BRS, Inc. 13808 Santa Fe Crossings Dr. Edmond, OK Ph 405 607 8877	**TECHNICAL BULLETIN** **High Capacity Rake Plate & Eave Plate**	**Bulletin No. TS18** **Revision No. 1** Date: February 26, 2018

This technical bulletin is being issued to accompany the release of the new High Capacity(HC) Rake Plate and the new Eave Plate for use with the TS-324 roof system. These plates are part of the BRS continous improvement program to keep the panel system at the fore front of the industry. The bulletin will cover the necessary information to allow the licenssee to design and detail these parts in conjunction with the existing TS-324 clips and accessories.

Key Features and Notes:

- The HC Rake Plate, eave plate and rake plate washer are made of 50ksi minimum yield G90 galvanized steel in 0.064" thickness.
- The HC Rake and eave plates are 10'-0 long.
- The top and bottom flanges are a nominal 2" wide on all parts with no angled offset between the top and bottom flanges.
- The HC Rake and eave plates come in ½", 1 ½", 2", 2 ½" and 3" nominal heights that match the available clip standoff heights.
- Custom size or shaped high capacity rake and eave plate can be fabricated. The bottom flange cannot be changed however the vertical web and top flange can be adjusted. Contact BRS for design help for creating these parts. It is the licensee's responsibility to ensure any changes do not change the tested design values.
- The HC Rake Plate washers are preassembled on to the HC Rake Plate. The parts as designed and tested require two ¼-14 self-drilling clip screws per location (14 total per part). ***Warning –do not use self-drilling shoulder screws with these products.***
- The HC Rake Plate washers are not self centering. The HC Rake Plate washers are to be centered during installation of the HC Rake Plate per the installation sticker included at one end of each part. The sticker depicts the alignment of the rake washer with the factory stamped scribe line which indicates the center of the slot at each location.
- The HC Rake Plate is designed to be attached flush to a rake angle of a minimum thickness of 16ga. The HC Rake Plate requires a clear run of 2 ½" wide along the rake angle free of structural fasteners used for the rake angle attachment. The rake angle structural attachment should be checked to ensure that it meets the loads being induced by the HC Rake Plates.
- The eave plate is pre-punched for ¼-14 self-drilling fasteners at 6" on center and require (20) fasteners per 10'-0 part.
- The HC Rake Plates have been tested and the data is available at no cost in C2178-1 test report conducted at Encon Technology, Inc laboratory. They were also included in the diaphragm tests.
- The HC Rake Plate can be used in conjunction the BA series wind clips to allow wide roof planes without steps to account for expansion-contraction movement(3/12" of travel in both directions -7" nominal overall). Wider roof planes may require additional panel fasteners at the eave and/or shoulder fasteners at the endlaps to help with load transfer through the system. Be careful with the quantity and location of single skinned floating roof curbs on wide roof planes in that you don't overload the end lap or eave fasteners.
- The HC Rake Plate is designed so that it can be replaced should the rake be subjected to the ultimate tested load. The roof should still be attached to the building due to the patented retention design which can be seen in the test photos.
- BRS recommends using the HC Rake Plate at both rakes for roof designs with high uplift requirements.
- These parts are currently available through Logan Stampings.

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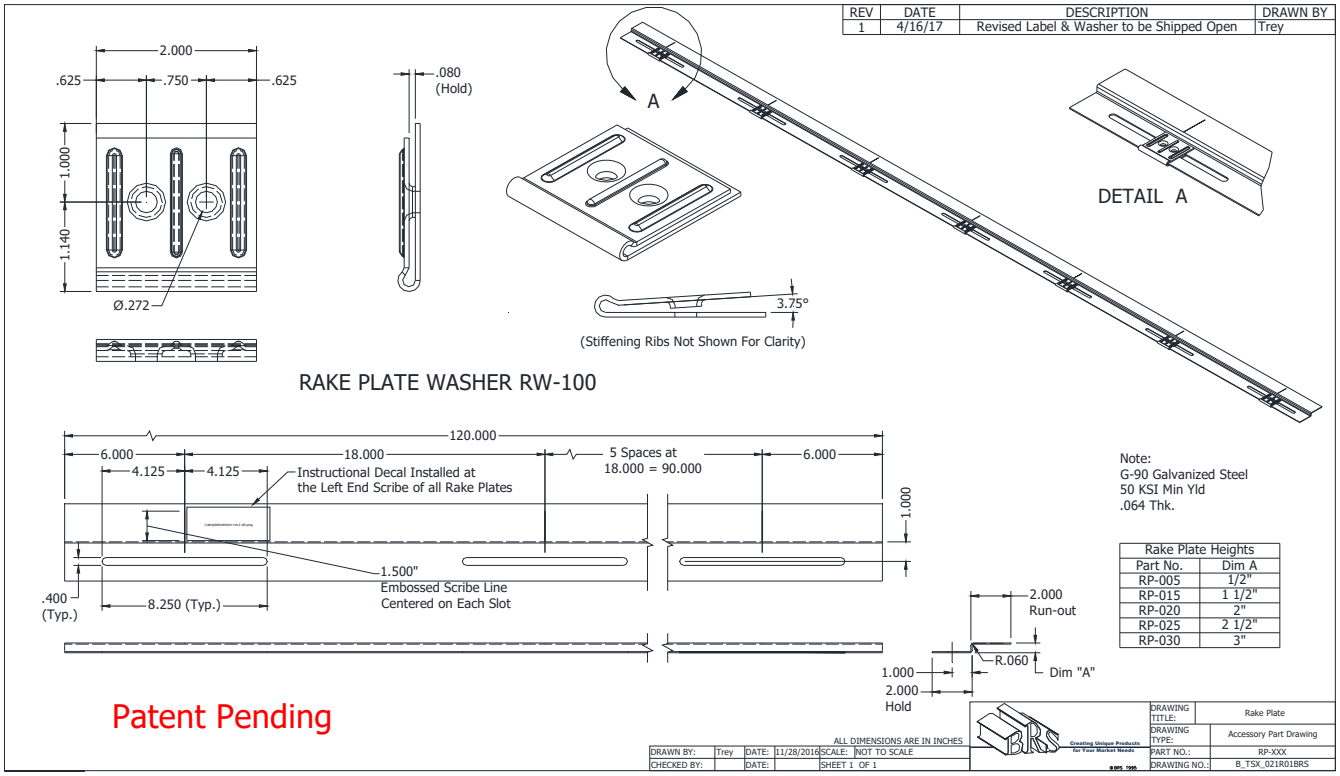
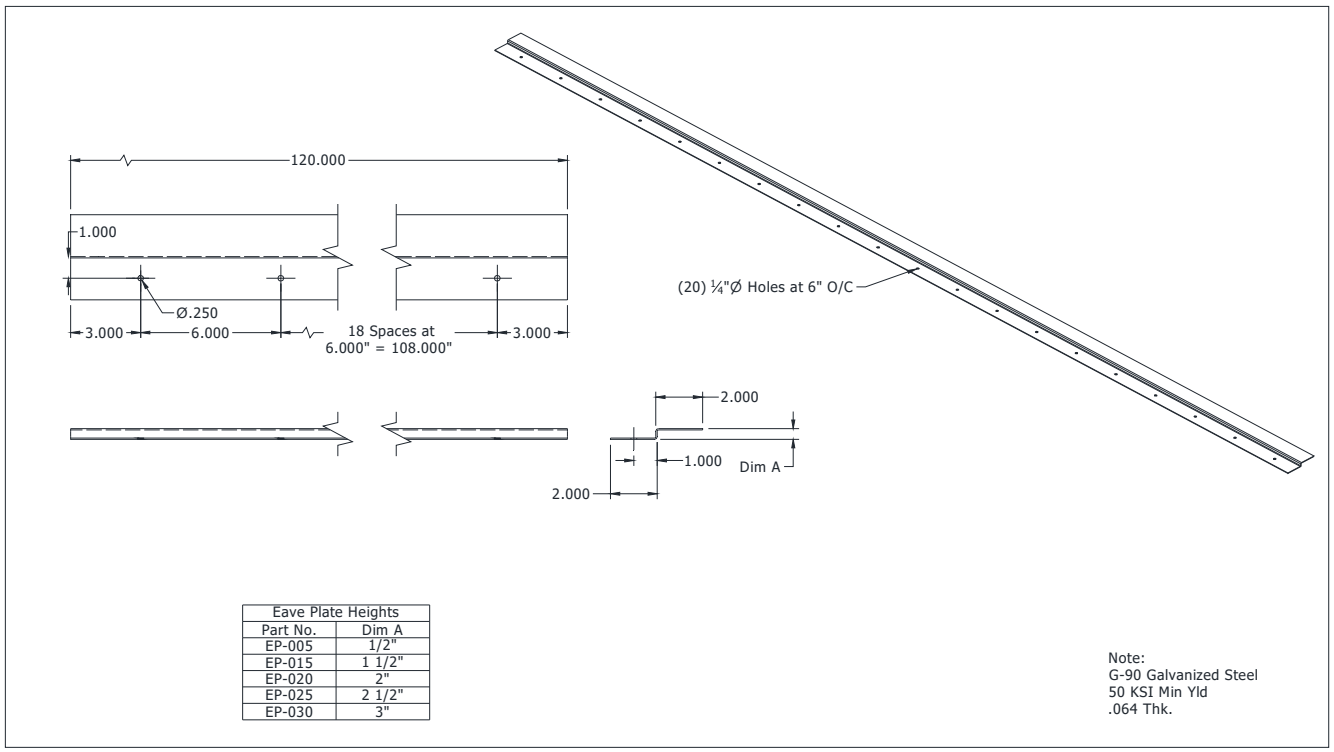
High Capacity Rake Plate



High Capacity Eave Plate



Eave Plate Heights	
Part No.	Dim A
EP-005	1/2"
EP-015	1 1/2"
EP-020	2"
EP-025	2 1/2"
EP-030	3"

Note:
G-90 Galvanized Steel
50 KSI Min Yld
.064 Thk.

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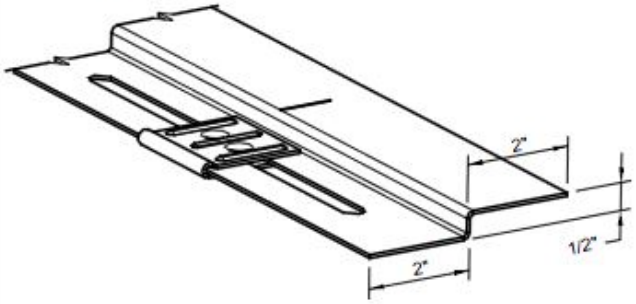
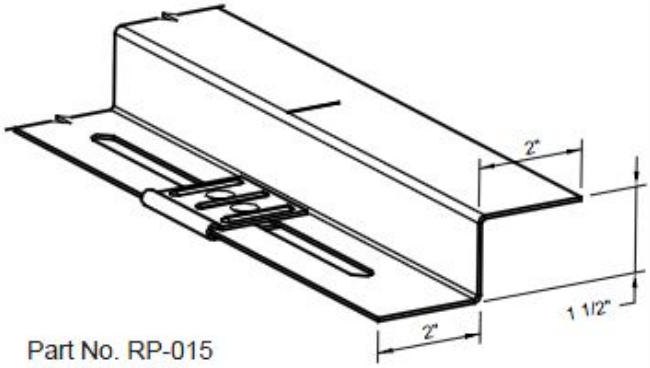
RAKE PLATE (for 1/2" stand-off)
- 16 ga., 50 ksi Galvanized Steel
- 10'-0" length
- Factory punched holes



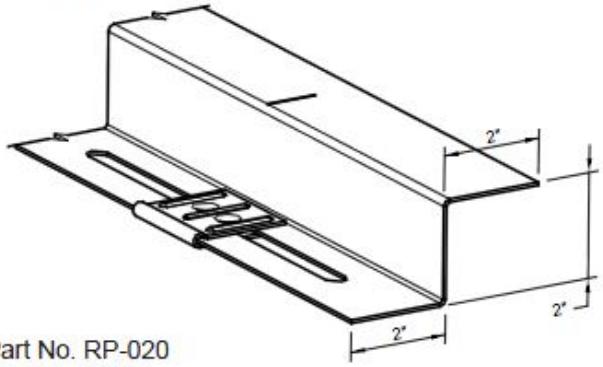
Part No. RP-005
Weight - 9.39

RAKE PLATE (for 1-1/2" stand-off)
- 16 ga., 50 ksi Galvanized Steel
- 10'-0" length
- Factory punched holes



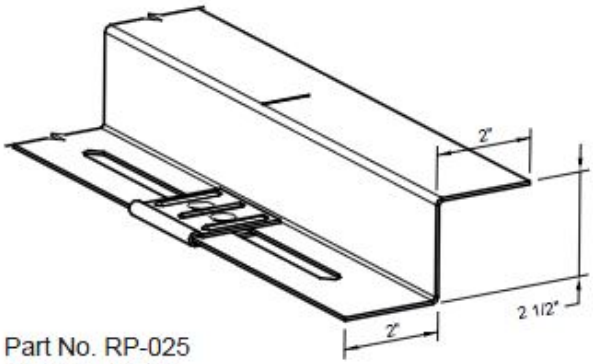
Part No. RP-015
Weight - 11.43

RAKE PLATE (for 2" stand-off)
- 16 ga., 50 ksi Galvanized Steel
- 10'-0" length
- Factory punched holes



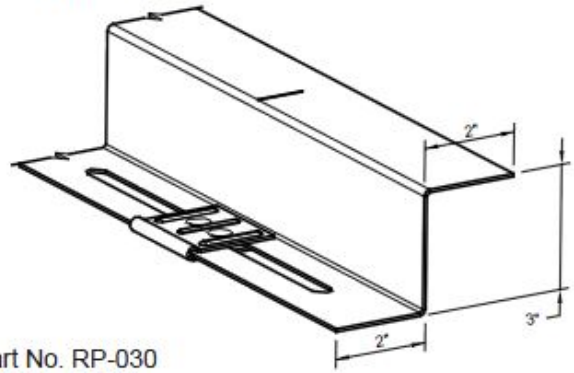
Part No. RP-020
Weight - 12.45

RAKE PLATE (for 2-1/2" stand-off)
- 16 ga., 50 ksi Galvanized Steel
- 10'-0" length
- Factory punched holes



Part No. RP-025
Weight - 13.47

RAKE PLATE (for 3" stand-off)
- 16 ga., 50 ksi Galvanized Steel
- 10'-0" length
- Factory punched holes



Part No. RP-030
Weight - 14.49

Note: Custom sized or shaped parts can be be fabricated. Please contact BRS for help in creating these parts. Be sure that new designs do not invalidate the any current test data you may be using in your roof designs.

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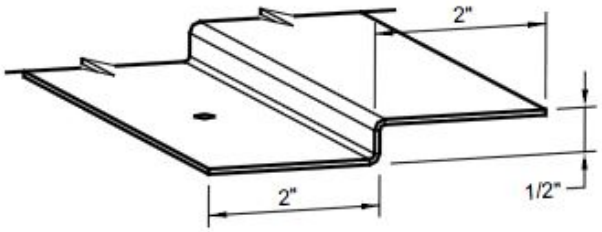
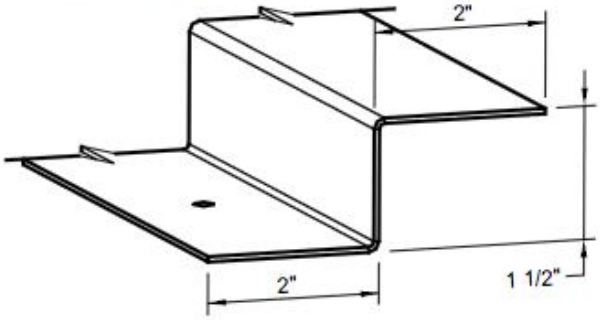
EAVE PLATE (for 1/2" stand-off)
- 16 ga., 50 ksi Galvanized Steel
- 10'-0" length
- Factory punched holes



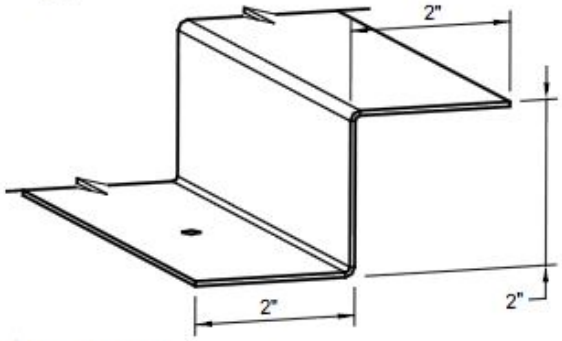
Part No. EP-005
Weight - 8.77

EAVE PLATE (for 1-1/2" stand-off)
- 16 ga., 50 ksi Galvanized Steel
- 10'-0" length
- Factory punched holes



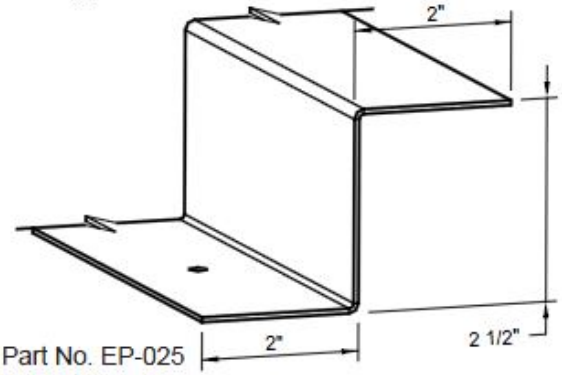
Part No. EP-015
Weight - 10.81

EAVE PLATE (for 2" stand-off)
- 16 ga., 50 ksi Galvanized Steel
- 10'-0" length
- Factory punched holes



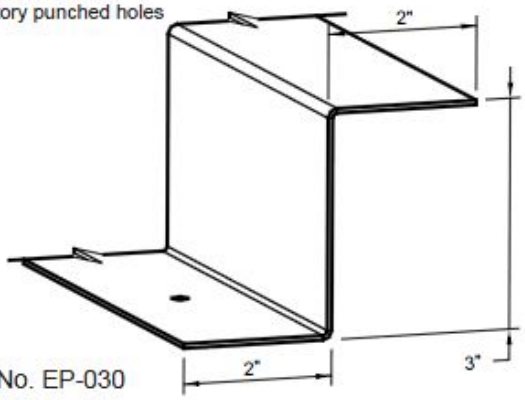
Part No. EP-020
Weight - 11.83

EAVE PLATE (for 2-1/2" stand-off)
- 16 ga., 50 ksi Galvanized Steel
- 10'-0" length
- Factory punched holes



Part No. EP-025
Weight - 12.85

EAVE PLATE (for 3" stand-off)
- 16 ga., 50 ksi Galvanized Steel
- 10'-0" length
- Factory punched holes



Part No. EP-030
Weight - 13.87

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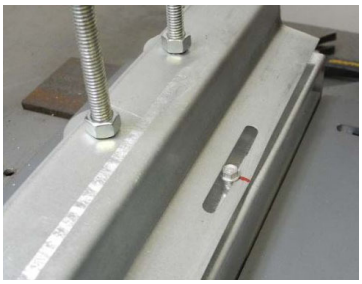
Rake Plate Calculations

Test Date:	1.16.2018
Type:	Pull Test
Description:	
Rake Plate	RP-005, RP-015, RP-030 and RP-138
Fastener	(2) 1/4"-14 x 1.25" long SDS with RP-005, RP-015, RP-030
	1/4"-14 x 1.25" long Shoulder SDS with RP-138
Support Thickness	16 ga.

Test	Rake Plate	Ultimate Load (lbs)	Failure Mode
1	RP-005	813	Plate rolled off clip
2	RP-005	790	Plate rolled off clip
3	RP-005	794	Plate rolled off clip
Average		799	
4	RP-015	841	Plate rolled off clip
5	RP-015	824	Plate rolled off clip
6	RP-015	806	Plate rolled off clip
Average		824	
7	RP-030	761	Plate rolled off clip
8	RP-030	818	Plate rolled off clip
9	RP-030	782	Plate rolled off clip
Average		787	
10	RP-138	186	Plate rolled off fastener
11	RP-138	217	Plate rolled off fastener
12	RP-138	228	Plate rolled off fastener
Average		210	

Old Style with Shoulder Screws (RP- 138)



Tested Load = 210#

Fastener locations per part = 10

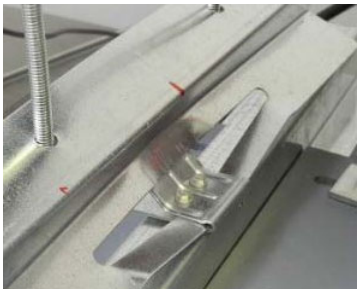
Total load per 10' part = 210 x 10 = 2100#

Design Load = 2100# / s.f. of 2 = 1050#

1050#/10' = 105 plf

105plf / 2' max tributary = **52.5 psf design load**

New Style with Shoulder Screws (RP-030)



Tested Load = 787#

Fastener locations per part = 7

Total load per 10' part = 787 x 7 = 5509#

Design Load = 5509# / s.f. of 2 = 2754.5#

2754.5#/10' = 275.45 plf

275.45plf / 2' max tributary = **137.73 psf design load**

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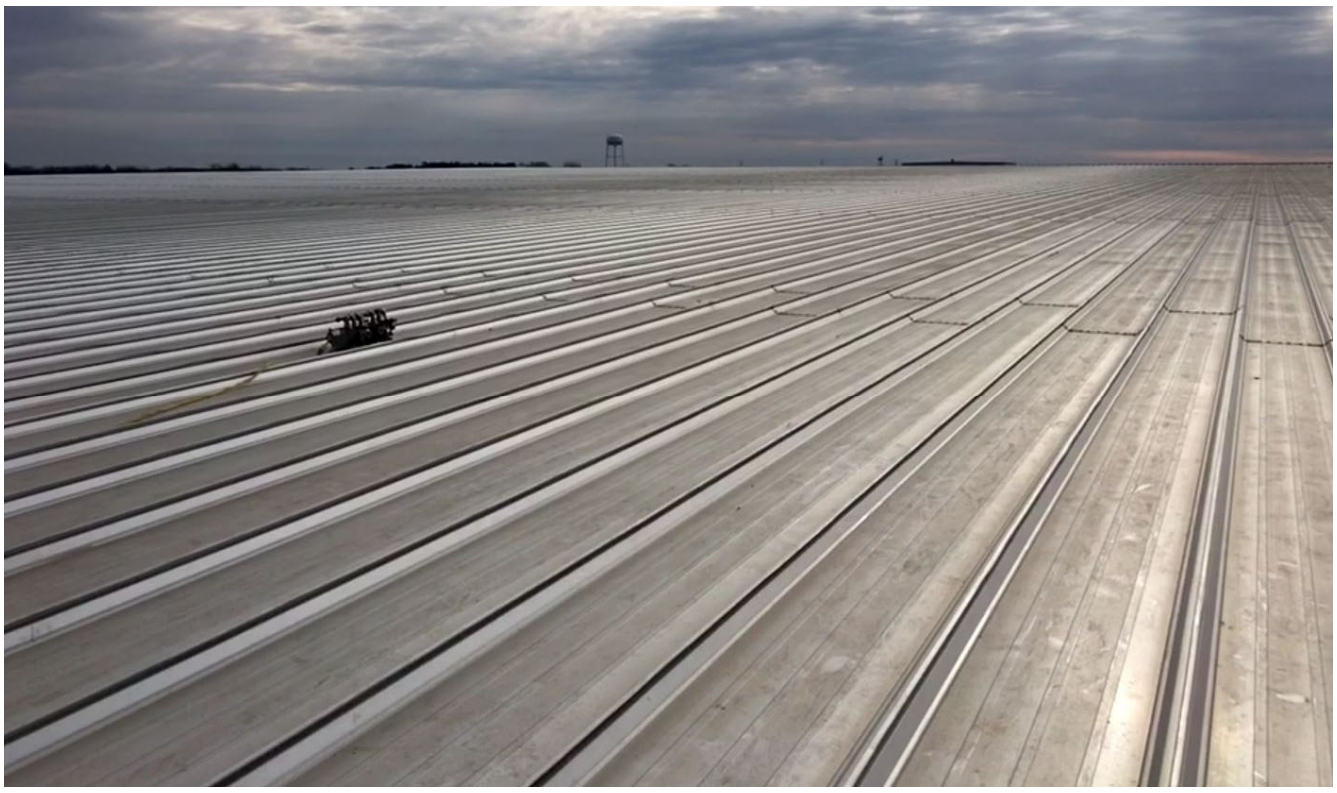
Expansion Calculations

Panel Material	Steel	
Panel length	450	feet
Design Temperature Differential	100	degrees
Expansion - Theoretical	3.51	inches
Expansion with Clip Friction (20% REDUCTION)	2.81	inches

Expansion Calculations

Panel Material	Steel	
Panel length	500	feet
Design Temperature Differential	100	degrees
Expansion - Theoretical	3.90	inches
Expansion with Clip Friction (20% REDUCTION)	3.12	inches

The HC Rake Plate has a nominal travel of 3 ½" in each direction when the HC Rake Plate washers are properly centered during installation.



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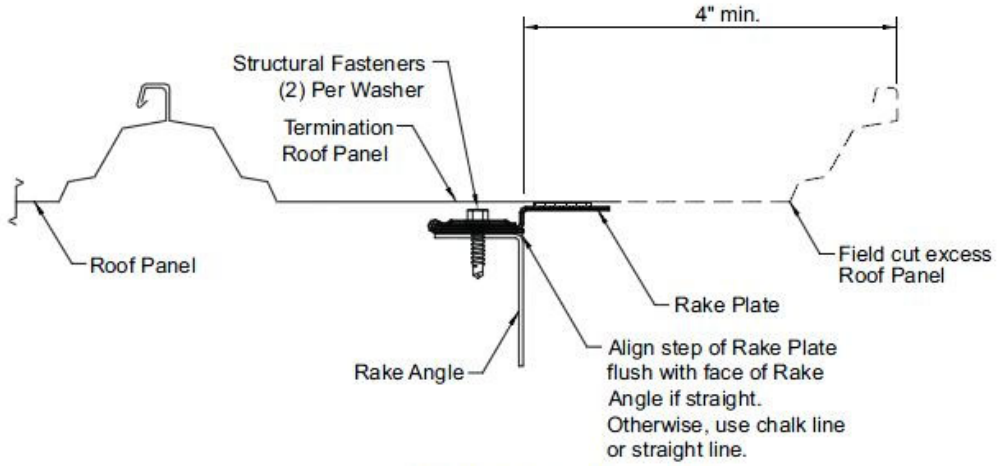
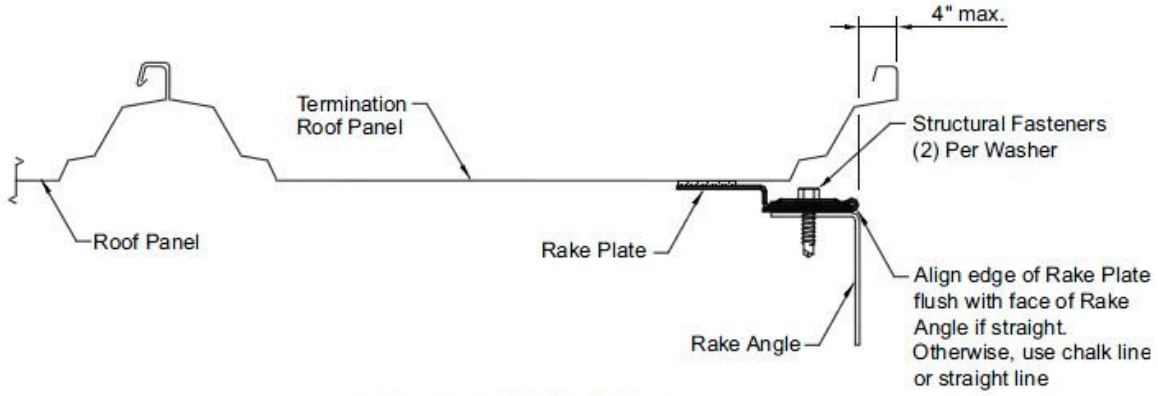
High Capacity Rake Installation Procedure

This method can be used at both ends of a roof plane or as only the termination on one end of the roof plane.



STANDARD RAKE PLATE POSITION



ALTERNATE RAKE PLATE POSITION

Refer to the erection drawings to determine which position to place the rake plate. The position of the rake plate will depend on the location of the termination roof panel as shown on the above illustrations.

If the leading edge of the panel extends 4" or more beyond the face of the rake angle, install the rake plate in the **standard** position.

If the leading edge of the panel extends less than 4" beyond the face of the rake angle, install the rake plate in the **alternate** position.

If the rake condition requires transition flashing, refer to the following page.

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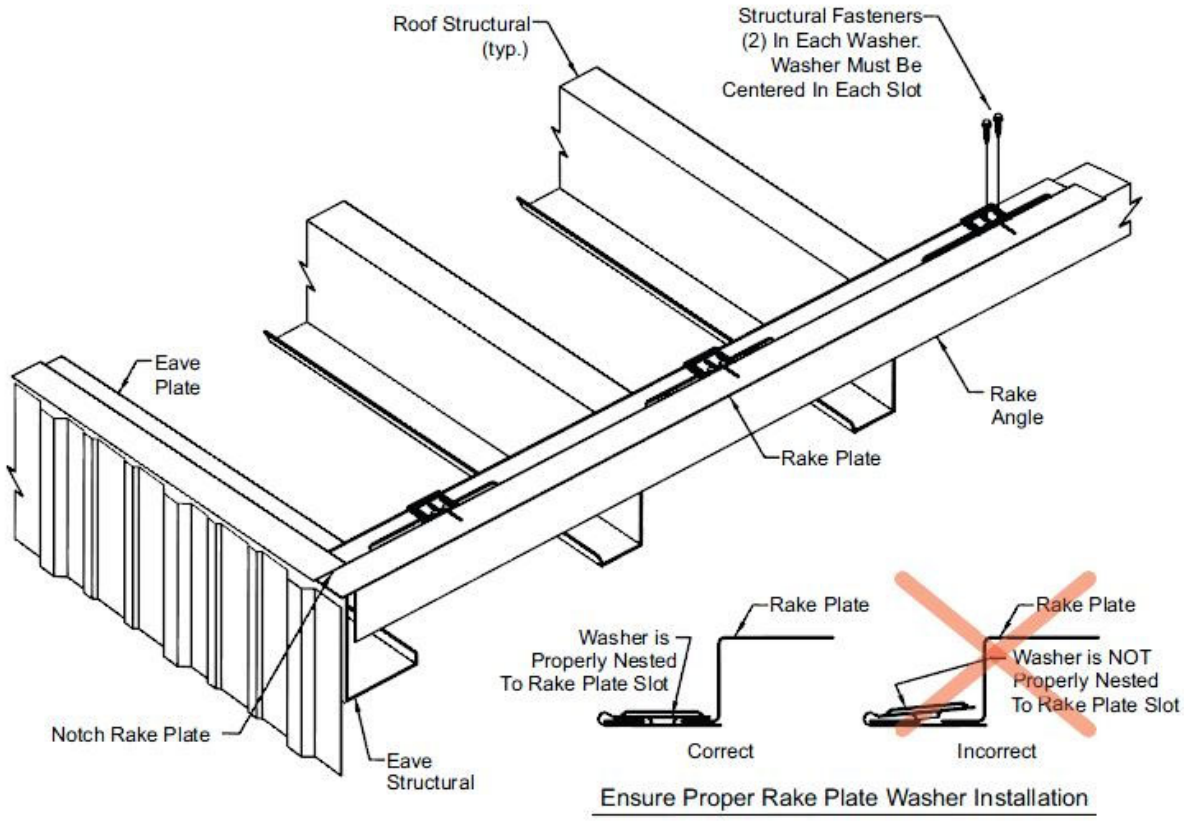

Ensure Proper Rake Plate Washer Installation

It is important that the rake plate is installed in a straight line square with the eave.

If the rake angles have been installed straight and true, the edge of the rake angle can be used to align the rake plate.

If the rake angle is not true and square, a chalkline should be used to guide the installation of the rake plate.

Start the end of the rake plate flush with the outer edge of the eave plate. Notch the bottom flange of the rake plate to clear the eave plate.

Secure the rake plate to the rake angle with 2 structural fasteners in the rake plate's attachment washer.

To allow for expansion/contraction movement, secure the rake plate to the rake angle with **structural fasteners** two per washer. Ensure each washer is centered in its respective slot.

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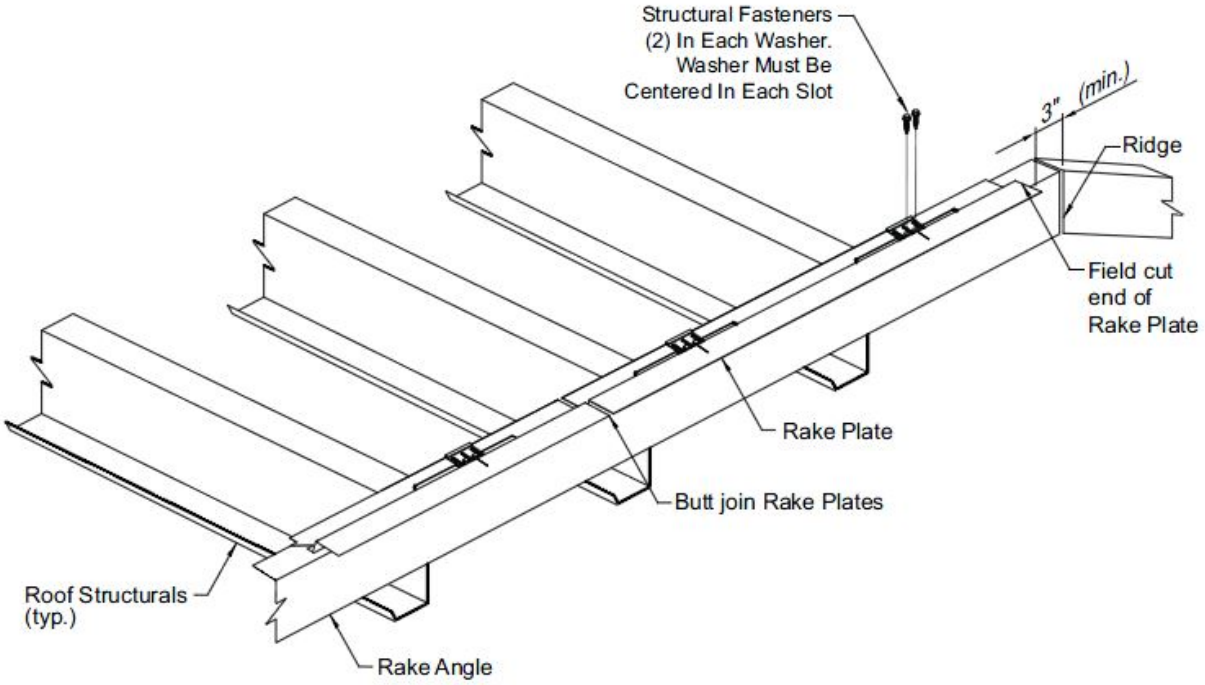
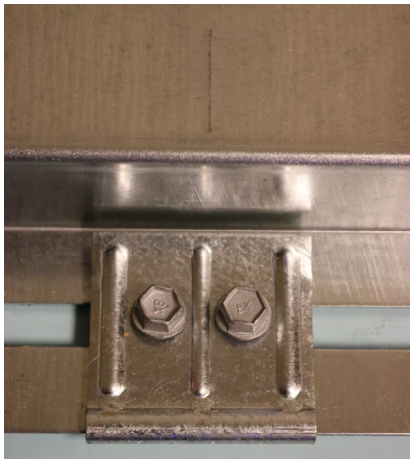


Butt join the ends of the rake plate. Install the structural fasteners in the washers, 2 per washer centered in the slot.

Field cut the last rake perimeter plate three inches (3") from the ridge line or high eave line.

Installation sticker found on each part.



Properly aligned rake washer.

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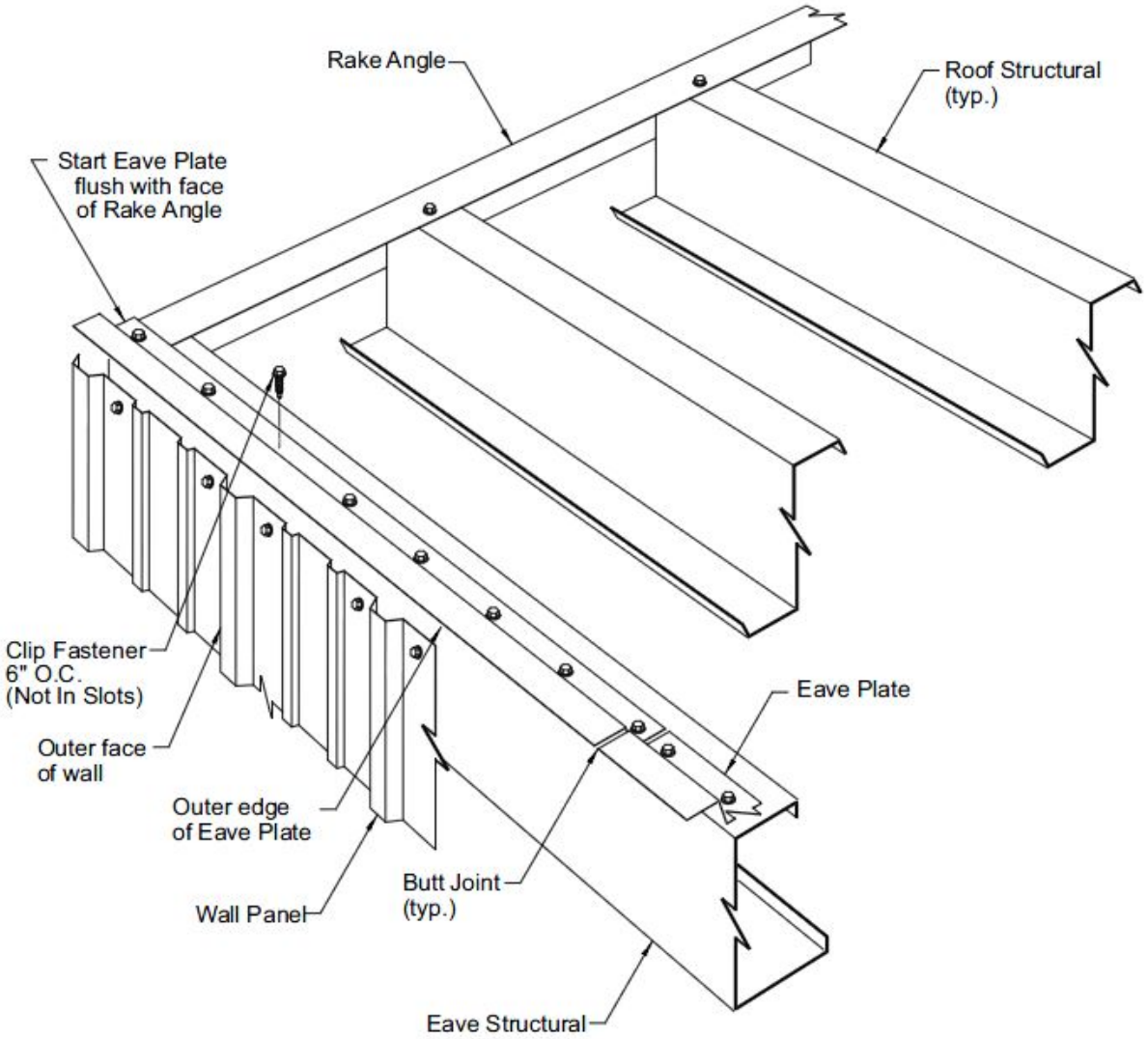
Eave Plate Installation Procedure



The eave plate provides a solid attachment surface for the eave end of the roof panel.

The eave plate must be installed before the roof insulation is placed over the structurals.

Before installing the eave plate, check that the eave structural members are in a straight alignment from rake to rake. Shim the eave plate as necessary to provide a level roof line.

Install the starting and finish ends of the eave plates flush with outer face of rake angle.

Install the outer edge of the eave plate flush with the outside face of the wall panel.

Tightly butt join the eave plates and fasten to the eave structural as shown.

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