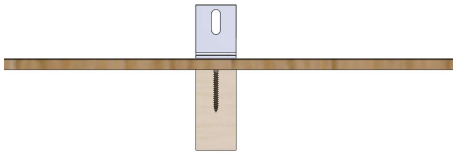
Expires: 12/31/26

Shawn P. Kelley, P.E.
Professional Engineer
moment ENGINEERING + DESIGN
14101 Parke Long Ct #205
Chantilly, VA 20151
spkelley@mseglc.com

Attachments:
1. Table 1.1: K2 Flex Foot – Rafter Mounting Options
2. Table 1.2: K2 Flex Foot – Deck Mounting Options

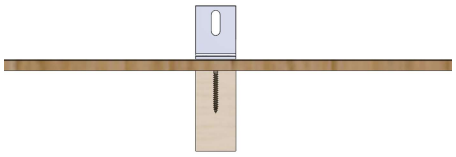
Table 1.1: Flex Foot - Rafter Mounting Options

Bracket directly attached to wood rafter (G=0.42) with 5/16"ø x 3" Lag Screw through 7/16" OSB (threaded embedment specified per configuration)

CONFIGURATION	ALLOWABLE LOADS[3,4]
	ALLOWABLE TENSILE LOAD (LBS)[1]: 409 ALLOWABLE COMPRESSIVE LOAD (LBS): 409 ALLOWABLE SHEAR (LBS)[2]: 176

1. Determined using NDS Eq. 12.2-1 with 2" minimum thread length
2. Allowable shear based on parallel to grain loading with reduction factor applied for embedment <8D
3. Load duration factors (if applicable) have not been applied to table values
4. Maximum vertical load to bracket shall not exceed 650 lbs including the effect of any load combinations or load duration factors applicable to the connection.

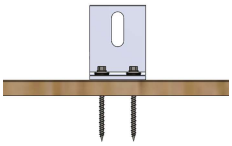
Bracket directly attached to wood rafter (G=0.42) with 5/16"ø x 4" Lag Screw through 7/16" OSB (threaded embedment specified per configuration)

CONFIGURATION	ALLOWABLE LOADS[3,4]
	ALLOWABLE TENSILE LOAD (LBS)[1]: 511 ALLOWABLE COMPRESSIVE LOAD (LBS.): 511 ALLOWABLE SHEAR (LBS)[2]: 220

1. Determined using NDS Eq. 12.2-1 with 2.5" minimum thread length
2. Allowable shear based on parallel to grain loading with full embedment 8D
3. Load duration factors (if applicable) have not been applied to table values
4. Maximum vertical load to bracket shall not exceed 650 lbs including the effect of any load combinations or load duration factors applicable to the connection

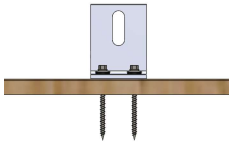
Table 1.2: Flex Foot - Deck Mounting Options

Bracket attached to 7/16" OSB sheathing (G=0.42) with (4) #10 wood screws fully embedded through OSB sheathing. Assumes min. 8" distance from all OSB panel edges and 24" O.C. maximum rafter spacing.

CONFIGURATION	ALLOWABLE LOADS[3,4]
	ALLOWABLE TENSILE LOAD (LBS)[1]: 167 ALLOWABLE COMPRESSIVE LOAD (LBS.): 167 ALLOWABLE SHEAR (LBS)[2]: 144

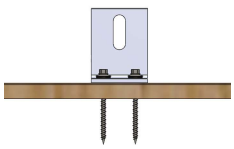
1. Determined using NDS Eq. 12.2-2 with full thread engagement through 7/16" OSB
2. Determined using Premier SIPS Technical Bulletin #11b, dated 6/15/11
3. Load duration factors (if applicable) have not been applied to table values
4 Maximum vertical load to bracket shall not exceed 650 lbs including the effect of any load combinations or load duration factors applicable to the connection

Bracket attached to 7/16" OSB sheathing (G=0.42) with (4) #12 wood screws fully embedded through OSB sheathing. Assumes min. 8" distance from all OSB panel edges and 24" O.C. maximum rafter spacing.

CONFIGURATION	ALLOWABLE LOADS[3,4]
	ALLOWABLE TENSILE LOAD (LBS)[1]: 184 ALLOWABLE COMPRESSIVE LOAD (LBS.): 184 ALLOWABLE SHEAR (LBS)[2]: 434

1. Determined using NDS Eq. 12.2-2 with full thread engagement through 7/16" OSB
2. Determined using Premier SIPS Technical Bulletin #11b, dated 6/15/11
3. Load duration factors (if applicable) have not been applied to table values
4 Maximum vertical load to bracket shall not exceed 650 lbs including the effect of any load combinations or load duration factors applicable to the connection

Bracket attached to 7/16" OSB sheathing (G=0.42) with (4) #14 wood screws fully embedded through OSB sheathing. Assumes min. 8" distance from all OSB panel edges and 24" O.C. maximum rafter spacing.

CONFIGURATION	ALLOWABLE LOADS[3,4]
	ALLOWABLE TENSILE LOAD (LBS)[1]: 211 ALLOWABLE COMPRESSIVE LOAD (LBS.): 211 ALLOWABLE SHEAR (LBS)[2]: 466

1. Determined using NDS Eq. 12.2-2 with full thread engagement through 7/16" OSB
2. Determined using Premier SIPS Technical Bulletin #11b, dated 6/15/11
3. Load duration factors (if applicable) have not been applied to table values
4 Maximum vertical load to bracket shall not exceed 650 lbs including the effect of any load combinations or load duration factors applicable to the connection