

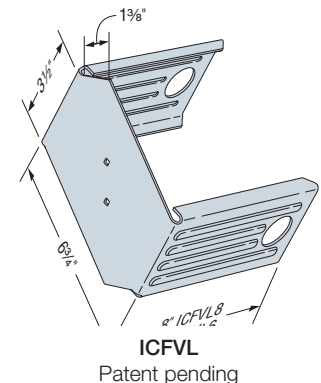
ICFVL™ Ledger Connector System

SIMPSON
Strong-Tie

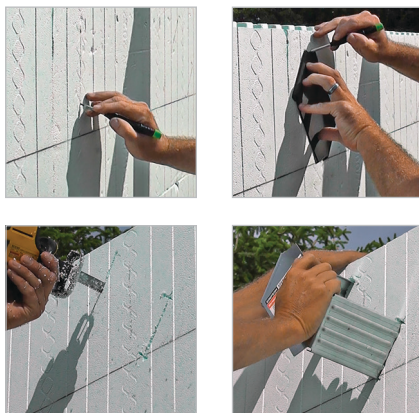
The ICFVL Ledger Connector System is engineered to solve the challenges of mounting wood or steel ledgers to insulated concrete form (ICF) walls up to 4½" thick, as specified by the designer. The ICFVL6 connector's maximum ICF wall thickness is 3¼" and the new ICFVL8 can accommodate maximum ICF wall thickness of 4½". This is the only ledger attachment to ICF that provides both vertical download capacity and floor diaphragm load transfer all in one part. This flier provides information on the various products we have to serve the ICF market.

The ICFVL is a 14-gauge galvanized steel connector designed to provide both vertical and lateral in-plane resistance. The embedded legs are embossed for additional stiffness and the holes allow for concrete to flow through and around the connector. The exposed flange on the face of the ICF provides a structural surface for mounting either a wood or steel ledger. There are two models in the series. The ICFVL6 features 6" legs and the ICFVL8 has 8" legs to accommodate thicker foam.

See strongtie.com for additional information.



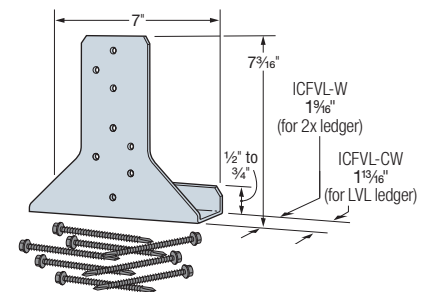
Installation of ICFVL



1. Snap a line for the bottom of the ledger and mark the on-center spacing
2. Use a template to mark the kerf locations in the ICF¹
3. Cut the kerfs as marked
4. Insert the ICFVL flush to the face of the ICF
5. Place concrete (min. f'c = 2,500 psi/ 17.2 Mpa)

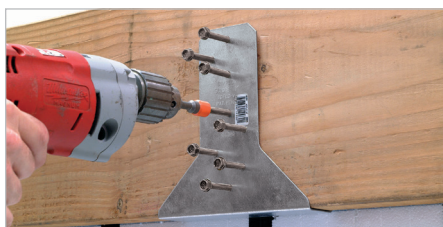
Installation tip: Use a screw through one or both diamond holes in face of ICFVL and into web to hold in place during concrete pour (remove prior to ledger installation).

1. ICFVL template not offered with product. Dimensions for template can be found at strongtie.com.



ICFVL-W and ICFVL-CW

Attachment of Wood Ledger



1. Slip the appropriate ledger connector underneath the wood ledger (as shown).
2. For denser wood species (specific gravity ≥ 0.50), predrilling may be necessary. Predrill ledger only with 5/32" drill bit.
3. Position the bottom of the ledger level to the chalk line and drive the screws through the wood and into the ICFVL.
4. All screws should be located at least ½" from the edge of the ICFVL.

Note: Do not splice at the ICFVL-W or ICFVL-CW location.

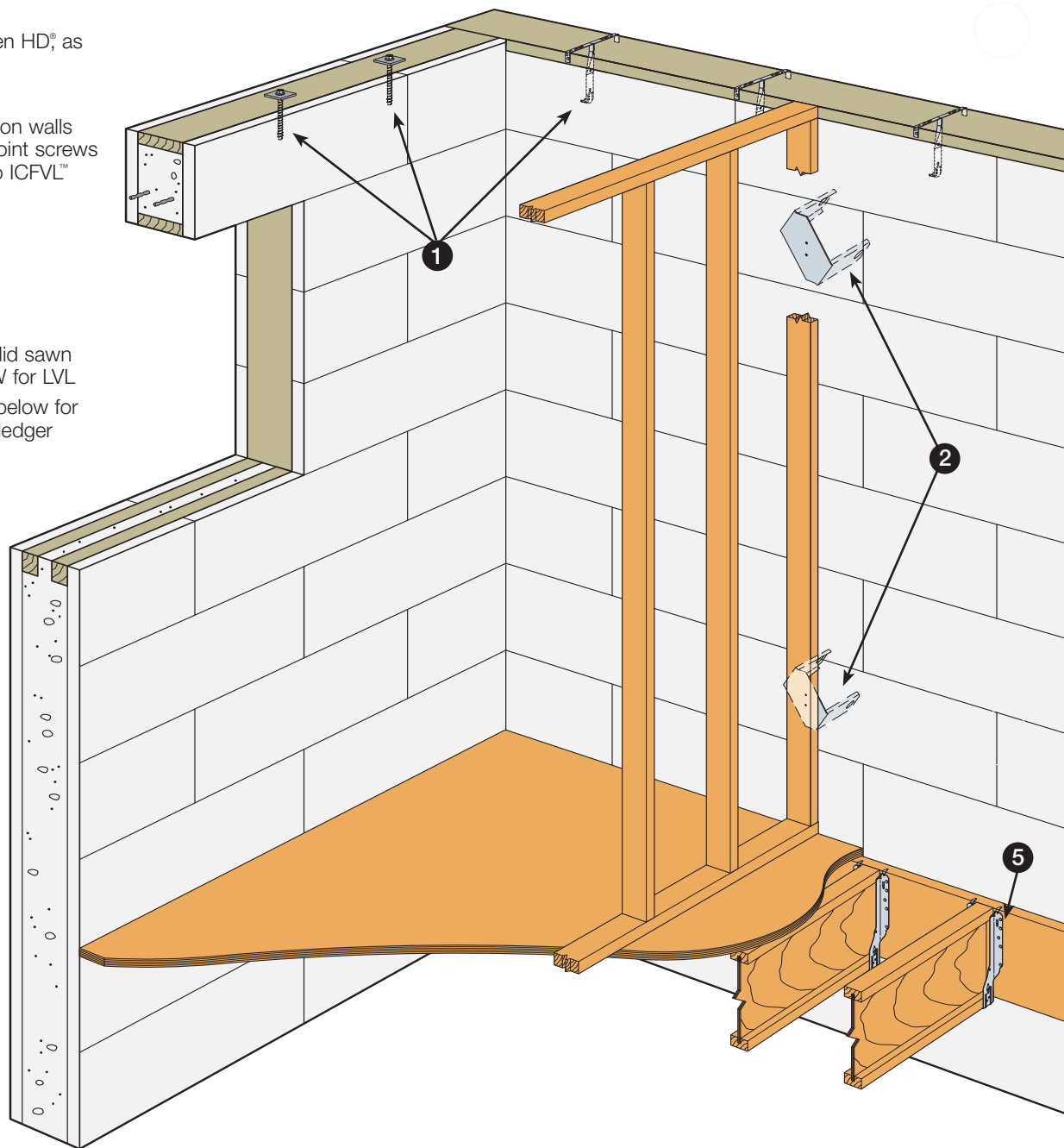
Attachment of Steel Ledger



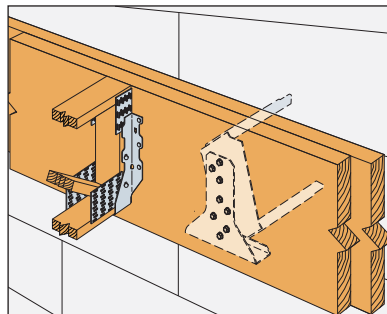
1. Position bottom of the ledger level to the chalk line and drive the required number of screws through the steel ledger and into the ICFVL
2. All screws (#14 x ¾" drill point — not provided) should be located at least ½" from the edge of the ICFVL
3. Space screws evenly

ICF Connectors

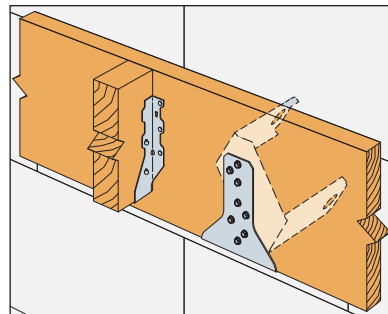
- 1 Use MAB15Z or Titen HD®, as shown in illustration
- 2 Attach interior partition walls with ¼-14 #3 drill point screws (sold separately) into ICFVL™ where needed
- 3 Use ICFVL to attach ledger to ICF
- 4 Use ICFVL-W for solid sawn lumber or ICFVL-CW for LVL
Note: See drawing below for detail on double 2x ledger
- 5 Use IUS hanger for I-joist floor system



Typical face-mount, floor-truss hangers include, but not limited to, LUS, HUS, HGUS™ and HHUS. Attachment of second ledger to be designed by others.



Alternative hanger for solid sawn floor joist using LUS joist hangers.



Use wood-to-steel drill point screws through wood cabinets and into ICFVL connector.

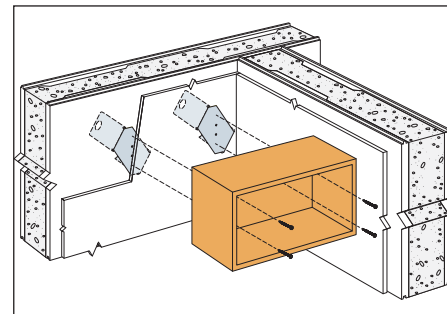
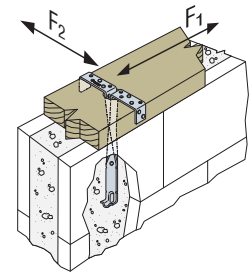


Plate Connections

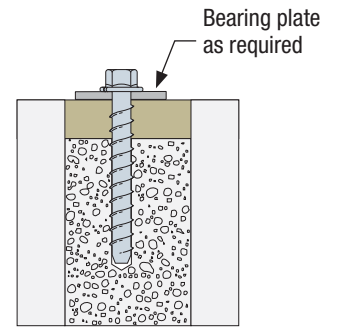
Prescriptive MAB Anchor Spacing

Model No.	O.C. Spacing to Replace 1/2" Anchor Bolts 6' o.c.	O.C. Spacing to Replace 5/8" Anchor Bolts 6' o.c.	Min. Concrete End Distance	Min. O.C. Spacing
MAB15	3'-10"	2'-8"	6 1/2"	13"

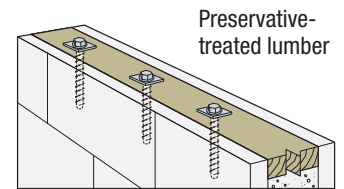
1. "Prescriptive" denotes designs per the IRC[®] or conventional provisions of the IBC[®] for wind speeds 100 mph or less, or for Seismic Design Category D and less (SDC E and less in IBC).
2. Spacing is based on parallel-to-plate load direction only.
3. Place anchors not more than 12" from the end of sill and splices per code.
4. Concrete shall have a minimum compressive strength of $f'_c = 2,500$ psi.
5. Spacings apply to DF, SP and HF sill plates.



Typical MAB15 Installation into ICF



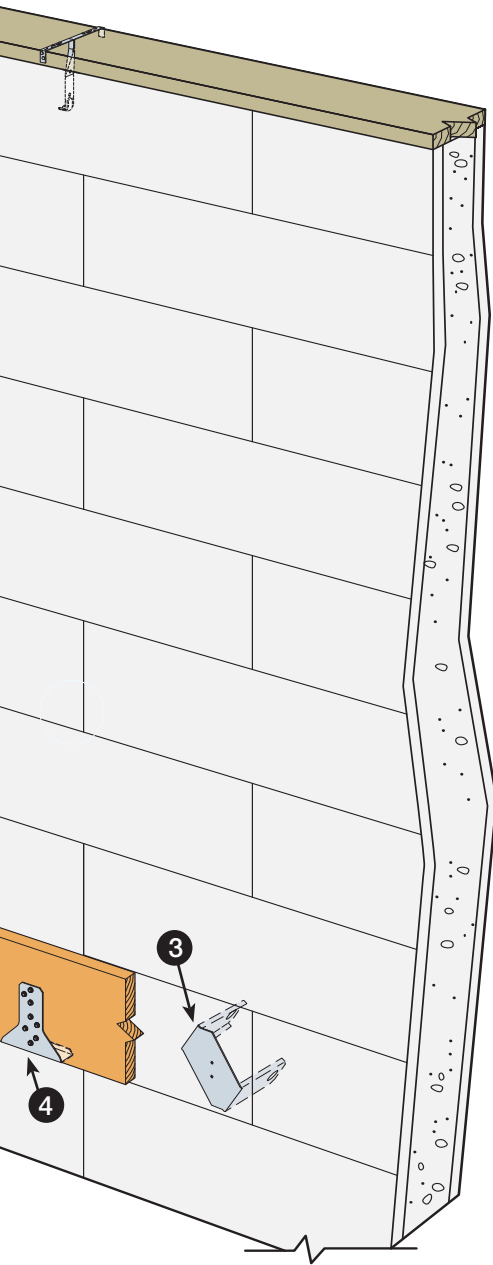
Titen HD Anchor



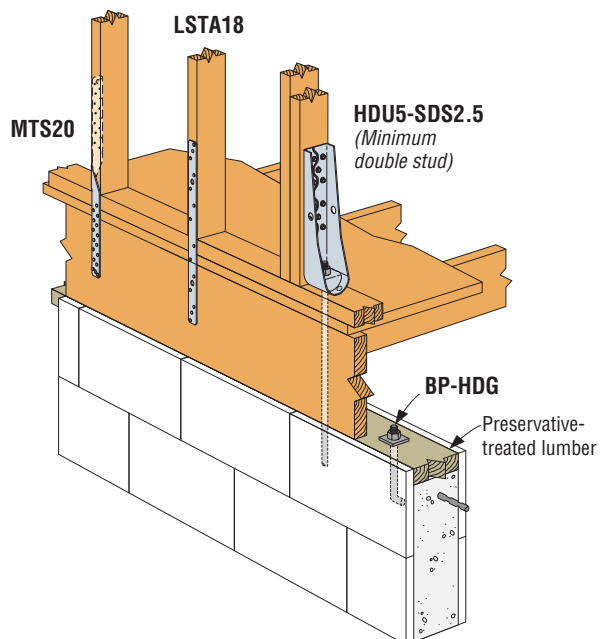
Titen HD Installation into ICF

Titen HD[®] Anchor

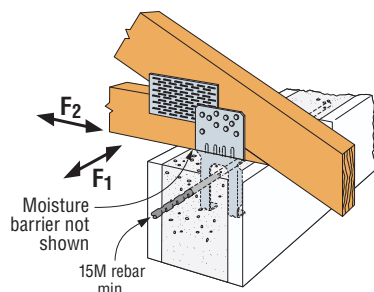
The Titen HD Anchor may be used for sill plate applications. Use bearing plates as required by code. Refer to the code report (ICC-ES ESR-2713), or use Simpson Strong-Tie Anchor Designer[™] software. Download at: strongtie.com/software



For additional corrosion information, see the current Simpson Strong-Tie[®] Wood Construction Connectors catalog or strongtie.com.



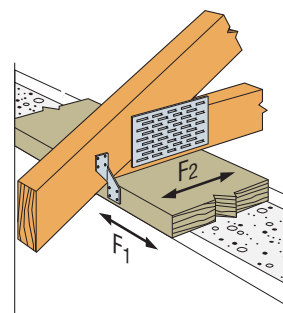
Truss Connections



LTA Lateral Truss Anchor, for High Uplift and Lateral Values, Eliminates Treated Plate

See the current Simpson Strong-Tie® Wood Construction Connectors catalog or strongtie.com for additional information on lateral truss anchors.

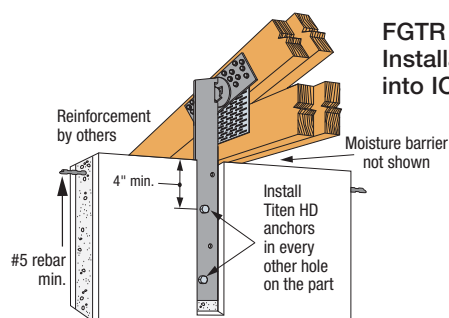
Model No.	Fasteners (in.)	Allowable Loads (160) ¹		
		Uplift	Lateral	
			F ₁	F ₂
LTA2	(10) 0.148 x 1½	990	415	735



H3 for Single Plate-to-Truss Connection

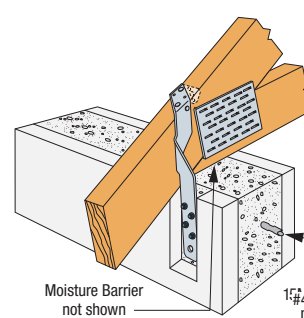
See the current Simpson Strong-Tie Wood Construction Connectors catalog or strongtie.com for additional information on and other models of seismic and hurricane ties.

Model No.	Ga.	Fasteners (in.)		Allowable Loads (160) ¹		
		To Rafter or Truss Single Ply	To Plates	Uplift	Lateral	
					F ₁	F ₂
H3	20	(4) 0.131 x 1½	(4) 0.131 x 1½	290	180	145



FGTR Installation into ICF

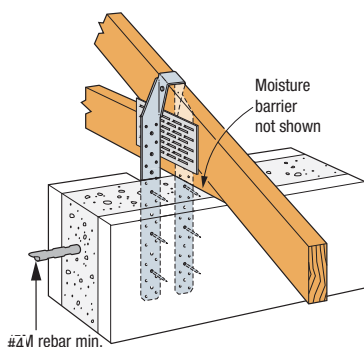
Model No.	Fasteners (in.)		Allowable Uplift Loads (160) ¹
	To Rafters or Truss	To Concrete	
FGTR	(18) ¼ x 3 SDS	(2) ½ x 5 Titen HD®	3,400



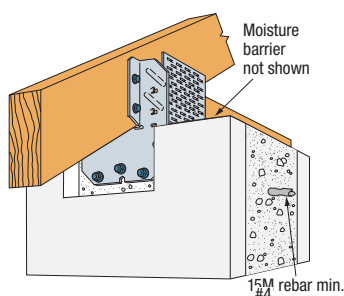
Typical MTSM20 Installation into ICF

See the current Simpson Strong-Tie Wood Construction Connectors catalog or strongtie.com for additional information on and other models of twist straps.

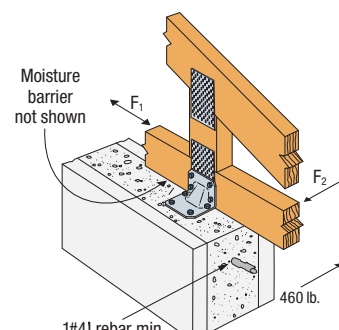
Model No.	L (in.)	Fasteners (in.)		Allowable Uplift Loads (160) ¹
		To Rafter or Truss	To Concrete	
		Single Ply		
MTSM20	20	(7) 0.148 x 1½	(4) ¼ x 1¾ Titen Turbo™	715



H16 Installation into ICF



HM9 Installation into ICF



HGAM10 Installation into ICF

Model No.	Ga.	Fasteners (in.)		Allowable Loads (160) ¹		
		To Rafter or Truss	To Concrete	Uplift	F ₁	F ₂
H16	18	(2) 0.148 x 1½	(6) ¼ x 1¾ Titen Turbo	1,180	—	—
HM9	18	(4) ¼ x 1½ SDS	(5) ¼ x 1¾ Titen Turbo	760	670	190
HGAM10	14	(4) ¼ x 1½ SDS	(4) ¼ x 1¾ Titen Turbo	585	630	795

1. Allowable loads are for SPF/HF species wood. See the current Simpson Strong-Tie Wood Construction Connectors catalog or strongtie.com for additional wood and installation information.
2. Minimum concrete edge distance is 1¼" when using Simpson Strong-Tie Titen Turbo screws.
3. See the current Simpson Strong-Tie Wood Construction Connectors catalog for additional dimensional, installation and loading information.
4. Allowable loads have been increased for wind or earthquake loading with no further increases allowed. Reduce where other loads govern.
5. The HM9KT is sold as a 10-pack with the required fasteners. The HGAM10KTA is sold as a 10-pack with the required fasteners.

ICF Connectors

General Notes:

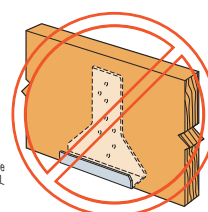
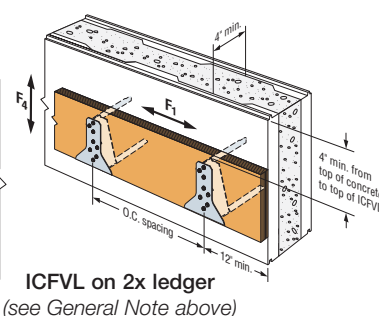
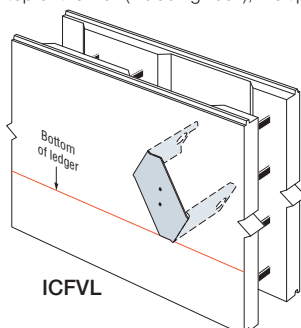
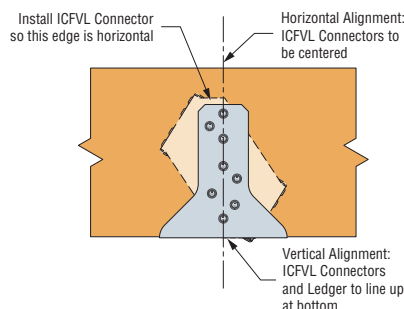
- For denser wood species (specific gravity ≥ 0.50), predrilling may be necessary. Predrill ledger only with 5/32" drill bit.
- These products are not intended for use with preservative-treated lumber.
- Do not splice ledger at ICFVL™ location.
- No load duration increase is allowed.
- Minimum concrete compressive strength (f'_c) is 2,500 psi.
- Use the unity equation when applying vertical and lateral loads simultaneously.
Design Vertical Load/Allowable Vertical Load + Design Lateral Load/Allowable Lateral Load ≤ 1.0 .
- Unless otherwise noted, loads are in pounds (lb.).

Warning: Industry studies show that hardened fasteners can experience performance problems in wet environments. Accordingly, use this product in dry, interior applications only.

Wood Ledgers

Allowable Loads (lb.) – ASD	
Vertical (F_v)	Lateral (F_l)
2,280	1,265

- Use (8) ICF-D3.25 screws (provided).
- Loads apply to ICF with 4½" maximum foam thickness with the ICFVL8 and 3¼" maximum foam thickness with the ICFVL6.
- Loads assume a minimum spruce-pine-fir ledger.
- Loads may not be increased for short-term loading.
- The top of the ICFVL must be installed 4" minimum below the top of the wall. For installations where the ICFVL is installed less than 4" from the top of the wall (including flush), multiply the allowable loads by 0.94.

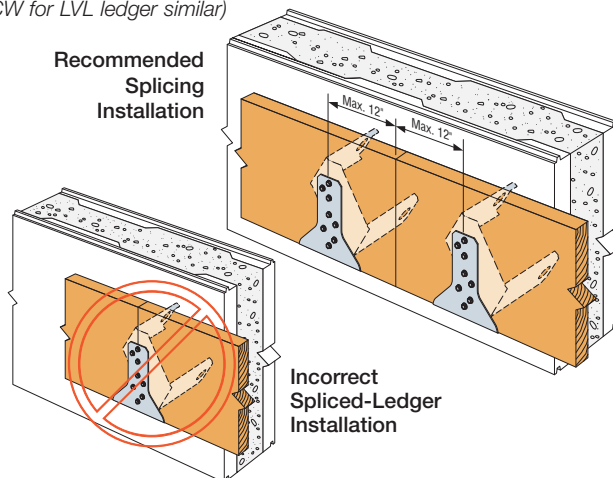


Typical Wood Ledger Installation with ICFVL and ICFVL-W
(ICFVL-CW for LVL ledger similar)

ICFVL Spacing to Replace Anchor Bolts							
½" Diameter Bolts				⅝" Diameter Bolts			
12" o.c.	24" o.c.	36" o.c.	48" o.c.	12" o.c.	24" o.c.	36" o.c.	48" o.c.
48"	48"	48"	48"	48"	48"	48"	48"
(2) ⅝" Diameter Bolts				¾" Diameter Bolts			
12" o.c.	24" o.c.	36" o.c.	48" o.c.	12" o.c.	24" o.c.	36" o.c.	48" o.c.
24"	48"	48"	48"	42"	48"	48"	48"

- This table addresses vertical load applications only.
- The Designer may specify different spacing based on the load requirements.
- Spacings are based on perpendicular to grain capacity of bolt in spruce-pine-fir wood ledger compared to tested value of ICFVL with a maximum allowable spacing of 48".
- Connector spacing requirements are based on a $C_D = 1.00$ load duration. Contact Simpson Strong-Tie for alternate load durations.
- Bolt design values are based on 2015 NDS Table 12E for SPF lumber (SG = 0.42), a minimum 6" anchor embedment, and concrete with $f'_c = 2,500$ psi.

Recommended Splicing Installation



Steel Ledgers

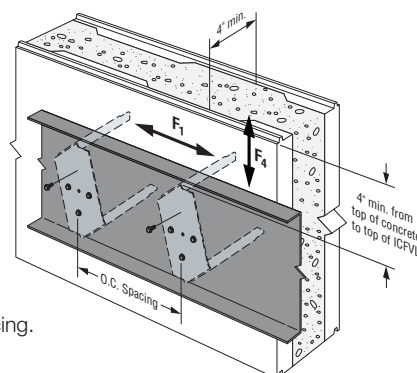
Allowable Loads (lb.) – ASD	
Vertical (F_v)	Lateral (F_l)
1,660	1,265

- Use four #14 x ¾" or ¼-14 x ¾", #3 drill point screws (not provided).
- Loads apply to ICF with 4½" maximum foam thickness with the ICFVL8 and 3¼" maximum foam thickness with the ICFVL6.
- The ICFVL must be installed not less than 4" from the top of the wall to achieve the allowable loads shown. For installations where the ICFVL is installed less than 4" from the top of the wall (including flush applications), multiply the allowable loads by 0.94.

Ledger Thickness mil (gauge)	ICFVL Spacing to Replace Anchor Bolts			
	½" Diameter Bolts		⅝" Diameter Bolts	
	12" o.c.	24" o.c.	12" o.c.	24" o.c.
68 (14)	11"	22"	9"	18"
54 (16)	15"	30"	12"	24"

- This table addresses vertical load applications only.
- For steel ledgers, the ICFVL spacing is closer for 68 mil ledgers than for 54 mil ledgers because the calculated load for the bolt is greater for a thicker member than for a thinner member.
- Steel ledger values are based on steel with a minimum yield strength, $F_y = 50$ ksi and tensile strength $F_u = 65$ ksi.

Requires four screws at each location.
Table provides on-center spacing.



Typical Steel Ledger Installation with ICFVL
(minimum 16 gauge, 54 mil steel ledger)

ICF Connectors

The following spacing tables are an alternative to the ICFVL™ spacing to replace anchor bolts tables or allowable loads on page 5. They give the spacing of the ICFVL Ledger Connectors based on the allowable vertical load of the connector, the load on the floor and the span of the joists. The designer must determine the design load, the ledger design and joist design. This table is useful if the designer already has loads and spans, but not necessarily anchor bolt spacing.

Uniform Loads		ICFVL Spacing for SPF Wood Ledger (in.)										
Dead Load (psf)	Live Load (psf)	Joist Span (ft.)										
		10	12	14	16	18	20	22	24	26	28	30
10	40	48	48	48	48	48	48	48	46	42	39	36
15	40	48	48	48	48	48	48	45	41	38	36	33
20	40	48	48	48	48	48	46	41	38	35	33	30
10	60	48	48	48	48	43	39	36	33	30	28	26
20	60	48	48	48	43	38	34	31	28	26	24	23
30	60	48	48	43	38	34	30	28	25	23	22	20
40	60	48	46	39	34	30	27	25	23	21	20	18
10	100	48	41	36	31	28	25	23	21	19	18	17
20	100	46	38	33	28	25	23	21	19	18	16	15

Values in the cells highlighted in yellow represent the maximum allowable spacing of 48".

See notes for table below..

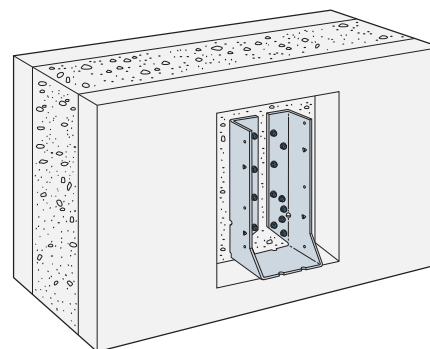
Uniform Loads		ICFVL Spacing for Steel Ledger (in.) – 54 (16)									
Dead Load (psf)	Live Load (psf)	Joist Span (ft.)									
		10	12	14	16	18	20	22	24	26	28
10	40	48	48	48	48	44	40	36	33	31	28
15	40	48	48	48	45	40	36	33	30	28	26
20	40	48	48	47	42	37	33	30	28	26	24
10	60	48	47	41	36	32	28	26	24	22	20
20	60	48	42	36	31	28	25	23	21	19	18
30	60	44	37	32	28	25	22	20	18	17	16
40	60	40	33	28	25	22	20	18	17	15	14
10	100	36	30	26	23	20	18	16	15	14	13
20	100	33	28	24	21	18	17	15	14	13	12

1. Values shown are maximum spacing distances (inches) based on two-span ledger and simple supported joists. It does not consider concentrated loads. The Engineer of Record can modify the spacing accordingly for other conditions.
2. Joist and ledger are to be designed by others.
3. Spacing tables address vertical load applications only. If the connection is designed to resist simultaneous lateral loads, spacing may decrease. Contact Simpson Strong-Tie for additional information.
4. The ICFVL must be installed no closer than 4" below the top of wall to achieve the connector spacing.
5. The maximum distance between the end of the ledger and the first ICFVL is 12" as per the recommended splicing installation.

Alternative Retrofit Solution for Direct Attachment of Joist to Wall

The HU and HUC hangers are heavy-duty, face-mount joist hangers made from 14-gauge galvanized steel. These hangers can be directly attached to concrete wall using 1/4" x 1 3/4" Simpson Strong-Tie® Titen Turbo™ hex-head screws. See strongtie.com for more information on installation and use.

Simpson Strong-Tie offers many retrofit products for attaching wood or steel framing members to concrete. For expanded details contact us at (800) 999-5099 and request the current *Anchoring, Fastening and Restoration Systems for Concrete and Masonry* catalog, or visit the Simpson Strong-Tie website at strongtie.com.



HUC410 Installed on Face of Concrete in ICF