Strong-Drive[®] SDWC **TRUSS** SCreW Truss/Rafter-to-Plate and Stud-to-Plate Connections



Attach Trusses and Rafters Faster (800) 999-5099 strongtie.com

For Truss/Rafter-to-Plate and Stud-to-Plate Connections

The Strong-Drive SDWC Truss screw provides a stud-to-bottom plate or stud-to-top plate connection as well as a method to fasten trusses and rafters to top plates. The fully-threaded shank engages the entire length of the fastener providing a secure connection. The SDWC is tested in accordance with ICC-ES AC233 (screw) and AC13 (wall assembly and roof-to-wall assembly) for uplift and lateral loads between wall plates and vertical wall framing and between the top plate and the roof rafters or trusses.

Codes/Standards: IAPMO UES ER-262

Features



- · Wide tolerance on installation angle makes it easy to install the SDWC correctly
- Can be installed from inside the structure, eliminating exterior work on the upper stories and enhancing job safety
- Fastening can be performed before or after exterior sheathing is applied for added flexibility

SDWC15450-KT and

- SDWC-GUIDE

separately)

or

SDWC15600-KT contains:

• (50) Strong-Drive SDWC screws

• (1) Matched-tolerance driver bit

for SDWC15600 only;

for SDWC15450 only;

also sold separately

also sold separately

SDWC-GUIDE275

(Part no. BIT30T-RT1; also sold

• (1) Metal installation guide tool

Installation guide

- Metal installation guide tool (included) to help ensure proper installation
- Matched-tolerance driver bit (included) engages fastener head securely to allow one-handed driving (replacement bit part no. BIT30T-R1)
- SDWC15450 is recognized for use in preservativetreated wood as described in the evaluation report

SDWC15450B-KT and SDWC15600B-KT contains:

- (500) Strong-Drive SDWC screws
- (2) Matched-tolerance driver bits (Part no. BIT30T-RT1: also sold separately)
- (2) Metal installation guide tools
 - SDWC-GUIDE for SDWC15600 only; also sold separately or
 - SDWC-GUIDE275 for SDWC15450 only; also sold separately



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General Load Information

E-Coat [®]									
Size	Thread Length (in.)		Retail Pack	Mini-Bulk Bucket					
		Fasteners Per Pack	Retail Per Master Carton	Model No.	Fasteners Per Bucket	Model No.			
0.152 x 4½	41⁄4	50	6	SDWC15450-KT	500	SDWC15450B-KT			



Clear Zinc Coating (with Orange Topcoat)

	Thread Length		Retail Pack	Mini-Bulk Bucket		
Size	(in.)	Fasteners Per Pack	Retail Per Master Carton	Model No.	Fasteners Per Bucket	Model No.
0.152 x 6	5¾	50	6	SDWC15600-KT	500	SDWC15600B-KT

Allowable Shear Loads - DFL, SP, SPF

	Fastener	Thread Length (in.)		Main Member	Allowable Shear Loads (lb.)							
Model No.	Length		Side Member			Zpara		Zperp				
	(111.)				SP	DFL	SPF	SP	DFL	SPF		
SDWC15450	41⁄2	41⁄4	2x (Face)	2x (End Grain)	—		_	225	205	190		
			(2)2x (Face)	2x (Edge)	245	240	180	240	240	240		
SDWC15600	6	5¾	2x (Face)	2x (End Grain)	—	—		225	205	190		
			(2)2x (Face)	2x (End Grain)		—	_	225	225	190		

1. Allowable loads are shown at the wood load duration factor of C_D = 1.0. Loads may be increased for load duation up to a C_D = 1.6.

2. Tabulated values must be multiplied by all applicable adjustment factors per the NDS.

3. The main and side members shall be sawn lumber or structural composite lumber with a specific gravity or equivalent specific gravity 0.42 to 0.55.

 Z_{para} — Parallel-to-grain loading in the side member and perpendicular-to-grain loading in the main member.

5. Z_{perp} — Perpendicular-to-grain loading in the side member and perpendicular-to-grain loading in the main member, except for 2x (edge) where main member is loaded parallel to grain.

6. The connection conditions of this table are for specific intended applications. Reference lateral design values for all other shear connections are calculated following the NDS.

Allowable Withdrawal and Pull-Through Loads - DFL, SP, SPF

Model No.	Screw Length (in.)	Thread Length (in.)	Main Member	Allowab	le Withdrawa (lb./in.)	al Loads	Allowable Pull-Through Loads (lb./in.)			
			Wolfibor	SP	DFL	SPF	SP	DFL	SPF	
SDW015450	416	41/.	2x (Edge)	250	230	150	—	_	—	
3DWC10400	4 1⁄2	4 74	2x (End Grain)	200	140	100	208	180	175	
	G	F3/	2x (Face)	210	180	120	255	195	160	
SDWC15600	6	5%	(2) 2x (Face)	220	200	160	240	225	190	

1. Allowable loads are shown at the wood load duration factor of C_D = 1.0. Loads may be increased for load duration up to a C_D = 1.6.

 Tabulated values must be multiplied by all applicable adjustment factors per the NDS. 3. The reference withdrawal and pull-through values are in pounds per inch of the thread penetration into the main member and a minimum 1½"-thick side member, respectively.

Continuous Load Path Considerations



Strong-Drive SDWC TRUSS Screw

Building codes require structures to be designed to create a continuous load path. Forces must be transferred from their point of origin to the building elements that are designed to resist them. When uplift forces act on a roof, the roof must be tied down to the wall below it; and if the uplift forces are large enough, the wall must be tied down to the foundation or wall below. Like many common hurricane ties, the SDWC screw fastens the rafter or truss directly to the top plate of the wall below. See pp. 5-9 of this guide for installation requirements and load transfer capacities. The wall top plate alone does not offer sufficient resistance to roof uplift forces, and therefore must be tied to the studs or framing below. See pp. 10–12 of this guide for stud-to-plate installation requirements and load transfer capacities.

Note: In the following pages, truss plate applications have been simplified to improve illustration clarity. Fastener installations are not intended to replace diaphragm boundary members. Designed details to prevent cross-grain bending and cross-grain tension may be necessary.



Roof-to-Wall Connections

Installation Option 1 Instructions

These instructions apply if the truss/rafter is either aligned with or offset from the stud below.

Note: SDWC screws install best with a minimum 18V (if cordless) drill using the matched-tolerance bit included in the SDWC15600KT.



Typical SDWC Installation – Truss Aligned w/Stud (offset truss similar)





Min. Edge Distance for Top Plate Splice



Step 1 — Align the metal installation guide tool (included) with the truss or rafter, and drive the tip of the Strong-Drive SDWC to engage the threads.



Step 2 — While continuing to drive the SDWC, "drop" the fastener head into the guide channel to ensure optimal installation angle of 22°. The installation angle range is 10°–30° (see illustration). Once the installation angle is established, the metal installation guide tool may be removed.



Step 3 — Drive the SDWC until the head of the fastener is fully countersunk into the double top plate. Verify that the entire shank of the fastener is installed into a wood member.

Roof-to-Wall Connections



Installation Option 2 Instructions

These instructions apply only if the truss/rafter is offset from the stud below

Note: SDWC screws install best with a minimum 18V (if cordless) drill using the matched-tolerance bit included in the SDWC15600KT.



top plate splice for full values Min. Edge Distance for Top Plate Splice

Step 1 — Position point of the SDWC no less than ½" from edge of the double top plate. While perpendicular to the top plate is preferred, an installed angle up to and including 30° away from the installer is acceptable.



Step 2 — Drive the SDWC until the head of the fastener is fully countersunk into the double top plate. Verify that the entire shank of the fastener is installed into a wood member.

Allowable Roof-to-Wall Connection Loads - DFL, SP, SPF, HF

Model No.	Minor Diameter (in.)	Length (in.)	Thread Length (in.)	Allowable Loads (lb.)							
					DF/SP		SPF/HF				
				Uplift	F1	F2	Uplift	F1	F2		
SDWC15600	0.152	6	5¾	615	130	225	485	115	190		

1. Loads have been increased for wind and earthquake loading ($C_D = 1.6$), no further increases allowed; reduce where other loads govern.

Allowable loads are for SDWC installed per the installation instructions. SDWC screws are shown installed on the interior side of the wall. Installation on the exterior side of the wall is also acceptable.

3. An SDWC screw may be used in each ply of 2- or 3-ply rafters or trusses. The allowable uplift load for each screw shall be multiplied by 0.90, but may be limited by the capacity of the plate or the connection between the top plate to the framing below. SDWC screws in multi-ply assemblies must be spaced a minimum of 11/2" o.c.

4. Loads assume a minimum overhang of 31/2".

5. For uplift connection load path, the Designer shall verify complete continuity of the uplift path.

6. When the screw is loaded simultaneously in more than one direction, the allowable load must be evaluated using the following unity equation: (Design Uplift \div Allowable Uplift) + (Design F2 \div Allowable F2) \le 1.0

7. Top plate, stud and top plate splice fastened per applicable Building Code.

8. Table loads do not apply to trusses with end-grain bearing.

Truss/Rafter-to-Top Plate Connections



Truss/Rafter-to-Top Plate Connections Utilizing Two-Screw Configurations

Allowable loads for the SDWC Truss screws when installed from the underside of the top plate and from the face of the truss/rafter using a two-screw configuration per the detail configurations shown on following page.



Allowable Loads for Truss/Rafter-to-Top Plate Two-Screw Connections

	Model No.	Minor Diameter	Length (in.)	Thread Length (in.) Quantity Required	Quantity Required	Allowable Loads (lbs.)					
Configuration						DF/SP			SPF/HF		
		(in.)	()		Uplift	F ₁	F ₂	Uplift	F ₁	F ₂	
А			6	5¾	2	1,200	685	995	1,045	495	670
В		0 150				1,195	680	925	1,195	405	680
С	300013000	0.152				905	535	790	850	330	595
D						1,115	645	920	960	385	610

1. Loads have been increased for wind and earthquake loading (C_D =1.6) with no further increase allowed; reduce where other loads govern.

2. For Uplift Connection Load Path, the Designer shall verify complete continuity of the uplift load path.

3. When cross-grain tension cannot be avoided, supplemental reinforcement shall be considered by the Designer.

4. The SDWC screws shall not interfere with other fasteners or truss plates. Where truss plates must be penetrated for Configuration D, a Truss Designer approval is required in accordance with ANSI/TPI 1-2007/2014, Section 7.5.3.4 and 8.9.2. To pre-drill through truss plate, use a ¼" drill bit.

5. The metal installation guide provided with the screw is angled at 22° and can be used for Configurations C and D; proper installation angles for all configurations are the responsibility of the installer.

6. SDWC screws must be offset min. 1/4" from top plate splices for full values.

7. Loads assume minimum overhang of 31/2".

8. When a screw is loaded simultaneously in more than one direction, the allowable load must be evaluated using the unity equation: (Design Uplift ÷ Allowable Uplift) + (Design F1 ÷ Allowable F1) + (Design F2 ÷ Allowable F2) ≤ 1.0. The three terms in the unity equation represent the possible generated force directions. The number of terms that must be considered for simultaneous loading is the sole discretion of the Designer and depends on the method of calculating wind forces and the utilization of the screws within the structural system.

9. An SDWC screw may be used in each ply of 2- or 3-ply rafters or trusses. The allowable uplift load for each screw shall be multiplied by 0.90, but may be limited by the capacity of the plate or the connection between the top plate to the framing below. SDWC screws in multi-ply assemblies must be spaced a minimum of 11/2" o.c.

Truss/Rafter-to-Top Plate Connections





Configuration A: Truss Aligned with Stud—Install through Top Plate into Truss/Rafter Both screws installed at a $4^{\circ}-14^{\circ}$ angle, offset $\frac{3}{4}^{\circ}-1\frac{1}{4}^{\circ}$ from opposite edges of the top plate.



Minimum Edge Distances

Configuration B: Truss Offset from Stud—Install through Top Plate into Truss/Rafter

Both screws installed vertically $\pm 5^{\circ}$ into the center of the truss/rafter from the underside of the top plate, $\frac{1}{2}$ "-1" from opposite edges of the top plate.

Truss/Rafter-to-Top Plate Connections



Installation Angle Range



Configuration C: Install through Top Plate into Truss/Rafter

Both screws installed at a 16°–30° angle, offset $\frac{1}{2}$ " from the opposite edges of truss/rafter. Use metal installation guide included in screw kits for optimal 22° installation.



Minimum Edge Distances

Installation Angle Range

Configuration D: Install through Truss/Rafter to Top Plate

Both screws installed at a 20°–25° angle with a ½"-½" offset from the opposite edges of top plate 3" ± ¼" above top plate. Use metal installation guide included in screw kits for optimal 22° installation. To predrill through truss plates, use a ½" drill bit.

Narrow Face of Stud-to-Plate Connections



The Strong-Drive SDWC Truss screw provides an easy-to-install, high-capacity solution for stud-to-bottom plate or stud-to-top plate(s) connections. This table provides additional allowable load information for the SDWC screws when installed through the narrow face of the stud. The allowable loads are for SDWC screw installed per the details shown on page 11.

Narrow Face of Stud-to-Plate Connections

						Allowable	ble Loads (lb.)			
Type of Connection	Model Number	Quantity Required	Minor Diameter	Length (in.)	Length	Plate Size	DF	/SP	SPF/HF	
			()		()		Uplift	F2	Uplift	F2
1	SDWC15600 ²	1	0.152	6	5 3⁄4	(2) 2x	590	170	510	145
2	SDWC156003	1	0.152	6	5 3⁄4	2x	450	155	310	135
3	SDWC154504	1	0.152	4 1⁄2	4 1⁄4	2x	295	150	255	130

1. Loads have been increased for wind and earthquake (C_D =1.6), no further increase is allowed; reduce when other loads govern.

Where noted, the SDWC15600 is to be installed through the narrow face of a 2x stud into a double 2x top or bottom plate.
 Where noted, the SDWC15600 is to be installed through the narrow face of 2x stud into a single 2x bottom plate over a wood floor system.

4. Where noted, the SDWC15450 is to be installed through the narrow face of 2x stud into a single 2x bottom plate over a concrete/masonry foundation.

5. Double-top plates shall be fastened together as required by applicable Code.

6. The F2 direction is perpendicular to the wall. When the screw is loaded simultaneously in more than one direction, the allowable load must be evaluated using the following equation: (Design Uplift ÷ Allowable Uplift) + (Design F2 ÷ Allowable F2) ≤ 1.0

7. One SDWC screw per stud maximum when installed in the narrow face of the stud. Where the SDWC screws are installed on multiple adjacent studs, the minimum spacing between screws must be 1½". The allowable uplift load for each screw shall be multiplied by 0.90, but may be limited by the capacity of the plate.

8. For uplift Continuous Load Path, connections in the same area (i.e. truss to plate connector and plate to stud connector) must be on the same side of the wall.

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Narrow Face of Stud-to-Plate Connections



Narrow Face of Stud-to-Top Plate Connection

(this application requires SDWC15600)



Installation Angle Range



F2

2

1

Narrow Face of Stud-to-Bottom Plate Connection Over Wood Floor (SDWC15600 shown)



Installation Angle Range



Min. Edge Distance and Splice Offset Requirements

3



Narrow Face of Stud-to-Bottom Plate Connection Over Masonry/ Concrete Foundation (the application requires SDWC15450)





Installation Angle Range



Min. Edge Distance and Splice Offset Requirements

Wide Face of Stud-to-Plate Connections

SDWC — Allowable Wide Face of Stud-to-Plate **Connection Loads**

	_		No of	Minor Diameter (in.)	Length (in.)	Thread	Nominal	A	llowable	Loads (lb).)
	Type of Connection	Model No.	Screws			Length	Plate Thickness	DF/SP		SPF/HF	
	Connootion		Installed			(in.)	(in.)	Uplift	F2	Uplift	F ₂
			1					590	177	510	152
	1	SDWC156005	2	0.152	6	5¾	(2) 2x	1,135	320	980	275
			3					1,700	485	1,470	415
			1					450	189	310	153
	2	SDWC156004	2	0.152	6	5¾	2x	865	345	595	280
			3					1,295	515	895	420
			1					360	215	310	153
3 S	SDWC15450 ³	2	0.152	41⁄2	41⁄4	2x	690	390	595	280	
			3					1,035	585	895	420

1. Loads have been increased for wind and earthquake loading ($C_D = 1.6$) with no further increases allowed; reduce where other loads govern.

2. Allowable loads are for SDWC installed per the installation instructions.

3. Where noted, the SDWC15450 is to be installed through the face of 2x stud into a single 2x bottom plate over a concrete/masonry foundation.

4. Where noted, the SDWC15600 is to be installed through the face of 2x stud into a single 2 x bottom plate over a wood floor system.

5. Where noted, the SDWC15600 is to be installed through the face of 2x stud into a double 2x top or bottom plate.

Wide-Face Stud-to-Plate Connections



00 0

6. Double-top plates shall be fastened together as required by applicable code.

÷ Allowable Uplift) + (Design F1 ÷ Allowable F1) + (Design F2 ÷ Allowable

7. When a screw is loaded simultaneously in more than one direction, the allowable load must be evaluated using the unity equation: (Design Uplift

Optimal 22°

20°

0.0

SDWC15450)

 $\propto =$

21/2" ± 1/4"



Spacing Requirements

Optimal 22°



One Screw

One fastener driven in wide face of 2x4, 2x6 or 2x8; maintain minimum edge distance of 3/4".



Two Screws Two fasteners driven into same wide face of 2x4, 2x6 or 2x8. Maintain minimum edge distance of 34" and maximum edge distance of 1" for proper spacing between fasteners.



Three Screws

Two fasteners driven into same wide face of 2x4, 2x6 or 2x8. Maintain minimum edge distance of 3/4" and maximum edge distance of 1" for proper spacing between fasteners. One fastener driven within 1/8" of centerline of 2x4, 2x6 or 2x8 on OPPOSITE wide face.



Connection

1 2

3

(see below).

3" ± 1/4"

 $3" \pm 1/4"$

21/2" ± 1/4"

Dimension α is as shown in 1, 2 or 3 depending on the SDWC screw being used and the floor substrate.

This ∝ measurement is applicable for one, two and

three screw connections



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Top-of-Wall Assemblies for SPF Lumber

SDWC Pre-Engineered Top-of-Wall Assemblies for Continuous Uplift Load Path for SPF (or Better) Wood Framing

The Strong-Drive SDWC Truss screw is designed to fasten roof rafters/trusses to wall plates and wall plates to studs. When used to connect rafters/trusses to top plates, a second connection from top plates to the studs below is necessary in order to maintain a continuous load path (as would be required for any connection method). This table provides allowable uplift loads for the pre-engineered top-of-wall assemblies shown on pp. 14–15. These assemblies have been designed and tested to provide a continuous load path from the rafter/truss to the studs in the wall below and account for any reductions that may result from top plate rotation due to eccentric loading. The continuous load path from the bottom of the stud to the supporting structure is by others.



SDWC — Allowable Uplift Load for Pre-Engineered Top	of-Wall Assemblies
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			Allowable Rafter/Truss Uplift Load (lb.)							
Wall	Rafter/Truss Connection to Top Plates	Top Plate Connection to Studs at 16" On Center⁴	2	x4 SPF Framin	ıg	2x6 SPF Framing				
Assembly			Raf	ter/Truss Spac	ing	Rafter/Truss Spacing				
			12	16	24	12	16	24		
А		1 - SDWC15600	385	485	485	385	485	485		
В		2-SDWC15600	485	485	485	485	485	485		
С	1 - SDWC15600	1-SDWC15600	305	410	485	305	410	485		
D		1 - SDWC15600	120	160	240	120	160	240		
E		WSP per Designer ³	145	195	290	105	140	210		

1. Allowable loads apply to SPF (G=0.42) or may be used for wood framing with higher specific gravity.

2. Uplift loads have been increased for wind loading ($C_{\rm D}$ =1.6) with no further increases allowed; reduce where other loads govern.

3. Wood structural panel (WSP) sheathing used in Wall Type E must be designed and constructed to resist uplift in accordance with the American Wood Council's 2008 or 2015 Special Design Provisions for Wind and Seismic standard.

4. As indicated in table header, studs spaced at 16" o.c. for all assemblies.



Top-of-Wall Assemblies for SPF Lumber





Wall Assembly A One SDWC as Angled Stud Screw





Wall Assembly B Two SDWCs as Angled Stud Screws



> Truss or rafter

6" SDWC each

Stud at 16" o.c. (not reqd. to align

with truss/rafter)

rafter/truss

000000000

One 6" SDWC

each stud

³⁄4" – 2"



One SDWC as Vertical Stud Screw Through Both Plates

14

Top-of-Wall Assemblies for SPF Lumber



Wall Assembly F Rafter/Truss Offset from Stud shown here or installed into corner of plates as shown in Assembly A-E drawings for connection requirements

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Sole-to-Rim Connections



Allowable Shear Values for Sole-to-Rim Connections

		Model No.			Allowable Loads (lb.)								
	Size (in.)		Sole Plate Nominal Size	Minimum Penetration into Rim Board (in.)	Minimum Penetration	2x DF/SP Rim Board		2x SPF/HF Rim Board		1 ¼" Min. LVL Rim Board		1¼" Min. LSL Rim Board	
					DF/SP Sole Plate	SPF/HF Sole Plate	DF/SP Sole Plate	SPF/HF Sole Plate	DF/SP Sole Plate	SPF/HF Sole Plate	DF/SP Sole Plate	SPF/HF Sole Plate	
	0.152 x 4.5	SDWC15450	2x	2.25	235	205	205	205	255	225	275	215	
	0.152 x 6	SDWC15600	2x or 3x	2.25	235	205	205	205	255	225	275	215	

1. Allowable loads are based on testing per ICC-ES AC233 and are limited to parallel-to-grain loading.

2. Allowable loads are shown at the wood load duration factor of C_D = 1.00. Loads may be increased for load duration by the building code up to a C_D = 1.60.

3. Minimum spacing of the SDWC is 6" o.c., minimum end distance is 6" and minimum edge distance is %".

4. Wood structural panel up to 1%" thick is permitted between the sole plate and rim board provided it is fastened to the rim board per code and the minimum penetration of the screw into the rim board is met.

5. A double 2x sole plate is permitted provided it is independently fastened per the code and the minimum screw penetration per the table is met.



Top-of-Wall Assemblies for Factory-Built Structures

The allowable uplift loads are provided for the Simpson Strong-Tie® SDWC15600 wood screw installed with a 5%" OSB bearing strip between the truss and top plate.





SDWC — Allowable Uplift Loads for Factory-Built Structures

Model No.	Minor Diameter (in.)	Length (in.)	Thread Length	Allowable Uplift SPF/DF/SP (lb.) (160)			
			(in.)	With Overhang	Without Overhang		
SDWC15600	0.152	6	5¾	415	370		

 Loads have been increased for wind or earthquake (C_D=1.6); no further increase allowed; reduce where other loads govern.

2. Allowable loads apply to Spruce-Pine-Fir, Hem-Fir, Douglas Fir-Larch and Southern Pine.

- Allowable loads are for an SDWC installed per the "With Overhang" or "Without Overhang" installation details.
- 4. SDWC must be installed on the exterior side of the wall.
- 5. SDWC must be installed at an angle between 10° and 22°. Guide provided with screws is at 22°.
- 6. For Uplift Continuous Load Path, top plate to stud connections must be located on the exterior side of the wall.
- 7. Table loads do not apply to trusses with endgrain bearing.
- 8. Top plate, stud and top plate splice fastened per applicable building code.



Section A-A Min. Edge Distance for Top Plate Splice

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Notes



Notes

Type-17 point for faster starts

Fully threaded shank completely engages wood members

See faster starts and a smooth finish

 Caphead countersinks for a smooth finish



The results are in: new Strong-Drive[®] SDWC Truss screw is another clear solution for fastening trusses and rafters to wall top plates. Featuring a fully threaded shank, the SDWC screw requires no predrilling, has a sharp tip for faster starts and countersinks flush for a smooth finish. The screw can be installed before or after sheathing is applied from inside the structure, which eliminates exterior work on the upper stories and increases job safety. SDWC screws are sold with a metal guide for the correct installation angle and a matched-tolerance driver bit.



Free guide included for a correct angle every time

This filer is effective until June 30, 2020, and reflects information available as of May 1, 2018. This information is updated periodically and should not be relied upon after June 30, 2020. Contact Simpson Strong-Tie for current information and limited warranty or see strongtie.com.

(800) 999-5099 strongtie.com

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