



Beam Hanger Design Guide

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First Tech Credit Union

Portland, Oregon 2017

Courtesy of: Oregon Forest Resources Institute

Building Forests in Cities

MTC Solutions is a specialty supplier of connection solutions for modern mass timber applications in commercial, industrial and residential projects. We are proud to be working with the most innovative partners on cutting-edge projects across North America. Our goal is to see the wood construction industry thrive and help to maintain a low carbon footprint through education, research, and cost-effective approaches.



WE SUPPLY

MTC Solutions stocks more than 450 mass timber connection solutions ready for delivery throughout North America.

WE FUND



We do extensive research with leading North American universities to innovate Mass Timber Connections Solutions, reduce costs and extend the reach of mass timber in the market.



WE GUIDE

We offer free educational sessions on mass timber solutions in forms of webinars, technical learning sessions and event participation throughout North America.

WE EDUCATE



We provide the support needed to design efficient connection solutions. Our North American Support team is available to answer any design questions.

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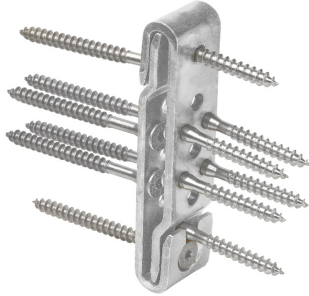
THE BEAM HANGER REVOLUTION

Recent Advances in mass timber fabrication technology and the use of virtual modeling software have changed the way modern mass timber structures are built. It is now possible to fully pre-install connection systems and have them ready for on-site assembly

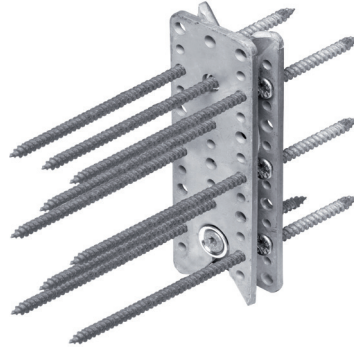
Pre-engineered connections make it possible to reduce installation error by installing connections in a controlled shop environment. This reduces the cost and complexity of labour required on site.

The Beam Hanger System pushes the industry to the next level by allowing pre manufacturing of connections. The Beam Hanger Systems presented in this guide are a revolutionary solution that allows for simple, fully concealed and fire rated connections in mass timber structures.

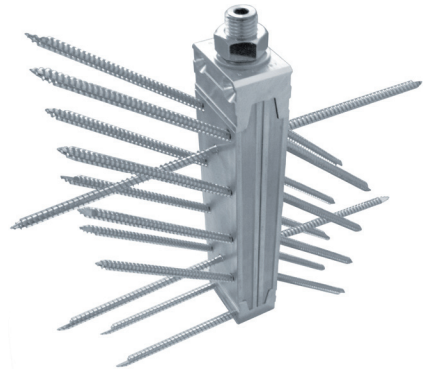
It is an off the shelf high capacity system, cost competitive as a structural package and delivered on site in record time.



GIGANT System



RICON S VS System



MEGANT System

Simple and Fast Installation

The Beam Hanger System typically consists of two identical parts, one installed in the primary member and the other in the secondary member.

These components are pre-installed into the members using structural wood screws. Depending on the Beam Hanger type, the system could include other required installation hardware. For more information, see hardware section, pages 8 to 10.

A simple, efficient and repetitive installation which reduces shop time and overall mass timber system supply cost.

Once the connection is ready in the shop, it is transported to the job site so it can be simply dropped-in place with no further installation work required. This allows for a more streamlined workflow.

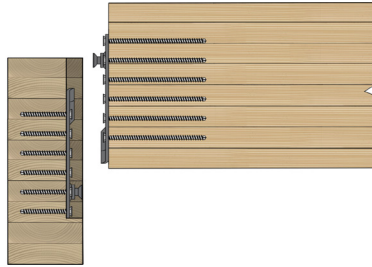


**Install of pre manufactured Post to Beam connection
First Tech building, Portland Oregon**

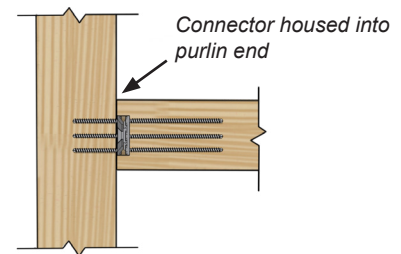
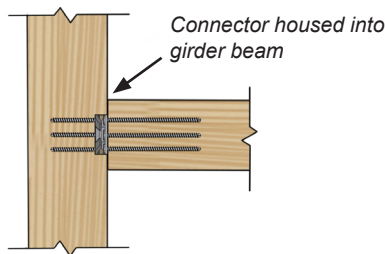
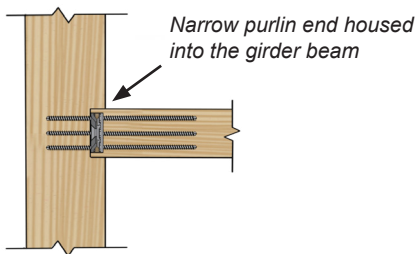
Fully Concealable System

The Beam Hanger System can be installed with various housing options to provide an architecturally appealing and fully concealed connection in mass timber elements.

This concealed arrangement also helps provide fire protection as explained in the following section.



Typical Concealed Configuration Achieved through Routing for Fire-Rated Connections



Top View of Three Concealed Installation Options

Fire-Rated

Full-scale fire resistance testing of loaded specimens connected with the Beam Hanger System were preformed at the Southwest Research Institute in San Antonio Texas.

The fire testing was conducted to verify the char layer calculations provided in North American Design standards. The tested Beam Hanger Systems were awarded with a 1-hour fire rating with a specified minimum char layer thickness.

It is also possible to calculate the fire rating for a Beam Hanger System using the appropriate codes and guidelines.

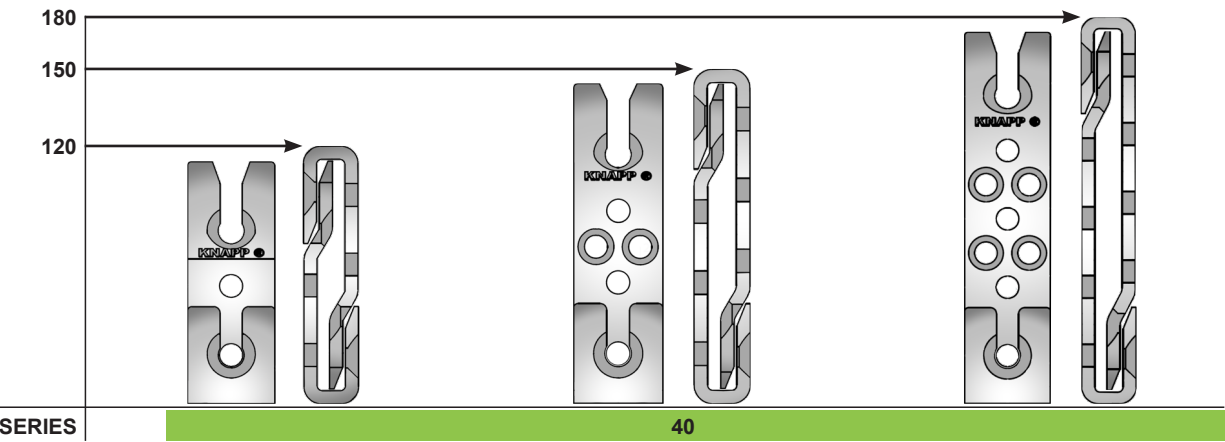
This is recommended for the Beam Hanger Systems that were not a part of the full-scale testing at the published date of this guide.



RICON S VS and MEGANT Connectors After Fire Testing

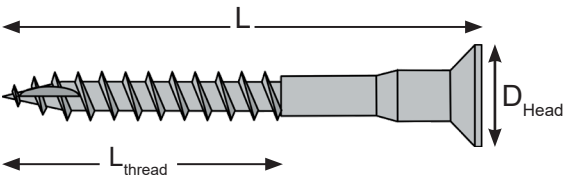
HARDWARE

GIGANT



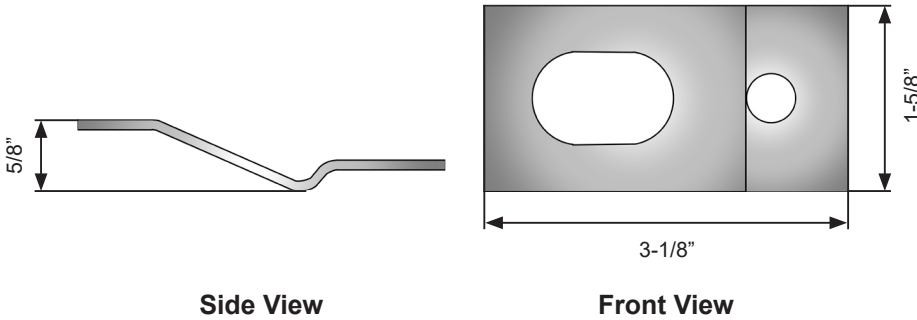
Note:
1. Product kit includes two identical connector plates.

Fastener - Gigant CSK

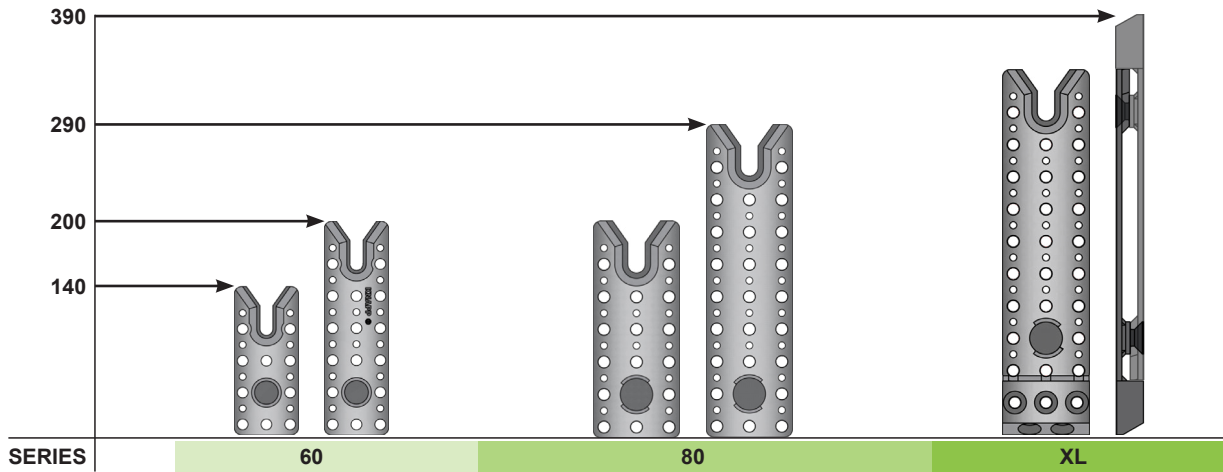


Item #	Type	D		L		L _{thread}		D _{Head}		Bit
		in	[mm]	in	[mm]	in	[mm]	in	[mm]	
170110080000100	Gigant CSK Screws	3/8"	[10]	3-1/8"	[80]	2-1/4"	[54]	3/4"	[18]	T40
170110120000100				4-3/4"	[120]	3-3/8"	[84]	3/4"	[18]	

Uplift Option - Clip Lock System



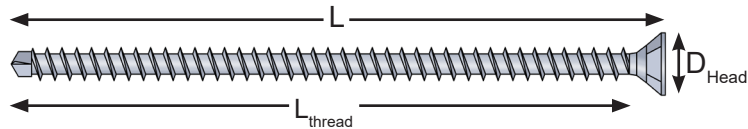
RICON S VS



Note:

- Product kit includes two identical connector plates.

Fastener - ASSY VG CSK



Item #	Type	D		L		L _{thread}		D _{Head}		Bit
		in	[mm]	in	[mm]	in	[mm]	in	[mm]	
140080080000102	ASSY VG CSK	5/16"	[8]	3-1/8"	[80]	2-1/2"	[61]	5/8"	[15]	AW 40
140080160000102				6-1/4"	[160]	5-5/8"	[143]			
140100100000102		3/8"	[10]	4"	[100]	3"	[77]	3/4"	[18.5]	AW 50
140100200000102				7-7/8"	[200]	7-1/4"	[185]			

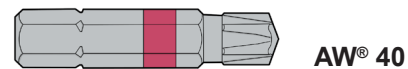
Notes:

- Apply 6-1/4" or 7-7/8" screw into the end grain.
- The suggested maximum installation torque for the 5/16" diameter VG CSK screw is 11.8 lbs.ft.
- The suggested maximum installation torque for the 3/8" diameter VG CSK screw is 23.6 lbs.ft.

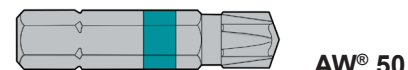
Bit - AW® Drive

The AW® Bits are engineered and patented for proper installation of all ASSY® screws and offer exceptional fit and durability. The AW® Bit series is engineered for:

- Optimum torque transfer
- Snug fit
- Self centering
- Reduced wobbling



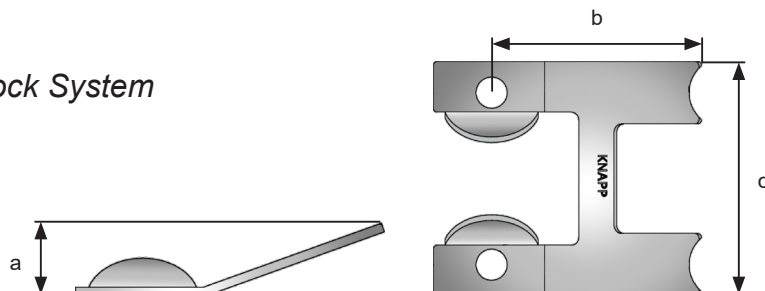
AW® 40



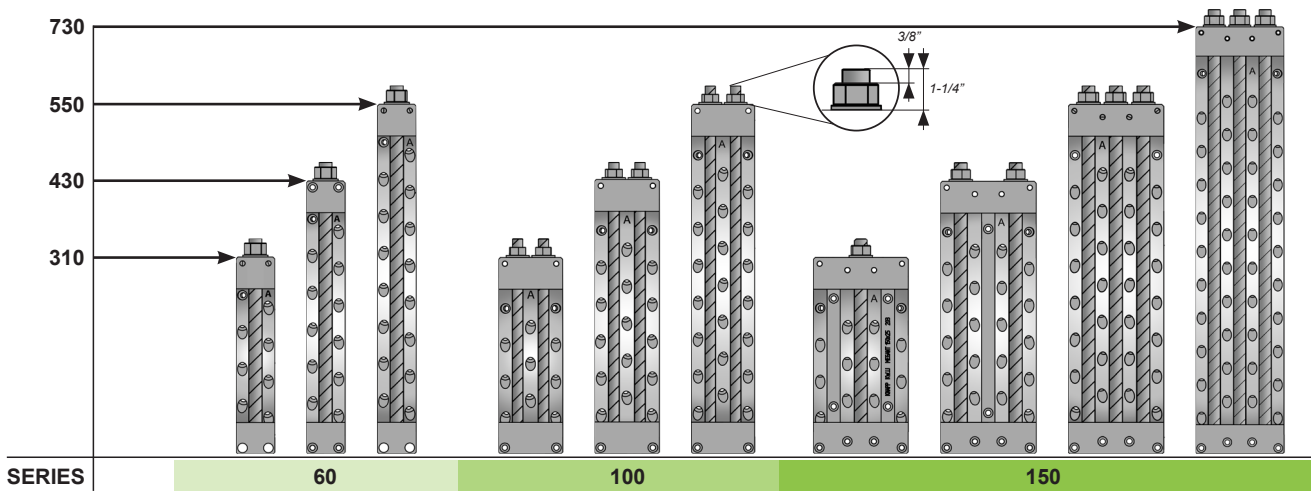
AW® 50

Table Uplift Options - Clip Lock System

SERIES	60	80
a	3/4"	3/4"
b	2-1/8"	2"
c	2-3/8"	3-1/4"



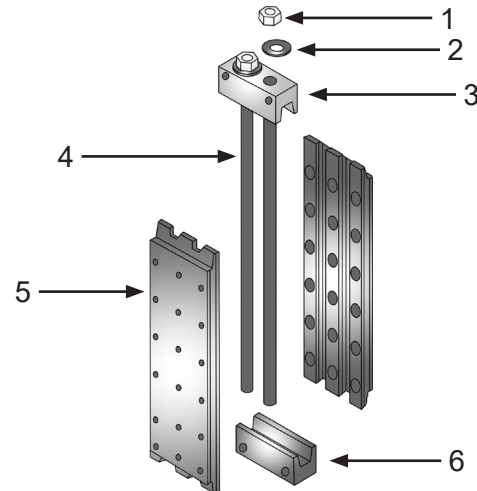
MEGANT



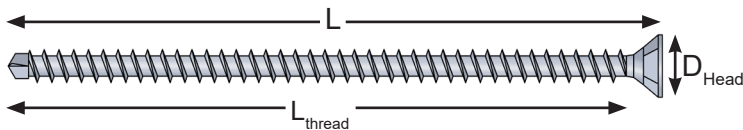
Note:
1. The suggested installation torque of the top nut for the MEGANT is 29.5 lbs.ft.

Product Kit Details

Number	Description
1	Hex Nut
2	Washer
3	Top Clamping Jaws [Without Thread]
4	Threaded Rod
5	Connector Plate [x 2]
6	Bottom Clamping Jaws [With Thread]



Fastener - ASSY VG CSK



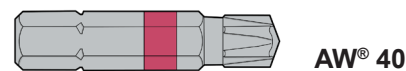
Item #	Type	D		L		L _{thread}		D _{Head}		Bit
		in	[mm]	in	[mm]	in	[mm]	in	[mm]	
140080160000102	ASSY VG CSK	5/16"	[8]	6-1/4"	[160]	5-5/8"	[143]	5/8"	[15]	AW 40

Note:
1. The suggested maximum installation torque for the 5/16" diameter VG CSK screw is 11.8 lbs.ft.

Bit - AW® Drive

The AW® Bits are engineered and patented for proper installation of all ASSY® screws and offer exceptional fit and durability. The AW® Bit series is engineered for:

- Optimum torque transfer
- Snug fit
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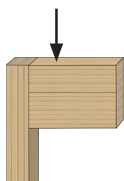


BEAM HANGER : SELECTION TOOL

The following pre-selection table helps the designer in choosing the right Beam Hanger System. The table lists the allowable loads for each system based on the minimum beam width and minimum beam depth.

More detail on a specific Beam Hanger System can be found in the pages listed in the table. Other requirements such as geometry and special connections should also be taken into consideration.

Table 1 Beam Hanger Selection guide for Douglas Fir Glulam Members

Minimum Beam Width		Minimum Beam Depth		Allowable Load							Connector			
														
inch	[mm]	inch	[mm]	Kips	Kips						Page			
					5	10	15	20	25	30				
2-3/8"	[60]	6-1/4"	[160]	1.2									Gigant 120x40	16
		7-7/8"	[200]	1.9									Gigant 150x40	17
		8-3/4"	[222]	2.5									Gigant 180x40	18
4"	[100]	7"	[180]	3.7									Ricon S VS 140x60	20
		9-1/2"	[240]	5.2									Ricon S VS 200x60	22
		15-3/4"	[400]	8.2									Megant 310x60	30
		20-1/2"	[520]	12.8									Megant 430x60	32
		25-1/4"	[640]	12.8									Megant 550x60	34
4-3/4"	[120]	9-1/2"	[240]	7.5									Ricon S VS 200x80	24
		13"	[330]	9.1									Ricon S VS 290x80	26
		17"	[430]	17.1									Ricon XL 390x80	28
5-5/8"	[140]	15-3/4"	[400]	10.5									Megant 310x100	36
		20-7/8"	[530]	17.5									Megant 430x100	38
		25-5/8"	[650]	19.5									Megant 550x100	40
7-1/2"	[190]	15-3/4"	[400]	13.6									Megant 310x150	42
		20-1/2"	[520]	22.7									Megant 430x150	44
		25-1/4"	[640]	31.8									Megant 550x150	46
		33-1/8"	[830]	32.6									Megant 730x150	48

Notes:

- Allowable loads listed here are only valid for Allowable Stress Design in the USA. This table is a pre-selection tool, please refer to each respective connector section and the CSA O86 for complete design guideline.
- Allowable loads listed here are only valid for use in D-Fir in standard term loading ($C_D = 1.0$), please refer to each respective connector section for more values.
- In the table:
 - Single connector allowable load.
 - Double connectors allowable load, minimum beam width is larger than listed value, refer to respective connector section.

HOW TO USE THIS GUIDE

About This Guide

All allowable loads presented in this document have been derived following the applicable provisions in the 2018 National Design Specification (NDS) for Wood Construction, the NDS Supplement: Design Values for Wood Construction.

Design Table Explanation

Item #	Min. Beam Size	Fastener Information	Allowable Loads
Product Item number	The minimum beam cross section requirements needed to install the Beam Hanger System	Fasteners are used to install the system in both the Primary member and the Secondary member Type: Corresponds to the names and dimensions of the screws used Quantity: Number of screws used	Allowable Loads are derived based on the American standards. For more information please see Allowable Loads Determination section.

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners				Allowable Loads [lbs]			
			Primary Member		Secondary Member		Floor C _D =1.0	Snow C _D =1.15	Roof C _D =1.25	Uplift
			Type	Quantity	Type	Quantity				
SINGLE RICON 140X60 S VS 170214060000900	4" x 7"	0.42 (SPF)	VG CSK 5/16" x 3-1/8"	7	VG CSK 5/16" x 6-1/4"	7	2,440	2,800	3,050	See uplift design p. 51 - 53
				10		10	3,370	3,870	4,210	
		0.49 (D.Fir)		7		7	2,690	3,090	3,360	
				10		10	3,710	4,260	4,630	

Assigned Specific Gravities (G)



S-P-F
G = 0.42



Douglas Fir
G = 0.49

Table Color Code

The colors represent the diameter of the fasteners used in the system:

- 1/4"
- 5/16"
- 3/8"
- 1/2"

Special Connections





If available, uplift design details will be presented for the Beam Hanger Systems in this guide. All other special connections will be listed in the table of content.

Icons Explanation

This design guide includes special icons intended to help the designer to select the right Beam Hanger System.




Compatible Material

This category highlights the compatible building materials with each beam hanger system.

-  The Beam Hanger System can be installed to wood elements
-  The Beam Hanger System can be installed to steel material
-  The Beam Hanger System can be installed to concrete material
-  The Beam Hanger System can be welded to the main or secondary member



Allowable Load Evaluation

This category identifies the approval bodies that have awarded the Beam Hanger System with the appropriate certifications.

-  The allowable loads for the Beam Hanger System were analyzed using the ICC-ES
-  European Technical Approval (EU)
-  Canadian Construction Materials Centre
-  International Code Council






Fire Rating

This category identifies the fire rating method for the Beam Hanger systems.

-  Full scale fire testing certifying system for 1.5 hours fire rating
-  Fire design may be calculated up to 3 hours

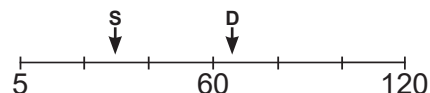
Installation Possibilities

The Beam Hanger Systems can be installed from different orientations. The orientations are relative to the main member. They also include special installation possibilities. Each installation orientation is general and does not take into consideration specific project constraints.

-  The Beam Hanger System can be installed and dropped in from above only
-  The Beam Hanger System can be installed and positioned from all sides (left, right, up and down)
-  The Beam Hanger System can be fully concealed and housed into the members
-  The Beam Hanger System can not be fully concealed
-  The Beam Hanger System can be pre-installed in a shop to the members before arriving on-site

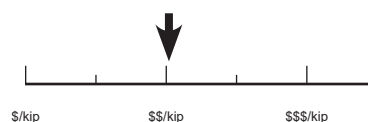
Number of Fasteners to Install

This category shows a summary of the number of fasteners required for fastening the system. The minimum screw quantity required for the Beam Hanger Systems is presented on the left and the maximum quantity on the right. The S indicates single connections, and D double connections



Cost to Capacity Ratio

This category shows a general cost to capacity ratio within the Beam Hanger Systems. This is meant to provide the designer with information on the cost of the Beam Hanger System relative to the capacities reached.



NOTES TO THE DESIGNER

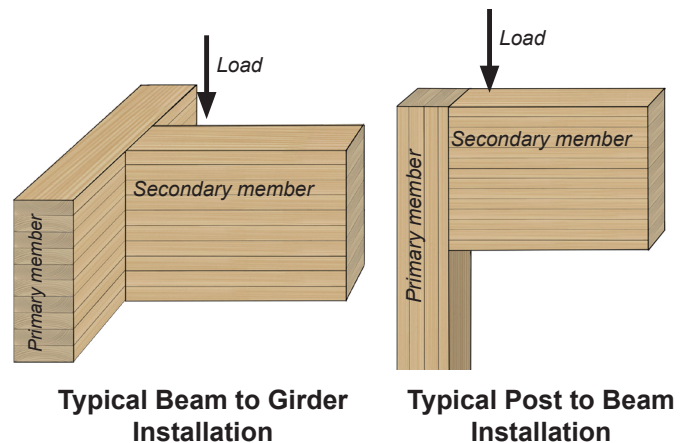
1. Allowable loads are derived in accordance with ASTM D 7147-11. Values given in the design tables are ASD equivalent and need to be adjusted in accordance with all parameters listed in the NDS-2018.
2. Allowable loads provided are the maximum load that a connection is designed to resist.
3. Connectors in combination with carbon steel ASSY VG CSK fasteners are to be used in dry service conditions and temperatures below 100F so that $C_M = 1.0$ and $C_t = 1.0$.
4. Connectors are to be aligned with the resultant vertical force, with the plates installed symmetrically about the vertical axis. Horizontal eccentricities shall be avoided.
5. Connectors, if subjected to rotational forces, must be designed accordingly and appropriate additional measures must be defined by the designer.
6. If splitting of the wood or wood-based material is observed during installation or prior to installation of the fasteners, a design professional must be contacted immediately, and appropriate measures must be taken. In case of fastener damage or breakage, a design professional must also be notified.
7. Pilot holes may be used to facilitate the installation of the fasteners for the sake of greater precision. Pilot hole diameters shall not exceed 60% of the outer thread diameter of the fastener.
8. Allowable loads may exceed the shear capacity of the glulam member or cross-laminated timber or other material properties. The specifying designer must verify the capacity of all members of the connection accordingly.
9. Installation must respect all minimum beam size requirements.
10. Connection geometry requirements must be respected, otherwise connections must be reinforced.
11. Listed allowable loads apply to different timber species according to their respective specific gravities (G) as per NDS-2018.
12. The sample beam depths listed in this design guide are for guidance purposes only. Note that tolerances for glulam finished dimensions provided within manufacturing standards ANSI 117 may not provide the adequate squareness and depth consistency required to ensure a problem-free field installation. A 1/4" (6mm) undersize in depth and 1/8" (3 mm) in width may be required. Verify glulam finished dimensions with the timber provider for more information.

Allowable Loads Derivation

Allowable loads presented in this design guide was calculated following the recognized data analysis presented in ICC-ES Acceptance Criteria and ASTM standards.

Fastener allowable loads were evaluated following the analysis presented in ICC-ES AC13. ASSY fully threaded fasteners are in accordance with the ICC evaluation report; ESR-3178.

Typical Load Application





Carbon 12

Portland, Oregon 2017

Courtesy of: Andrew Poque

GIGANT 120 X 40

Connector Parameters and Dimensions

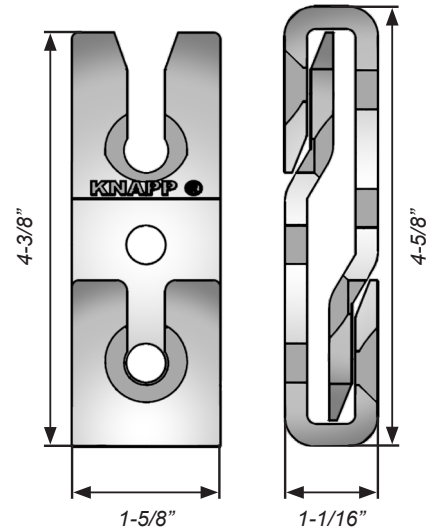
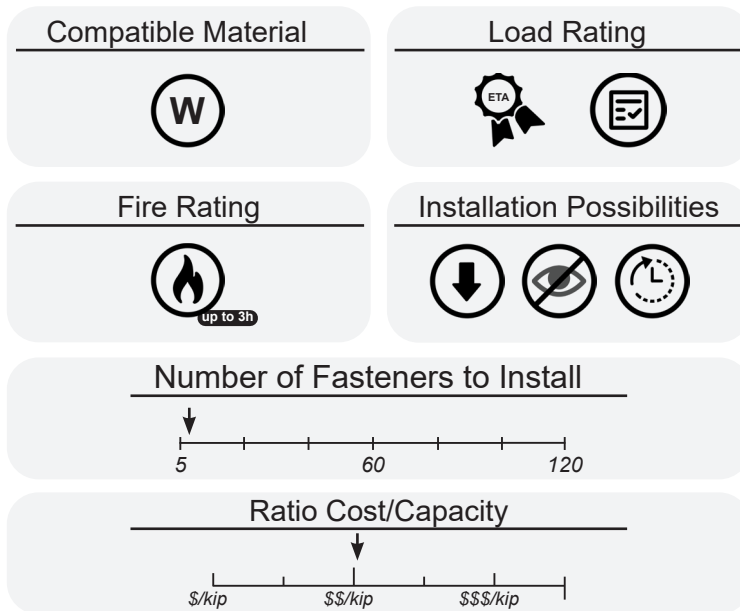


Table 2.1 Allowable Loads for GIGANT 120 x 40

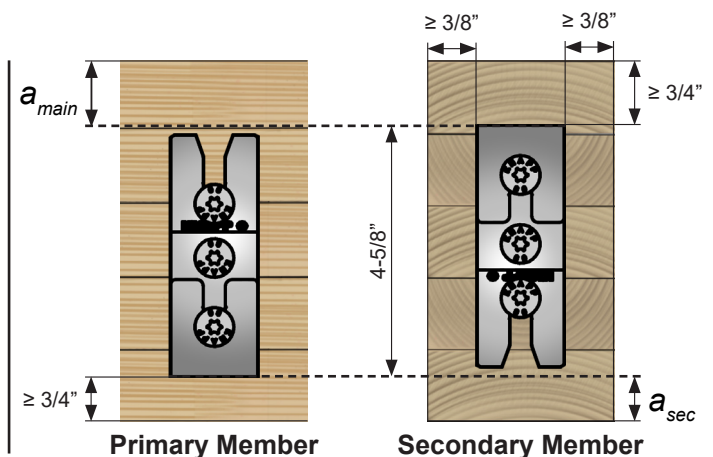
Item #	Min. Beam Size	Specific Gravity [G]	Fasteners				Allowable Loads [lbs]	
			Primary Member		Secondary Member		Down Load	Uplift
			Type	Quantity	Type	Quantity		
GIGANT 120 x 40 170112040000100	2-3/8" x 6-1/4"	0.42 (SPF)	Gigant CSK 3/8" x 3-1/8"	3	Gigant CSK 3/8" x 4-3/4"	3	1,090	See uplift design p. 51 - 53
		0.49 (D.Fir)	Gigant CSK 3/8" x 3-1/8"	3	Gigant CSK 3/8" x 4-3/4"	3	1,230	

Table 2.2 Geometry Requirements - Minimum and Maximum Distances (a_{main} , a_{sec})

Beam Depth	6-1/4"	7-3/4"	9-1/4"	10-3/4"	12-1/4"	13-3/4"	15-1/4"	16-3/4"	18-1/4"
a_{main} & a_{sec}	min	3/4"							
	max	3/4"	7/8"	1-3/8"	1-3/4"	2-1/4"	2-3/4"	3-1/4"	3-5/8"

Notes:

- Allowable loads listed are only valid for Allowable Stress Design in the USA.
- Allowable loads listed are only valid using listed Gigant CSK screws.
- Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
- Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
- Connector placement must respect the requirements presented in the adjacent figures.
- All connection design must meet all relevant requirements of the Notes to the Designer section.
- The secondary member must be prevented from twisting.
- All icons are described in section "How to use this guide" on page 9.
- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- For the beam sizes not listed in table 2.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 2.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



GIGANT 150 X 40

Connector Parameters and Dimensions

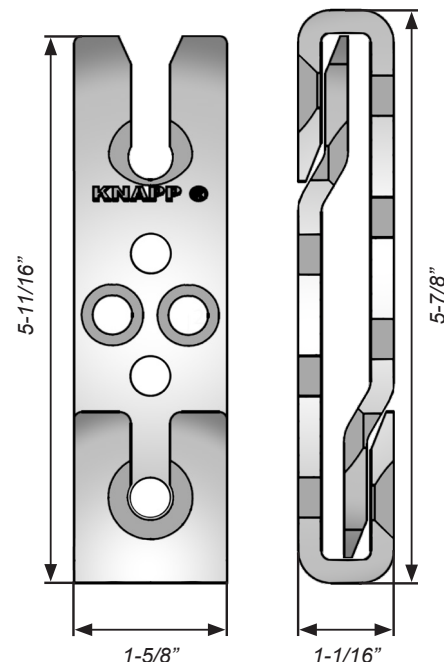
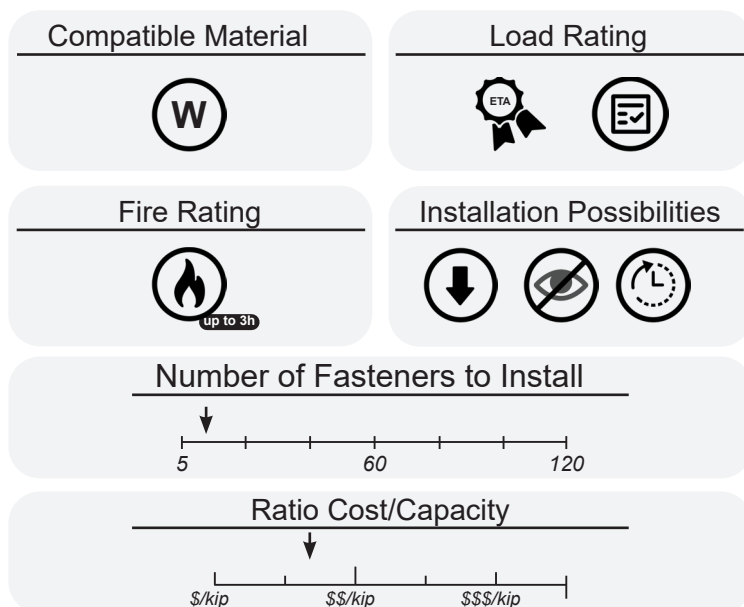


Table 3.1 Allowable Loads for GIGANT 150 x 40

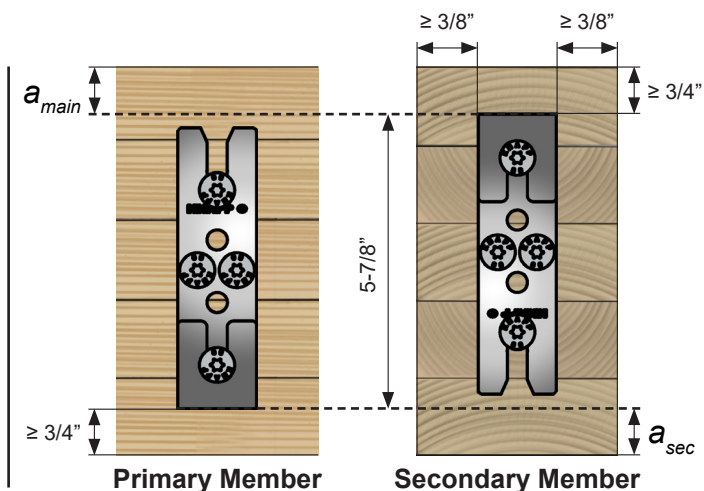
Item #	Min. Beam Size	Specific Gravity [G]	Fasteners				Allowable Loads [lbs]	
			Primary Member		Secondary Member		Down Load	Uplift
			Type	Quantity	Type	Quantity		
GIGANT 150 x 40 170115040000100	2-3/8" x 7-7/8"	0.42 (SPF)	Gigant CSK 3/8" x 3-1/8"	4	Gigant CSK 3/8" x 4-3/4"	4	1,640	See uplift design p. 51 - 53
		0.49 (D.Fir)	Gigant CSK 3/8" x 3-1/8"	4	Gigant CSK 3/8" x 4-3/4"	4	1,910	

Table 3.2 Geometry Requirements - Minimum and Maximum Distances (a_{main} , a_{sec})

Beam Depth		7-7/8"	9-3/8"	10-7/8"	12-3/8"	13-7/8"	15-3/8"	17-3/4"	18-3/8"	19-7/8"
a_{main} & a_{sec}	min	3/4"								
	max	7/8"	1-3/8"	1-3/4"	2-1/4"	2-3/4"	3-1/4"	3-3/4"	4-1/8"	4-1/2"

Notes:

- Allowable loads listed are only valid for Allowable Stress Design in the USA.
- Allowable loads listed are only valid using listed Gigant CSK screws.
- Allowable loads listed are only valid for dry service condition ($C_d=1.0$).
- Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
- Connector placement must respect the requirements presented in the adjacent figures.
- All connection design must meet all relevant requirements of the Notes to the Designer section.
- The secondary member must be prevented from twisting.
- All icons are described in section "How to use this guide" on page 9.
- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- For the beam sizes not listed in table 3.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 3.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



GIGANT 180 X 40

Connector Parameters and Dimensions

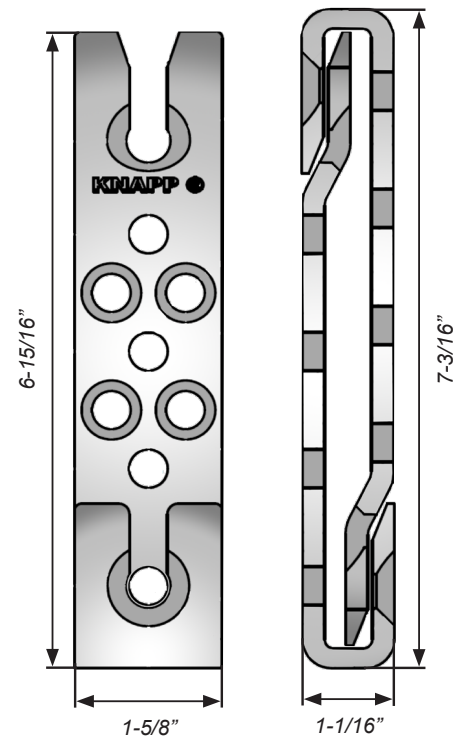
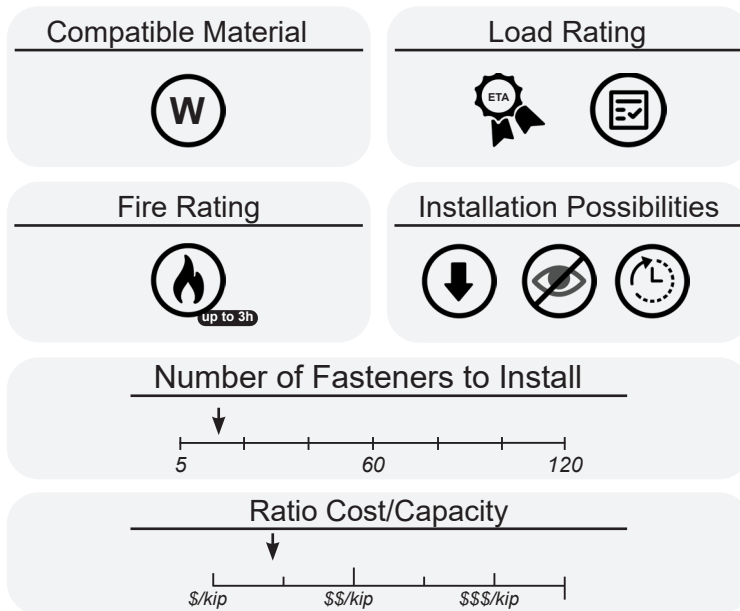


Table 4.1 Allowable Loads for GIGANT 180 x 40

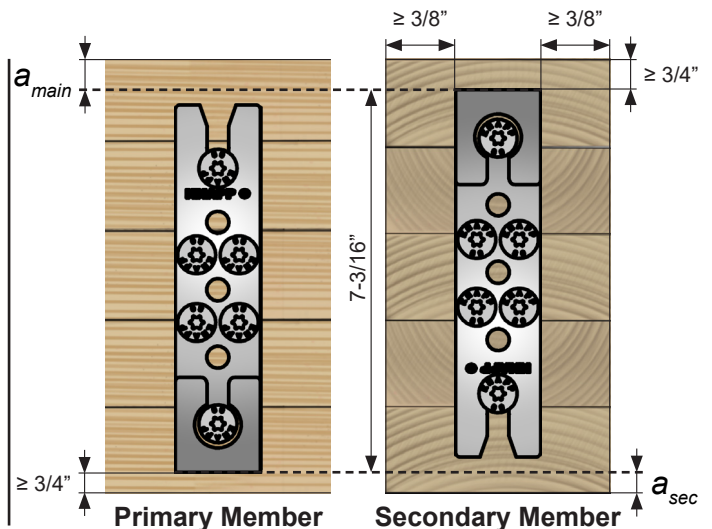
Item #	Min. Beam Size	Specific Gravity [G]	Fasteners				Allowable Loads [lbs]	
			Primary Member		Secondary Member		Down Load	Uplift
			Type	Quantity	Type	Quantity		
GIGANT 180 x 40 170118040000100	2-3/8" x 8-3/4"	0.42 (SPF)	Gigant CSK 3/8" x 3-1/8"	6	Gigant CSK 3/8" x 4-3/4"	6	2,180	See uplift design p. 51 - 53
		0.49 (D.Fir)	Gigant CSK 3/8" x 3-1/8"	6	Gigant CSK 3/8" x 4-3/4"	6	2,460	

Table 4.2 Geometry Requirements - Minimum and Maximum Distances (a_{main} , a_{sec})

Beam Depth	8-3/4"	10-1/4"	11-3/4"	13-1/4"	14-3/4"	16-1/4"	17-3/4"	19-1/4"	20-3/4"
a_{main} & a_{sec}	min	3/4"							
	max	3/4"	1-5/8"	2"	2-1/2"	2-7/8"	3-3/8"	3-3/4"	4-1/4"

Notes:

- Allowable loads listed are only valid for Allowable Stress Design in the USA.
- Allowable loads listed are only valid using listed Gigant CSK screws.
- Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
- Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
- Connector placement must respect the requirements presented in the adjacent figures.
- All connection design must meet all relevant requirements of the Notes to the Designer section.
- The secondary member must be prevented from twisting.
- All icons are described in section "How to use this guide" on page 9.
- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- For the beam sizes not listed in table 4.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 4.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .





Rocky Ridge YMCA

Calgary, Alberta 2016

RICON S VS 140 X 60

Connector Parameters and Dimensions

Compatible Material

Load Rating

Fire Rating

Installation Possibilities

Number of Fasteners to Install

Ratio Cost/Capacity

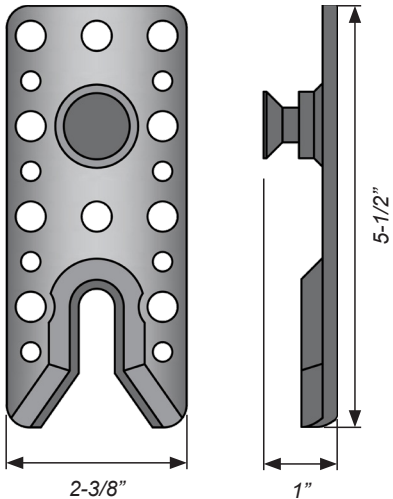
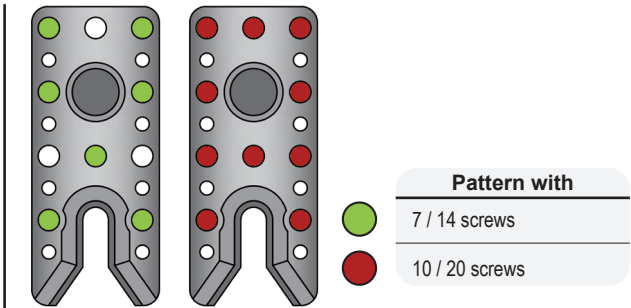


Table 5.1 Allowable Loads for RICON S VS 140 x 60

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners				Allowable Loads [lbs]			
			Primary Member		Secondary Member		Floor C _d =1.0	Snow C _d =1.15	Roof C _d =1.25	Uplift
			Type	Quantity	Type	Quantity				
SINGLE RICON 140X60 S VS 170214060000900	4" x 7"	0.42 (SPF)	VG CSK 5/16" x 3-1/8"	7	VG CSK 5/16" x 6-1/4"	7	2,440	2,800	3,050	See uplift design p. 51 - 53
				10		10	3,370	3,870	4,210	
		0.49 (D.Fir)		7		7	2,690	3,090	3,360	
				10		10	3,710	4,260	4,630	
DOUBLE RICON 140X60 S VS 170214060000900	6-3/4" x 7"	0.42 (SPF)	VG CSK 5/16" x 3-1/8"	14	VG CSK 5/16" x 6-1/4"	14	4,140	4,760	5,180	
				20		20	5,720	6,570	7,150	
		0.49 (D.Fir)		14		14	4,570	5,250	5,710	
				20		20	6,300	7,240	7,870	

- Notes:
1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
 2. Allowable loads listed are only valid using listed ASSY screws.
 3. Allowable loads listed are only valid for dry service condition (C_d=1.0).
 4. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 5. Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.21). If not fulfilled, additional reinforcement in accordance with Reinforcement Section (p. 64-69) must be applied.
 6. The secondary member must be prevented from twisting.
 7. All icons are described in section "How to use this guide" on page 9.
 8. Screw installation must follow the patterns presented under the design table.
 9. All connection design must meet all relevant requirements of the Notes to the Designer section.



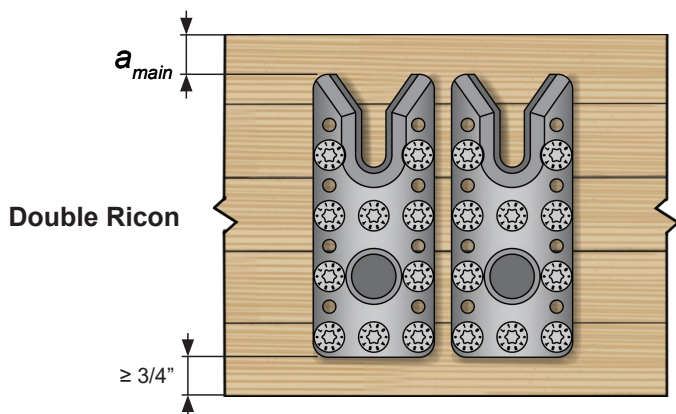
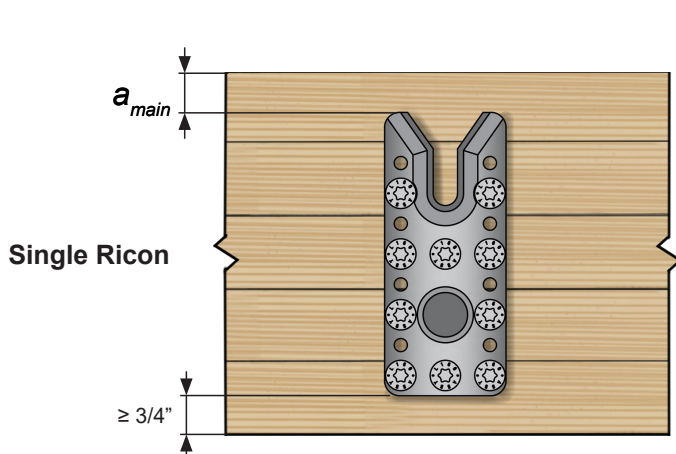
Connection Geometry Requirements

Table 5.2 Minimum and Maximum Distances (a_{main} , a_{sec})

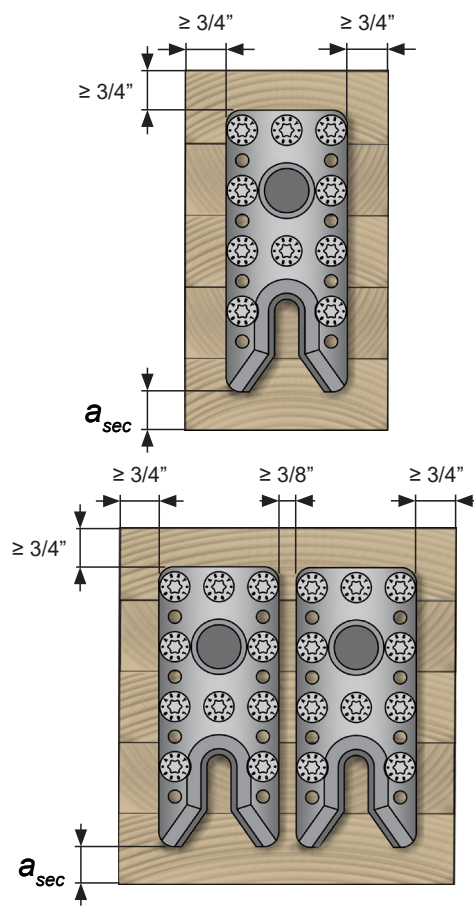
Beam Depth	7-1/8"	9"	10-1/2"	12"	13-1/2"	15"	16-1/2"	18"	19-1/2"	21"	22-1/2"	24"
a_{main} & a_{sec}	3/4"											
a_{main}	3/4"	1-1/4"	1-5/8"	2-1/8"	2-1/2"	3"	3-3/8"	3-7/8"	4-1/4"	4-3/4"	5-1/4"	5-5/8"
a_{sec}	3/4"	1-1/4"	1-5/8"	2-1/8"	2-1/2"	3"	3-3/8"	3-7/8"	4-1/4"	4-3/4"	5-1/4"	5-5/8"

Notes:

- The connector may be used without reinforcement if $a_{min} \leq [a_{main} \& a_{sec}] \leq a_{max}$. If $a_{sec} > a_{max}$, the connection must be reinforced following the reinforcement section (p.64-69).
- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- For the beam sizes not listed in table 5.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 5.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Primary Member



Secondary Member

RICON S VS 200 X 60

Connector Parameters and Dimensions

Compatible Material



Load Rating



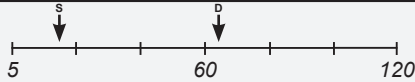
Fire Rating



Installation Possibilities



Number of Fasteners to Install



Ratio Cost/Capacity

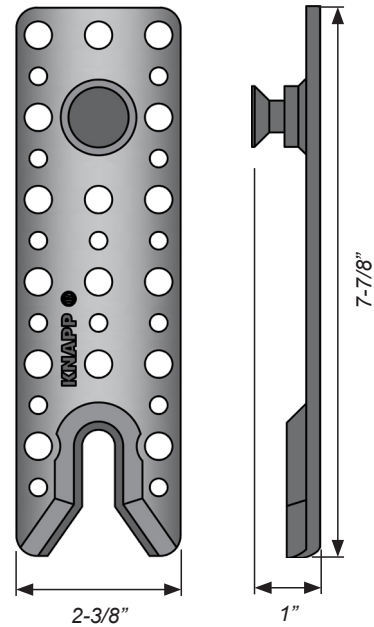
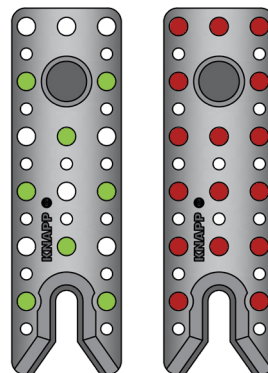


Table 6.1 Allowable Loads for RICON S VS 200 x 60

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners				Allowable Loads [lbs]			
			Primary Member		Secondary Member		Floor C _D =1.0	Snow C _D =1.15	Roof C _D =1.25	Uplift
			Type	Quantity	Type	Quantity				
SINGLE RICON 200X60 S VS 1702200600000900	4" x 9-1/2"	0.42 (SPF)	VG CSK 5/16" x 3-1/8"	8	VG CSK 5/16" x 6-1/4"	8	2,730	3,130	3,410	See uplift design p. 51 - 53
				16		16	4,800	5,520	6,000	
		0.49 (D.Fir)		8		8	3,000	3,450	3,750	
				16		16	5,290	6,080	6,610	
DOUBLE RICON 200X60 S VS 1702200600000900	6-3/4" x 9-1/2"	0.42 (SPF)	VG CSK 5/16" x 3-1/8"	16	VG CSK 5/16" x 6-1/4"	16	4,640	5,320	5,790	
				32		32	8,160	9,380	10,200	
		0.49 (D.Fir)		16		16	5,100	5,860	6,370	
				32		32	8,990	10,330	11,230	

Notes:

1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
2. Allowable loads listed are only valid using listed ASSY screws.
3. Allowable loads listed are only valid for dry service condition ($C_D=1.0$).
4. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
5. Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.23). If not fulfilled, additional reinforcement in accordance with Reinforcement Section (p. 64-69) must be applied.
6. The secondary member must be prevented from twisting.
7. All icons are described in section "How to use this guide" on page 9.
8. Screw installation must follow the patterns presented under the design table.
9. All connection design must meet all relevant requirements of the Notes to the Designer section.



Pattern with

8 / 16 screws

16 / 32 screws

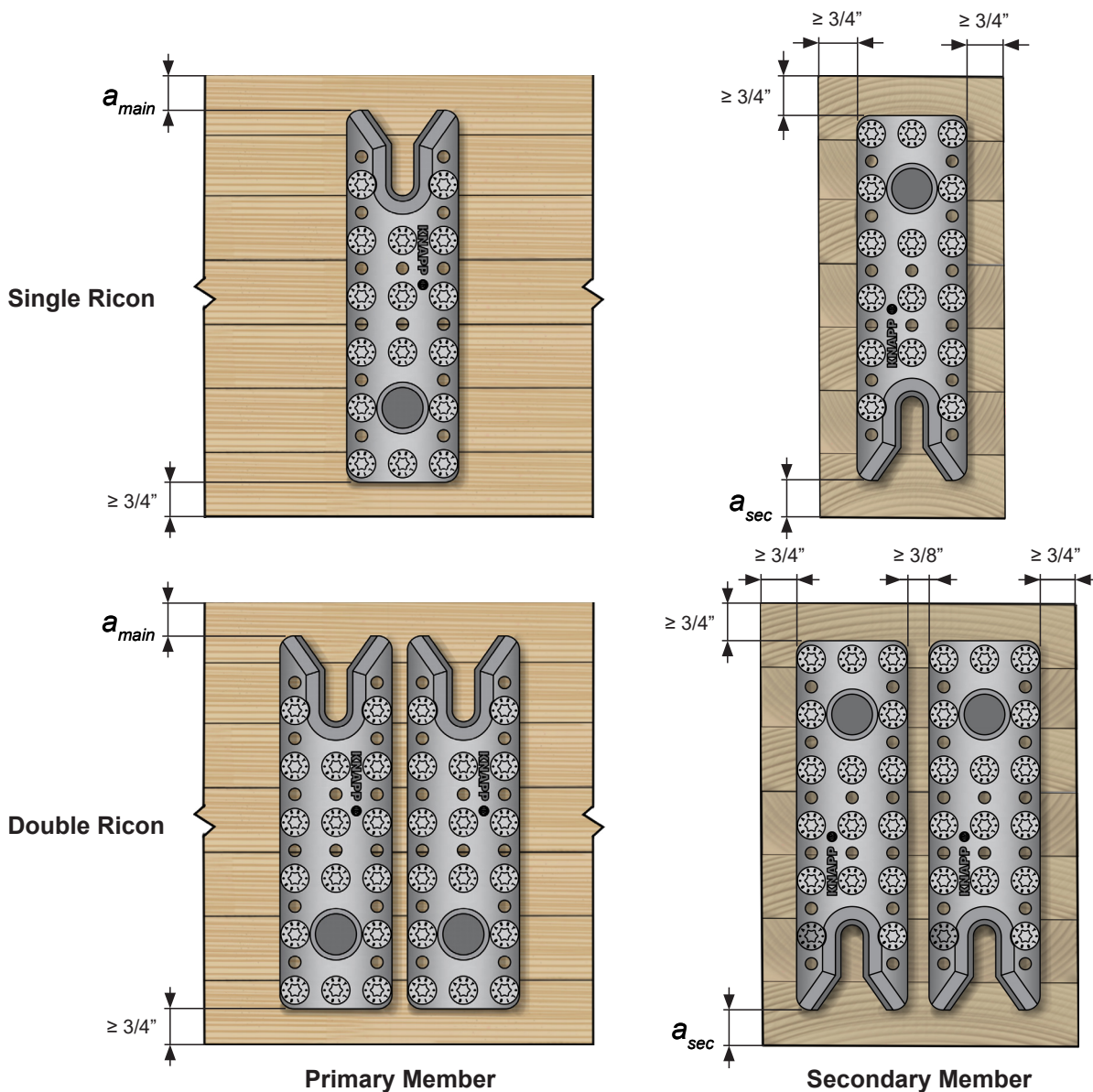
Connection Geometry Requirements

Table 6.2 Minimum and Maximum Distances (a_{main} , a_{sec})

Beam Depth	9-1/2"	10-1/2"	12"	13-1/2"	15"	16-1/2"	18"	19-1/2"	21"	22-1/2"	24"	25-1/2"	27"
a_{main} & a_{sec}	$\frac{3}{4}"$												
a_{main}	$\frac{3}{4}"$	1-5/8"	2-1/8"	2-1/2"	3"	3-3/8"	3-7/8"	4-1/4"	4-3/4"	5-1/4"	5-5/8"	6-1/8"	6-1/2"
a_{sec}	$\frac{3}{4}"$	1-5/8"	2-1/8"	2-1/2"	3"	3-3/8"	3-7/8"	4-1/4"	4-3/4"	5-1/4"	5-5/8"	6-1/8"	6-1/2"

Notes:

- The connector may be used without reinforcement if $a_{min} \leq [a_{main} \& a_{sec}] \leq a_{max}$. If $a_{sec} > a_{max}$, the connection must be reinforced following the reinforcement section (p.64-69).
- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- For the beam sizes not listed in table 6.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 6.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



RICON S VS 200 X 80

Connector Parameters and Dimensions

Compatible Material



Load Rating



Fire Rating



Installation Possibilities



Number of Fasteners to Install



Ratio Cost/Capacity

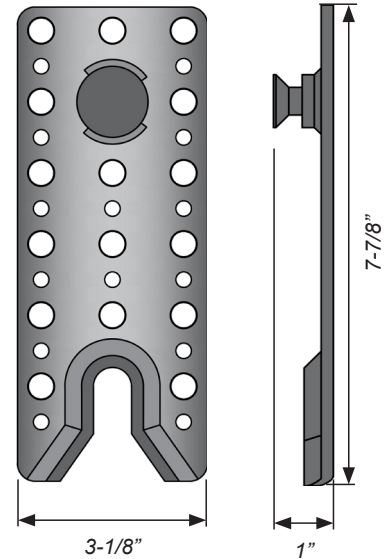
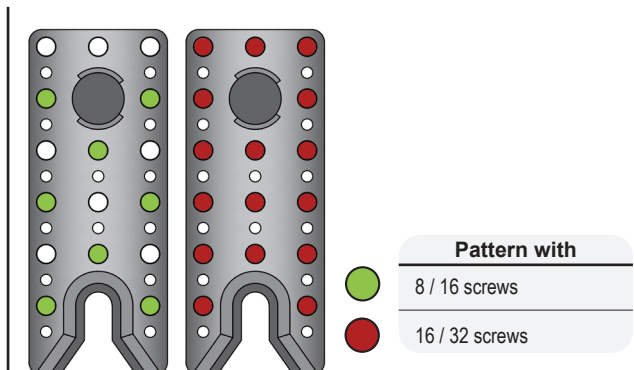


Table 7.1 Allowable Loads for RICON S VS 200 x 80

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners				Allowable Loads [lbs]			
			Primary Member		Secondary Member		Floor C _D =1.0	Snow C _D =1.15	Roof C _D =1.25	Uplift
			Type	Quantity	Type	Quantity				
SINGLE RICON 200X80 S VS 170220080000900	4-3/4" x 9-1/2"	0.42 (SPF)	VG CSK 3/8" x 4"	8	VG CSK 3/8" x 7-7/8"	8	3,690	4,240	4,610	See uplift design p. 51 - 53
				16		16	6,890	7,920	8,610	
		0.49 (D.Fir)		8		8	4,060	4,660	5,070	
				16		16	7,580	8,710	9,470	
DOUBLE RICON 200X80 S VS 170220080000900	8-1/4" x 9-1/2"	0.42 (SPF)	VG CSK 3/8" x 4"	16	VG CSK 3/8" x 7-7/8"	16	6,450	7,420	8,060	
				32		32	12,050	13,860	15,060	
		0.49 (D.Fir)		16		16	7,100	8,150	8,870	
				32		32	13,260	15,240	16,570	

Notes:

1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
2. Allowable loads listed are only valid using listed ASSY screws.
3. Allowable loads listed are only valid for dry service condition ($C_D=1.0$).
4. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
5. Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.25). If not fulfilled, additional reinforcement in accordance with Reinforcement Section (p. 64-69) must be applied.
6. The secondary member must be prevented from twisting.
7. All icons are described in section "How to use this guide" on page 9.
8. Screw installation must follow the patterns presented under the design table.
9. All connection design must meet all relevant requirements of the Notes to the Designer section.



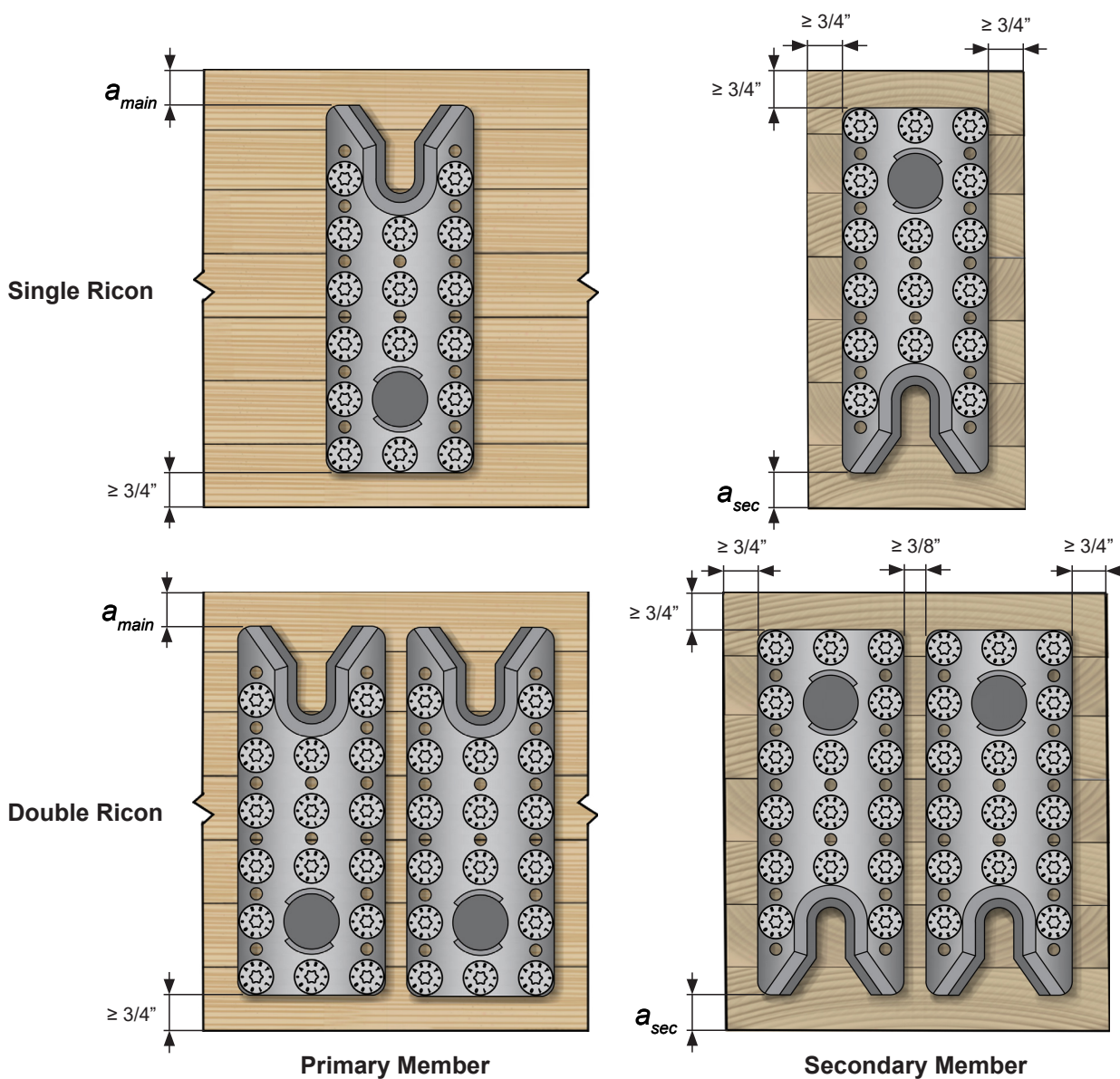
Connection Geometry Requirements

Table 7.2 Minimum and Maximum Distances (a_{main} , a_{sec})

Beam Depth	9-1/2"	10-1/2"	12"	13-1/2"	15"	16-1/2"	18"	19-1/2"	21"	22-1/2"	24"	25-1/2"	27"
a_{main} & a_{sec}	3/4"												
min													
max	3/4"	1-5/8"	2-1/8"	2-1/2"	3"	3-3/8"	3-7/8"	4-1/4"	4-3/4"	5-1/4"	5-5/8"	6-1/8"	6-1/2"

Notes:

1. The connector may be used without reinforcement if $a_{min} \leq [a_{main} \& a_{sec}] \leq a_{max}$. If $a_{sec} > a_{max}$, the connection must be reinforced following the reinforcement section (p.64-69).
2. Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
3. For the beam sizes not listed in table 7.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
4. For deeper than listed beams in table 7.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



RICON S VS 290 X 80

Connector Parameters and Dimensions

Compatible Material



Load Rating



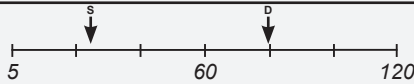
Fire Rating



Installation Possibilities



Number of Fasteners to Install



Ratio Cost/Capacity

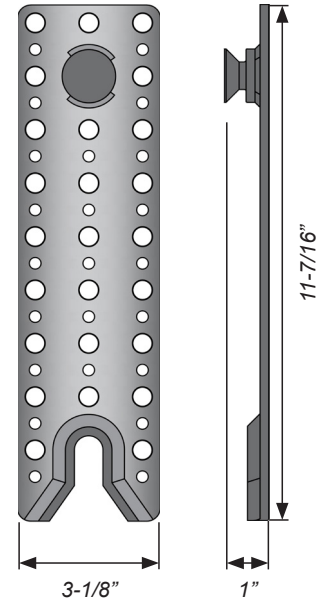
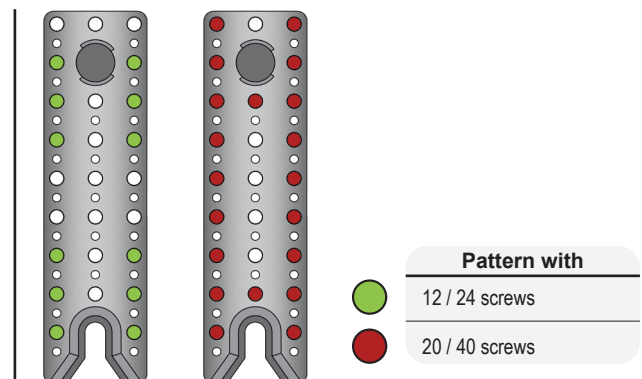


Table 8.1 Allowable Loads for RICON S VS 290 x 80

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners				Allowable Loads [lbs]			
			Primary Member		Secondary Member		Floor C _D =1.0	Snow C _D =1.15	Roof C _D =1.25	Uplift
			Type	Quantity	Type	Quantity				
SINGLE RICON 290X80 S VS 170229080000900	4-3/4" x 13"	0.42 (SPF)	VG CSK 3/8" x 4"	12	VG CSK 3/8" x 7-7/8"	12	5,260	6,040	6,570	See uplift design p. 51 - 53
				20		20	8,340	9,590	10,420	
		0.49 (D.Fir)		12		12	5,790	6,650	7,230	
				20		20	9,100	10,460	11,370	
DOUBLE RICON 290X80 S VS 170229080000900	8-1/4" x 13"	0.42 (SPF)	VG CSK 3/8" x 4"	24	VG CSK 3/8" x 7-7/8"	24	9,200	10,570	11,490	
				40		40	14,590	16,780	18,230	
		0.49 (D.Fir)		24		24	10,130	11,630	12,650	
				40		40	15,920	18,300	19,890	

Notes:

1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
2. Allowable loads listed are only valid using listed ASSY screws.
3. Allowable loads listed are only valid for dry service condition ($C_D=1.0$).
4. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
5. Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.27). If not fulfilled, additional reinforcement in accordance with Reinforcement Section (p. 64-69) must be applied.
6. The secondary member must be prevented from twisting.
7. All icons are described in section "How to use this guide" on page 9.
8. Screw installation must follow the patterns presented under the design table.
9. All connection design must meet all relevant requirements of the Notes to the Designer section.



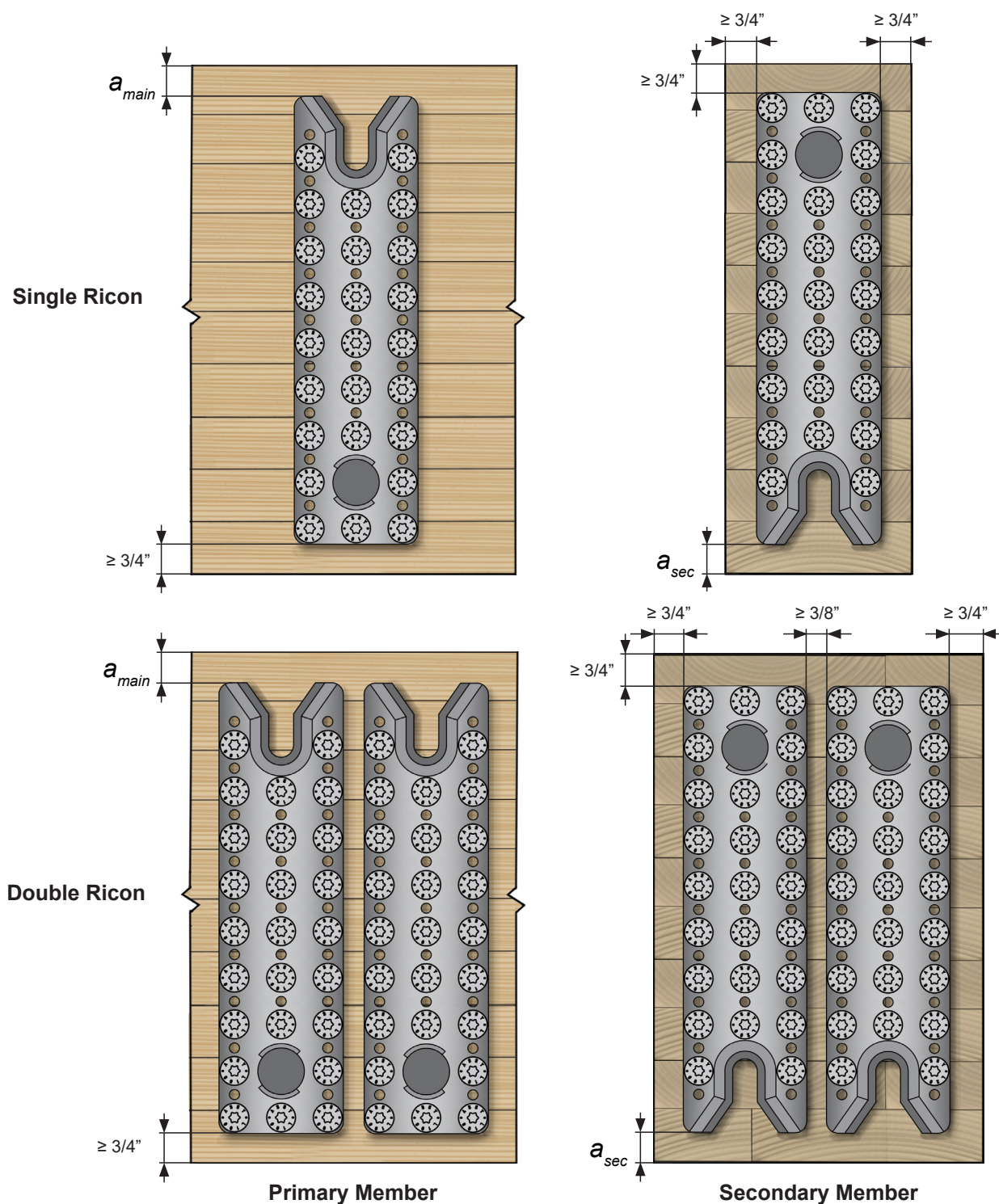
Connection Geometry Requirements

Table 8.2 Minimum and Maximum Distances (a_{main} , a_{sec})

Beam Depth		13"	13-1/2"	15"	16-1/2"	18"	19-1/2"	21"	22-1/2"	24"	25-1/2"	27"	28-1/2"	30"
a _{main} & a _{sec}	min	3/4"												
	max	3/4"	1-1/4"	2-3/4"	3-3/8"	3-7/8"	4-1/4"	4-3/4"	5-1/4"	5-5/8"	6-1/8"	6-1/2"	7"	7-1/2"

Notes:

- The connector may be used without reinforcement if $a_{min} \leq [a_{main} \text{ \& } a_{sec}] \leq a_{max}$. If $a_{sec} > a_{max}$, the connection must be reinforced following the reinforcement section (p.64-69).
- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- For the beam sizes not listed in table 8.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 8.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



RICON XL 390 X 80

Connector Parameters and Dimensions

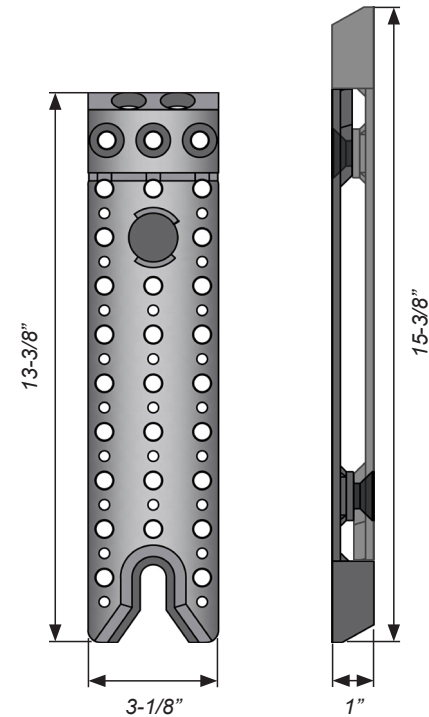
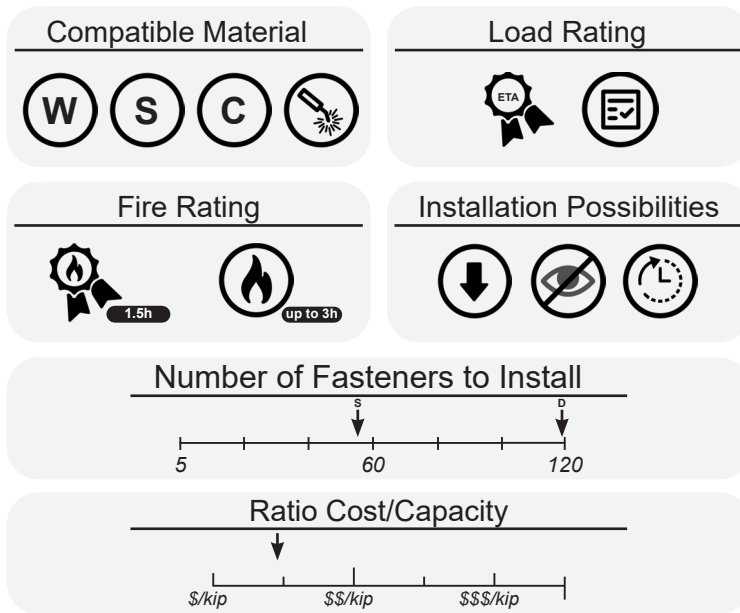
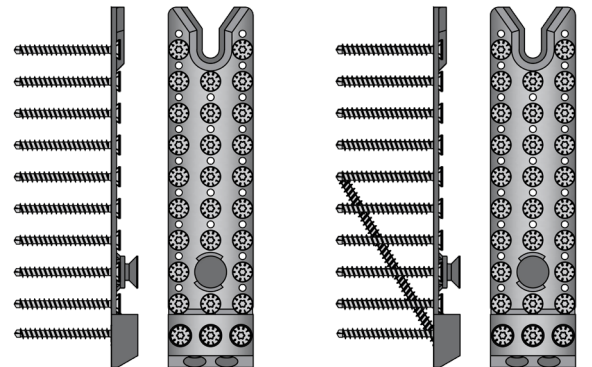


Table 9.1 Allowable Loads for RICON S VS 390 x 80

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners				Allowable Loads [lbs]			
			Primary Member		Secondary Member		Floor C _D =1.0	Snow C _D =1.15	Roof C _D =1.25	Uplift
			Type	Quantity	Type	Quantity				
SINGLE RICON XL 390X80 170239080000900	4-3/4" x 17"	0.42 (SPF)	VG CSK 3/8" x 4" [+ 3/8" x 7-7/8"]	28	VG CSK 3/8" x 7-7/8" [+ 3/8" x 7-7/8"]	28	11,200	12,800	14,000	See uplift design p. 51 - 53
				28 [+ 2]		28 [+ 2]	15,500	17,800	19,300	
		0.49 (D.Fir)		28		28	12,300	14,100	15,300	
				28 [+ 2]		28 [+ 2]	17,100	19,600	21,300	
DOUBLE RICON XL 390X80 170239080000900	8-1/4" x 17"	0.42 (SPF)	VG CSK 3/8" x 4" [+ 3/8" x 7-7/8"]	56	VG CSK 3/8" x 7-7/8" [+ 3/8" x 7-7/8"]	56	19,600	22,400	24,500	
				56 [+ 4]		56 [+ 4]	27,120	31,150	33,770	
		0.49 (D.Fir)		56		56	21,520	24,670	26,770	
				56 [+ 4]		56 [+ 4]	29,920	34,300	37,270	

Notes:

1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
2. Allowable loads listed are only valid using listed ASSY screws.
3. Allowable loads listed are only valid for dry service condition ($C_D=1.0$).
4. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
5. Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.29). If not fulfilled, additional reinforcement in accordance with Reinforcement Section (p. 64-69) must be applied.
6. The secondary member must be prevented from twisting.
7. All icons are described in section "How to use this guide" on page 9.
8. Screw installation must follow the patterns presented under the design table.
9. All connection design must meet all relevant requirements of the Notes to the Designer section.



Pattern with 28 / 56 screws

Pattern with 28[+2] / 56[+4] screws

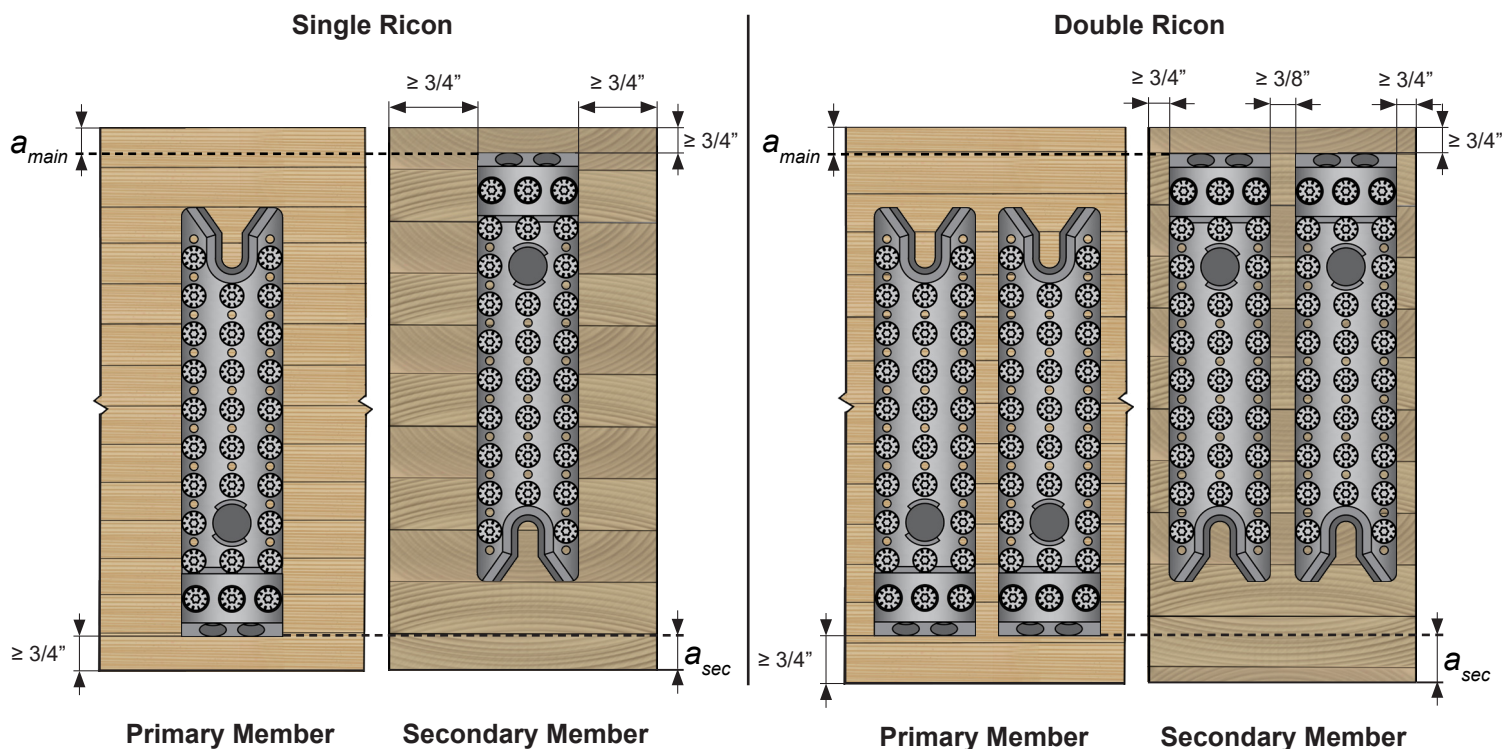
Connection Geometry Requirements

Table 9.2 Minimum and Maximum Distances (a_{main} , a_{sec})

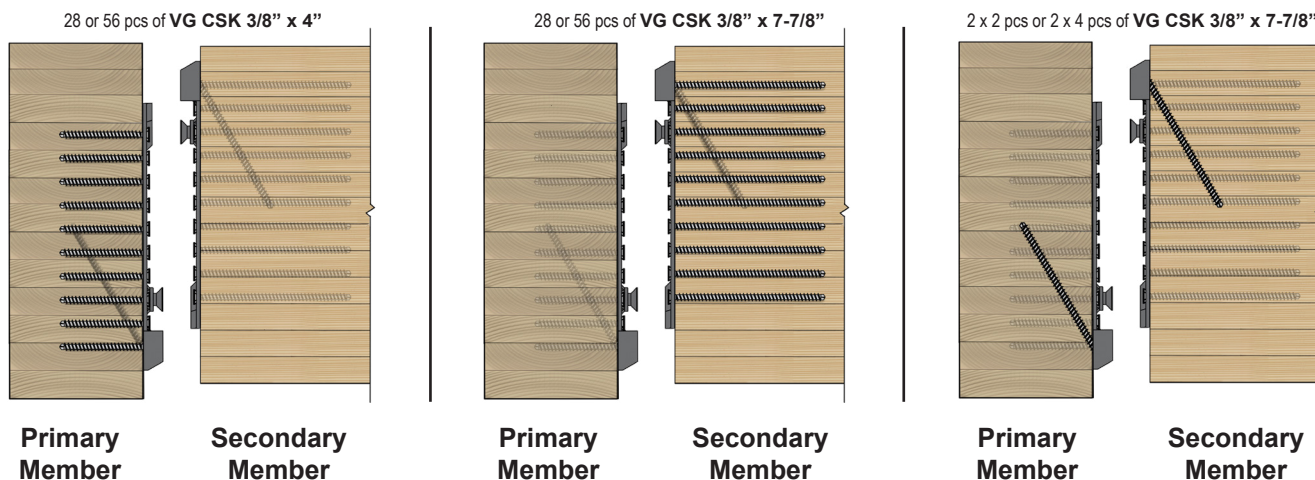
Beam Depth	17"	18"	19-1/2"	21"	22-1/2"	24"	25-1/2"	27"	28-1/2"	30"	31-1/2"	33"	34-1/2"
a_{main} & a_{sec}	min	3/4"											
	max	3/4"	1-7/8"	2-1/4"	2-3/4"	3-1/4"	3-3/4"	4-1/8"	4-5/8"	5"	5-1/2"	5-7/8"	6-3/8"

Notes:

- The connector may be used without reinforcement if $a_{min} \leq [a_{main} \text{ \& } a_{sec}] \leq a_{max}$. If $a_{sec} > a_{max}$, the connection must be reinforced following the reinforcement section (p.64-69).
- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- For the beam sizes not listed in table 9.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 9.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Screw Location Instructions





MEGANT 310 X 60

Connector Parameters and Dimensions



Compatible Material

W




Load Rating

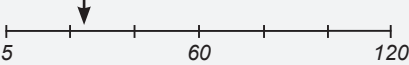
Fire Rating


Installation Possibilities

Number of Fasteners to Install



Ratio Cost/Capacity



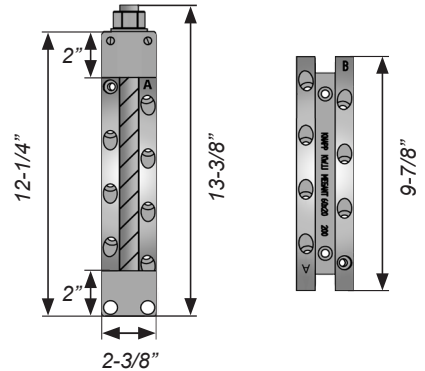


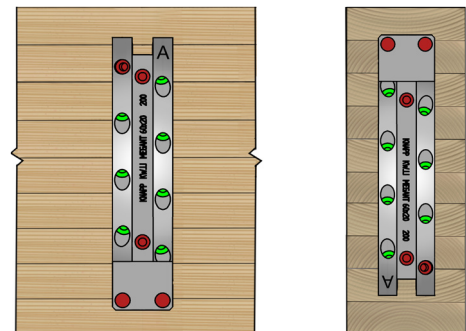


Table 10.1 Allowable Loads for MEGANT 310 x 60

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners		Threaded Rod	Allowable Loads [lbs]	
			Type	Quantity		Down Load	Uplift
MEGANT 310 x 60 170703100600200	4" x 15-3/4"	0.42 (SPF)	VG CSK 5/16" x 6-1/4"	24	1 pcs of M20 x 340 [13-3/8"] Grade 8.8	7,220	See uplift design p. 51
		0.49 (D.Fir)	VG CSK 5/16" x 6-1/4"	24	1 pcs of M20 x 340 [13-3/8"] Grade 8.8	8,180	

- Notes:
- Allowable loads listed are only valid for Allowable Stress Design in the USA.
 - Allowable loads listed are only valid using listed ASSY screws.
 - Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
 - Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 - Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.31).
 - The minimum primary member width must be $\geq 6"$.
 - The secondary member must be prevented from twisting.
 - All icons are described in section "How to use this guide" on page 9.
 - Screw installation must follow the patterns presented in the figures below.
 - All connection design must meet all relevant requirements of the Notes to the Designer section.

Fasteners		
	Orientation	Quantity
	90°, Horizontal	10
	45°, Inclined	14



Primary Member Secondary Member

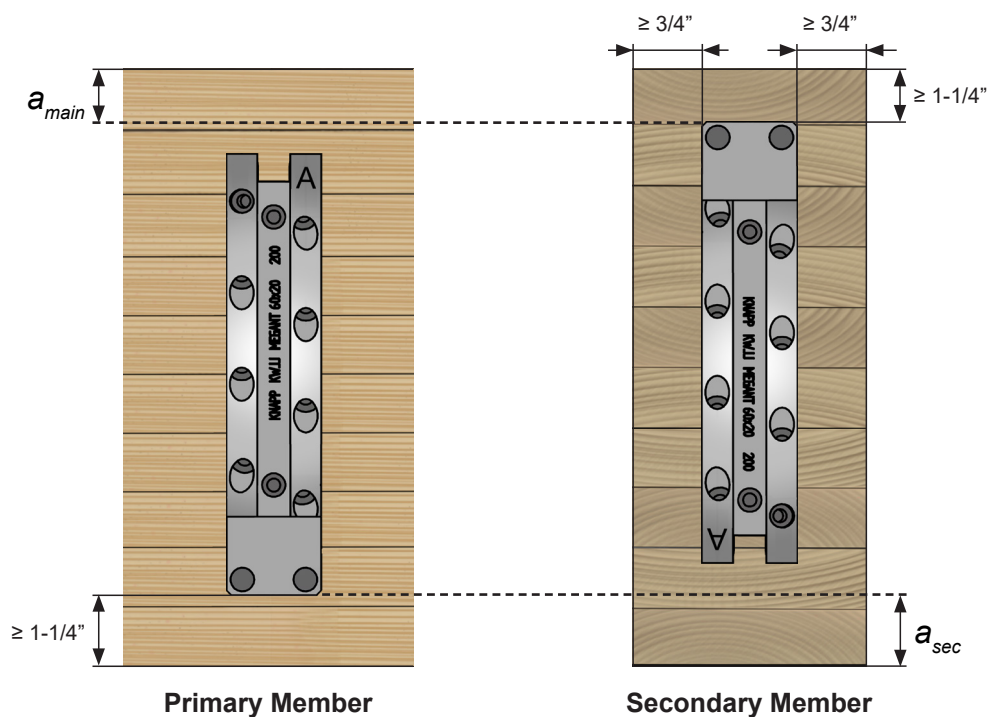
Connection Geometry Requirements

Table 10.2 Minimum and Maximum Distances (a_{main} , a_{sec})

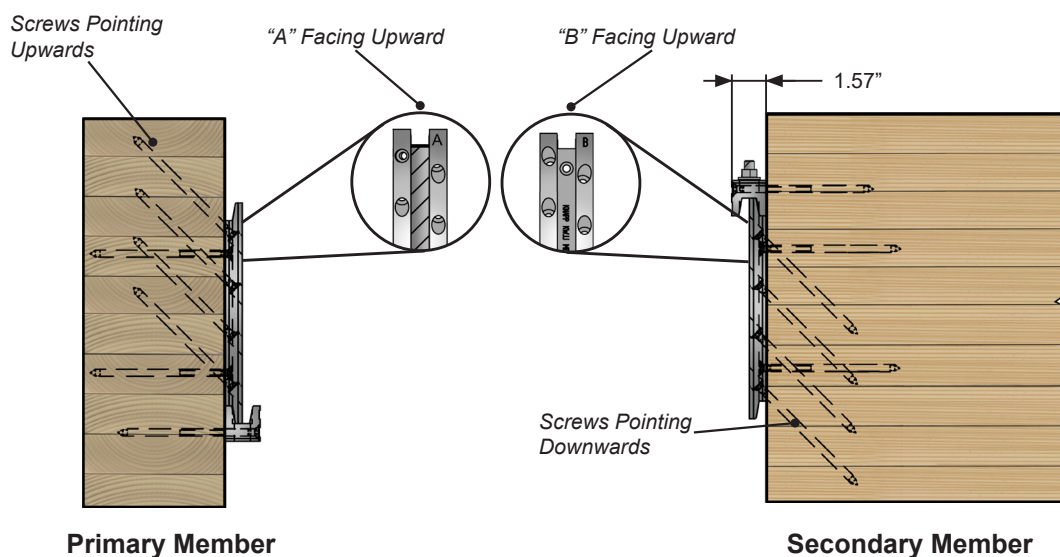
Beam Depth	15-3/4"	18"	19-1/2"	21"	22-1/2"	24"
a_{main} & a_{sec}	1-1/4"					
min						
max	2-3/8"	4-1/2"	5"	5-3/8"	5-7/8"	6-1/4"

Notes:

- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- Please refer to the "Hardware" section, page 10, to see MEGANT components in detail.
- For the beam sizes not listed in table 10.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 10.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Location Instructions - Connector Plates and Screws



MEGANT 430 X 60

Connector Parameters and Dimensions

Compatible Material

Load Rating

Fire Rating

1.5h
 up to 3h

Installation Possibilities

Number of Fasteners to Install

Ratio Cost/Capacity

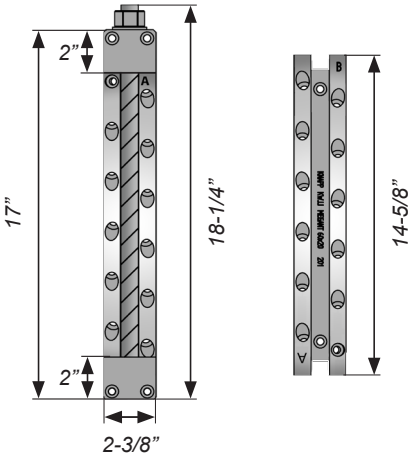
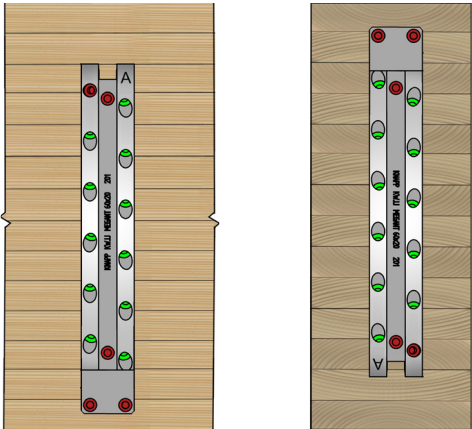


Table 11.1 Allowable Loads for MEGANT 430 x 60

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners		Threaded Rod	Allowable Loads [lbs]	
			Type	Quantity		Down Load	Uplift
MEGANT 430 x 60 170704300600200	4" x 20-1/2"	0.42 (SPF)	VG CSK 5/16" x 6-1/4"	32	1 pcs of M20 x 460 [18-1/4"] Grade 8.8	11,350	See uplift design p. 51
		0.49 (D.Fir)	VG CSK 5/16" x 6-1/4"	32	1 pcs of M20 x 460 [18-1/4"] Grade 8.8	12,830	

- Notes:
- Allowable loads listed are only valid for Allowable Stress Design in the USA.
 - Allowable loads listed are only valid using listed ASSY screws.
 - Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
 - Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 - Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.33).
 - The minimum primary member width must be $\geq 6"$.
 - The secondary member must be prevented from twisting.
 - All icons are described in section "How to use this guide" on page 9.
 - Screw installation must follow the patterns presented in the figures below.
 - All connection design must meet all relevant requirements of the Notes to the Designer section.

Fasteners		
	Orientation	Quantity
	90°, Horizontal	10
	45°, Inclined	22



Primary Member Secondary Member

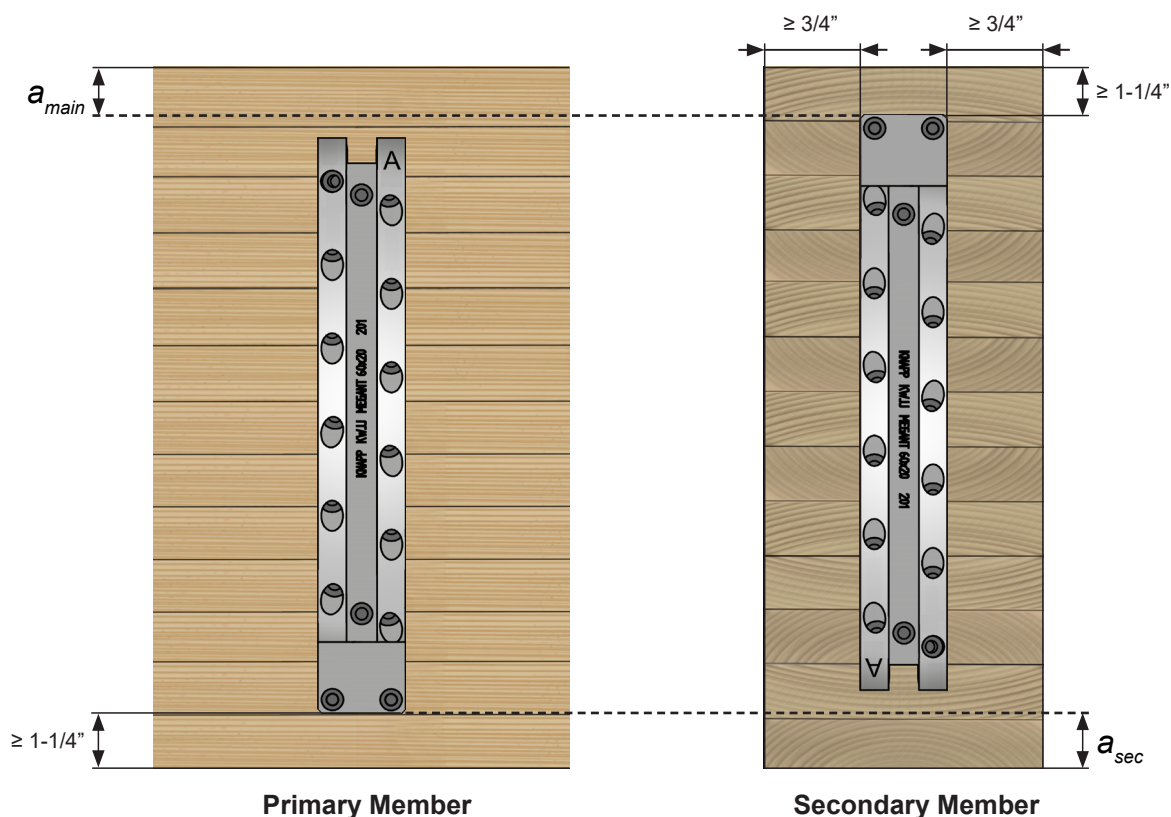
Connection Geometry Requirements

Table 11.2 Minimum and Maximum Distances (a_{main} , a_{sec})

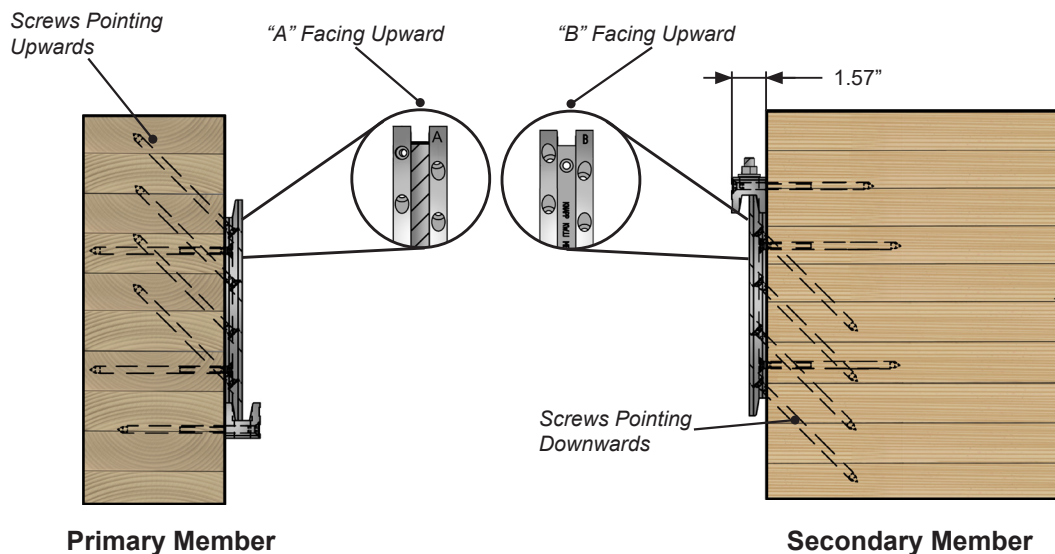
Beam Depth	20-1/2"	22-1/2"	24"	25-1/2"	27"	28-1/2"	30"	31-1/2"	33"
a_{main} & a_{sec}	min	1-1/4"							
	max	2-3/8"	4-3/8"	5-7/8"	6-3/4"	7-1/4"	7-3/4"	8-1/8"	8-5/8"

Notes:

- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- Please refer to the "Hardware" section, page 10, to see MEGANT components in detail.
- For the beam sizes not listed in table 11.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 11.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Location Instructions - Connector Plates and Screws





MEGANT 550 X 60

Connector Parameters and Dimensions



Compatible Material

W




Load Rating

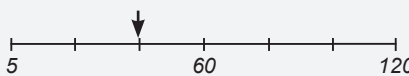
Fire Rating

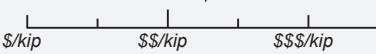
Installation Possibilities

Number of Fasteners to Install



Ratio Cost/Capacity



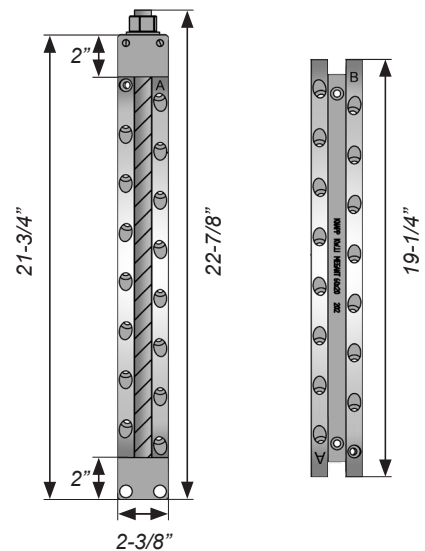


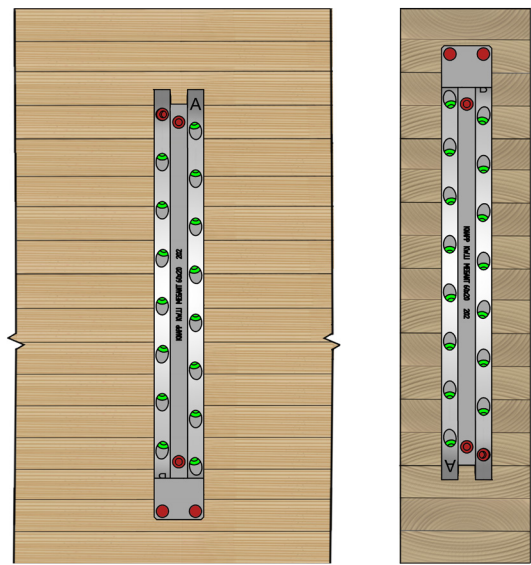


Table 12.1 Allowable Loads for MEGANT 550 x 60

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners		Threaded Rod	Allowable Loads [lbs]	
			Type	Quantity		Down Load	Uplift
MEGANT 550 x 60 170705500600200	4" x 25-1/4"	0.42 (SPF)	VG CSK 5/16" x 6-1/4"	40	1 pcs of M20 x 580 [22-7/8"] Grade 8.8	12,830	See uplift design p. 51
		0.49 (D.Fir)	VG CSK 5/16" x 6-1/4"	40	1 pcs of M20 x 580 [22-7/8"] Grade 8.8	12,830	

- Notes:
- Allowable loads listed are only valid for Allowable Stress Design in the USA.
 - Allowable loads listed are only valid using listed ASSY screws.
 - Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
 - Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 - Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.35).
 - The minimum primary member width must be $\geq 6"$.
 - The secondary member must be prevented from twisting.
 - All icons are described in section "How to use this guide" on page 9.
 - Screw installation must follow the patterns presented in the figures below.
 - All connection design must meet all relevant requirements of the Notes to the Designer section..

Fasteners		
	Orientation	Quantity
	90°, Horizontal	10
	45°, Inclined	30



Primary Member Secondary Member

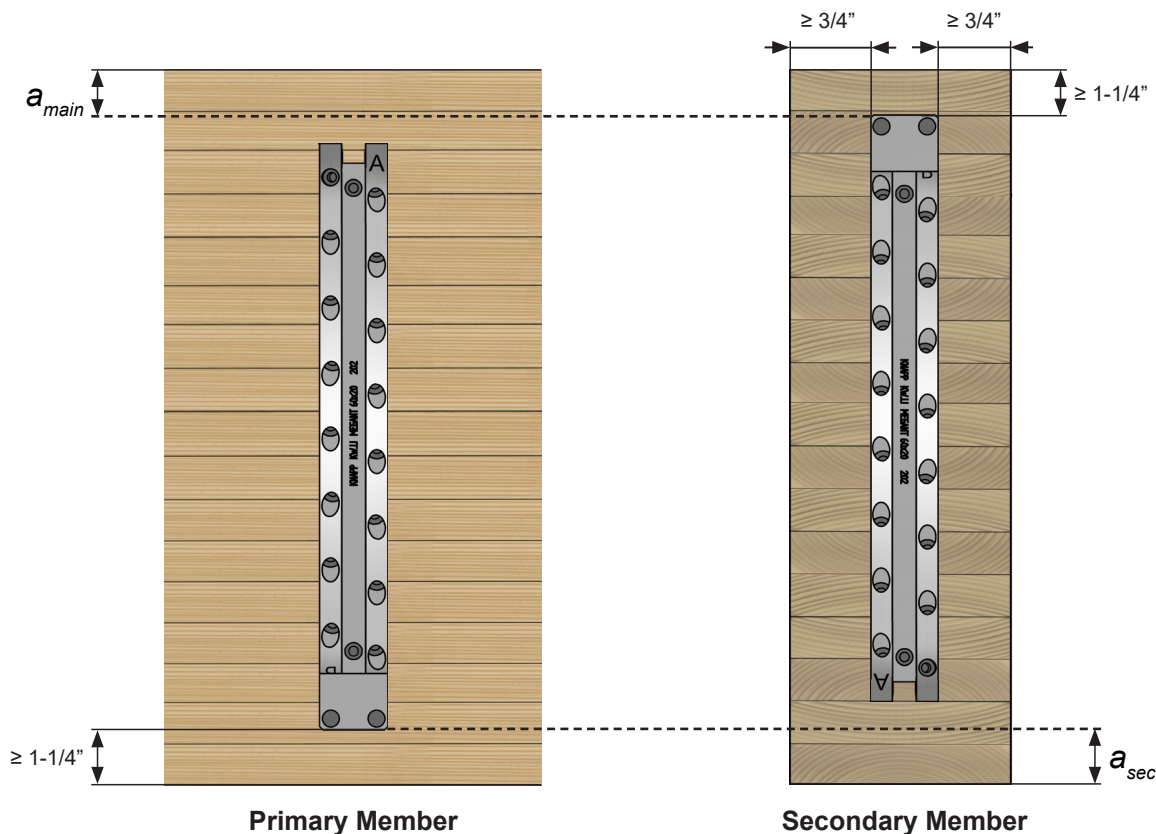
Connection Geometry Requirements

Table 12.2 Minimum and Maximum Distances (a_{main} , a_{sec})

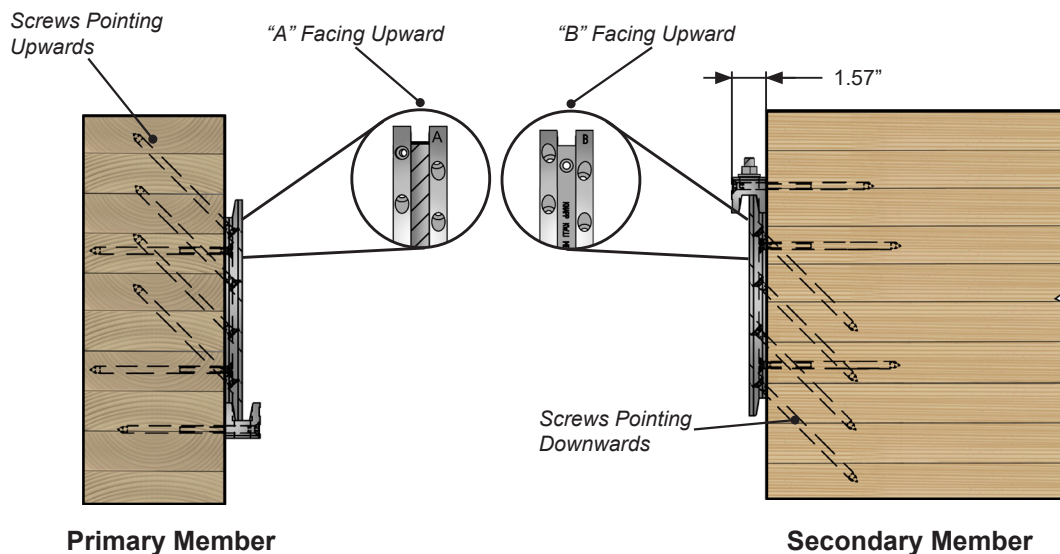
Beam Depth	25-1/4"	27"	28-1/2"	30"	31-1/2"	33"	34-1/2"	36"	37-1/2"	38-7/8"	40-3/8"
a_{main} & a_{sec}	min	1-1/4"									
	max	2-3/8"	4-1/8"	5-5/8"	7-1/8"	8-5/8"	9"	9-1/2"	9-7/8"	10-1/4"	11-1/4"

Notes:

- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- Please refer to the "Hardware" section, page 10, to see MEGANT components in detail.
- For the beam sizes not listed in table 12.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 12.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Location Instructions - Connector Plates and Screws



MEGANT 310 X 100

Connector Parameters and Dimensions

Compatible Material

W

Load Rating

ETA

Fire Rating

1.5h
 up to 3h

Installation Possibilities

Number of Fasteners to Install

Ratio Cost/Capacity

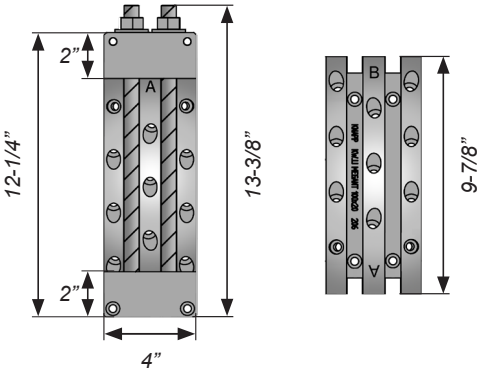
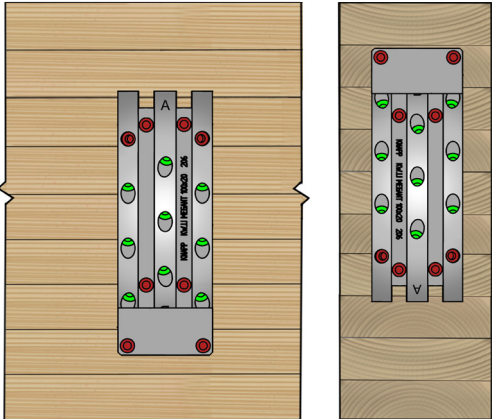


Table 13.1 Allowable Loads for MEGANT 310 x 100

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners		Threaded Rod	Allowable Loads [lbs]	
			Type	Quantity		Down Load	Uplift
MEGANT 310 x 100 170703101000200	5-5/8" x 15-3/4"	0.42 (SPF)	VG CSK 5/16" x 6-1/4"	34	2 pcs of M16 x 340 [13-3/8"] Grade 8.8	9,280	See uplift design p. 51
		0.49 (D.Fir)	VG CSK 5/16" x 6-1/4"	34	2 pcs of M16 x 340 [13-3/8"] Grade 8.8	10,510	

- Notes:
- Allowable loads listed are only valid for Allowable Stress Design in the USA.
 - Allowable loads listed are only valid using listed ASSY screws.
 - Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
 - Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 - Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.37).
 - The minimum primary member width must be $\geq 6"$.
 - The secondary member must be prevented from twisting.
 - All icons are described in section "How to use this guide" on page 9.
 - Screw installation must follow the patterns presented in the figures below.
 - All connection design must meet all relevant requirements of the Notes to the Designer section.

Fasteners		
	Orientation	Quantity
	90°, Horizontal	16
	45°, Inclined	18



Primary Member Secondary Member

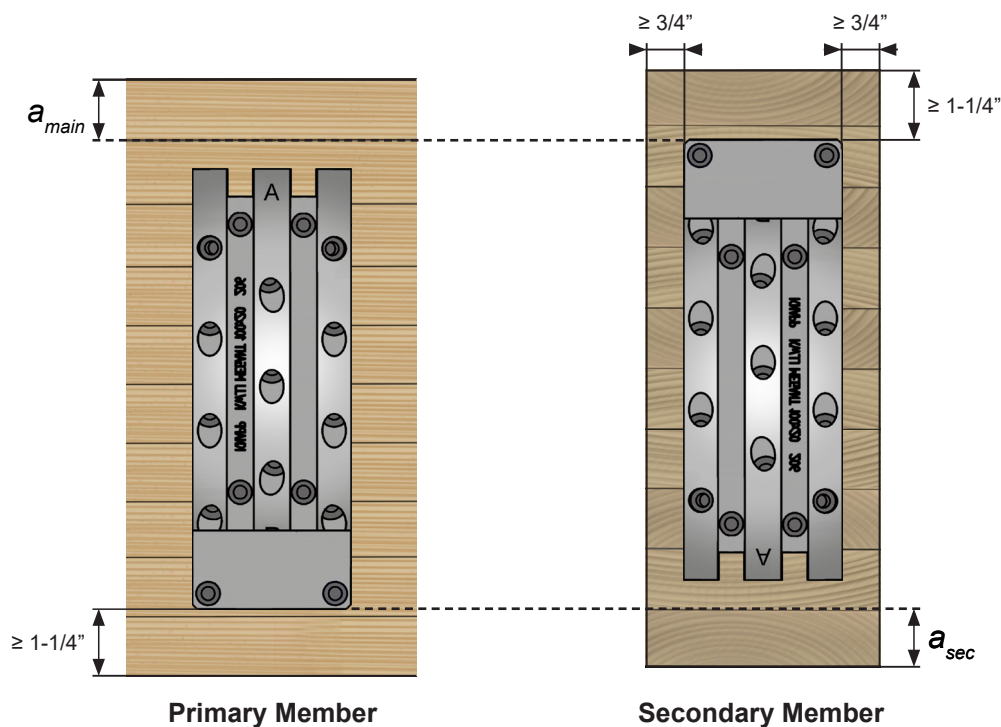
Connection Geometry Requirements

Table 13.2 Minimum and Maximum Distances (a_{main} , a_{sec})

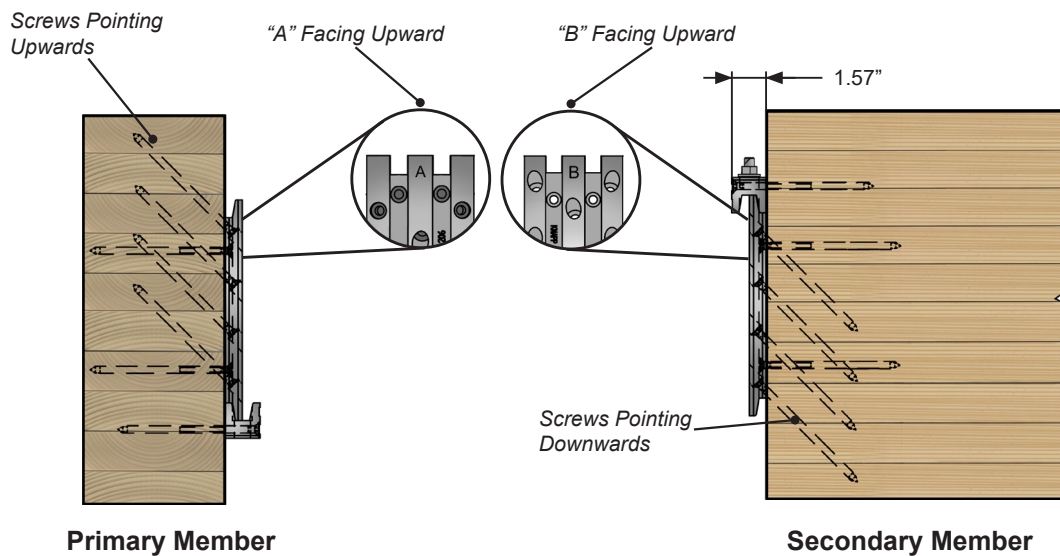
Beam Depth	15-3/4"	18"	19-1/2"	21"	22-1/2"	24"
a_{main} & a_{sec}	1-1/4"					
min						
max	2-3/8"	3-1/4"	3-3/4"	4-1/4"	4-3/4"	5-1/8"

Notes:

- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- Please refer to the "Hardware" section, page 10, to see MEGANT components in detail.
- For the beam sizes not listed in table 13.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 13.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Location Instructions - Connector Plates and Screws





MEGANT 430 X 100

Connector Parameters and Dimensions



Compatible Material

W




Load Rating

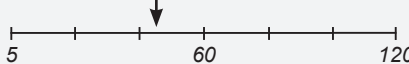
Fire Rating


Installation Possibilities

Number of Fasteners to Install



Ratio Cost/Capacity



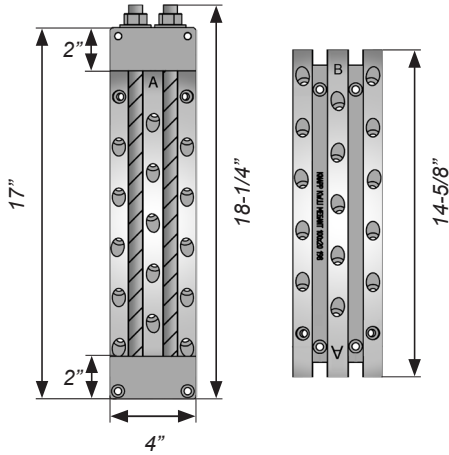


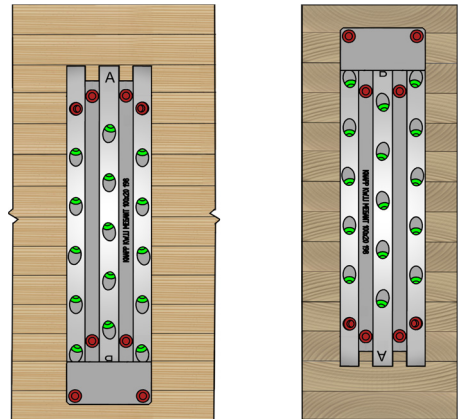


Table 14.1 Allowable Loads for MEGANT 430 x 100

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners		Threaded Rod	Allowable Loads [lbs]	
			Type	Quantity		Down Load	Uplift
MEGANT 430 x 100 170704301000200	5-5/8" x 20-7/8"	0.42 (SPF)	VG CSK 5/16" x 6-1/4"	46	2 pcs of M16 x 460 [18-1/4"] Grade 8.8	15,480	See uplift design p. 51
		0.49 (D.Fir)	VG CSK 5/16" x 6-1/4"	46	2 pcs of M16 x 460 [18-1/4"] Grade 8.8	17,530	

- Notes:
- Allowable loads listed are only valid for Allowable Stress Design in the USA.
 - Allowable loads listed are only valid using listed ASSY screws.
 - Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
 - Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 - Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.39).
 - The minimum primary member width must be $\geq 6"$.
 - The secondary member must be prevented from twisting.
 - All icons are described in section "How to use this guide" on page 9.
 - Screw installation must follow the patterns presented in the figures below.
 - All connection design must meet all relevant requirements of the Notes to the Designer section.

Fasteners		
	Orientation	Quantity
	90°, Horizontal	16
	45°, Inclined	30



Primary Member Secondary Member

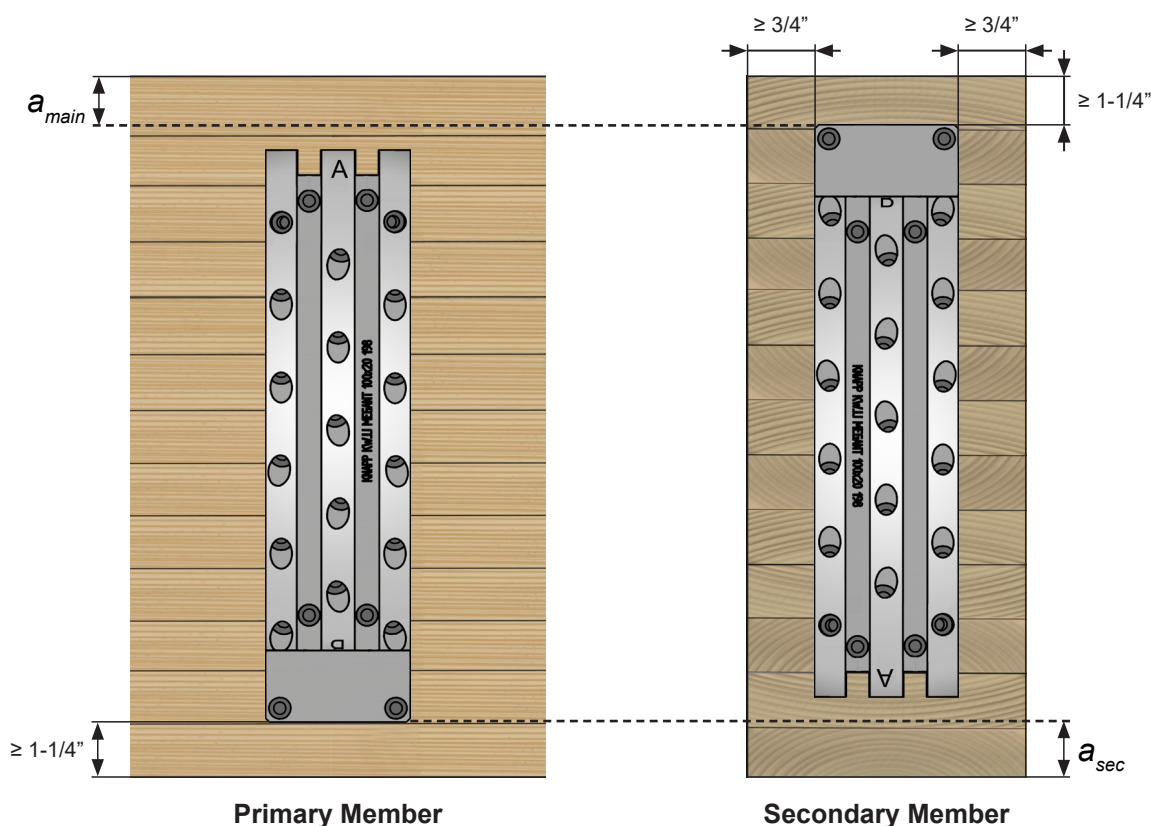
Connection Geometry Requirements

Table 14.2 Minimum and Maximum Distances (a_{main} , a_{sec})

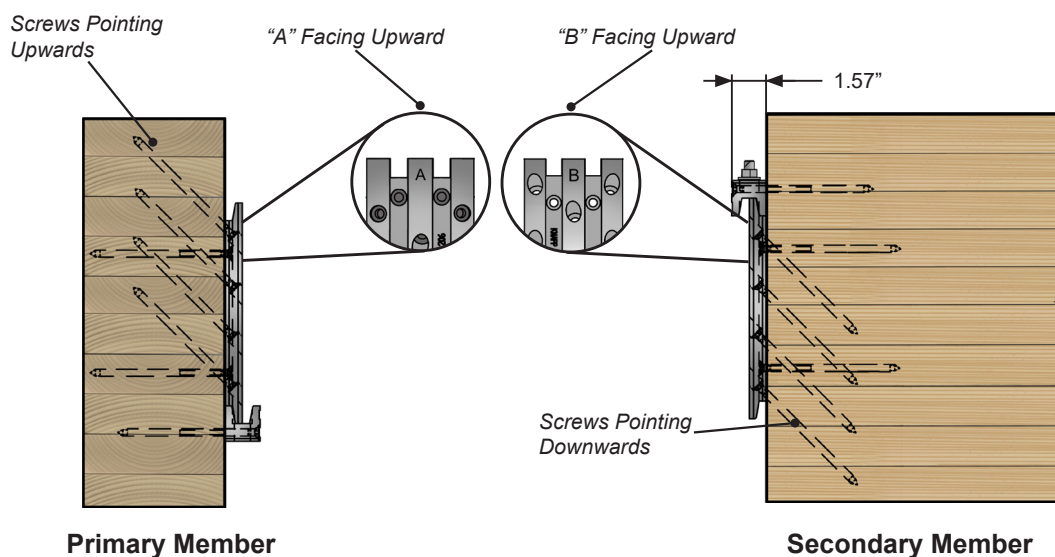
Beam Depth	20-7/8"	22-1/2"	24"	25-1/2"	27"	28-1/2"	30"	31-1/2"	33"
a_{main} & a_{sec}	min	1-1/4"							
	max	2-3/4"	4-3/8"	5-1/8"	5-5/8"	6"	6-1/2"	6-7/8"	7-3/8"

Notes:

- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- Please refer to the "Hardware" section, page 10, to see MEGANT components in detail.
- For the beam sizes not listed in table 14.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 14.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Location Instructions - Connector Plates and Screws



MEGANT 550 X 100

Connector Parameters and Dimensions

Compatible Material

Load Rating

Fire Rating
 1.5h up to 3h

Installation Possibilities

Number of Fasteners to Install

Ratio Cost/Capacity

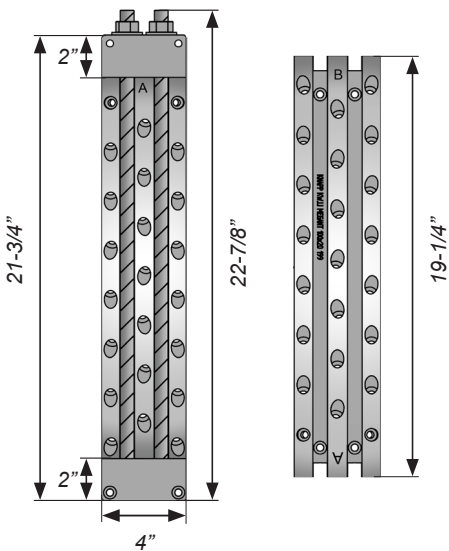
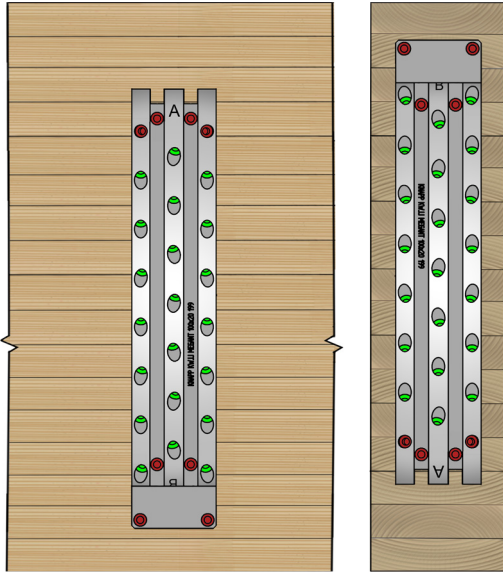


Table 15.1 Allowable Loads for MEGANT 550 x 100

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners		Threaded Rod	Allowable Loads [lbs]	
			Type	Quantity		Down Load	Uplift
MEGANT 550 x 100 170705501000200	5-5/8" x 25-5/8"	0.42 (SPF)	VG CSK 5/16" x 6-1/4"	58	2 pcs of M16 x 580 [22-7/8"] Grade 8.8	19,500	See uplift design p. 51
		0.49 (D.Fir)	VG CSK 5/16" x 6-1/4"	58	2 pcs of M16 x 580 [22-7/8"] Grade 8.8	19,500	

- Notes:
1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
 2. Allowable loads listed are only valid using listed ASSY screws.
 3. Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
 4. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 5. Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.41).
 6. The minimum primary member width must be $\geq 6"$.
 7. The secondary member must be prevented from twisting.
 8. All icons are described in section "How to use this guide" on page 9.
 9. Screw installation must follow the patterns presented in the figures below.
 10. All connection design must meet all relevant requirements of the Notes to the Designer section.

Fasteners		
	Orientation	Quantity
	90°, Horizontal	16
	45°, Inclined	42



Primary Member Secondary Member

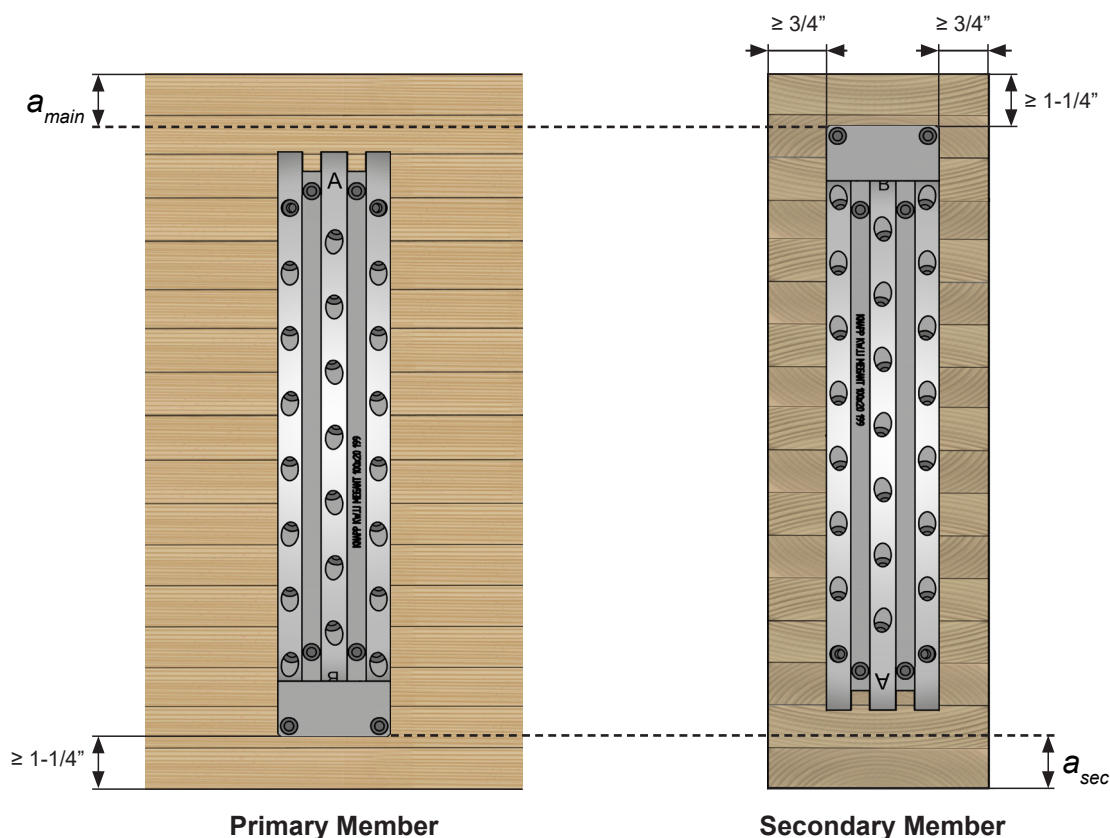
Connection Geometry Requirements

Table 15.2 Minimum and Maximum Distances (a_{main} , a_{sec})

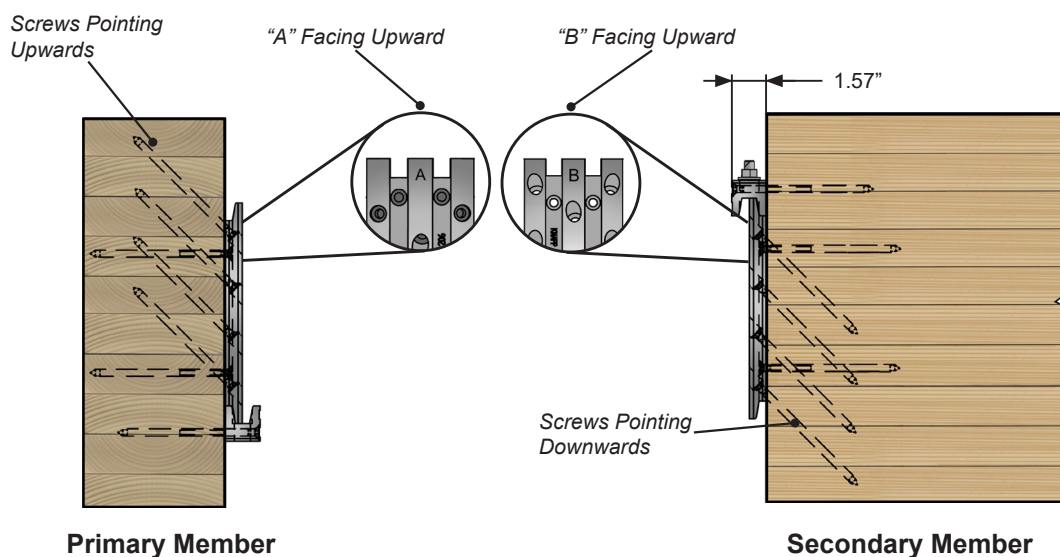
Beam Depth	25-5/8"	27"	28-1/2"	30"	31-1/2"	33"	34-1/2"	36"	37-1/2"	38-7/8"	40-3/8"
a_{main} & a_{sec}	min	1-1/4"									
	max	2-3/4"	4-1/8"	5-5/8"	6-7/8"	7-3/8"	7-3/4"	8-1/4"	8-3/4"	9-1/4"	10-1/8"

Notes:

- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- Please refer to the "Hardware" section, page 10, to see MEGANT components in detail.
- For the beam sizes not listed in table 15.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 15.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Location Instructions - Connector Plates and Screws





MEGANT 310 X 150

Connector Parameters and Dimensions



Compatible Material

W




Load Rating

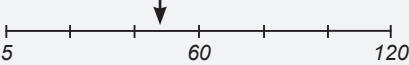
Fire Rating


Installation Possibilities

Number of Fasteners to Install



Ratio Cost/Capacity



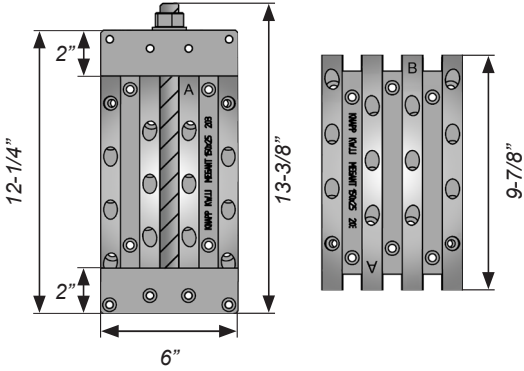


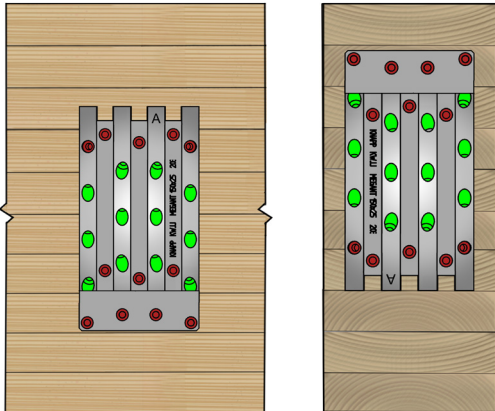


Table 16.1 Allowable Loads for MEGANT 310 x 150

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners		Threaded Rod	Allowable Loads [lbs]	
			Type	Quantity		Down Load	Uplift
MEGANT 310 x 150 170703101500200	7-1/2" x 15-3/4"	0.42 (SPF)	VG CSK 5/16" x 6-1/4"	48	1 pcs of M20 x 340 [13-3/8"] Grade 8.8	12,010	See uplift design p. 51
		0.49 (D.Fir)	VG CSK 5/16" x 6-1/4"	48	1 pcs of M20 x 340 [13-3/8"] Grade 8.8	13,600	

- Notes:
1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
 2. Allowable loads listed are only valid using listed ASSY screws.
 3. Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
 4. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 5. Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.43).
 6. The secondary member must be prevented from twisting.
 7. All icons are described in section "How to use this guide" on page 9.
 8. Screw installation must follow the patterns presented in the figures below.
 9. All connection design must meet all relevant requirements of the Notes to the Designer section.

Fasteners		
	Orientation	Quantity
	90°, Horizontal	24
	45°, Inclined	24



Primary Member Secondary Member

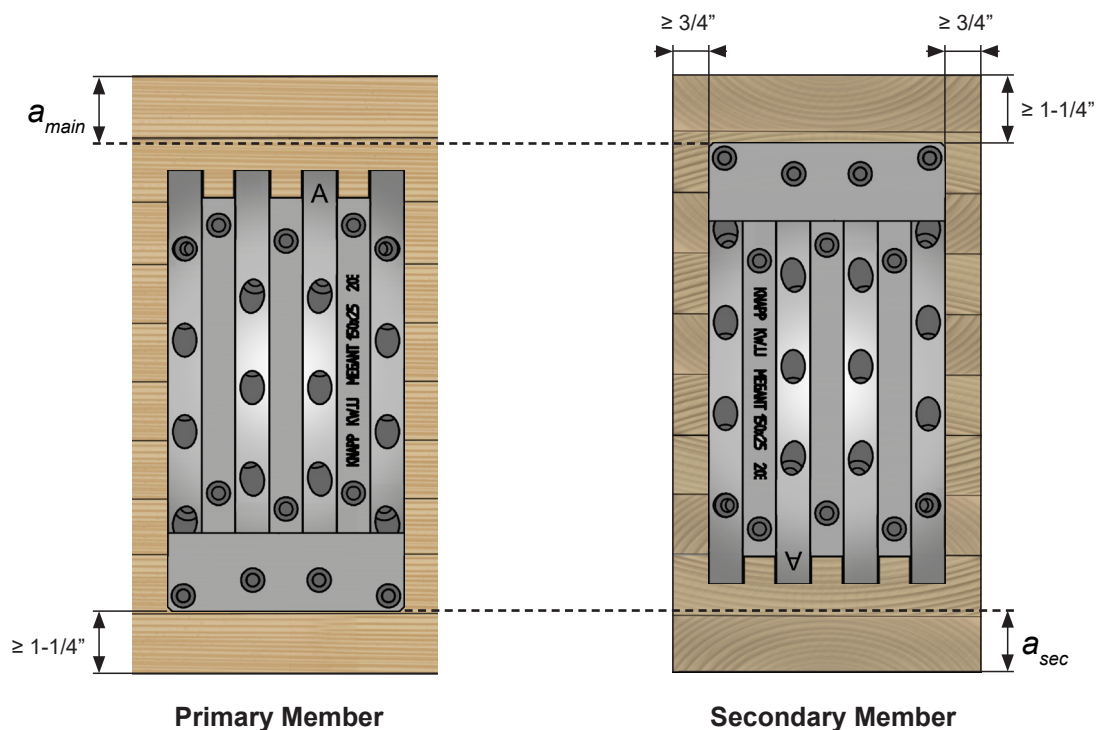
Connection Geometry Requirements

Table 16.2 Minimum and Maximum Distances (a_{main} , a_{sec})

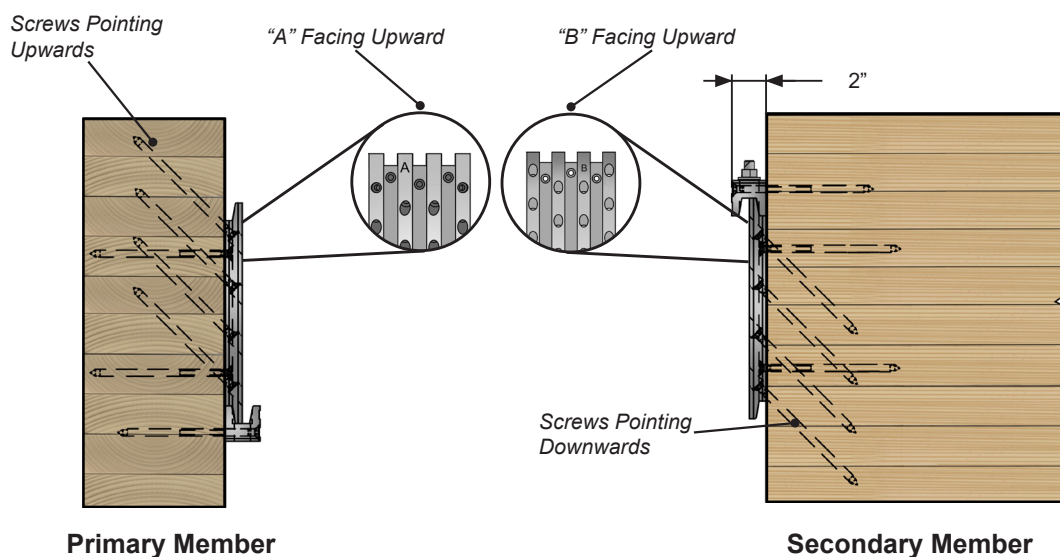
Beam Depth	15-3/4"	18"	19-1/2"	21"	22-1/2"	24"
a_{main} & a_{sec}	1-1/4"					
min						
max	2-3/8"	3-1/4"	3-3/4"	4-1/4"	4-3/4"	5-1/8"

Notes:

- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- Please refer to the "Hardware" section, page 10, to see MEGANT components in detail.
- For the beam sizes not listed in table 16.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 16.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Location Instructions - Connector Plates and Screws



MEGANT 430 X 150

Connector Parameters and Dimensions

Compatible Material

W

Load Rating

ETA

Fire Rating

1.5h

up to 3h

Installation Possibilities

Number of Fasteners to Install

5

60

120

Ratio Cost/Capacity

\$/kip

\$\$/kip

\$\$\$ /kip

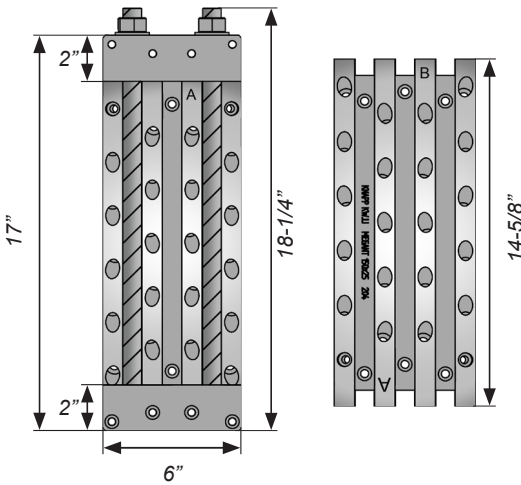
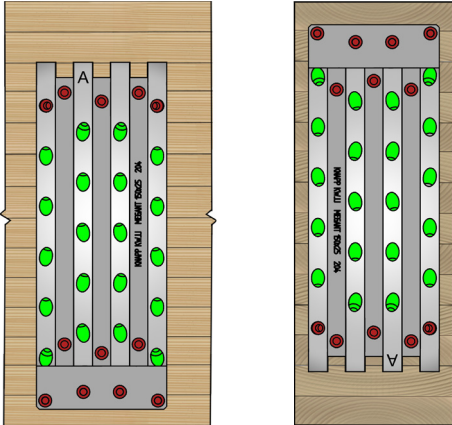


Table 17.1 Allowable Loads for MEGANT 430 x 150

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners		Threaded Rod	Allowable Loads [lbs]	
			Type	Quantity		Down Load	Uplift
MEGANT 430 x 150 170704301500200	7-1/2" x 20-1/2"	0.42 (SPF)	VG CSK 5/16" x 6-1/4"	64	2 pcs of M20 x 460 [18-1/4"] Grade 8.8	20,020	See uplift design p. 51
		0.49 (D.Fir)	VG CSK 5/16" x 6-1/4"	64	2 pcs of M20 x 460 [18-1/4"] Grade 8.8	22,670	

- Notes:
- Allowable loads listed are only valid for Allowable Stress Design in the USA.
 - Allowable loads listed are only valid using listed ASSY screws.
 - Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
 - Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 - Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.45).
 - The secondary member must be prevented from twisting.
 - All icons are described in section "How to use this guide" on page 9.
 - Screw installation must follow the patterns presented in the figures below.
 - All connection design must meet all relevant requirements of the Notes to the Designer section.

Fasteners		
	Orientation	Quantity
●	90°, Horizontal	24
●	45°, Inclined	40



Primary Member Secondary Member

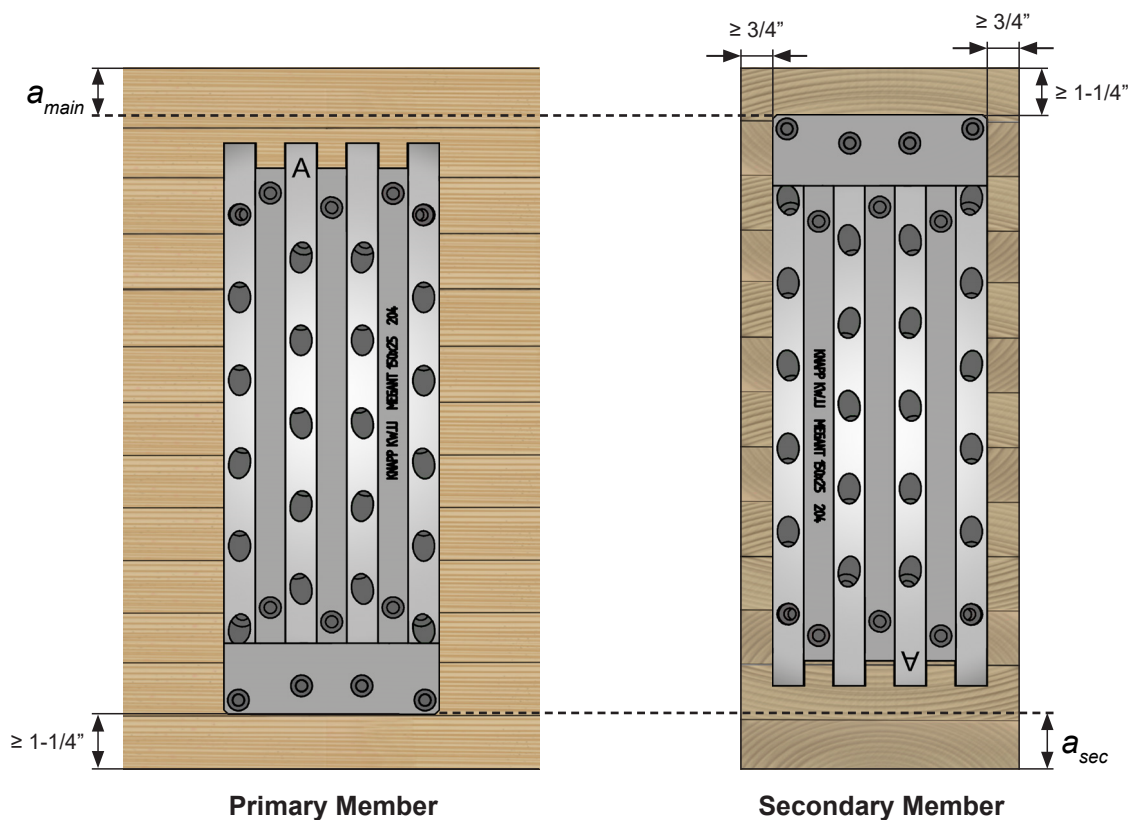
Connection Geometry Requirements

Table 17.2 Minimum and Maximum Distances (a_{main} , a_{sec})

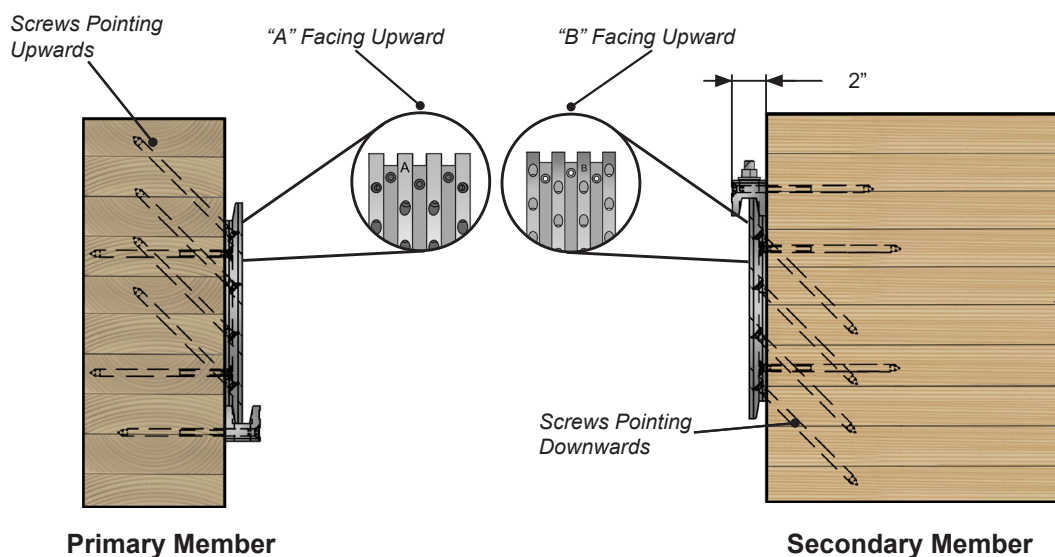
Beam Depth		20-1/2"	22-1/2"	24"	25-1/2"	27"	28-1/2"	30"	31-1/2"	33"	34-1/2"	36"	37-1/2"	38-7/8"
a _{main} & a _{sec}	min	1-1/4"												
	max	2-3/8"	4-3/8"	5-1/8"	5-5/8"	6"	6-1/2"	6-7/8"	7-3/8"	7-3/4"	8-1/4"	8-3/4"	9-1/4"	9-5/8"

Notes:

- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- Please refer to the "Hardware" section, page 10, to see MEGANT components in detail.
- For the beam sizes not listed in table 17.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 17.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Location Instructions - Connector Plates and Screws





MEGANT 550 X 150

Connector Parameters and Dimensions



Compatible Material

W




Load Rating

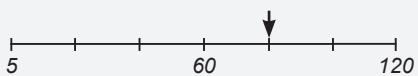
Fire Rating


Installation Possibilities

Number of Fasteners to Install



Ratio Cost/Capacity



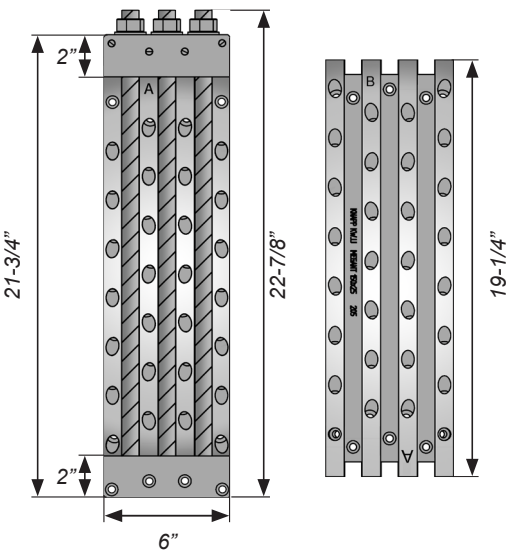


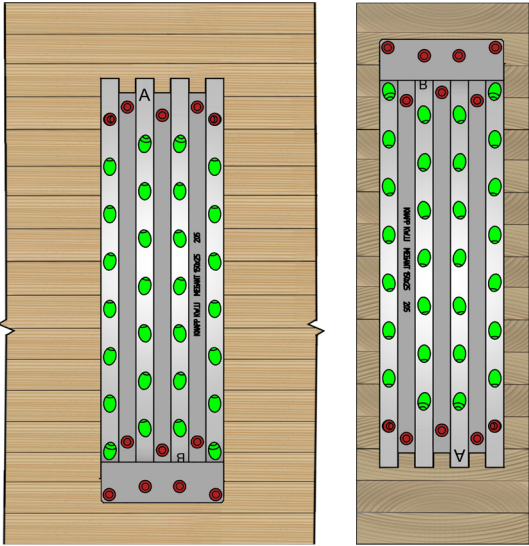


Table 18.1 Allowable Loads for MEGANT 550 x 150

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners		Threaded Rod	Allowable Loads [lbs]	
			Type	Quantity		Down Load	Uplift
MEGANT 550 x 150 170705501500200	7-1/2" x 25-1/4"	0.42 (SPF)	VG CSK 5/16" x 6-1/4"	80	3 pcs of M20 x 580 [22-7/8"] Grade 8.8	28,030	See uplift design p. 51
		0.49 (D.Fir)	VG CSK 5/16" x 6-1/4"	80	3 pcs of M20 x 580 [22-7/8"] Grade 8.8	31,730	

- Notes:
1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
 2. Allowable loads listed are only valid using listed ASSY screws.
 3. Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
 4. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 5. Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.47).
 6. The secondary member must be prevented from twisting.
 7. All icons are described in section "How to use this guide" on page 9.
 8. Screw installation must follow the patterns presented in the figures below.
 9. All connection design must meet all relevant requirements of the Notes to the Designer section.

Fasteners		
Orientation	Quantity	
 90°, Horizontal	24	
 45°, Inclined	56	



Primary Member Secondary Member

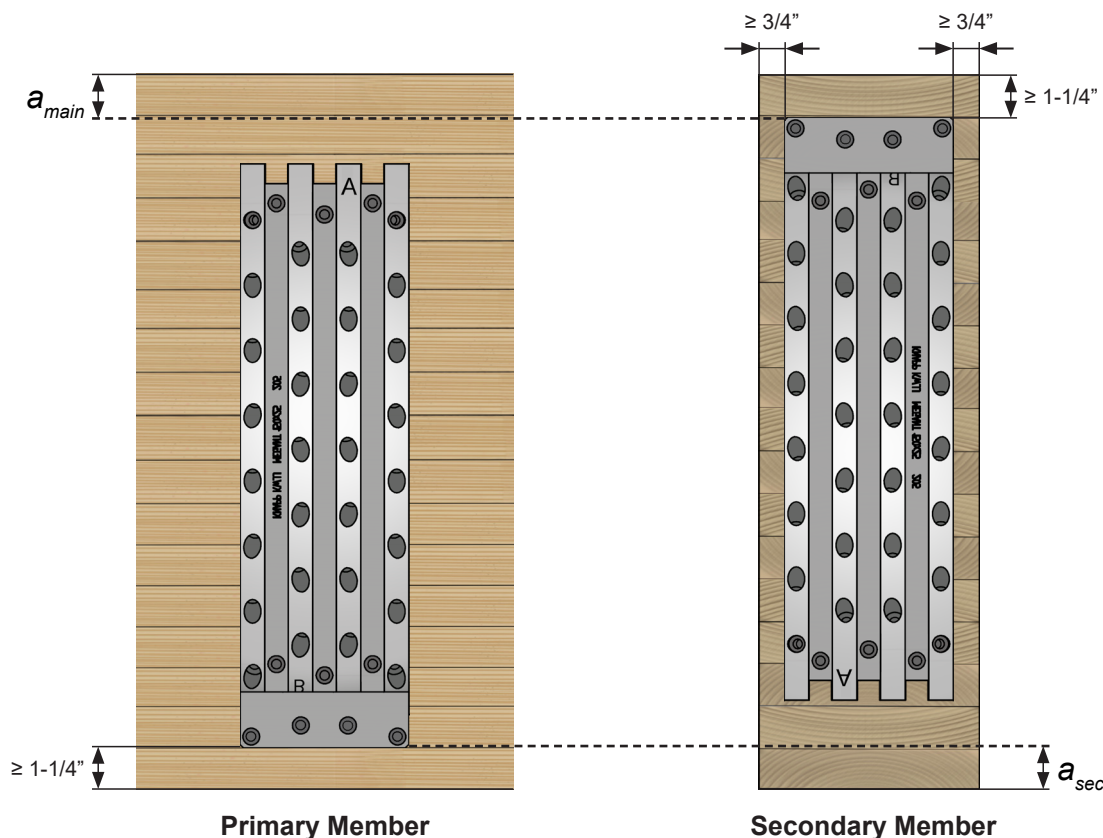
Connection Geometry Requirements

Table 18.2 Minimum and Maximum Distances (a_{main} , a_{sec})

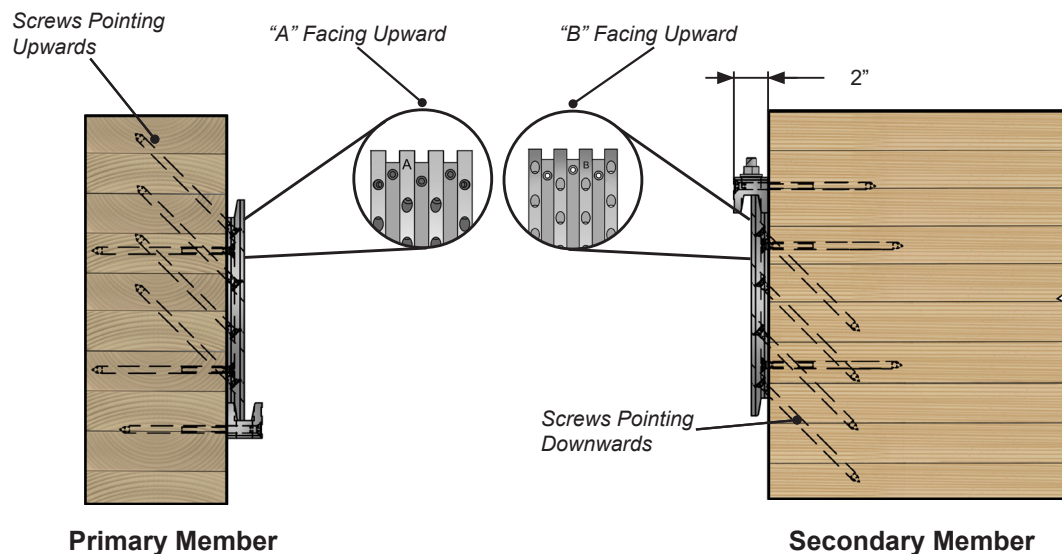
Beam Depth	25-1/4"	27"	28-1/2"	30"	31-1/2"	33"	34-1/2"	36"	37-1/2"	38-7/8"
a_{main} & a_{sec}	min	1-1/4"								
	max	2-3/8"	4-1/8"	5-5/8"	6-7/8"	7-3/8"	7-3/4"	8-1/4"	8-3/4"	9-1/4"

Notes:

- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- Please refer to the "Hardware" section, page 10, to see MEGANT components in detail.
- For the beam sizes not listed in table 18.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 18.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Location Instructions - Connector Plates and Screws



MEGANT 730 X 150

Connector Parameters and Dimensions

Compatible Material

Load Rating

Fire Rating

Installation Possibilities

Number of Fasteners to Install

Ratio Cost/Capacity

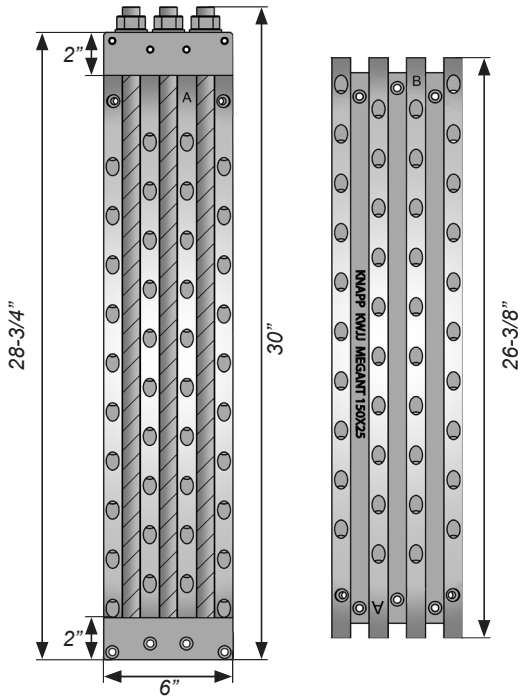
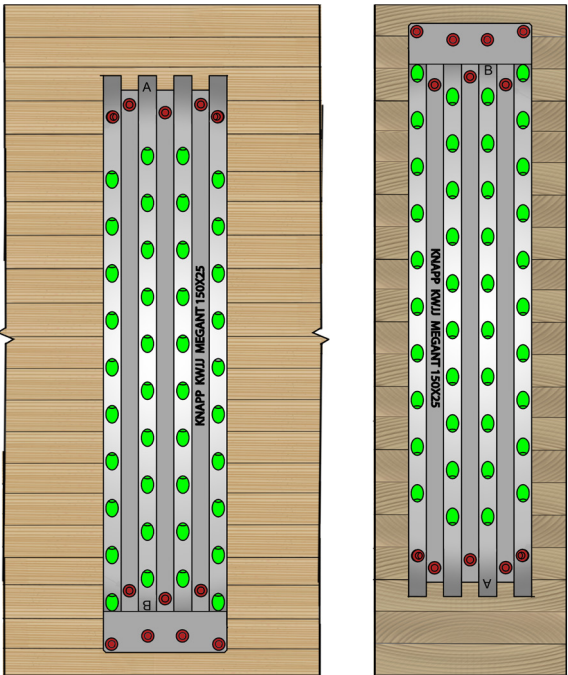


Table 19.1 Allowable Loads for MEGANT 730 x 150

Item #	Min. Beam Size	Specific Gravity [G]	Fasteners		Threaded Rod	Allowable Loads [lbs]	
			Type	Quantity		Down Load	Uplift
MEGANT 730 x 150 170707301500200	7-1/2" x 33-1/8"	0.42 (SPF)	VG CSK 5/16" x 6-1/4"	104	3 pcs of M20 x 760 [30"] Grade 8.8	32,630	See uplift design p. 51
		0.49 (D.Fir)	VG CSK 5/16" x 6-1/4"	104	3 pcs of M20 x 760 [30"] Grade 8.8	32,630	

- Notes:
1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
 2. Allowable loads listed are only valid using listed ASSY screws.
 3. Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
 4. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 5. Connector placement must respect the requirements presented in the Connection Geometry Requirement Section (p.49).
 6. The secondary member must be prevented from twisting.
 7. All icons are described in section "How to use this guide" on page 9.
 8. Screw installation must follow the patterns presented in the figures below.
 9. All connection design must meet all relevant requirements of the Notes to the Designer section.

Fasteners		
	Orientation	Quantity
	90°, Horizontal	24
	45°, Inclined	80



Primary Member Secondary Member

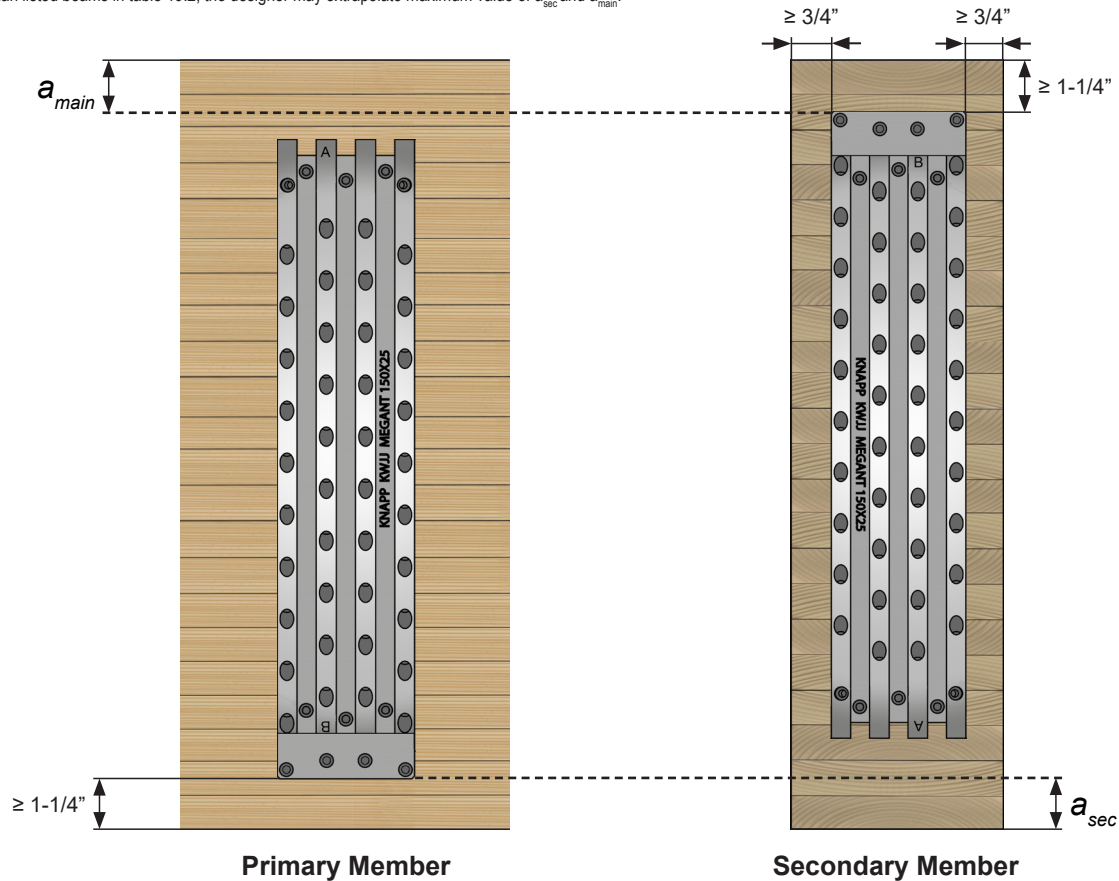
Connection Geometry Requirements

Table 19.2 Minimum and Maximum Distances (a_{main} , a_{sec})

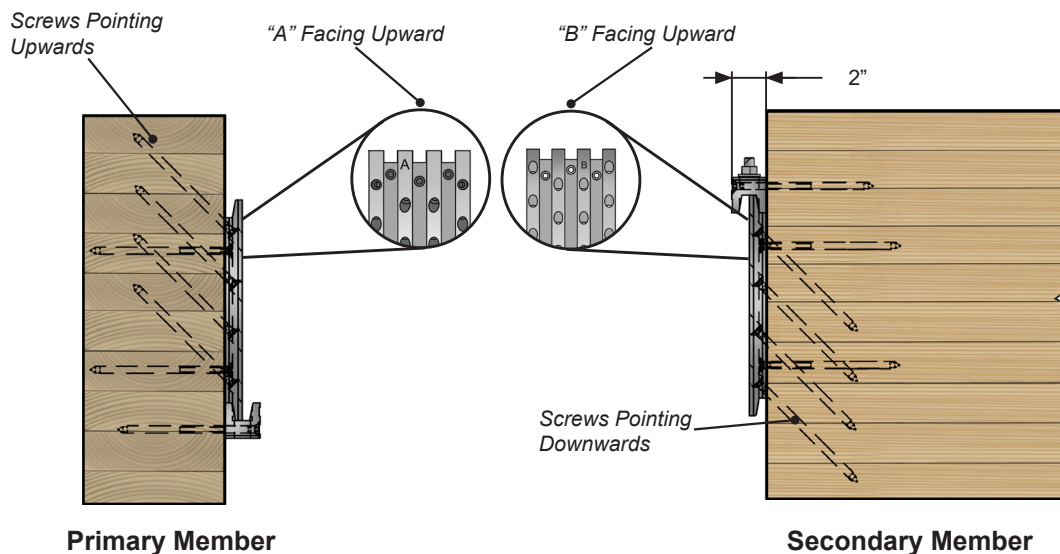
Beam Depth		33-1/8"	34-1/2"	36"	37-1/2"	38-7/8"	40-3/8"	41-7/8"	43-3/8"	44-7/8"	46-3/8"	47-7/8"	49-3/8"	50-7/8"
a _{main} & a _{sec}	min	1-1/4"												
	max	3-1/4"	4-1/2"	6"	7-1/2"	9"	10-1/8"	10-1/2"	11"	11-3/8"	11-7/8"	12-1/4"	12-3/4"	13-1/4"

Notes:

- Maximum distances do not apply to primary post/column members (a_{main}), where the wood grain direction is parallel to the line of the force.
- Please refer to the "Hardware" section, page 10, to see MEGANT components in detail.
- For the beam sizes not listed in table 19.2, the designer is permitted to interpolate the maximum value for a_{sec} and a_{main} .
- For deeper than listed beams in table 19.2, the designer may extrapolate maximum value of a_{sec} and a_{main} .



Location Instructions - Connector Plates and Screws





Carbon 12

Portland, Oregon 2017

Courtesy of: Andrew Poque

UPLIFT RESISTANCE DESIGN

When using a Beam Hanger System, additional hardware is required to resist possible uplift forces applied to the connection, for example wind suction.

- Fully threaded toe screw
- Spring steel Clip Lock Brace

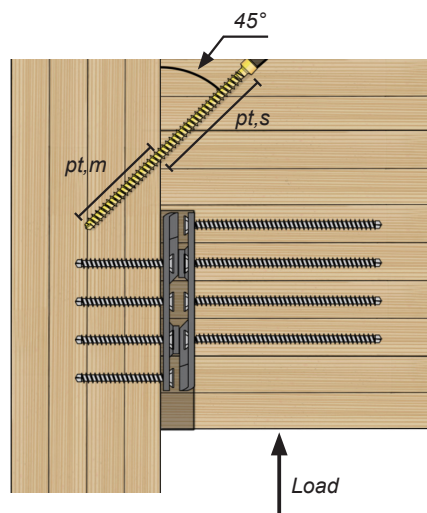
Beam Hanger Systems can resist uplift loading scenarios through two different hardware solutions:

Fully-Threaded Toe Screws

Fully threaded toe screws are installed after the connectors are dropped in place. The orientation of the screw relative to the sliding direction of the joint assures the screw resists primary in tension.

Fully-threaded toe screws can be used with all Beam Hanger Systems, the GIGANT, RICON S VS and the MEGANT.

The allowable loads are outlined in Table 20.



Example of a toe screw installation

Table 20. Allowable Loads [lbs] per Fastener with Minimum Effective Thread Penetration Length of the Primary and the Secondary Member, Fastener Installed at 45 deg

Fastener	Relative Density [G]	Thread Penetration Length $p_{t,m}$ $p_{t,s}$ [in]						
		3"	4"	5"	6"	7"	8"	9"
5/16 VG Cyl	0.42 (SPF)	617	822	1,028	1,233	1,255	1,255	1,255
3/8 VG Cyl		689	919	1,149	1,379	1,609	1,803	1,803
5/16 VG Cyl	0.49 (D.Fir)	721	962	1,202	1,255	1,255	1,255	1,255
3/8 VG Cyl		814	1,086	1,357	1,629	1,803	1,803	1,803

Notes:

1. Capacities listed in this table incorporate short term loading with $C_D = 1.6$
2. A minimum of two toe screws is recommended.

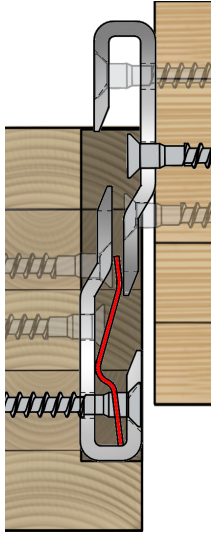
■ = Tensile Strength of fastener controls.

Clip Lock Brace System

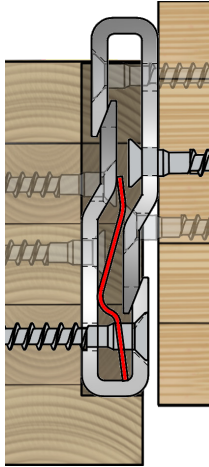
GIGANT - Clip Lock System

The installation of the Clip Lock Brace system **must** take place in the primary wood member.

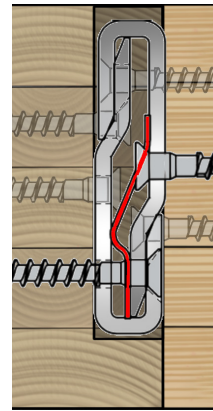
Step 1



Step 2



Step 3

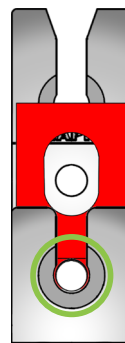


Screw Patterns With Clip Lock Brace System

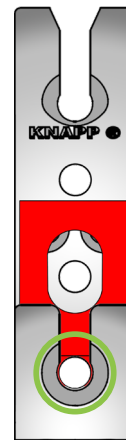
The installation of the Clip Lock Brace system for the GIGANT connectors will not change the screw pattern.

Installation sequence:

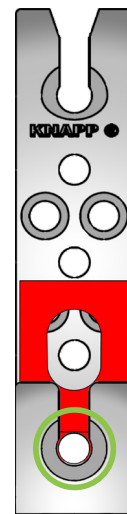
In the primary member, installed as the final step before assembly of the members



GIGANT
120x40



GIGANT
150x40



GIGANT
180x40

Table 21 Uplift Allowable Loads with Clip Lock Brace

Connector width		Allowable load
in	[mm]	[lbs]
1-5/8"	[40]	1,160

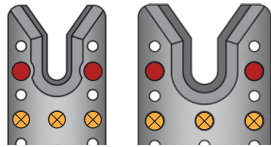
Note:

1. Capacities in this table incorporate short term loading with $C_D = 1.6$.

RICON S VS - Clip Lock System

The installation of the Clip Lock Brace system **must** take place in the primary wood member.

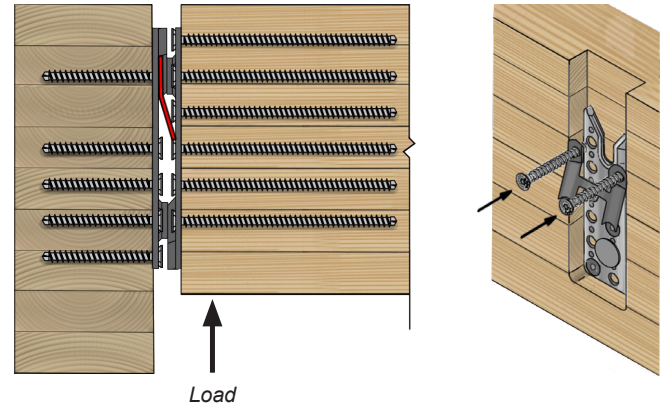
For the RICON S VS, a new screw pattern will apply, on the primary member only, to allow the Clip Lock Brace System to be installed properly.



● Clip-Lock Holes
 ● No screws with Clip-Lock

Note:

- Screws that would otherwise be installed under the clip lock can be placed in the center row of the connector, below the holes marked "X" in the figure above.



Screw Patterns With Clip Lock Brace System

In Primary Member Only

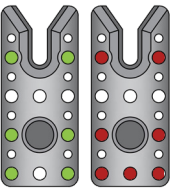
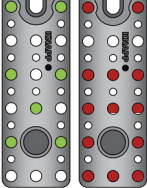
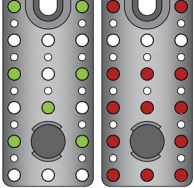
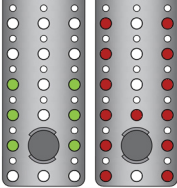
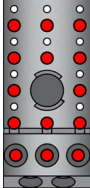


				
RICON S VS 140x60	RICON S VS 200x60	RICON S VS 200x80	RICON S VS 290x80	RICON XL 390x80
 6 screws	7 screws	7 screws	10 screws	-
 7 screws	13 screws	13 screws	17 screws	25 [+2] screws

Table 22.1 Uplift Allowable Loads with Clip Lock Brace

Connector width		Allowable load
in	[mm]	[lbs]
2-3/8"	[60]	1,740
3-1/8"	[80]	1,740

Note:

- Capacities in this table incorporate short term loading with $C_D = 1.6$.

Table 22.2 Reduction Factor to apply to Allowable Load

Connector	Relative Density [G]	R_{clip} Factor
RICON S VS 140x60	0.42 (SPF) - 0.49 (D.Fir)	0.7
RICON S VS 200x60		0.8
RICON S VS 200x80		0.8
RICON S VS 290x80		0.9
RICON XL 390x80		0.9




Carbon 12

Portland, Oregon 2017

Courtesy of: Andrew Poque

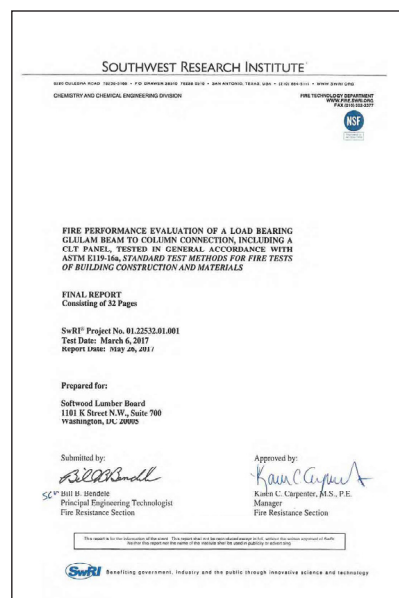
FIRE DESIGN

Full Scale Loaded Fire Test

 The NDS and the CSA recognize wood as a combustible material and a poor conductor of heat and refer to the property of wood in developing an insulating char layer in fire.

Wood can protect non-combustible elements such as a Beam Hanger System through an appropriately designed wood cover. The American Wood Council Technical Report 10 provides guidelines on char layer design for Beam Hangers in fire scenarios.

Full scale fire resistance rating testing with fully loaded specimens at the **Southwest Research Institute in San Antonio Texas** confirmed the char layer calculations and awarded the Beam Hanger System with a 1.5h fire rating.



**Glulam Connection
Fire Resistance Rating**

Char Layer Design

The wood cover must be thicker than the effective char thickness. As per the American Wood Council Technical Report 10, 2018 update, this wood cover refers to the a_{char} .

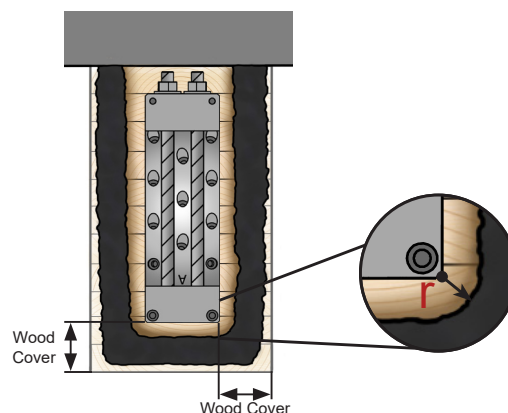
Table 23 Estimated Char Layer Thickness and Charring Rate Results

Fire Resistance Rating	Wood cover
	a_{char}
[hours]	[in]
1	1.5"
1.5	2.1"
2	2.7"

The Corner Effect

A multi directional exposure of columns and beams to the fire will result in faster charring at the corners. To account for this effect, corner rounding needs to be considered in fire design.

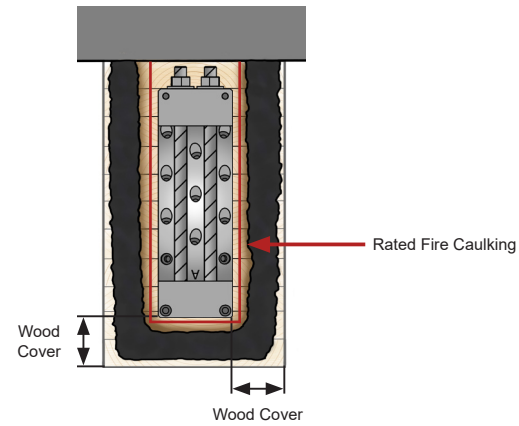
" r ", radius of the corner, is equal to the estimated char layer thickness.



Char Layer Fire Design

Installation Requirements - Fire Caulking

To reach the 1.5 hour fire rating approval, the Beam Hanger Systems must be installed with a fire rated caulking within the non charring area of the cross section.



Char Layer - Suggested Cross Sections GIGANT

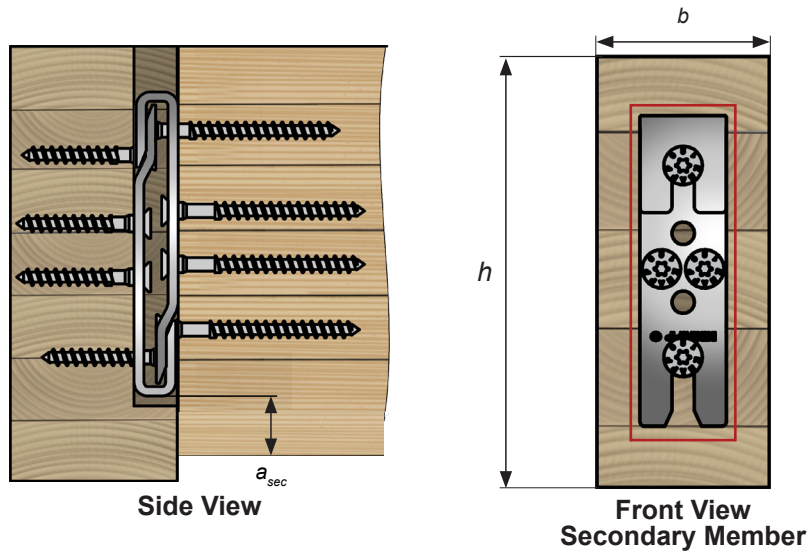


Table 24.1 Suggested Cross Sections

Connector	Fire Resistance Rating					
	1 hour			2 hours		
	Min. Beam Width (b) [in]	Min. Beam Height (h) [in]	a _{sec} [in]	Min. Beam Width (b) [in]	Min. Beam Height (h) [in]	a _{sec} [in]
GIGANT 120x40	4-1/2"	11-1/2"	2"	-	-	-
	5-1/2"	9-3/4"	1-1/2"			
GIGANT 150x40	4-1/2"	11-5/8"	2"	8-3/4"	14"	2-3/4"
	5-1/2"	9-7/8"	1-1/2"			
GIGANT 180x40	4-1/2"	11-3/4"	2"	8-3/4"	14"	2-3/4"
	5-1/2"	10"	1-1/2"			

Notes:

1. All minimum beam requirements account for the corner effect rounding when beams are designed for three-sided fire exposure.
2. Beam Hanger Systems must be installed with fire rated caulking within the non charring area.

RICON S VS

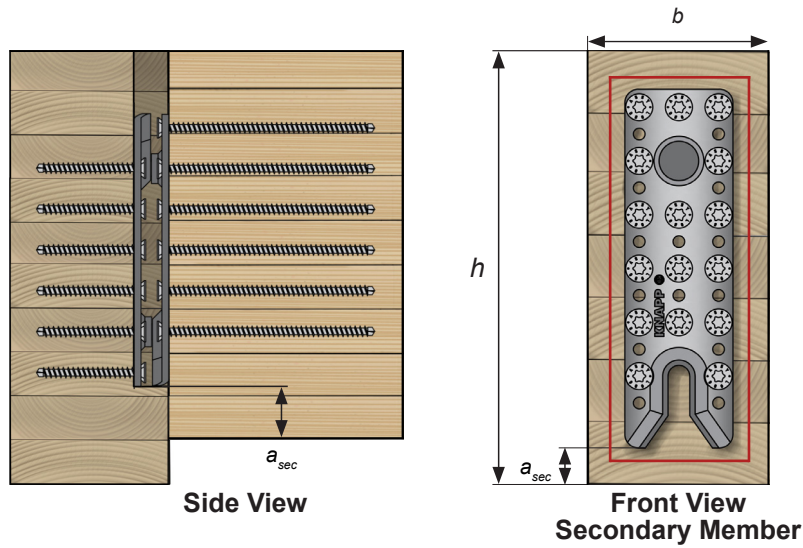


Table 24.2 Suggested Cross Sections

Connector		Fire Resistance Rating					
		1 hour			2 hours		
		Min. Beam Width (b) [in]	Min. Beam Height (h) [in]	a _{sec} [in]	Min. Beam Width (b) [in]	Min. Beam Height (h) [in]	a _{sec} [in]
RICON S VS 140x60	Single	6-5/16"	10-1/4"	1-1/2"	9-5/8"	14-1/4"	2-3/4"
	Double	8-1/8"	11-7/8"	2"	10-1/2"	17-3/8"	3-5/8"
RICON S VS 200x60	Single	5-1/4"	11-7/8"	2"	9-5/8"	14-1/4"	2-3/4"
	Double	8-1/8"	11-7/8"	2"	10-1/2"	17-3/8"	3-5/8"
RICON S VS 200x80	Single	6-1/8"	11-7/8"	2"	8-5/8"	17-3/8"	3-5/8"
	Double	9-3/4"	11-7/8"	2"	12-1/8"	17-3/8"	3-5/8"
RICON S VS 290x80	Single	6-1/8"	14-1/4"	2"	8-5/8"	17-3/8"	3-5/8"
	Double	9-3/4"	14-1/4"	2"	12-1/8"	17-3/8"	3-5/8"
RICON XL 390x80	Single	6-1/8"	18-3/8"	2"	8-5/8"	23-15/16"	3-5/8"
	Double	9-3/4"	18-3/8"	2"	12-1/8"	23-15/16"	3-5/8"

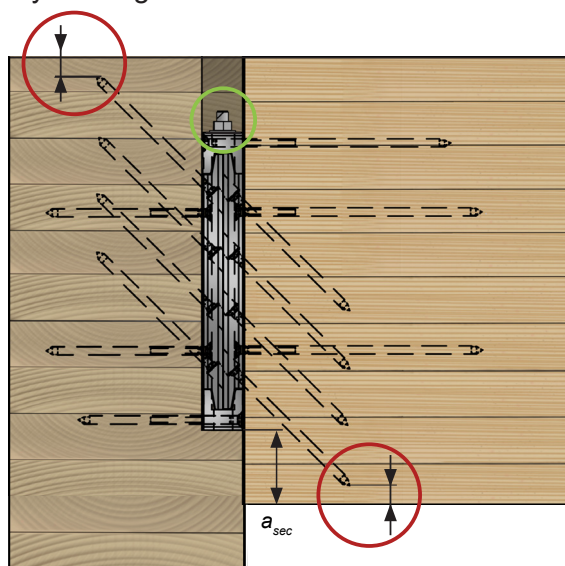
Notes:

1. All minimum beam requirements account for the corner effect rounding when beams are designed for three-sided fire exposure.
2. Beam Hanger Systems must be installed with fire rated caulking within the non charring area.

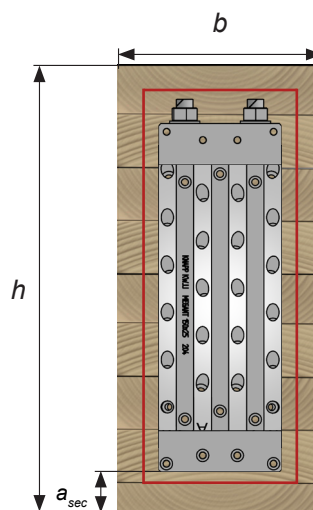
MEGANT

○ Note to consider inclined screw embedment at top and bottom for char layer design

○ Note to consider threaded rod height for char layer design



Side View



Front View
Secondary Member

Table 24.3 Suggested Cross Sections

Connector	Fire Resistance Rating					
	1 hour			2 hours		
	Min. Beam Width (b) [in]	Min. Beam Height (h) [in]	a _{sec} [in]	Min. Beam Width (b) [in]	Min. Beam Height (h) [in]	a _{sec} [in]
MEGANT 310x60	5-1/4"	16-1/4"	2-3/4"	7-3/4"	17-5/16"	3-7/8"
MEGANT 430x60	5-1/4"	20-7/8"	2-3/4"	7-3/4"	22-1/8"	3-7/8"
MEGANT 550x60	5-1/4"	25-5/8"	2-3/4"	7-3/4"	26-3/4"	3-7/8"
MEGANT 310x100	6-7/8"	15-3/8"	2"	9-5/16"	19-1/4"	3-5/8"
MEGANT 430x100	6-7/8"	20-1/8"	2"	9-5/16"	21-3/4"	3-5/8"
MEGANT 550x100	6-7/8"	24-7/8"	2"	9-5/16"	26-1/2"	3-5/8"
MEGANT 310x150	8-7/8"	15-3/8"	2"	11-1/4"	19-1/4"	3-5/8"
MEGANT 430x150	8-7/8"	20-1/8"	2"	11-1/4"	21-3/4"	3-5/8"
MEGANT 550x150	8-7/8"	24-7/8"	2"	11-1/4"	26-1/2"	3-5/8"
MEGANT 730x150	8-7/8"	31-7/8"	2"	11-1/4"	33-5/8"	3-5/8"

Notes:

1. All minimum beam requirements account for the corner effect rounding when beams are designed for three-sided fire exposure.
2. Beam Hanger Systems must be installed with fire rated caulking within the non charring area.



First Tech Credit Union

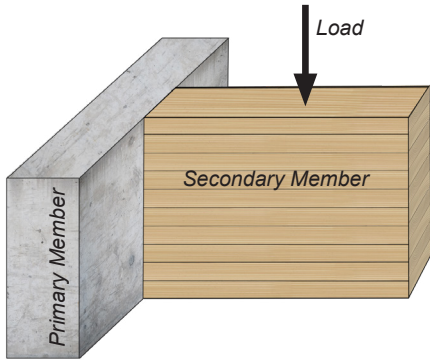
Portland, Oregon 2017

Courtesy of: Oregon Forest Resources Institute

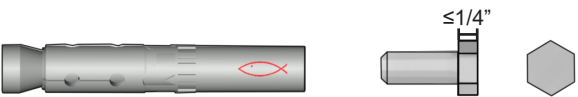
RICON S VS - SPECIAL CONNECTIONS

Concrete to Wood Connections C

The RICON S VS can also be anchored to concrete elements to create wood to concrete connections. Provided that concrete work is not as precise as timber work, tolerance requirements should be carefully considered.



Fischer High performance Anchor FH II 12/M8 with Hexagon Screw M8x20 8.8



Fischer High Performance Anchor FH II 15/ M10 with Hexagon Screw M10x20 8.8

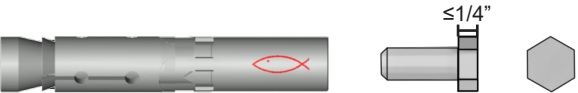
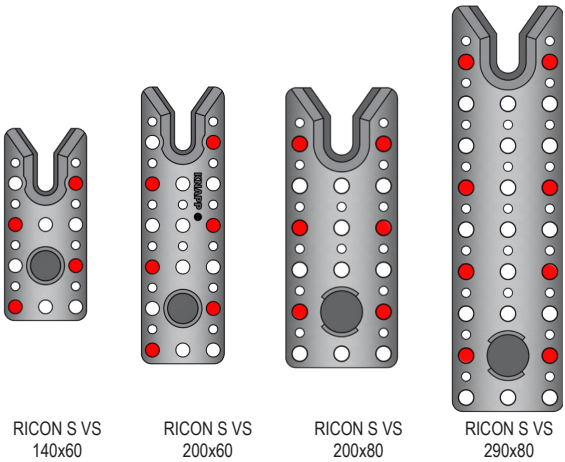


Table 25.1 Allowable Loads for Concrete to Wood Connections

Connector	Concrete Strength Class	Fasteners				Allowable Loads [lbs]			
		Primary (Concrete) Member		Secondary (Wood) Member		Floor C _d =1.0	Snow C _d =1.15	Roof C _d =1.25	Uplift
		Type	Quantity	Type	Quantity				
RICON S VS 140 x 60	C20/25	FH II 12/M8 I + M8 x 20 8.8	4	VG CSK 5/16" x 6-1/4"	10	2,890	3,320	3,610	See uplift design p. 51 - 53
RICON S VS 200 x 60			6		16	3,980	4,570	4,970	
RICON S VS 200 x 80	C50/60	FH II 15/M10 I + M10 x 20 8.8	6	VG CSK 3/8" x 7-7/8"	16	5,070	5,830	6,330	
RICON S VS 290 x 80			8		20	6,770	7,780	8,460	

- Notes:
1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
 2. Allowable loads listed are only valid using listed ASSY screws.
 3. Allowable loads listed are only valid for dry service conditions (C_m=1.0).
 4. All installation and design of the concrete bolts needs to be in accordance with the manufacturer recommendations.
 5. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
 6. Allowable loads listed are applicable for Specific Gravities 0.42 & 0.49.
 7. Connector placement must respect the minimum and maximum edge distance requirements for each connector size in concrete and wood.
 8. Screw installation must follow the patterns presented under the design table.
 9. Maximum bolt head thickness is 1/4".



Concrete Fastener Positioning (concrete to wood)

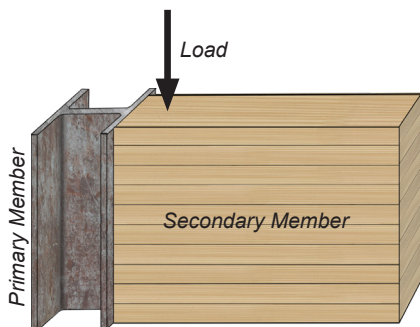
Steel to Wood Connections



The RICON S VS can be **bolted** or **welded** to steel elements to create wood to steel connections.

Bolts and welds need to be designed to transmit the respective loading requirements.

Option 1 - Bolted



Option 2 - Welded

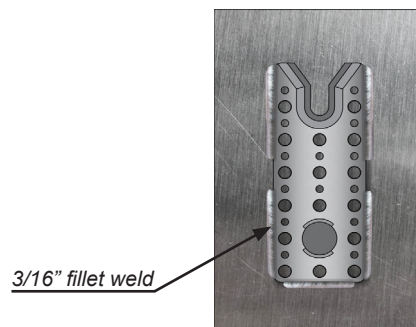
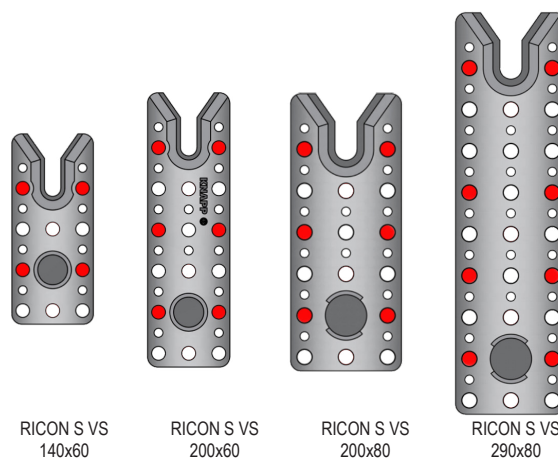


Table 25.2 Allowable Loads for Bolted Steel to Wood Connections

Connector	Steel Strength Class	Fasteners				Allowable Loads [lbs]			
		Primary (Steel) Member		Secondary (Wood) Member		Floor $C_D=1.0$	Snow $C_D=1.15$	Roof $C_D=1.25$	Uplift
		Type	Quantity	Type	Quantity				
RICON S VS 140 x 60	ASTM A36 or higher	M8 8.8 bolt + nut	4	VG CSK 5/16" x 6-1/4"	10	3,100	3,560	3,870	See uplift design p. 51 - 53
RICON S VS 200 x 60			6		16	4,420	5,080	5,520	
RICON S VS 200 x 80		M10 8.8 bolt + nut	6	VG CSK 3/8" x 7-7/8"	16	6,340	7,290	7,920	
RICON S VS 290 x 80			8		20	7,610	8,750	9,510	

Notes:

1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
2. Allowable loads listed are only valid using listed ASSY screws.
3. Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
4. Connector plates shall be installed symmetrically about the vertical axis to avoid eccentricity.
5. Bolts with a minimum tensile strength of 60 ksi shall be used.
6. Allowable loads are applicable for Specific Gravities 0.42 & 0.49.
7. The steel plate thickness shall be at least 1/4".
8. Bolt installation must follow the patterns presented under the design table.
9. Maximum bolt head thickness is 1/4".
10. All bolt and steel design criteria must be designed by a licensed design professional.

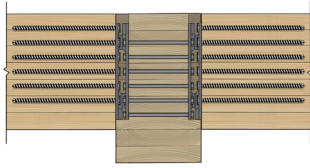


Bolt Positioning
(steel to wood)

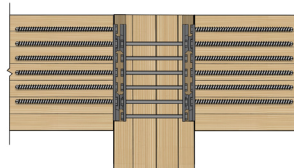
Through Connections

The RICON S VS is also suitable for double connections where secondary members connect into multiple faces of the primary member, a post member or a CLT wall element.

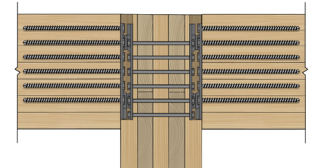
The Beam Hanger System is connected using through bolts or threaded rods suitable for structural applications.



Through Connection with a Beam



Through Connection with a Column



Through Connection with a CLT Wall

Table 25.3 Allowable Loads for Through Connections

Connector	Specific Gravity [G]	Fasteners (per connection)				Allowable Loads [lbs]			
		Primary Member		Secondary Members		Floor $C_D=1.0$	Snow $C_D=1.15$	Roof $C_D=1.25$	Uplift
		Type	Quantity	Type	Quantity				
RICON S VS 140 x 60	0.42 (SPF)	M8 8.8 bolt + jam nut	6	VG CSK 5/16" x 6-1/4"	20	2,190	2,510	2,730	See uplift design p. 51 - 53
RICON S VS 200 x 60			9		32	3,120	3,580	3,900	
RICON S VS 200 x 80		M10 8.8 bolt + jam nut	9	VG CSK 3/8" x 7-7/8"	32	4,480	5,150	5,600	
RICON S VS 290 x 80			12		40	5,420	6,230	6,770	
RICON S VS 140 x 60	0.49 (D.Fir)	M8 8.8 bolt + jam nut	6	VG CSK 5/16" x 6-1/4"	20	2,410	2,770	3,010	
RICON S VS 200 x 60			9		32	3,440	3,950	4,300	
RICON S VS 200 x 80		M10 8.8 bolt + jam nut	9	VG CSK 3/8" x 7-7/8"	32	4,930	5,660	6,160	
RICON S VS 290 x 80			12		40	5,920	6,800	7,400	

Notes:

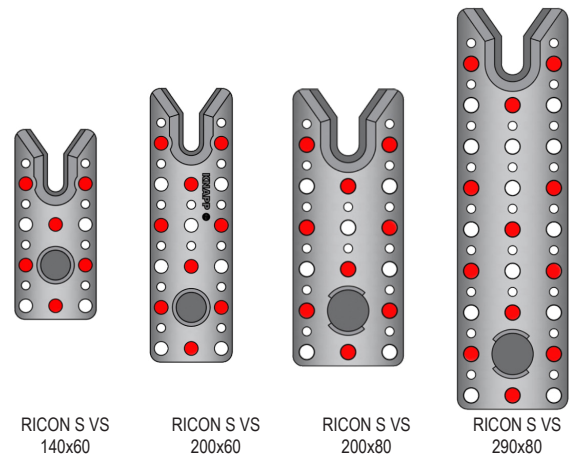
1. Allowable loads listed are only valid for Allowable Stress Design in the USA.
2. Allowable loads listed are only valid for dry service condition ($C_M=1.0$).
3. Connector plates shall be installed centered around the vertical axis to avoid eccentricity.
4. Bolts with a minimum tensile strength of 120 ksi shall be used.
5. Minimum end and edge distances need to be kept following recommendations in NDS 2018.
6. The length of the through penetration shall be a minimum of 4" for M8 8.8 bolts and 5" for M10 8.8 bolts.
7. Bolts shall be installed with tight fit, jam nuts and washer shall be used to allow connector plates to engage properly.
8. Maximum bolt head and jam nut thickness is 1/4".
9. Connector placement must respect the minimum and maximum edge distance requirement for each connector size.
10. Bolt installation must follow the patterns presented under the design table.
11. Other limiting factors regarding the wood strength, group tear out etc. need to be considered.



Threaded Rod M8x150
8.8 Jam Nut and Washer



Threaded M10x170 8.8
with Jam Nut and Washer



Bolt Positioning
(through connection)

Skewed Connections

The Beam Hanger System relies on different fastener lengths for load transfer in the primary and secondary member.

Primary Member

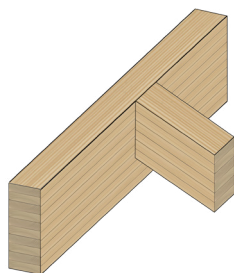
The connector plate installed into the primary member, for either a girder beam or a column, has fasteners driven in the side grain. This fiber orientation promotes higher withdrawal capacity, therefore the fasteners may be shorter and still sustain the same load.

ASSY VG CSK 5/16" x 3-1/8" screws may be used with:

- RICON S VS 140x60
- RICON S VS 200x60

ASSY VG CSK 3/8" x 4" screws may be used with:

- RICON S VS 200x80
- RICON S VS 290x80
- RICON XL 390x80



Rafter to Ridge Beam Connection

In skewed connections, the connector plate installed into the secondary member has fasteners driven into the grain at an angle relative to the connection angle.

Secondary Member

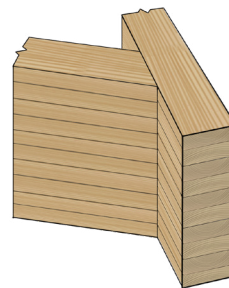
The connector plate installed into the secondary member has fasteners driven into the end grain. Longer fully threaded screws are used in the secondary member in order to compensate for the withdrawal capacity reduction characteristic of this orientation of the wood fiber.

ASSY VG CSK 5/16" x 6-1/4" screws may be used with:

- RICON S VS 140x60
- RICON S VS 200x60

ASSY VG CSK 3/8" x 7-7/8" screws may be used with:

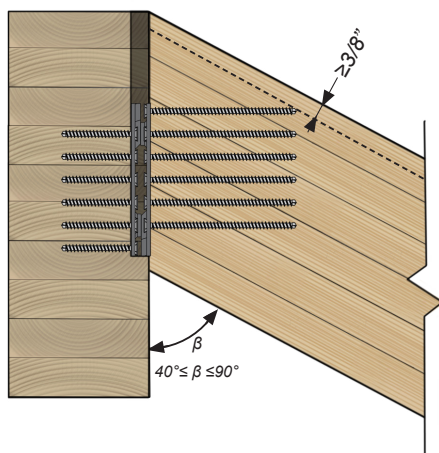
- RICON S VS 200x80
- RICON S VS 290x80
- RICON XL 390x80



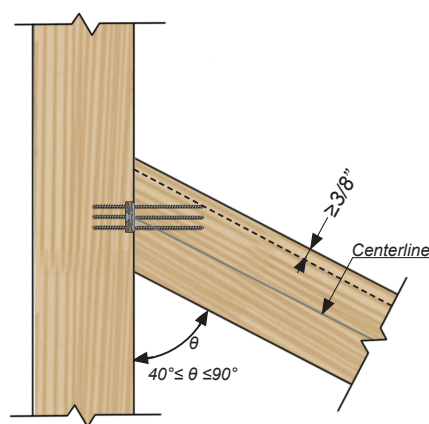
Joist to Beam Connection

The connection benefits from the changing the angle to grain relationship, and thus respective design values may be achieved with shorter screw length in the secondary member.

Skewed Connection Details



Side View: Rafter to Ridge Beam Connection



Top View: Joist to Beam or Column Connection

In skewed connections, the connector placement must respect the connection geometry requirements in order to be used without reinforcement. Where connection geometry imposes restrictions, fastener length may be reduced, and allowable connection loads shall be adjusted with the appropriate reduction factor (R_{SKEWED}).

For horizontal tilts (θ), the connector must be positioned within the centerline of the joist, otherwise eccentricities and resulting moments must be accounted for by the designer.

Table 26.1 Adjustment Factor (R_{SKEWED}) for RICON S VS 140x60 & 200x60

Screw Length [in]	β or $\theta = 90^\circ$	β or $\theta = 80^\circ$	β or $\theta = 70^\circ$	β or $\theta = 60^\circ$	β or $\theta = 50^\circ$	β or $\theta = 40^\circ$
6-1/4"	1.0	1.0	1.0	1.0	1.0	1.0
5-1/2"	0.9	1.0	1.0	1.0	1.0	1.0
4-3/4"	0.8	0.9	0.9	1.0	1.0	1.0

Table 26.2 Adjustment Factor (R_{SKEWED}) for RICON S VS 200x80, 290x80 & 390x80

Screw Length [in]	β or $\theta = 90^\circ$	β or $\theta = 80^\circ$	β or $\theta = 70^\circ$	β or $\theta = 60^\circ$	β or $\theta = 50^\circ$	β or $\theta = 40^\circ$
7-7/8"	1.0	1.0	1.0	1.0	1.0	1.0
7-1/8"	0.9	1.0	1.0	1.0	1.0	1.0
6-1/4"	0.8	0.9	0.9	1.0	1.0	1.0
5-1/2"	0.7	0.8	0.8	0.9	0.9	1.0

Notes:

1. Reduced fastener lengths only apply for installation in the secondary member.
2. Allowable Load of the connector must be adjusted with the reduction factor given in the table.

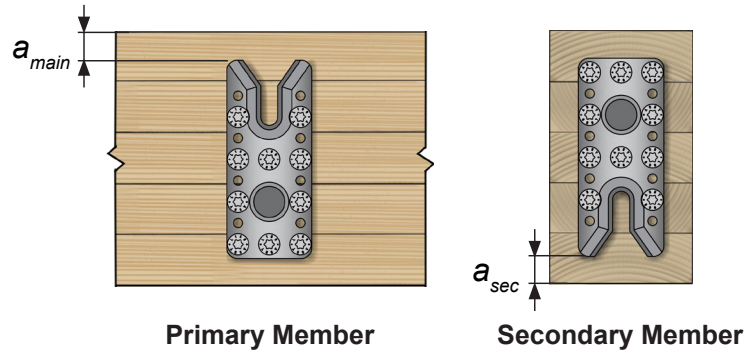


Rocky Ridge YMCA

Calgary, Alberta 2016

RICON S VS REINFORCEMENT

Where detailing requirements dictate connector placements other than the one specified in this document, connection strength may be limited, and reinforcement is required. Reinforcement may be achieved through the use of fully thread screws in compliance with ICC ESR-3178.



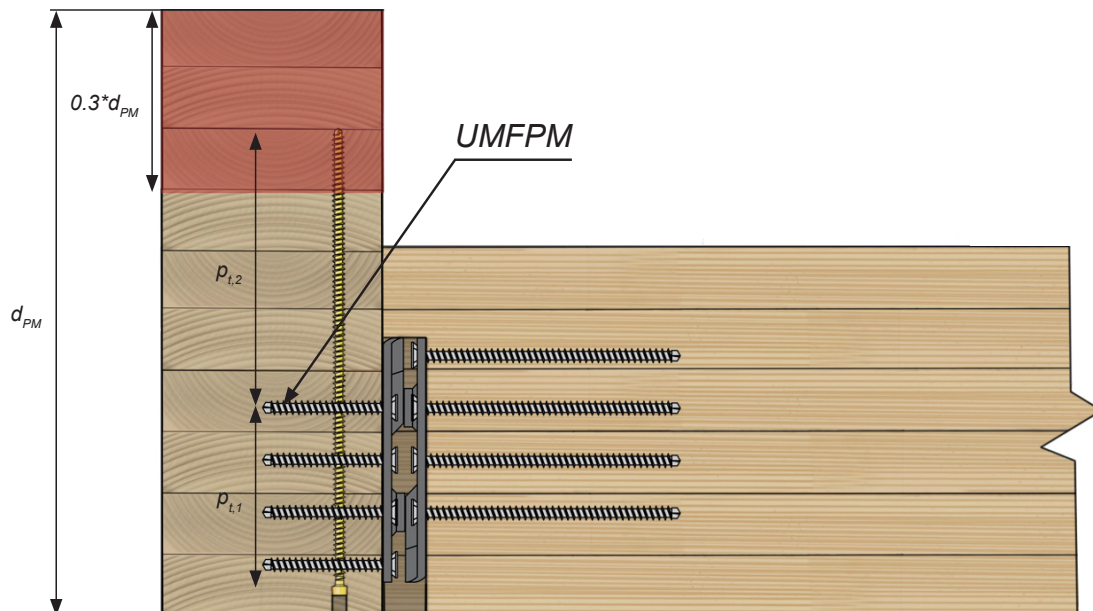
Primary Member Details

The effective thread penetration length $p_{t,1}$ and $p_{t,2}$ above and below the **upper most fastener in the primary member [UMFPM]** must exceed the value p_t provided in tables 27.1 through 27.5.

The fully threaded reinforcing screw must penetrate sufficiently ($> 4 \cdot D$) into the upper most section of the primary member ($0.3 \cdot d_{PM}$).

The effective thread penetration length may be adjusted to accommodate a wooden plug covering the screw head or to optimize screw selection to available screw lengths as per table 28.

The adjustment must fulfill $\min(p_{t,1}; p_{t,2}) > p_t$. The reinforcing fully threaded wood screw in the primary member may be installed from the top down or the bottom up as required.



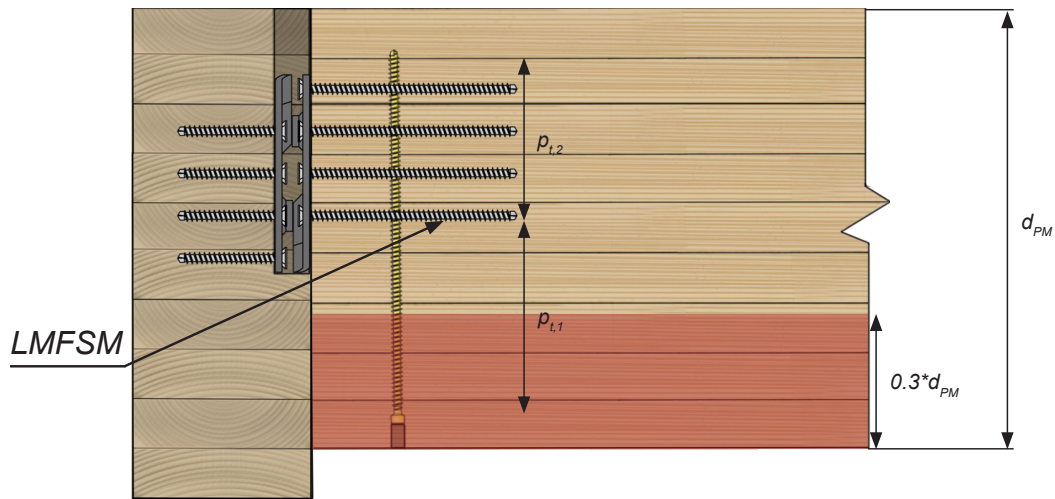
Secondary Member Details

The effective thread penetration length $p_{t,1}$ and $p_{t,2}$ above and below the **lower most fastener in the secondary member [LMFSM]** must exceed the value p_t provided in tables 27.1 through 27.5.

The fully threaded reinforcing screw must sufficiently penetrate ($> 4 \cdot D$) into the lower most section of the secondary member ($0.3 \cdot d_{SM}$).

The effective thread penetration length may be adjusted to accommodate a wooden plug covering the screw head or to optimize to available screw lengths as per table 28.

The adjustment must fulfill $\min(p_{t,1}; p_{t,2}) > p_t$. The reinforcing fully threaded wood screw in the secondary member may be installed from the top down or the bottom up as required.



Reinforcement Tables

The appropriate thread penetration length (p_t) given in table 27.1 through 27.5 depends on the ratio h_i/d_i , where h_i is the distance between the **UMFPM** and the

top of the primary member or the distance between the **LMFSM** and the bottom of the secondary member.

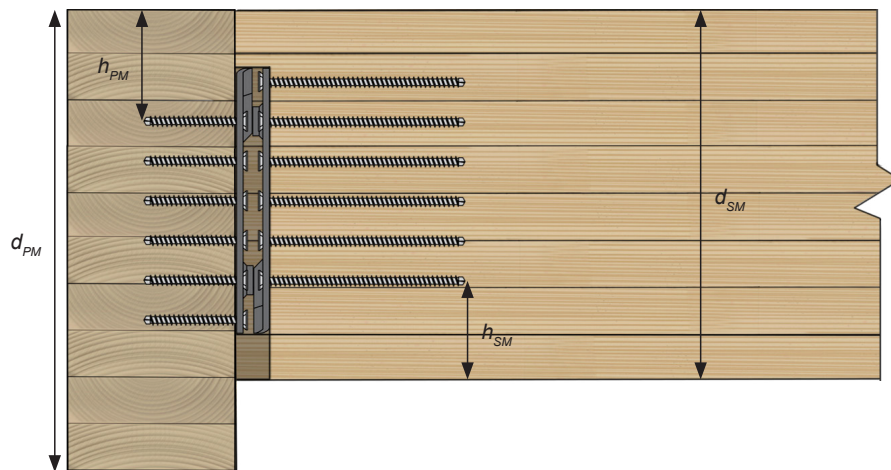


Table 27.1 Minimum Thread Penetration p_t [in] Needed for RICON S VS 140x60

h/d_i	0_0	0_1	0_2	0_3	0_4	0_5	0_6	0_7	0_8	0_9
0.3_	3.4	3.6	3.8	4.1	4.3	4.5	4.7	4.9	5.1	5.4
0.4_	5.6	5.8	6.1	6.3	6.5	6.8	7.0	7.2	7.5	7.7
0.5_	7.9	8.2	8.4	8.7	8.9	9.1	9.4	9.6	9.8	10.1

Table 27.2 Minimum Thread Penetration p_t [in] Needed for RICON S VS 200x60

h/d_i	0_0	0_1	0_2	0_3	0_4	0_5	0_6	0_7	0_8	0_9
0.3_	4.9	5.2	5.5	5.8	6.1	6.4	6.7	7.0	7.3	7.6
0.4_	8.0	8.3	8.6	9.0	9.3	9.6	10.0	10.3	10.6	11.0
0.5_	11.3	11.7	12.0	12.3	12.7	13.0	13.3	13.7	14.0	14.3

Table 27.3 Minimum Thread Penetration p_t [in] Needed for RICON S VS 200x80

h/d_i	0_0	0_1	0_2	0_3	0_4	0_5	0_6	0_7	0_8	0_9
0.3_	6.3	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8
0.4_	10.2	10.7	11.1	11.5	11.9	12.4	12.8	13.2	13.7	14.1
0.5_	14.5	15.0	15.4	15.8	16.3	16.7	17.1	17.6	18.0	18.4

Table 27.4 Minimum Total Thread Penetration p_t [in] Needed for RICON S VS 290x80

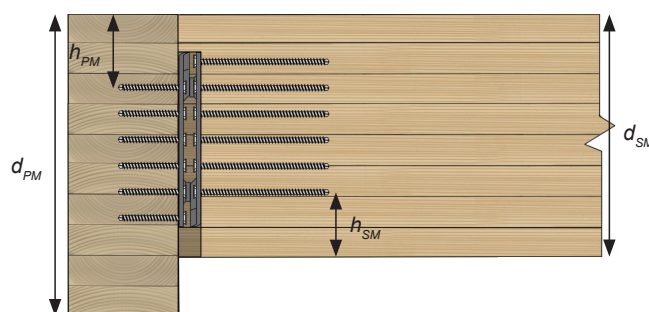
h/d_i	0_0	0_1	0_2	0_3	0_4	0_5	0_6	0_7	0_8	0_9
0.3_	7.6	8.0	8.5	9.0	9.4	9.9	10.4	10.9	11.4	11.9
0.4_	12.4	12.9	13.4	13.9	14.4	15.0	15.5	16.0	16.5	17.1
0.5_	17.6	18.1	18.7	19.2	19.7	20.2	20.7	21.3	21.8	22.3

Table 27.5 Minimum Thread Penetration p_t [in] Needed for RICON XL 390x80

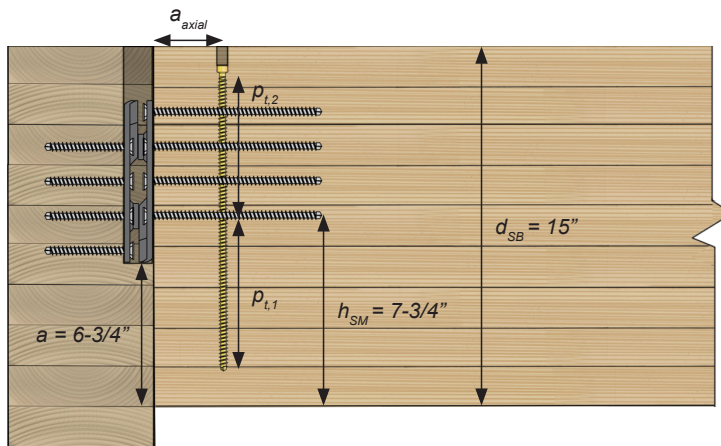
h/d_i	0_0	0_1	0_2	0_3	0_4	0_5	0_6	0_7	0_8	0_9
0.3_	14.1	15.0	15.8	16.7	17.5	18.4	19.3	20.2	21.2	22.1
0.4_	23.0	24.0	24.9	25.9	26.8	27.8	28.8	29.8	30.7	31.7
0.5_	32.7	33.7	34.7	35.6	36.6	37.6	38.6	39.5	40.5	41.4

Reinforcement notes:

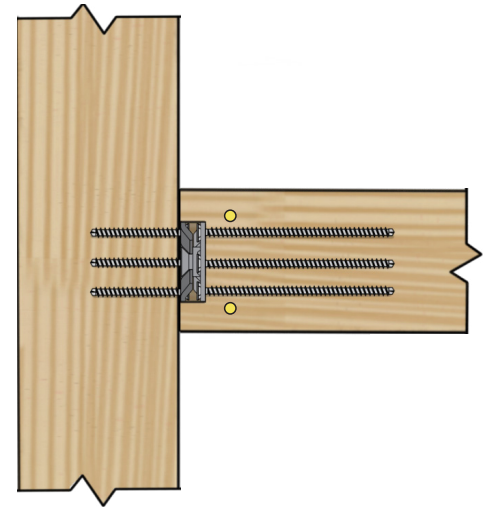
1. Ratios h/d_i are applicable to joist and header reinforcement.
2. Values in tables 27.1 and 27.2 are only applicable to 5/16" ASSY VG fasteners and values in tables 27.3, 27.4 and 27.5 are only applicable to 3/8" ASSY VG fasteners found in Table 28.
3. A minimum of two reinforcement fasteners shall be used.
4. For design purposes p_{t1} & p_{t2} may be considered a maximum of 8-3/8". Beyond this value, the tensile resistance of the fastener is governing. Longer fasteners however, still may be used when the length is required for installation purposes.
5. Fasteners shall be placed in a symmetrical pattern respecting all governing spacing requirements.
6. Double connections may require additional reinforcement.
7. RICON XL 390x80 reinforcement with more than 2 screws must be designed by a licensed design professional.



Reinforcement Design Example



Side View



Top View

As an example, to connect a 4-3/4" by 15" Glulam beam to a girder with the 140x60 RICON S VS mounted high in the cross section, reinforcement would be necessary as $a_{max} = 3"$ for a 15" beam and the actual measurement $a = 6-3/16"$, so $a > a_{max}$.

With given measurements of h_{SM} (7-3/4") the h_i/d_i ratio equals:

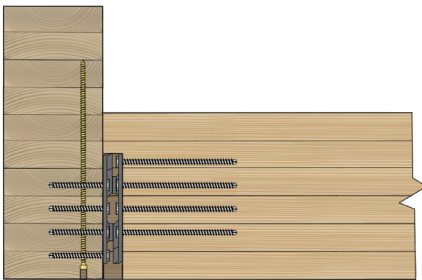
- $7-3/4" / 15" = 0.52$

According to Table 27.1, for the h_i/d_i ratio of 0.52, $p_t = 8.42"$, therefore $p_{t,1}$ and $p_{t,2}$ have to be larger or equal to 8.42".

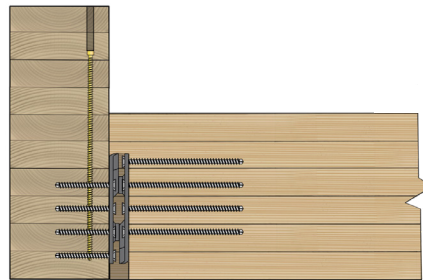
With 2 VG Cyl 5/16 x 11" fasteners countersunk 1" installed from above, the effective embedding lengths result in:

- $p_{t,1} = 2 * 4-3/4" > 8.42"$
- $p_{t,2} = 2 * 6-1/4" > 8.42"$

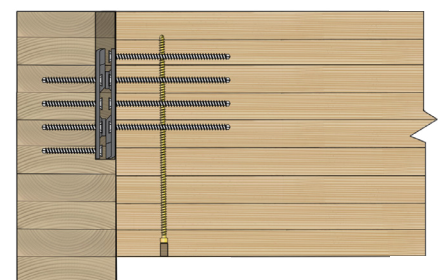
Reinforcement Possibilities



Header Reinforcement from Below



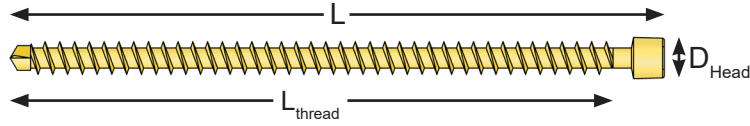
Header Reinforcement from Above



Joist Reinforcement from Below

Hardware Requirement - ASSY VG Cyl

Table 28 Screw Selection for ASSY VG Cylinder Head

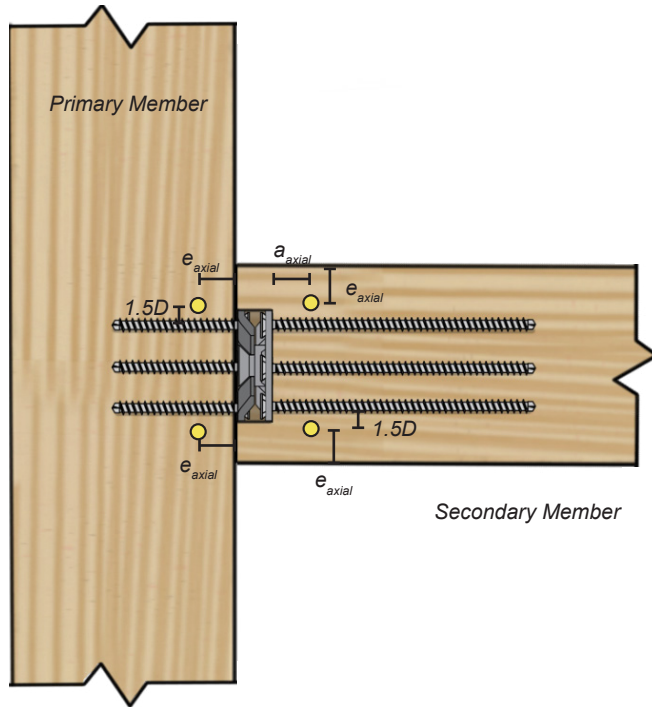


Item#	Box size pieces	D		L		L _{Thread}		D _{Head}		Bit
		in	[mm]	in	[mm]	in	[mm]	in	[mm]	
140080160000102	50	5/16"	[8]	6-1/4"	[160]	5-5/8"	[144]	3/8"	[10]	AW 40
140080180000102				7-1/8"	[180]	6-1/2"	[164]			
140080200000102	75			7-7/8"	[200]	7-1/4"	[184]			
140080220000102				9-1/2"	[240]	8-7/8"	[224]			
140080240000102				10-1/4"	[260]	9-5/8"	[244]			
140080260000102				11"	[280]	10-3/8"	[264]			
140080280000102				11-7/8"	[300]	11-1/8"	[284]			
140080300000102				13"	[330]	12-3/8"	[314]			
150080360000302	50			14-1/4"	[360]	13-1/2"	[344]			
150080380000302				15"	[380]	14-3/8"	[364]			
150080430000302	25			17"	[430]	16-1/4"	[414]			
150080480000302				19"	[480]	18-1/4"	[464]			
150080530000302				20-7/8"	[530]	20-1/4"	[514]			
150080580000302				22-7/8"	[580]	22-1/4"	[564]			
140100180000102	50	3/8"	[10]	7-1/8"	[180]	6-1/2"	[165]	0.528"	[13.4]	AW 50
140100200000102				7-7/8"	[200]	7-1/4"	[185]			
140100240000102				9-1/2"	[240]	8-7/8"	[225]			
140100260000102				10-1/4"	[260]	9-5/8"	[245]			
140100280000102				11"	[280]	10-3/8"	[265]			
140100300000102				11-7/8"	[300]	11-1/4"	[285]			
140100320000102				12-5/8"	[320]	12"	[305]			
140100340000102				13-3/8"	[340]	12-3/4"	[325]			
140100360000102				14-1/4"	[360]	13-5/8"	[345]			
140100380000102				15"	[380]	14-3/8"	[365]			
140100400000102				15-3/4"	[400]	15-1/8"	[385]			
140100430000102	25			17"	[430]	16-3/8"	[415]			
140100480000102				19"	[480]	18"	[456]			
140100530000102				20-7/8"	[530]	19-7/8"	[506]			
140100580000102				22-7/8"	[580]	21-7/8"	[556]			
140100650000102				25-5/8"	[650]	24-5/8"	[626]			
140100700000102				27-5/8"	[700]	26-5/8"	[676]			
140100750000102				29-1/2"	[750]	28-5/8"	[726]			
140100800000102				31-1/2"	[800]	30-1/2"	[776]			

Installation of Reinforcement

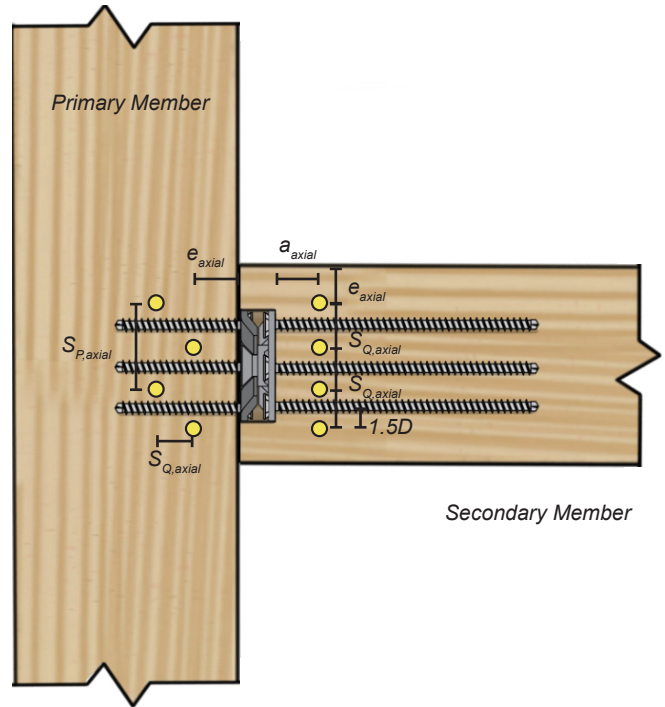
Reinforcing fasteners need to be installed as close as possible to the peak stress location they will experience while obeying the minimum geometry requirements.

It is not recommended to exceed a_{axial} or e_{axial} given in Table 29, and illustrated below. Reinforcement shall be assigned to one row of screws parallel to the line of the joint.



Top View

Geometry Requirements with 2 Reinforcement Screws in a Member



Top View

Geometry Requirements with > 2 Reinforcement Screws in a Member

Table 29 Geometry Requirements without Pre-drilling

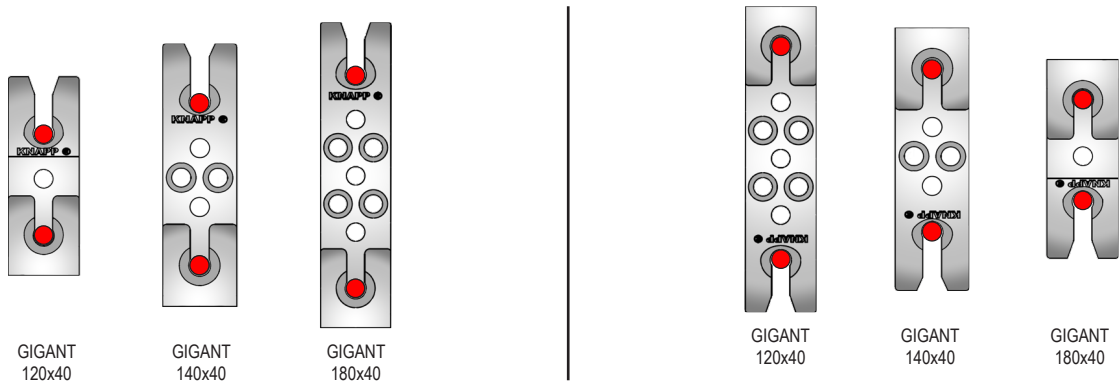
	End Distance	Edge Distance	Spacing Between Fasteners in a Row	Spacing Between Rows
	a_{axial}	e_{axial}	$S_{P,axial}$	$S_{Q,axial}$
$G \leq 0.42$	5 D	3 D	5 D	2.5 D
$0.42 < G \leq 0.55$	5 D	3 D	5 D	2.5 D
D-Fir	7.5 D	3 D	7.5 D	2.5 D

Notes:

- For precise installation of long reinforcing screws, pre-drilling can be allowed.
- Pre-drilling 5/16" diameter screws with a 3/16" drill bit and 3/8" diameter screws with a 1/4" drill bit.
- Pre-drilling of full screw length is permitted if required.

INSTALLATION AND TOLERANCES

GIGANT - Concealed Installation Requirements



- Notes:
1. The red dots indicate the positioning holes and should be aligned with the main holes on the members which are also marked red in the following figures.
 2. All concealed installation is suggested to be field verified.

Routing in Primary Member Only

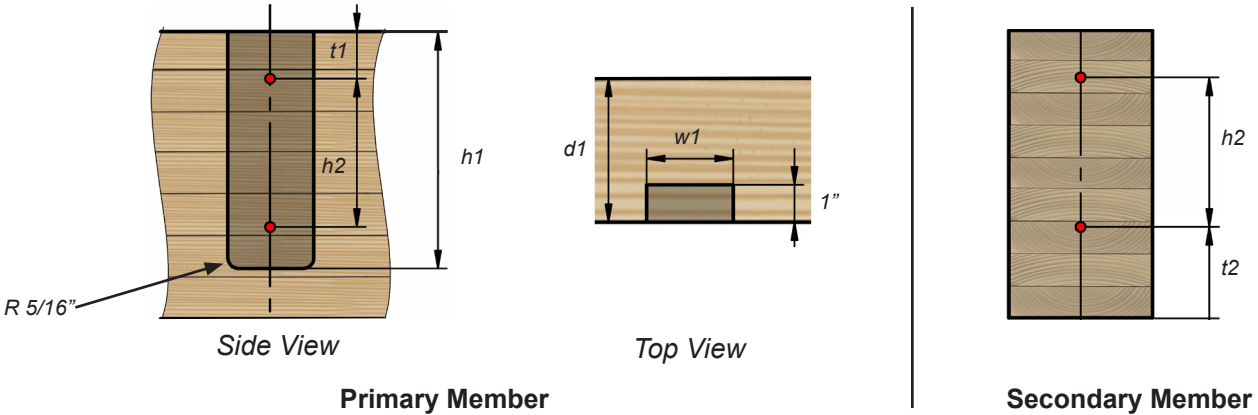
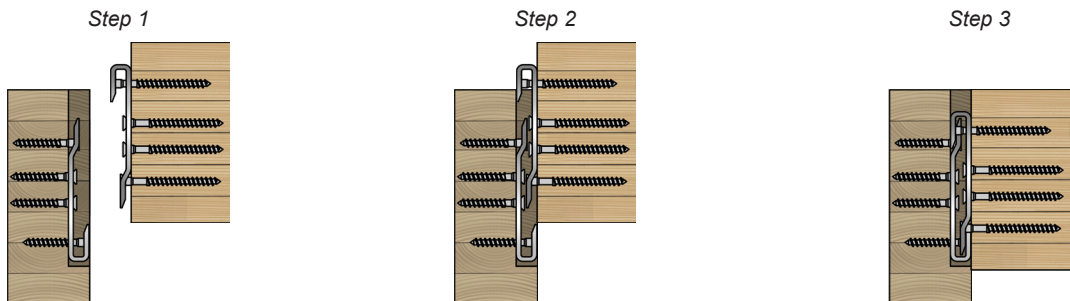


Table 30.1 Routing in Primary Member - Requirements

Connector	h1	h2	t1	t2	d1	w1
	[in]					
GIGANT 120 x 40	$a_{main} + 4-3/4"$	2-1/4"	$a_{main} + 1-1/2"$	$a_{sec} + 1-1/2"$	$\geq 4-1/4"$	$\geq 1-5/8"$
GIGANT 150 x 40	$a_{main} + 6"$	3-1/2"	$a_{main} + 1-1/2"$	$a_{sec} + 1-1/2"$	$\geq 4-1/4"$	$\geq 1-5/8"$
GIGANT 180 x 40	$a_{main} + 7-1/8"$	4-3/4"	$a_{main} + 1-5/8"$	$a_{sec} + 1-5/8"$	$\geq 4-1/4"$	$\geq 1-5/8"$

- Note:
1. a_{main} refers to the top edge distance in the Primary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
 2. a_{sec} refers to the bottom edge distance in the Secondary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.

Installation



Routing in Secondary Member Only

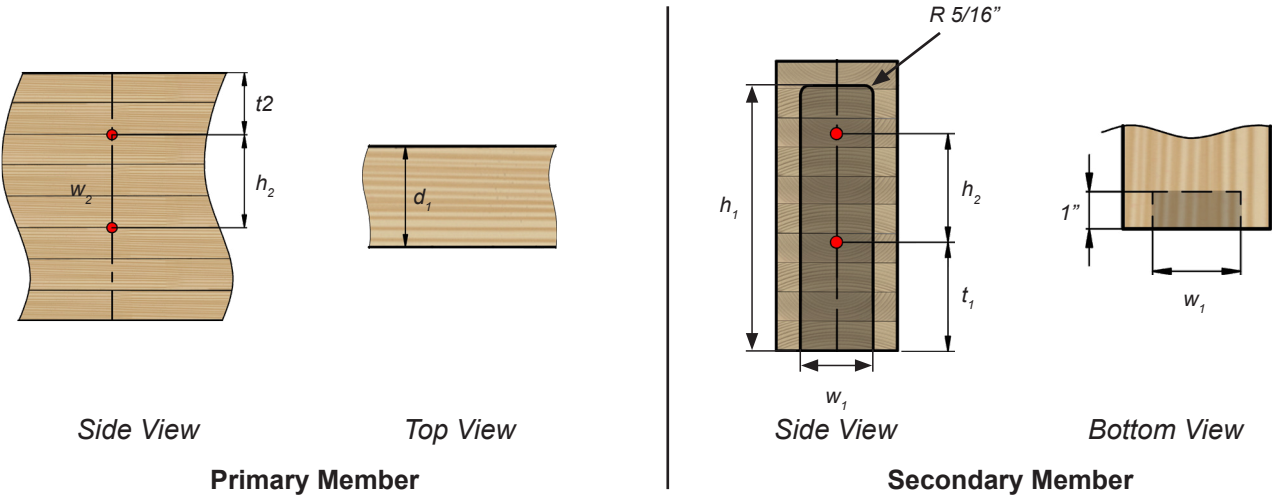


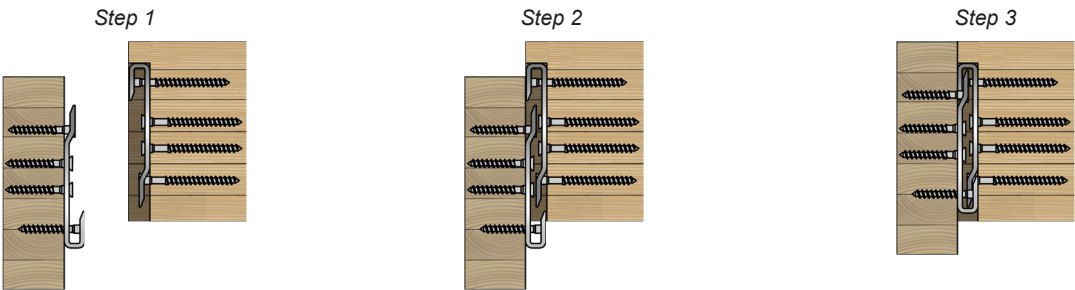
Table 30.2 Routing in Secondary Member - Requirements

Connector	h1	h2	t1	t2	d1	w1
	[in]					
GIGANT 120 x 40	$a_{sec} + 4-3/4''$	2-1/4"	$a_{sec} + 1-1/2''$	$a_{main} + 1-1/2''$	$\geq 3-1/4''$	$\geq 1-5/8''$
GIGANT 150 x 40	$a_{sec} + 6''$	3-1/2"	$a_{sec} + 1-1/2''$	$a_{main} + 1-1/2''$	$\geq 3-1/4''$	$\geq 1-5/8''$
GIGANT 180 x 40	$a_{sec} + 7-1/8''$	4-3/4"	$a_{sec} + 1-5/8''$	$a_{main} + 1-5/8''$	$\geq 3-1/4''$	$\geq 1-5/8''$

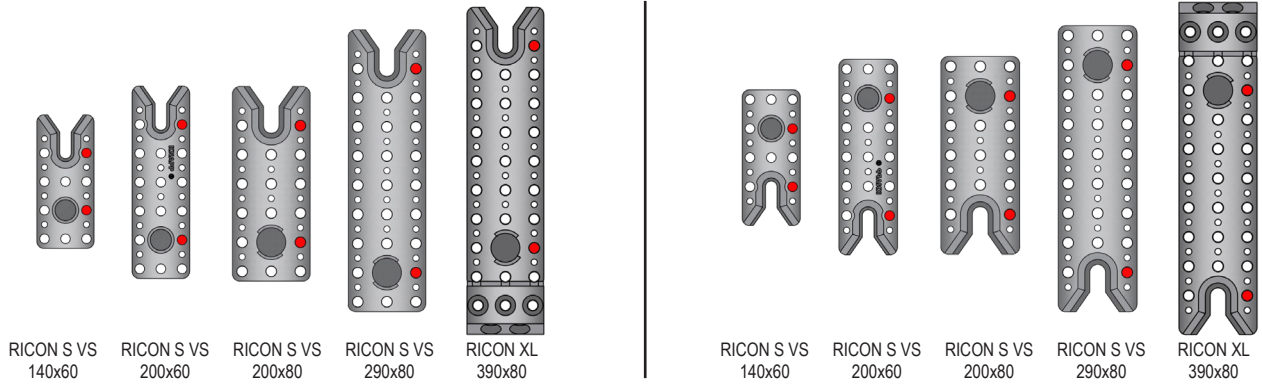
Note:

1. a_{main} refers to the top edge distance in the Primary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
2. a_{sec} refers to the bottom edge distance in the Secondary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.

Installation



RICON S VS - Concealed Installation Requirements



Notes:

1. The red dots indicate the positioning holes and should be aligned with the main holes on the members which are also marked red in the following figures.
2. All concealed installation is suggested to be field verified.

Routing in Primary Member Only

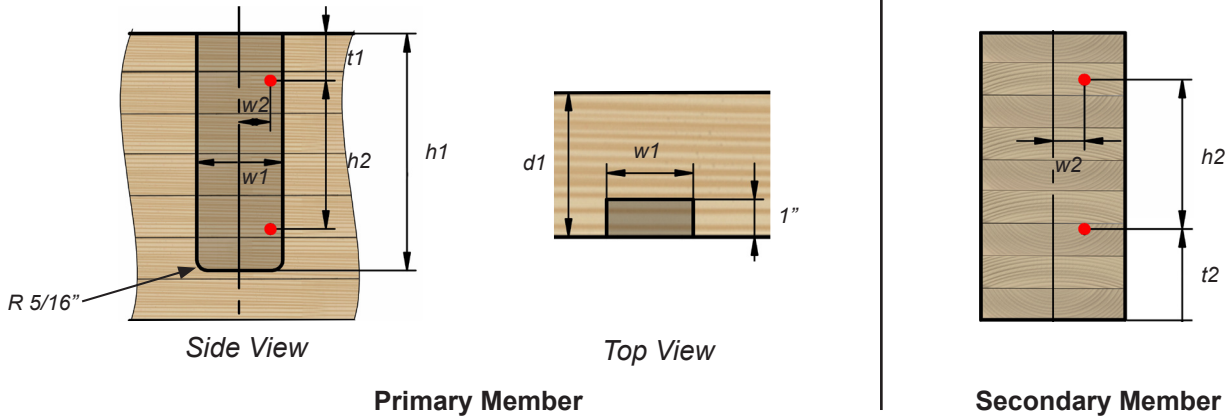


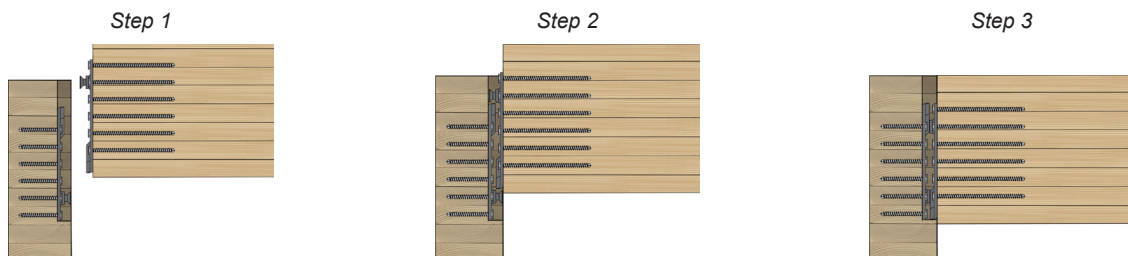
Table 31.1 Routing in Primary Member - Requirements

Connector	h1	h2	t1	t2	d1	w1	w2
	[in]						
RICON S VS 140x60	$a_{main} + 5\text{-}7/8"$	2-3/8"	$a_{main} + 1\text{-}9/16"$	$a_{sec} + 1\text{-}9/16"$	$\geq 4\text{-}1/4"$	$\geq 2\text{-}3/8"$	7/8"
RICON S VS 200x60	$a_{main} + 8\text{-}2/8"$	4-3/4"	$a_{main} + 1\text{-}9/16"$	$a_{sec} + 1\text{-}9/16"$	$\geq 4\text{-}1/4"$	$\geq 2\text{-}3/8"$	7/8"
RICON S VS 200x80	$a_{main} + 8\text{-}2/8"$	4-3/4"	$a_{main} + 1\text{-}9/16"$	$a_{sec} + 1\text{-}9/16"$	$\geq 5"$	$\geq 3\text{-}1/4"$	1-3/16"
RICON S VS 290x80	$a_{main} + 11\text{-}6/8"$	8-1/4"	$a_{main} + 1\text{-}9/16"$	$a_{sec} + 1\text{-}9/16"$	$\geq 5"$	$\geq 3\text{-}1/4"$	1-3/16"
RICON XL 390x80	$a_{main} + 15\text{-}6/8"$	8-1/4"	$a_{main} + 3\text{-}9/16"$	$a_{sec} + 3\text{-}9/16"$	$\geq 5"$	$\geq 3\text{-}1/4"$	1-3/16"

Note:

1. a_{main} refers to the top edge distance in the Primary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
2. a_{sec} refers to the bottom edge distance in the Secondary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.

Installation



Routing in Secondary Member Only

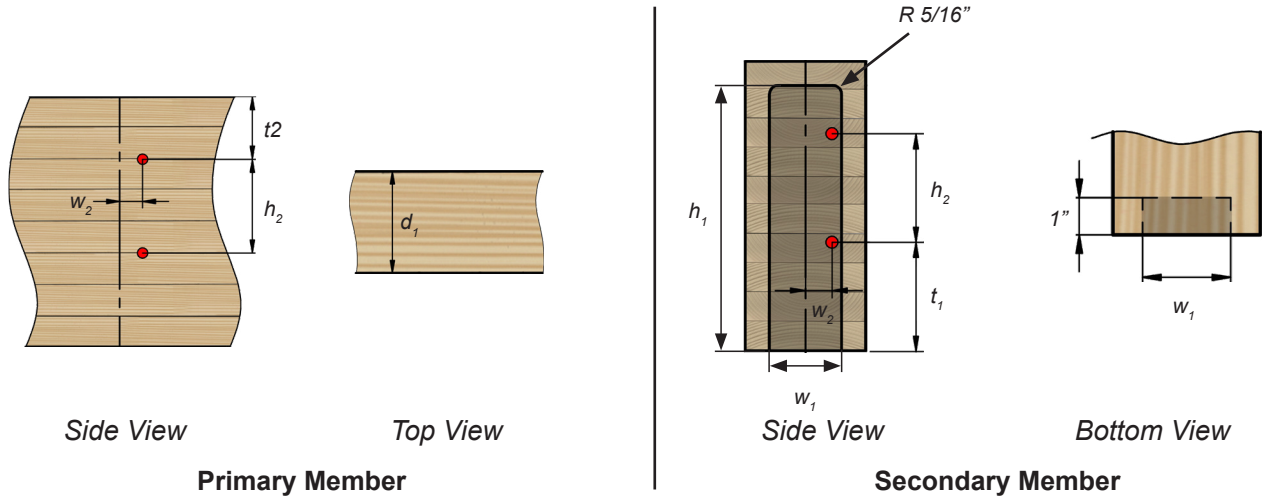


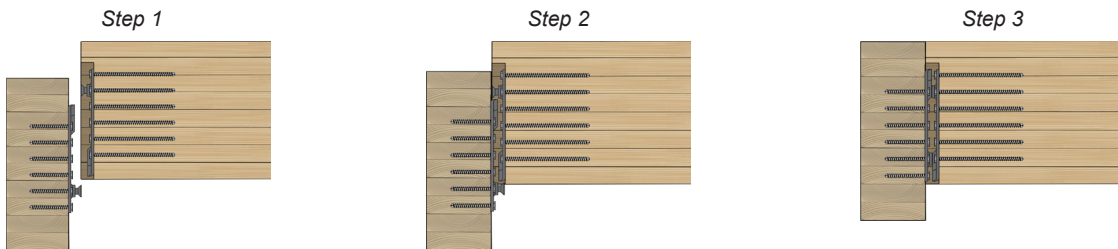
Table 31.2 Routing in Secondary Member - Requirements

Connector	h1	h2	t1	t2	d1	w1	w2
	[in]						
RICON S VS 140x60	$a_{sec} + 5-7/8''$	2-3/8"	$a_{sec} + 1-9/16''$	$a_{main} + 1-9/16''$	$\geq 3-1/4''$	$\geq 2-3/8''$	7/8"
RICON S VS 200x60	$a_{sec} + 7-2/8''$	4-3/4"	$a_{sec} + 1-9/16''$	$a_{main} + 1-9/16''$	$\geq 3-1/4''$	$\geq 2-3/8''$	7/8"
RICON S VS 200x80	$a_{sec} + 8-2/8''$	4-3/4"	$a_{sec} + 1-9/16''$	$a_{main} + 1-9/16''$	$\geq 4''$	$\geq 3-1/4''$	1-3/16"
RICON S VS 290x80	$a_{sec} + 11-6/8''$	8-1/4"	$a_{sec} + 1-9/16''$	$a_{main} + 1-9/16''$	$\geq 4''$	$\geq 3-1/4''$	1-3/16"
RICON XL 390x80	$a_{sec} + 15-6/8''$	8-1/4"	$a_{sec} + 3-9/16''$	$a_{main} + 3-9/16''$	$\geq 4''$	$\geq 3-1/4''$	1-3/16"

Note:

1. a_{main} refers to the top edge distance in the Primary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
2. a_{sec} refers to the bottom edge distance in the Secondary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.

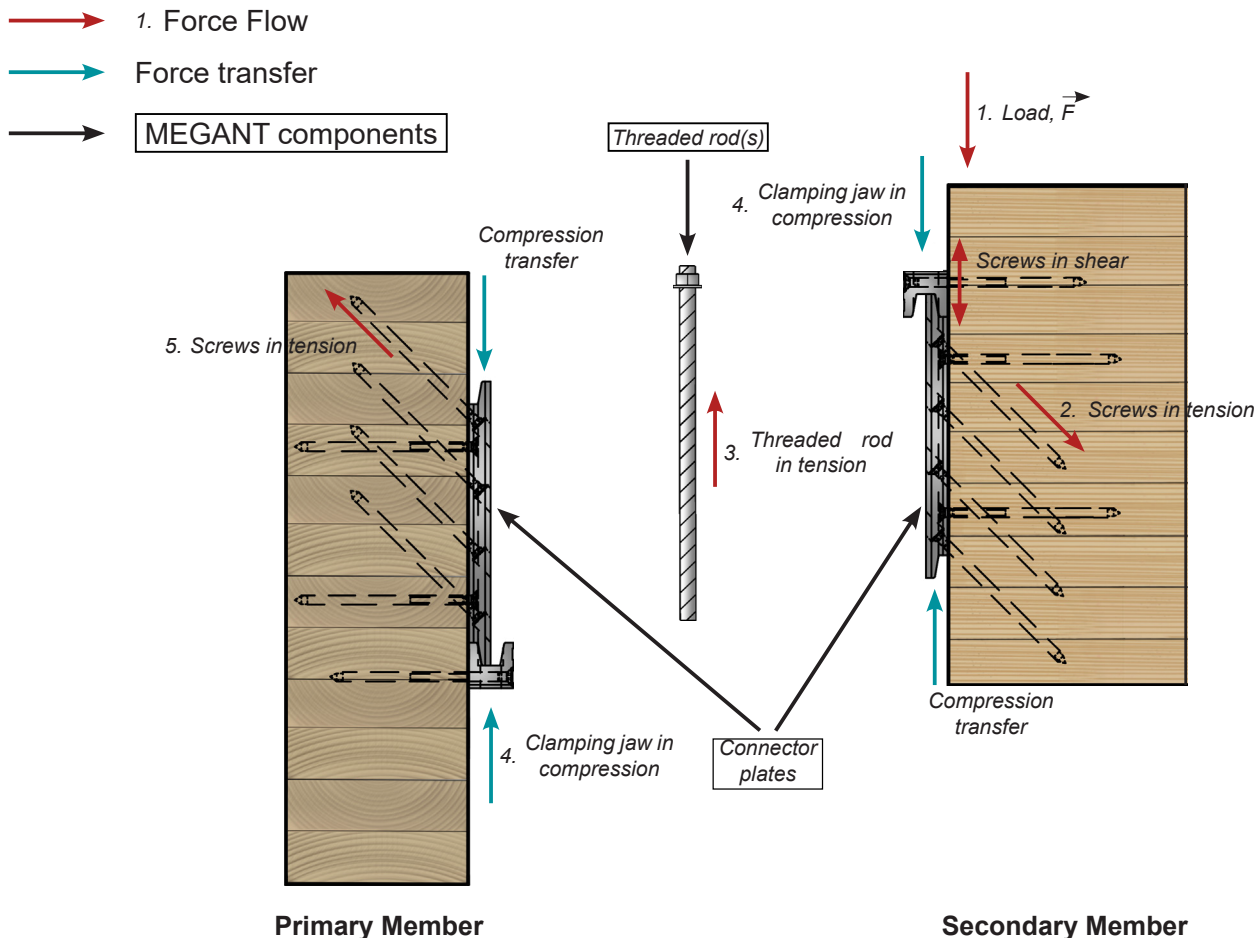
Installation



MEGANT - Concealed Installation Requirements

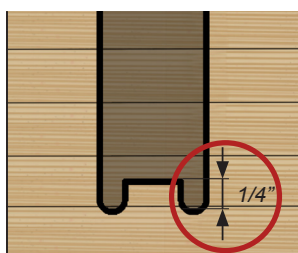
System Force Transfer

The following figure outlines the installation of the MEGANT connector and highlights the flow of forces through the different components. This is to aid in understanding why the fasteners and connector must be installed as specified.



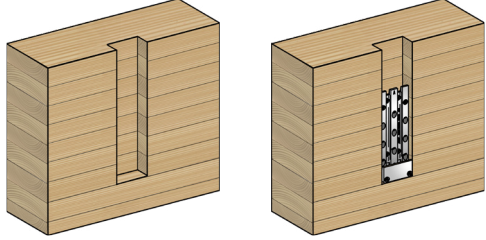
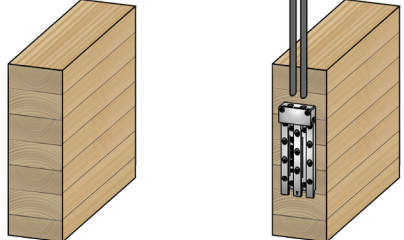
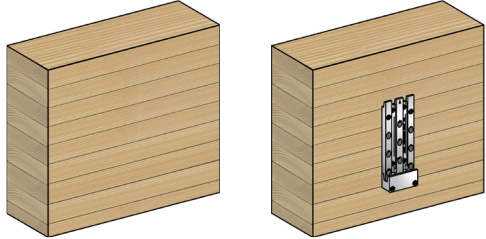
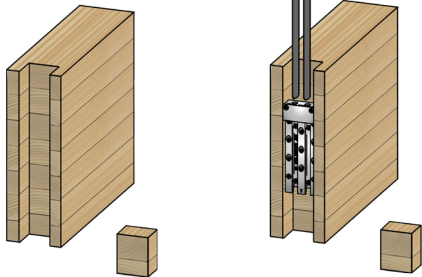
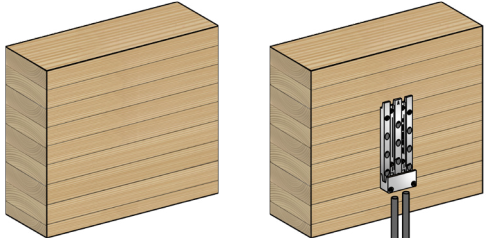
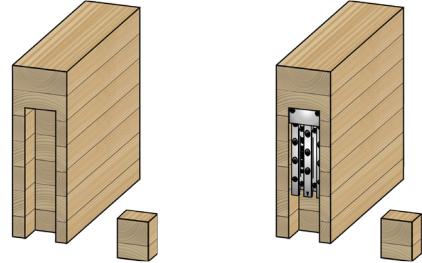
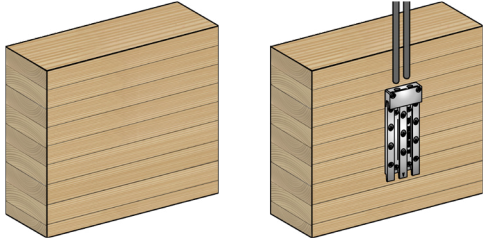
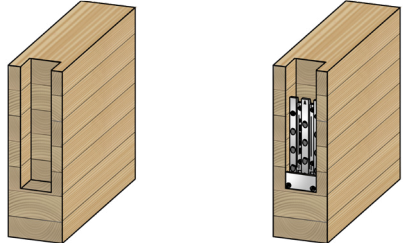
Routing Consideration

The housing for a fully concealed MEGANT connection is typically done using either a wood router or the finger mill tool of a CNC machine. In order to account for the round corner created by these rotating knife tools, it is recommended to allow for an extra 1/4" in the inside corners.

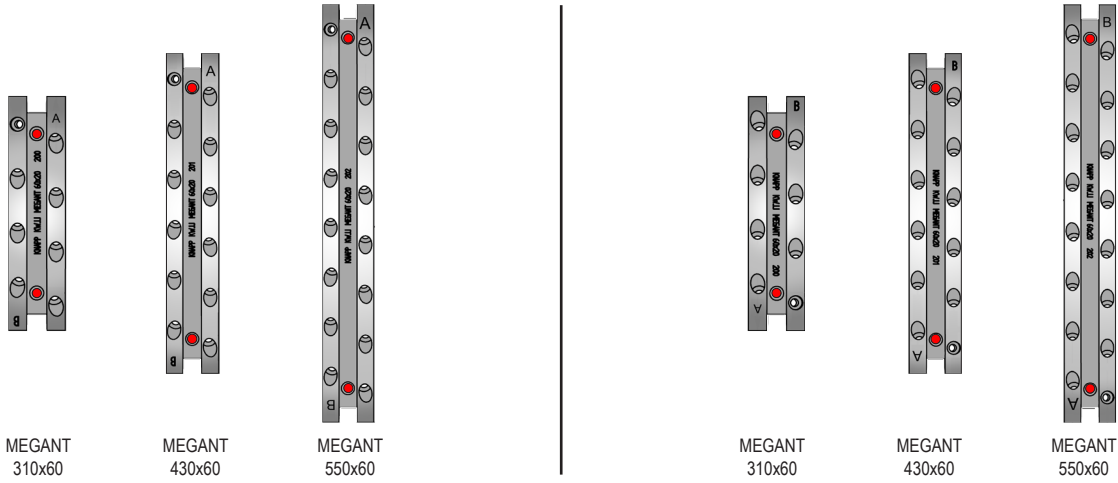


Top / Bottom View

Housing Possibilities

	Primary Member	Secondary Member
<p>Girder Housing</p> <p>Most common housing for concealed install.</p> <p>Concealed from below, the rod can be installed from the top.</p>		
<p>Joist Through Housing</p> <p>Full depth housing in joist.</p> <p>Concealed from below with wood plug, the rod can still be installed from the top.</p>		
<p>Joist Bottom Housing</p> <p>Joist housing from bottom up.</p> <p>Concealed from below with wood plug, the rod needs to be installed from bottom up.</p>		
<p>Joist Top Housing</p> <p>Joist housing from top down.</p> <p>Concealed from below. No wood plug required.</p> <p>Advantageous when installing the beams to existing columns with floor above.</p>		

MEGANT 60 Series



- Notes:
1. The red dots indicate the positioning holes and should be aligned with the main holes on the members which are also marked red in the following figures.
 2. All concealed installation is suggested to be field verified.

Routing in Primary Member Only

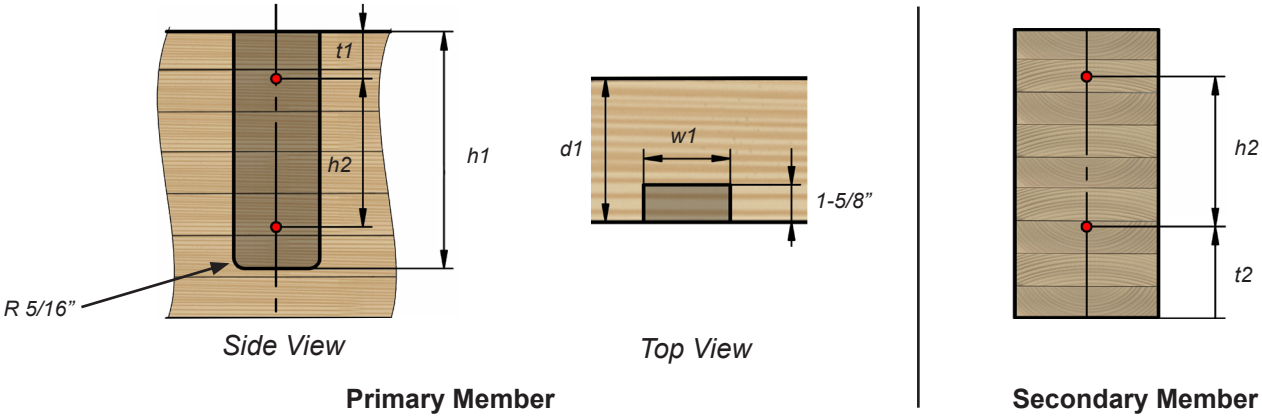


Table 32.1 Routing in Primary Member - Requirements

Connector	h1	h2	t1	t2	d1	w1
	[in]					
MEGANT 310x60	$a_{main} + 12-1/4"$	6-11/16"	$a_{main} + 2-3/4"$	$a_{sec} + 2-3/4"$	$\geq 7-7/8"$	$\geq 2-3/8"$
MEGANT 430x60	$a_{main} + 17"$	11-7/16"	$a_{main} + 2-3/4"$	$a_{sec} + 2-3/4"$	$\geq 7-7/8"$	$\geq 2-3/8"$
MEGANT 550x60	$a_{main} + 21-3/4"$	16-1/8"	$a_{main} + 2-3/4"$	$a_{sec} + 2-3/4"$	$\geq 7-7/8"$	$\geq 2-3/8"$

- Note:
1. a_{main} refers to the top edge distance in the Primary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
 2. a_{sec} refers to the bottom edge distance in the Secondary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
 3. To ensure a proper routing for the Megant connector, please refer to the "housing consideration" on page 76.

Routing in Secondary Member Only

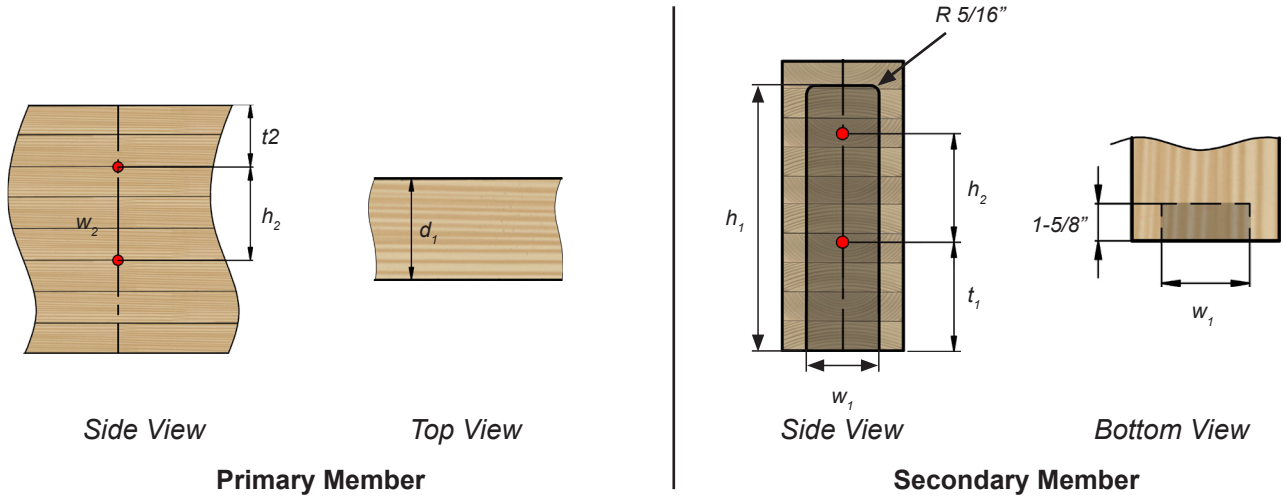
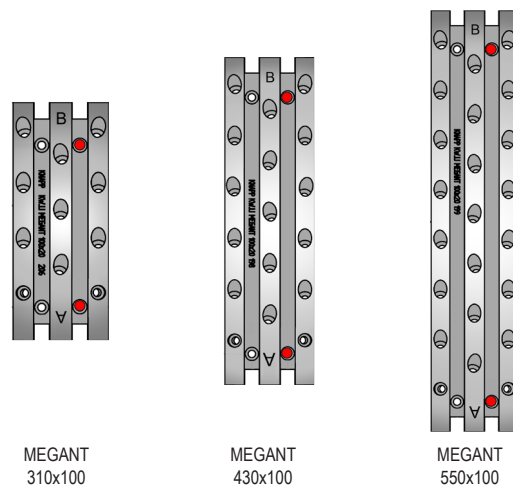
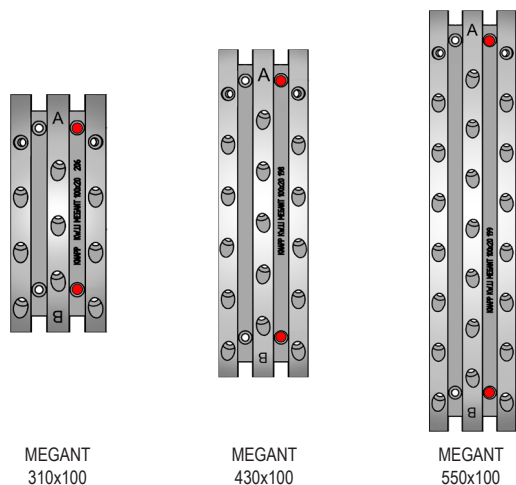


Table 32.2 Routing in Secondary Member - Requirements

Connector	h1	h2	t1	t2	d1	w1
	[in]					
MEGANT 310x60	$a_{sec} + 12-1/4''$	6-11/16"	$a_{sec} + 2-3/4''$	$a_{main} + 2-3/4''$	$\geq 6-1/4''$	$\geq 2-3/8''$
MEGANT 430x60	$a_{sec} + 17''$	11-7/16"	$a_{sec} + 2-3/4''$	$a_{main} + 2-3/4''$	$\geq 6-1/4''$	$\geq 2-3/8''$
MEGANT 550x60	$a_{sec} + 21-3/4''$	16-1/8"	$a_{sec} + 2-3/4''$	$a_{main} + 2-3/4''$	$\geq 6-1/4''$	$\geq 2-3/8''$

- Note:
1. a_{main} refers to the top edge distance in the Primary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
 2. a_{sec} refers to the bottom edge distance in the Secondary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
 3. To ensure a proper routing for the Megant connector, please refer to the "housing consideration" on page 76.

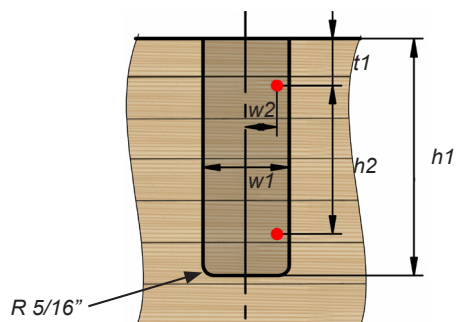
MEGANT 100 Series



Notes:

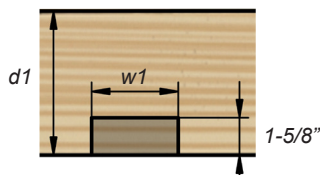
1. The red dots indicate the positioning holes and should be aligned with the main holes on the members which are also marked red in the following figures.
2. All concealed installation is suggested to be field verified.

Routing in Primary Member Only

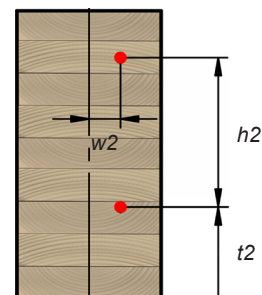


Side View

Primary Member



Top View



Secondary Member

Table 33.1 Routing in Primary Member - Requirements

Connector	h1	h2	t1	t2	d1	w1	w2
	[in]						
MEGANT 310x100	$a_{main} + 12-1/4"$	6-11/16"	$a_{main} + 2-9/16"$	$a_{sec} + 2-9/16"$	$\geq 7-7/8"$	$\geq 4"$	3/4"
MEGANT 430x100	$a_{main} + 17"$	11-7/16"	$a_{main} + 2-9/16"$	$a_{sec} + 2-9/16"$	$\geq 7-7/8"$	$\geq 4"$	3/4"
MEGANT 550x100	$a_{main} + 21-3/4"$	16-1/8"	$a_{main} + 2-9/16"$	$a_{sec} + 2-9/16"$	$\geq 7-7/8"$	$\geq 4"$	3/4"

Note:

1. a_{main} refers to the top edge distance in the Primary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
2. a_{sec} refers to the bottom edge distance in the Secondary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
3. To ensure a proper routing for the Megant connector, please refer to the "housing consideration" on page 76.

Routing in Secondary Member Only

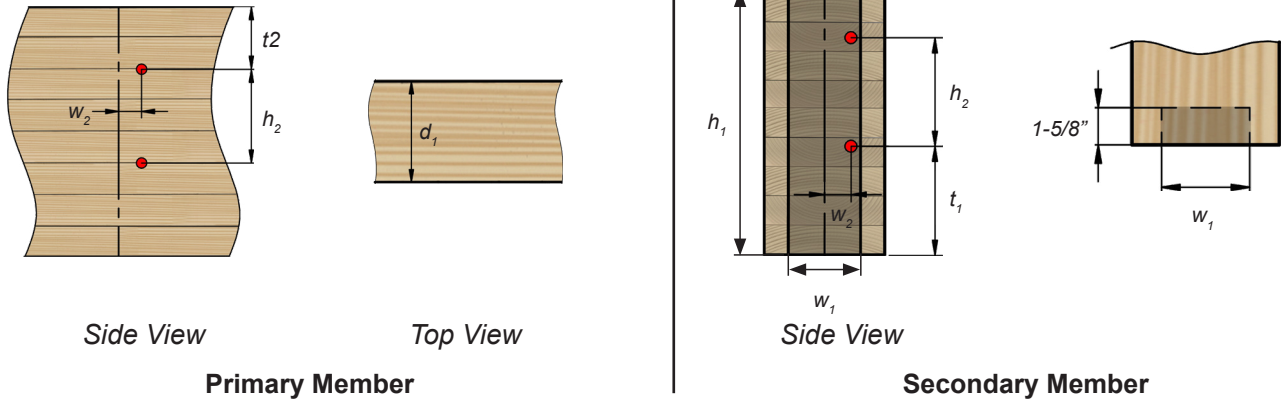
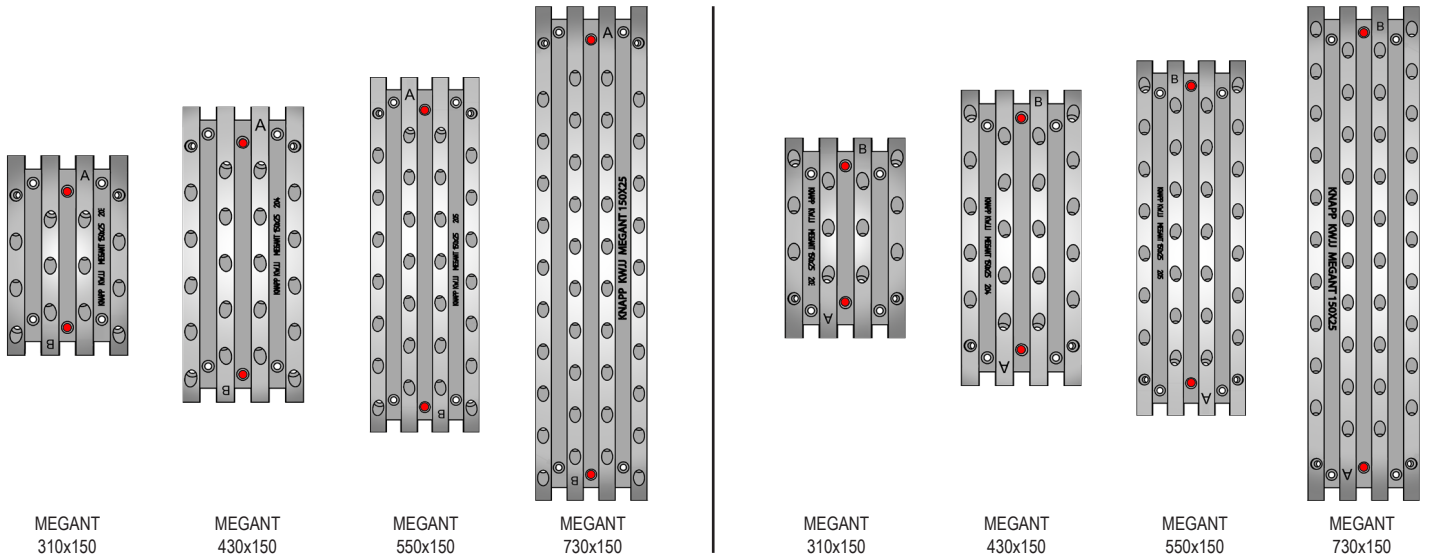


Table 33.2 Routing in Secondary Member - Requirements

Connector	h1	h2	t1	t2	d1	w1	w2
	[in]						
MEGANT 310x100	$a_{sec} + 12-1/4"$	6-11/16"	$a_{sec} + 2-9/16"$	$a_{main} + 2-9/16"$	$\geq 6-1/4"$	$\geq 4"$	3/4"
MEGANT 430x100	$a_{sec} + 17"$	11-7/16"	$a_{sec} + 2-9/16"$	$a_{main} + 2-9/16"$	$\geq 6-1/4"$	$\geq 4"$	3/4"
MEGANT 550x100	$a_{sec} + 21-3/4"$	16-1/8"	$a_{sec} + 2-9/16"$	$a_{main} + 2-9/16"$	$\geq 6-1/4"$	$\geq 4"$	3/4"

- Note:
1. a_{main} refers to the top edge distance in the Primary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
 2. a_{sec} refers to the bottom edge distance in the Secondary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
 3. To ensure a proper routing for the Megant connector, please refer to the "housing consideration" on page 76.

MEGANT 150 Series



Notes:

1. The red dots indicate the positioning holes and should be aligned with the main holes on the members which are also marked red in the following figures.
2. All concealed installation is suggested to be field verified.

Routing in Primary Member Only

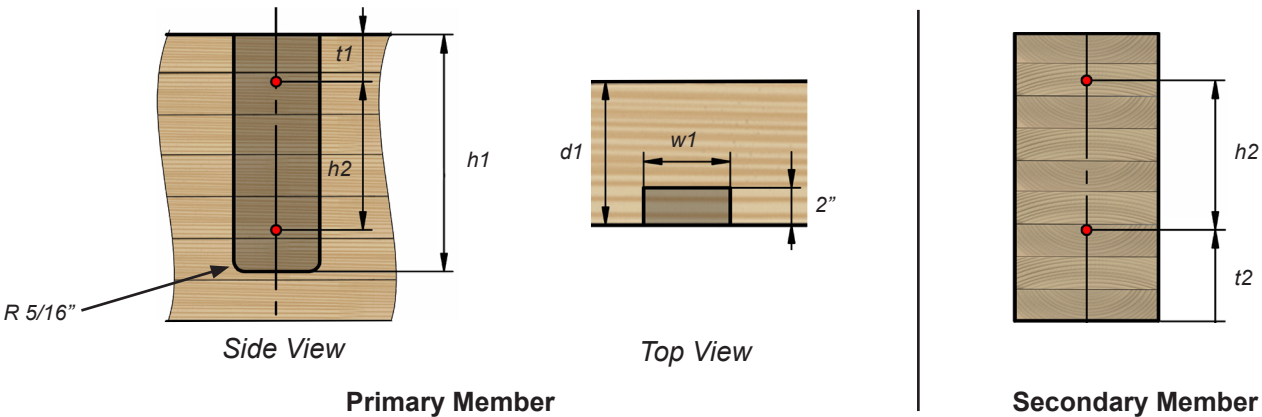


Table 34.1 Routing in Primary Member - Requirements

Connector	h1	h2	t1	t2	d1	w1
	[in]					
MEGANT 310x150	$a_{main} + 12-1/4"$	6-11/16"	$a_{main} + 2-9/16"$	$a_{sec} + 2-9/16"$	$\geq 8-3/8"$	$\geq 6"$
MEGANT 430x150	$a_{main} + 17"$	11-7/16"	$a_{main} + 2-9/16"$	$a_{sec} + 2-9/16"$	$\geq 8-3/8"$	$\geq 6"$
MEGANT 550x150	$a_{main} + 21-3/4"$	16-1/8"	$a_{main} + 2-9/16"$	$a_{sec} + 2-9/16"$	$\geq 8-3/8"$	$\geq 6"$
MEGANT 730x150	$a_{main} + 28-3/4"$	23-1/4"	$a_{main} + 2-9/16"$	$a_{sec} + 2-9/16"$	$\geq 8-3/8"$	$\geq 6"$

Note:

1. a_{main} refers to the top edge distance in the Primary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
2. a_{sec} refers to the bottom edge distance in the Secondary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
3. To ensure a proper routing for the Megant connector, please refer to the "housing consideration" on page 76.

Routing in Secondary Member Only

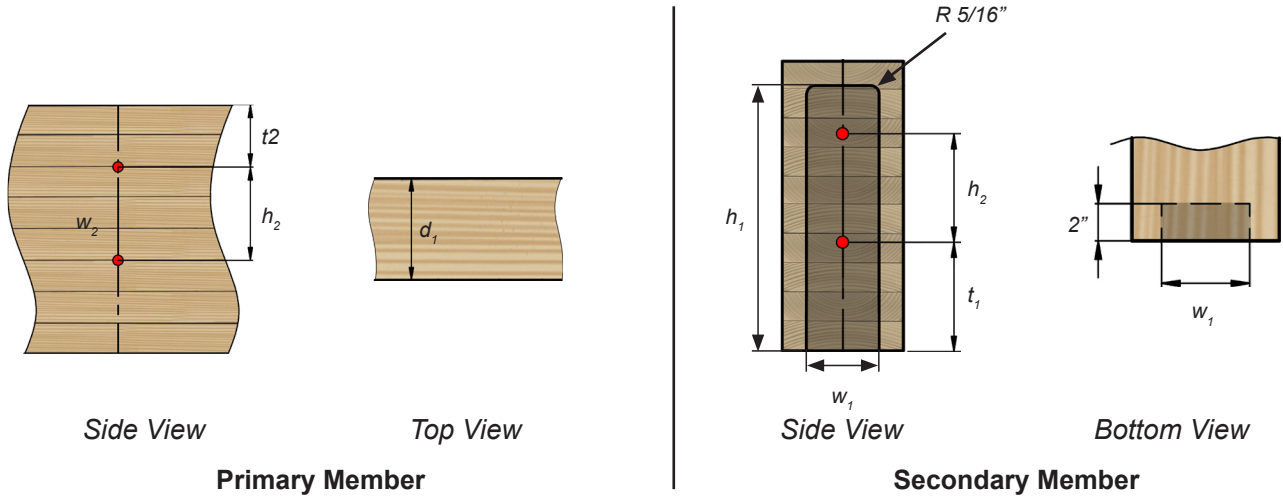


Table 34.2 Routing in Secondary Member - Requirements

Connector	h1	h2	t1	t2	d1	w1
	[in]					
MEGANT 310x150	$a_{sec} + 12-1/4"$	6-11/16"	$a_{sec} + 2-9/16"$	$a_{main} + 2-9/16"$	$\geq 6-1/4"$	$\geq 6"$
MEGANT 430x150	$a_{sec} + 17"$	11-7/16"	$a_{sec} + 2-9/16"$	$a_{main} + 2-9/16"$	$\geq 6-1/4"$	$\geq 6"$
MEGANT 550x150	$a_{sec} + 21-3/4"$	16-1/8"	$a_{sec} + 2-9/16"$	$a_{main} + 2-9/16"$	$\geq 6-1/4"$	$\geq 6"$
MEGANT 730x150	$a_{sec} + 28-3/4"$	23-1/4"	$a_{sec} + 2-9/16"$	$a_{main} + 2-9/16"$	$\geq 6-1/4"$	$\geq 6"$

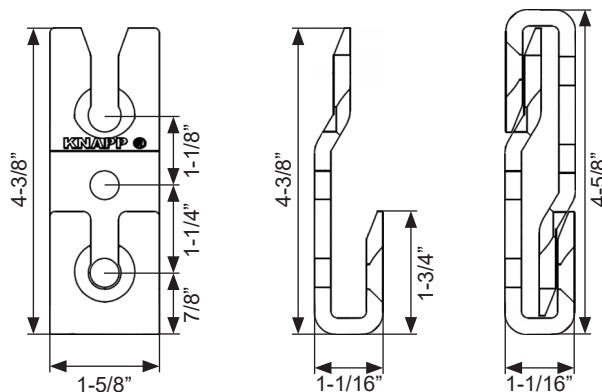
- Note:
- a_{main} refers to the top edge distance in the Primary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
 - a_{sec} refers to the bottom edge distance in the Secondary Member where reinforcement is not required. Please refer to the Geometry Requirement tables for each respective Beam Hanger System.
 - To ensure a proper routing for the Megant connector, please refer to the "housing consideration" on page 76.

ANNEX - DETAILING SECTION

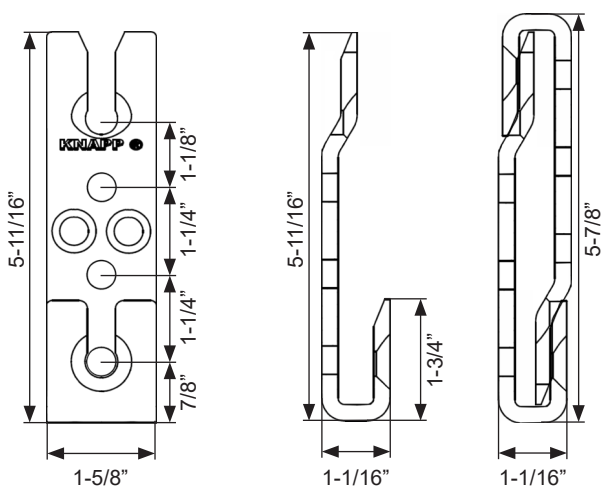
This annex presents detailed rendering and dimension of the different Beam Hangers Systems introduced in this design guide.

GIGANT

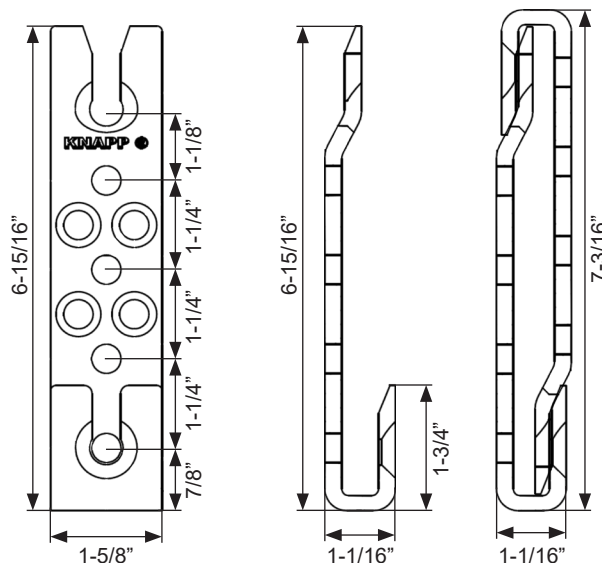
GIGANT 120 X 40



GIGANT 150 X 40

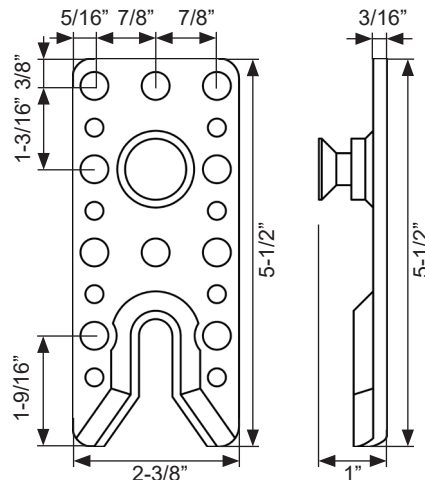


GIGANT 180 X 40

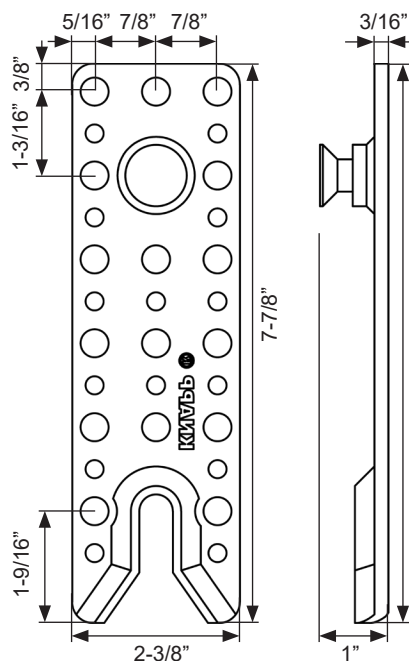


RICON S VS

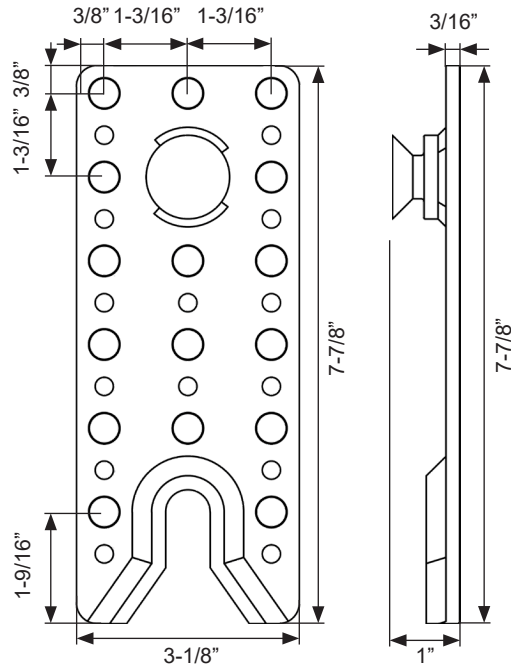
RICON S VS 140 x 60



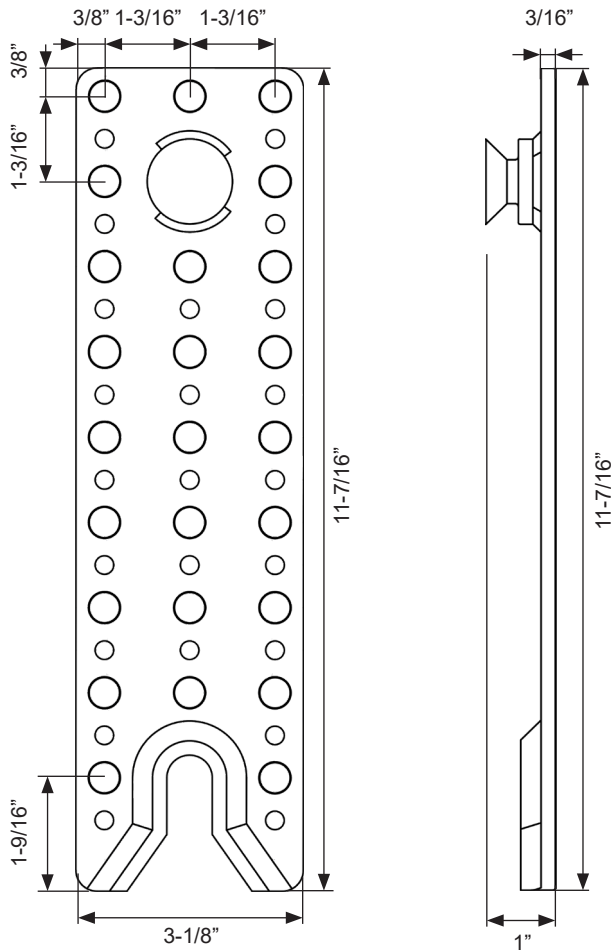
RICON S VS 200 x 60



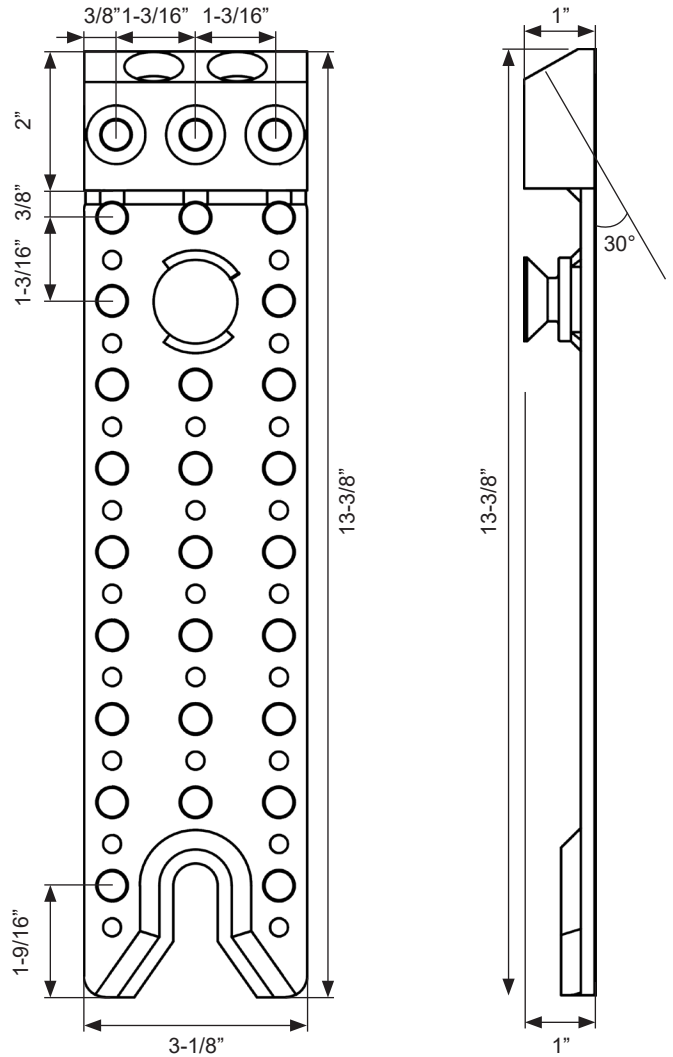
RICON S VS 200 x 80



RICON S VS 290 x 80

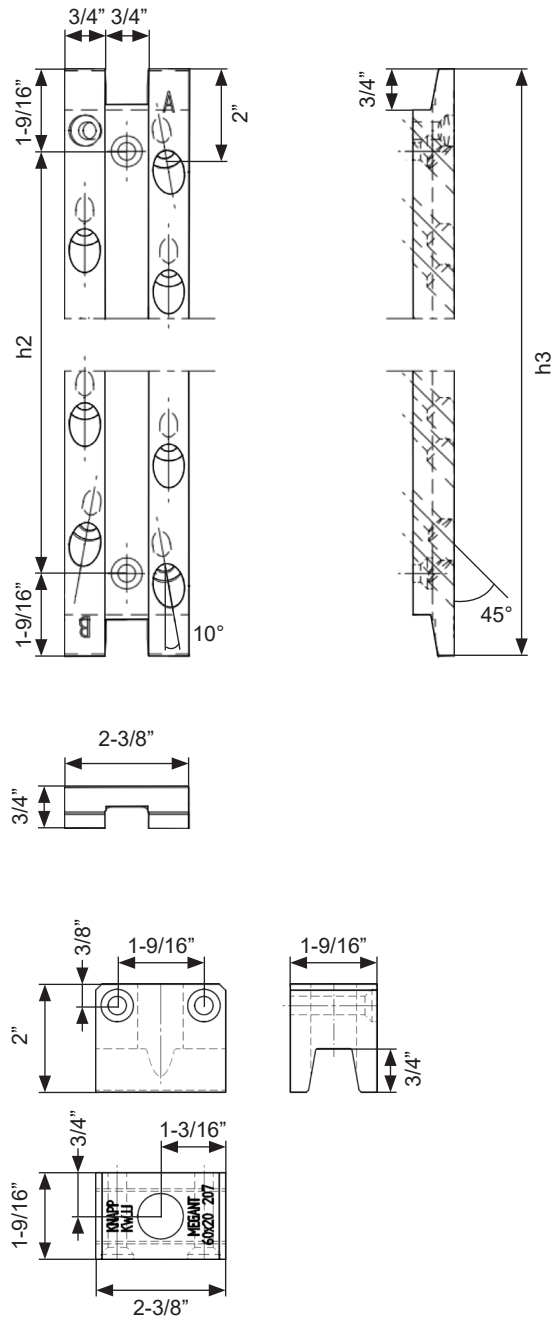


RICON S VS XL - 390 x 80



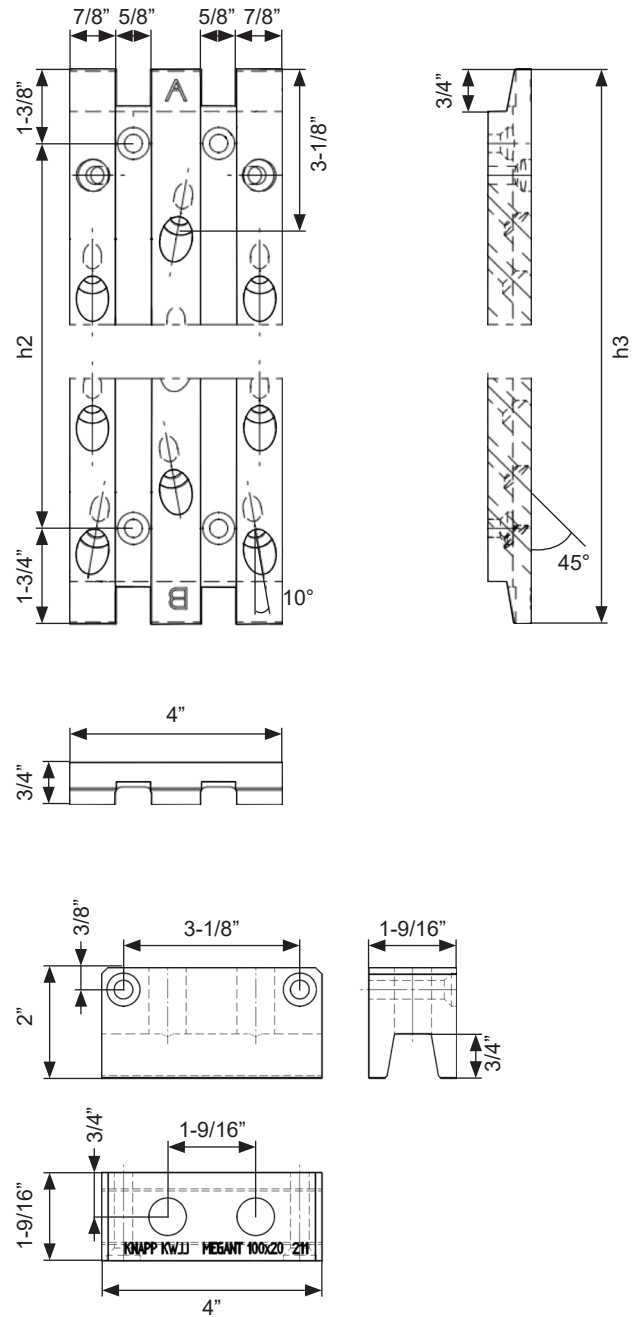
MEGANT

MEGANT 60 SERIES



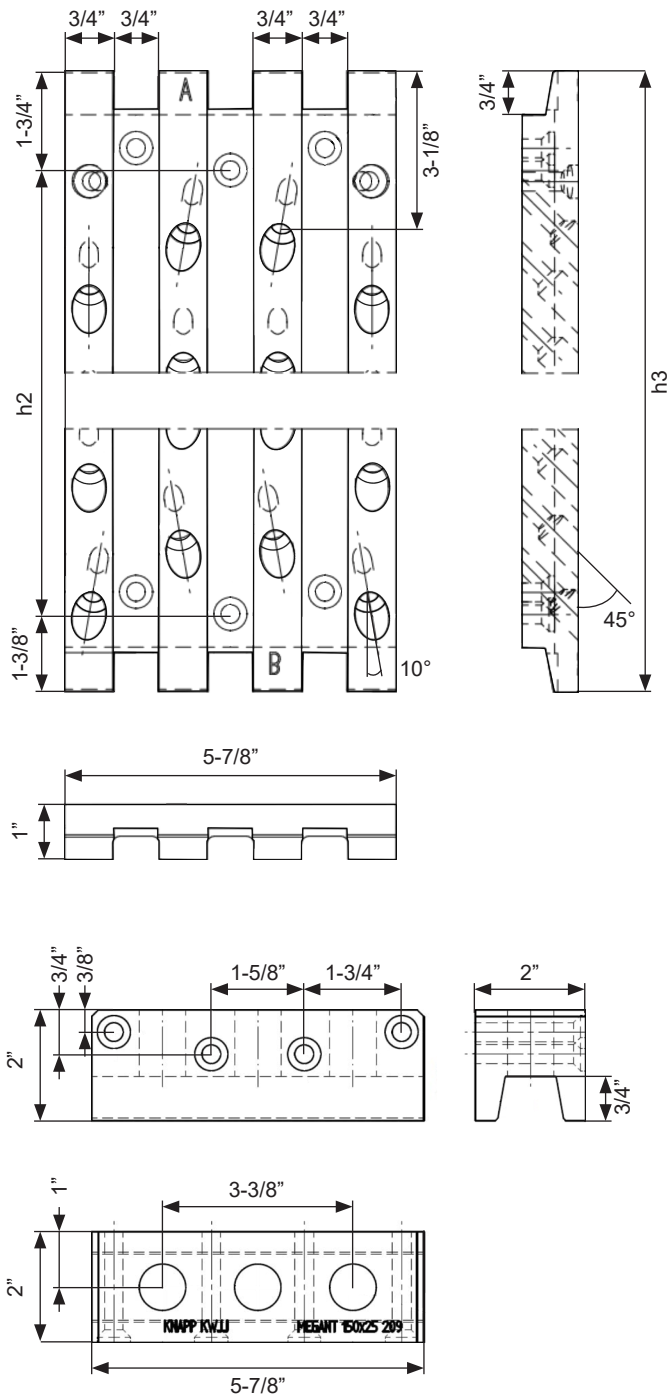
Connector	h2	h3
	[in]	
MEGANT 310x60	6-11/16"	9-7/8"
MEGANT 430x60	11-7/16"	14-5/8"
MEGANT 550x60	16-1/8"	19-1/4"

MEGANT 100 SERIES



Connector	h2	h3
	[in]	
MEGANT 310x100	6-11/16"	9-7/8"
MEGANT 430x100	11-7/16"	14-5/8"
MEGANT 550x100	16-1/8"	19-1/4"

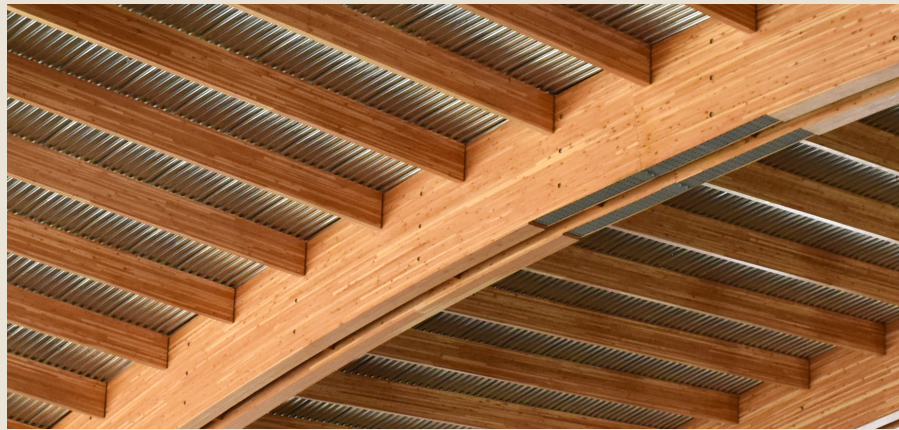
MEGANT 150 SERIES



Connector	h2	h3
	[in]	
MEGANT 310x150	6-11/16"	9-7/8"
MEGANT 430x150	11-7/16"	14-5/8"
MEGANT 550x150	16-1/8"	19-1/4"
MEGANT 730x150	23-1/4"	26-3/8"

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