Strong-Drive®
SDWS TIMBER Screw

Structural Wood-to-Wood Connections Including Ledgers, Indoor/Outdoor Projects

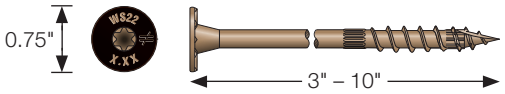
Designed to provide an easy-to-install, high-strength alternative to through-bolting and traditional lag screws. The Strong-Drive SDWS Timber screws are ideal for the contractor and do-it-yourselfer alike.

Double-barrier coating provides corrosion resistance equivalent to hot-dip galvanization, making it suitable for certain exterior and preservative-treated wood applications, as described in the evaluation report.

Codes/Standards: IAPMO-UES ER-192, State of Florida FL13975

US Patent 9,523,383

For more information, see p. 53, C-F-2019 Fastening Systems Catalog



SDWS Timber Screw — Allowable Shear Loads — Douglas Fir–Larch and Southern Pine Lumber

Size Dia.x L (in.)	Model No.	Thread Length (in.)	Reference DFL/SP Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2	2.5	3	3.5	4	4.5	6	8
0.22 x 3	SDWS22300DB	1½	255	—	—	—	—	—	—	—	—
0.22 x 4	SDWS22400DB	2⅜	405	405	305	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2¾	405	405	360	360	325	—	—	—	—
0.22 x 6	SDWS22600DB	2¾	405	405	405	405	365	365	355	—	—
0.22 x 8	SDWS22800DB	2¾	405	405	405	405	395	395	395	395	—
0.22 x 10	SDWS221000DB	2¾	405	405	405	405	395	395	395	395	395

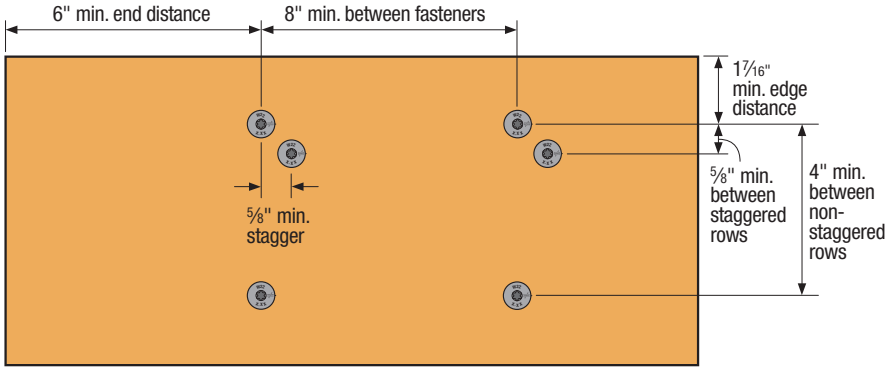
See footnotes below.

SDWS Timber Screw — Allowable Shear Loads — Spruce-Pine-Fir and Hem-Fir Lumber

Size Dia.x L (in.)	Model No.	Thread Length (in.)	Reference SPF/HF Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2	2.5	3	3.5	4	4.5	6	8
0.22 x 3	SDWS22300DB	1½	190	—	—	—	—	—	—	—	—
0.22 x 4	SDWS22400DB	2⅜	385	285	215	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2¾	405	290	290	290	195	—	—	—	—
0.22 x 6	SDWS22600DB	2¾	405	365	365	365	310	310	210	—	—
0.22 x 8	SDWS22800DB	2¾	405	365	365	365	310	310	280	280	—
0.22 x 10	SDWS221000DB	2¾	405	365	365	365	310	310	280	280	280

1. All applications are based on full penetration into the main member. Full penetration is the screw length minus the side member thickness.
2. Allowable loads are shown at the wood load duration factor of C_D = 1.0. Loads may be increased for load duration per the building code up to a C_D = 1.6. Tabulated values must be multiplied by all applicable adjustment factors per the NDS.
3. Minimum fastener spacing requirements to achieve table loads: 6" end distance, 1 7⁄16" edge distance, ⅝" between staggered rows of fasteners, 4" between non-staggered rows of fasteners and 8" between fasteners in a row.
4. For in-service moisture content greater than 19%, use C_M = 0.7.
5. Loads are based on installation into the side grain of the wood with the screw axis perpendicular to the face of the member.

Strong-Drive® SDWS TIMBER Screw (cont.)



SDWS Timber Screw Spacing Requirements

SDWS Timber Screw — Allowable Withdrawal Loads — Douglas Fir–Larch, Southern Pine, Spruce-Pine-Fir and Hem-Fir Lumber

Model No.	Fastener Length (in.)	Thread Length (in.)	Reference Withdrawal Design Value, W (lb./in.)		Max. Reference Withdrawal Design Value, W_{max} (lb.)	
			DFL and SP Main Member	HF and SPF Main Member	DFL and SP Main Member	HF and SPF Main Member
SDWS22300DB	3	1½	164	151	245	225
SDWS22400DB	4	2⅜	179	160	425	380
SDWS22500DB	5	2¾	214	187	590	495
SDWS22600DB	6	2¾	214	187	590	495
SDWS22800DB	8	2¾	214	187	590	495
SDWS221000DB	10	2¾	214	187	590	495

1. The tabulated reference withdrawal design value, W, is in pounds per inch of the thread penetration into the side grain of the main member.
2. The tabulated reference withdrawal design value, W_{Max}, is in pounds where the entire thread length must penetrate into the side grain of the main member.
3. Tabulated reference withdrawal design values, W and W_{Max}, are shown at a C_D = 1.0. Loads may be increased for load duration per the building code up to a C_D = 1.6. Tabulated values must be multiplied by all applicable adjustment factors from the NDS as referenced in the IBC or IRC.
4. Embedded thread length is that portion held in the main member including the screw tip.
5. Values are based on the lesser of withdrawal from the main member or pull-through of a 1½" side member.
6. For in-service moisture content greater than 19%, use C_M = 0.7.

Strong-Drive® SDWS TIMBER Screw with Gypsum Board Interlayer(s)

The Strong-Drive SDWS Timber screw may be installed with one or two layers of ⅝" gypsum board. This layer of gypsum is to be located between the side member and main member for a standard connection. See the tables below for the required screw lengths and allowable loads for these applications. Loads are derived from assembly testing based on ICC-ES AC233.

SDWS Timber Screw — Douglas Fir–Larch and Southern Pine Lumber Allowable Single Shear Loads with One Layer of ⅝" Gypsum Board

Size (in.)	Model No.	Thread Length (in.)	Reference DFL/SP Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2.0	2.5	3.0	3.5	4.0	4.5	6.0	8.0
0.22 x 4	SDWS22400DB	2.375	265	—	—	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2.75	265	265	235	—	—	—	—	—	—
0.22 x 6	SDWS22600DB	2.75	265	265	265	265	235	—	—	—	—
0.22 x 8	SDWS22800DB	2.75	265	265	265	265	255	255	255	—	—
0.22 x 10	SDWS221000DB	2.75	265	265	265	265	255	255	255	255	—

See footnotes on next page.

SDWS Timber Screw — Douglas Fir–Larch and Southern Pine Lumber Allowable Single Shear Loads with Two Layers of ⅝" Gypsum Board

Size (in.)	Model No.	Thread Length (in.)	Reference DFL/SP Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2.0	2.5	3.0	3.5	4.0	4.5	6.0	8.0
0.22 x 4	SDWS22400DB	2.375	—	—	—	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2.75	265	265	—	—	—	—	—	—	—
0.22 x 6	SDWS22600DB	2.75	265	265	265	265	—	—	—	—	—
0.22 x 8	SDWS22800DB	2.75	265	265	265	265	255	255	255	—	—
0.22 x 10	SDWS221000DB	2.75	265	265	265	265	255	255	255	255	—

See footnotes on next page.

Strong-Drive® SDWS TIMBER Screw with Gypsum Board Interlayer(s) (cont.)

SDWS Timber Screw — Spruce-Pine-Fir and Hem-Fir Lumber Allowable Single Shear Loads with One Layer of ⅝" Gypsum Board

Size (in.)	Model No.	Thread Length (in.)	Reference SPF/HF Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2.0	2.5	3.0	3.5	4.0	4.5	6.0	8.0
0.22 x 4	SDWS22400DB	2.375	250	—	—	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2.75	260	190	190	—	—	—	—	—	—
0.22 x 6	SDWS22600DB	2.75	260	235	235	235	200	—	—	—	—
0.22 x 8	SDWS22800DB	2.75	260	235	235	235	200	200	180	—	—
0.22 x 10	SDWS221000DB	2.75	260	235	235	235	200	200	180	180	—

See notes below.

SDWS Timber Screw — Spruce-Pine-Fir and Hem-Fir Lumber Allowable Single Shear Loads with Two Layers of ⅝" Gypsum Board

Size (in.)	Model No.	Thread Length (in.)	Reference SPF/HF Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2.0	2.5	3.0	3.5	4.0	4.5	6.0	8.0
0.22 x 4	SDWS22400DB	2.375	—	—	—	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2.75	260	190	—	—	—	—	—	—	—
0.22 x 6	SDWS22600DB	2.75	260	235	235	235	—	—	—	—	—
0.22 x 8	SDWS22800DB	2.75	260	235	235	235	200	200	180	—	—
0.22 x 10	SDWS221000DB	2.75	260	235	235	235	200	200	180	180	—

1. All applications are based on full penetration which equals fastener length minus side member thickness.
2. Allowable loads are shown at the wood load duration factor of C_D =1.0. Loads may be increased for load duration per the building code up to a C_D =1.6. Tabulated values must be multiplied by all applicable adjustment factors per the NDS.
3. Minimum fastener spacing requirements: 6" end distance, 1 1/16" edge distance, ⅝" between staggered rows of fasteners, 4" between non-staggered rows of fasteners and 8" between fasteners in a row. Refer to SDWS Spacing Requirements figure on p. 23.
4. For in-service moisture content greater than 19% use C_M = 0.7.
5. Gypsum board must be attached as required per the building code.

Ledger Structural Fastening Applications

Strong-Drive® SDWS TIMBER Screw in Ledger-to-Stud Applications

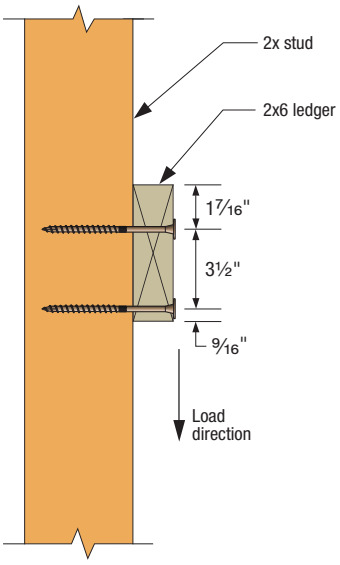
Strong-Drive SDWS Timber screws may be used to attach a ledger to the narrow face of nominal 2x lumber studs according to the following table. Tests and analyses were performed in accordance with ICC-ES Acceptance Criteria AC233.

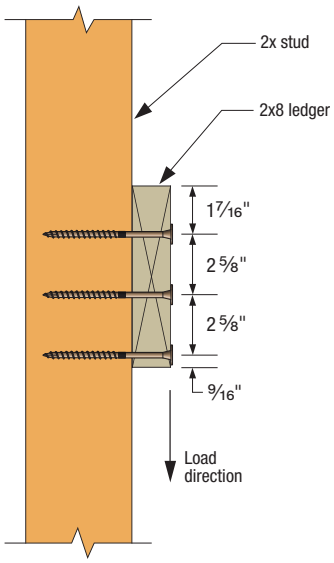
For more information, see p. 53, C-F-2019 Fastening Systems Catalog

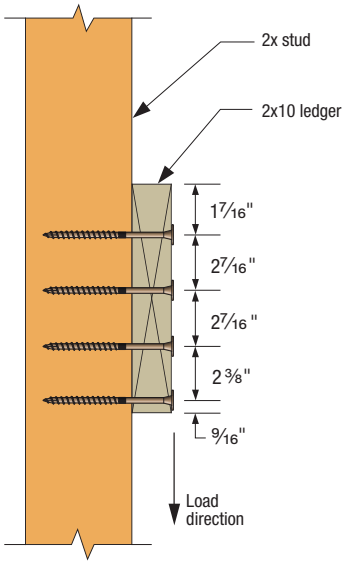
SDWS Timber Screw — Allowable Shear Loads for Ledger to Studs

Size (in.)	Model No.	Ledger Nominal Size (in.)	Number of Screws per Stud	Reference Allowable Shear Load (lb.)		
				SP	DFL	SPF/HF
0.22 x 4	SDWS22400DB	2x6	2	785	630	565
		2x8	3	1,060	890	855
		2x10	4	—	1,040	1,040

1. Allowable loads shall be limited to parallel-to-grain loaded solid sawn main members (minimum 2" nominal). Wood side members shall be loaded perpendicular to grain.
2. Allowable loads are based on DFL, SPF/HF, and SP wood members having a minimum specific gravity of 0.50, 0.42, and 0.55, respectively. Where the side and main members have different specific gravities, the lower values shall be used.
3. Allowable loads are shown at the wood load duration factor of C_D = 1.00. Loads may be increased for load duration as permitted by the building code up to a C_D = 1.60. All adjustment factors shall be applied per the 2012 National Design Specification (NDS). For in-service moisture content greater than 19%, use C_M = 0.70.
4. Fasteners shall be centered in the stud and spaced as shown in the figure. The stud minimum end distance is 6" when loaded toward the end and 2½" when loaded away from the end. The ledger end distance is 6" for full values. For ledger end distances between 2" and 6" use 50% of the table loads. For end distances between 2" and 4", predrill using a 5⁄32" bit for SDWS.
5. Screws may be installed with an intermediate layer of wood structural panel between the side and main member provided the wood structural panel is fastened to the main member per code and the minimum screw penetration of 2½" into the main member (excluding the wood structural panel) is met. Longer lengths of the screw series may be used.
6. For LRFD values, the reference connection design values shall be adjusted in accordance with the NDS-2018, section 11.3.
7. For 2x10 SP ledgers, use the number of screws and allowable loads of the 2x8 SP ledger.
8. For 2x8 ledgers with two screws, use 2x6 values. For 2x10 ledgers with three screws, use 2x8 values. Spacings and edge distances shown in the figure are minimum dimensions.
9. For loads in the opposite direction from that shown in the figure, use the table values multiplied by: 0.50 for two-screw connections, 0.67 for three-screw connections, and 0.75 for four-screw connections.





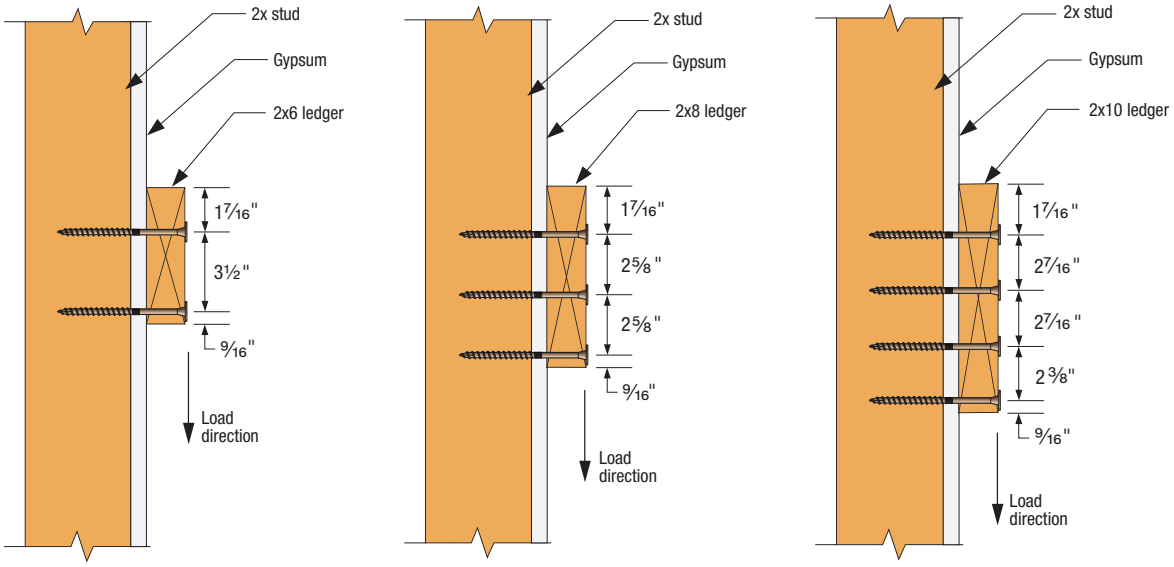


Strong-Drive®
SDWS **TIMBER** Screw with Gypsum Board Interlayer(s) (cont.)

SDWS Timber Screw — Allowable Shear Loads for Ledger Attachment to Studs with One or Two Layers of Gypsum Board

Size (in.)	Model No.	Ledger Size	Number of Screws per Stud	Reference Allowable Shear Load (lb.)		
				SP	DFL	SPF/HF
0.22 x 6	SDWS22600DB	2x6	2	510	410	365
		2x8	3	690	580	555
		2x10	4	—	675	675

1. Allowable loads shall be limited to parallel-to-grain loaded solid sawn main members (minimum 2" nominal). Wood side members shall be loaded perpendicular to grain.
2. Allowable loads are based on DFL, SPF/HF, and SP wood members having a minimum specific gravity of 0.50, 0.42, and 0.55, respectively. Where the side and main members have different specific gravities, the lower values shall be used.
3. Allowable loads are shown at the wood load duration factor of C_D = 1.00. Loads may be increased for load duration as permitted by the building code up to a C_D = 1.60. All adjustment factors shall be applied per the National Design Specification (NDS). For in-service moisture content greater than 19%, use C_M = 0.70.
4. Fasteners shall be centered in the stud and spaced as shown in the figure. The ledger minimum end distance is 6". The stud minimum end distance is 6" when the load is toward the end and 2½" when the load is away from the end.
5. Screws may be installed with an interlayer of wood structural panel (WSP) between the framing and the gypsum panel(s). When a WSP is present, it shall be a maximum of ½" thick, adjacent to the framing and fastened directly to the framing per code. Minimum screw penetration into the framing of 2½" shall be required; longer screw lengths shall be used to achieve the required penetration.
6. For LRFD values, the reference connection design values shall be adjusted in accordance with NDS-18, section 11.3.
7. For 2x10 SP ledgers, use the number of screws and allowable loads of the 2x8 SP ledger.
8. For 2x8 ledgers with two screws, use 2x6 values. For 2x10 ledgers with three screws, use 2x8 values. Spacings and edge distances shown in the figure are minimum dimensions.
9. For loads in the opposite direction from that shown in the figure, use the table values multiplied by: 0.50 for two-screw connections, 0.67 for three-screw connections, and 0.75 for four-screw connections.
10. Gypsum board must be attached as required per the building code.
11. For ledger end distances between 2" and 6", use 50% of load and predrill with 5⁄32" drill bit.



Note: Minimum stud dimension is nominal 2 x 6.

Notes to Installer Regarding the Attachment of Ledgers to Studs:

The screws must be installed into the middle of the stud with a tolerance of 3⁄16" either side of center. Various methods can be used to ensure proper placement of the screws in the stud including snapping a chalk line, using a stud finder or prerocking (attaching only a strip of gypsum at the ledger location until the ledger is fastened to the studs). If proper screw placement into the stud cannot be achieved in the field, blocking should be installed between studs to receive and support the ledger screws.

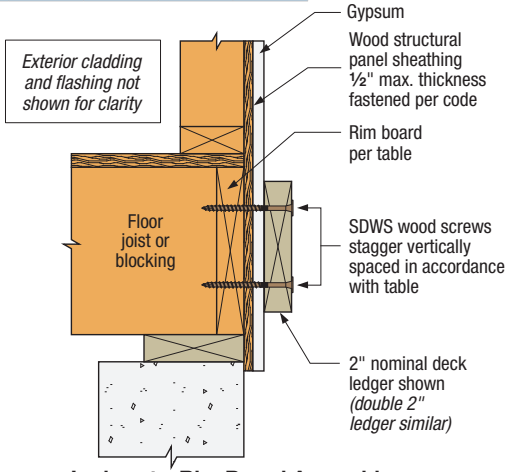
Ledger Structural Fastening Applications

Strong-Drive®
SDWS **TIMBER** Screw with Gypsum Board Interlayer(s) (cont.)

SDWS Timber Screw — 2015 and 2018 IRC Compliant Spacing for a Sawn Lumber Ledger to Rim Board with One or Two Layers of ⅝" Gypsum Board

Loading Condition	Nominal Ledger Thickness (in.)	Model No.	Rim Board Material and Minimum Size	Maximum Deck Joist Span						
				Up to 6 ft.	Up to 8 ft.	Up to 10 ft.	Up to 12 ft.	Up to 14 ft.	Up to 16 ft.	Up to 18 ft.
				Maximum On-Center Spacing of Fasteners (in.)						
40 psf Live 10 psf Dead	2x	For one layer of gypsum board use: SDWS22400DB For two layers of gypsum board use: SDWS22500DB	1" OSB 1" LVL	13	10	8	6	6	5	4
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	15	11	9	8	7	6	5
			2x SP, DFL 2x SPF, HF	20	15	12	10	9	8	7
100 psf Live 10 psf Dead	2x	For one layer of gypsum board use: SDWS22400DB For two layers of gypsum board use: SDWS22500DB	1" OSB 1" LVL	6	4	4	—	—	—	—
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	8	6	5	4	—	—	—
			2x SP, DFL 2x SPF, HF	9	7	5	5	4	—	—
100 psf Live 10 psf Dead	(2) 2x	For one layer of gypsum board use: SDWS22600DB	1" OSB 1" LVL	7	5	4	—	—	—	—
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	7	5	4	—	—	—	—
			2x SP, DFL 2x SPF, HF	7	5	4	—	—	—	—
60 psf Live 10 psf Dead	2x	For one layer of gypsum board use: SDWS22400DB For two layers of gypsum board use: SDWS22500DB	1" OSB 1" LVL	9	7	6	5	4	—	—
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	11	8	7	5	5	4	4
			2x SP, DFL 2x SPF, HF	14	11	9	7	6	5	5
40 psf Live 10 psf Dead	(2) 2x	For one layer of gypsum board use: SDWS22600DB	1" OSB 1" LVL	14	11	9	7	6	5	5
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	15	11	9	8	7	6	5
			2x SP, DFL 2x SPF, HF	15	11	9	8	7	6	5
60 psf Live 10 psf Dead	(2) 2x	For one layer of gypsum board use: SDWS22600DB	1" OSB 1" LVL	10	8	6	5	5	4	—
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	11	8	6	5	5	4	4
			2x SP, DFL 2x SPF, HF	11	8	6	5	5	4	4

1. Sawn rim board shall be spruce-pine-fir, hem-fir, Douglas fir–larch, or southern pine species. Ledger shall be hem-fir, Douglas fir–larch, or southern pine species.
2. Fastener spacings are based on the lesser of single fastener ICC-ES AC233 testing of the Strong-Drive® SDWS screw with a safety factor of 5.0 or ledger assembly testing based on ICC-ES AC13 with a factor of safety of 3.0. Spacing does NOT include NDS wet service factor adjustment.
3. Multiple ledger plies shall be fastened together per code independent of the SDWS screws.
4. SDWS screw spacing values are equivalent to 2018 IRC Table R507.9.1.3(1) and 2012/2015 IRC Table R507.2. The table also provides SDWS screw spacing for a wider range of materials commonly used for rim boards, and an alternate loading condition as required by some jurisdictions.
5. Rows of screws shall be vertically offset and evenly staggered. Screws shall be placed 1½" to 2" from the top and bottom of the ledger or rim board with 3" minimum and 6" maximum between rows and spaced per the table. End screws shall be located 6" from the end and at 1½" to 2" from the bottom of the ledger. For screws located at least 2" but less than 6" from the end, use 50% of the load per screw and 50% of the table spacing between the end screw and the adjacent screw, and for screws located between 2" and 4" from the end, predrill using a ⅝₃₂" drill.
6. The design installation permits a wood structural panel (WSP) interlayer in addition to one or two layers of gypsum board. If present, the WSP shall be a maximum of ½" thick, adjacent to the framing and fastened directly to the framing per the code.
7. Gypsum board must be attached as required per the building code.



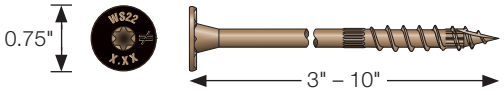
Ledger-to-Rim Board Assembly
(wood-framed lower floor acceptable, concrete wall shown for illustration purposes)

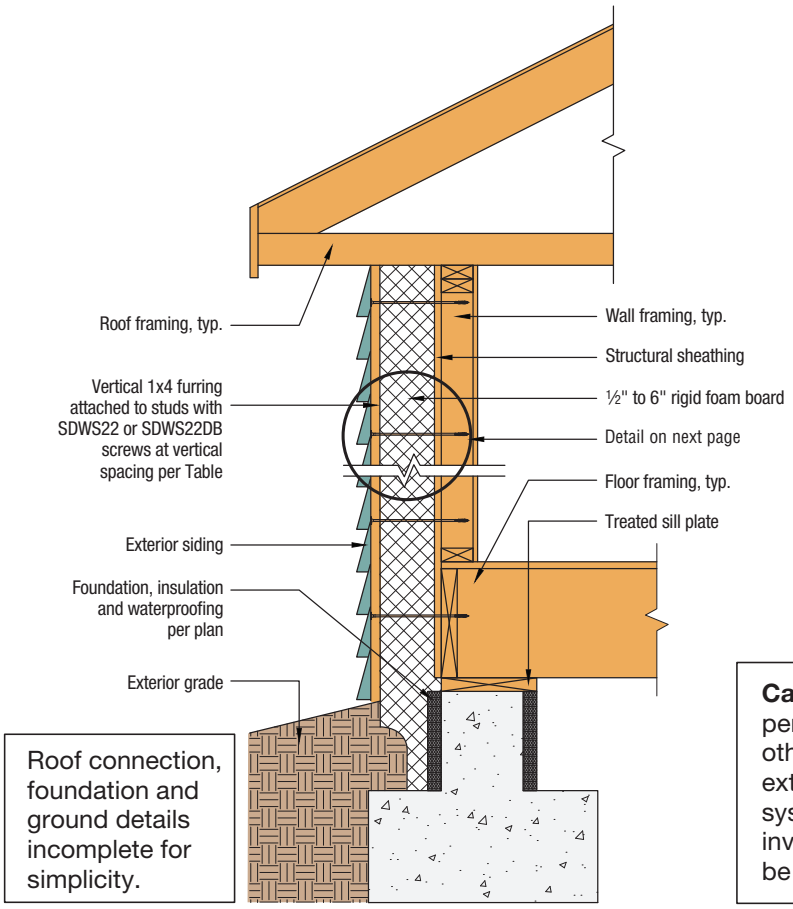
Exterior Foam-to-Wood Fastening

Strong-Drive®
SDWS **TIMBER** Screw
for Attaching Exterior Foam Insulation

Simpson Strong-Tie® Strong-Drive SDWS Timber screws may be used for installing exterior rigid-foam board insulation over wood structural panel (WSP) sheathing. Each fastener installs through furring strips, rigid-foam board and WSP sheathing into the wood wall stud framing. The fasteners do not typically require predrilling. Preservative-treated wood suitable for dry-service (AWPA UC1, UC2, UC3A) and untreated wood may be used depending on the protection needs of the construction. The SDWS products with "DB" in the model number have a double-barrier coating that provides corrosion resistance equivalent to hot-dip galvanization, while the products without "DB" in the model number can only be used in conditions with dry-service and no wood treatment chemicals. The table on p. 53 provides recommended spacing for fastening to vertical furring strips through ½" to 6" of rigid foam insulation board into each wall stud. The SDWS22DB and SDWS22 screws were evaluated as alternate threaded fasteners using ICC-ES AC233 and are the subject of IAPMO-UES ER-192. The Strong-Drive SDWS22DB Structural Wood screws were evaluated for corrosion resistance using ICC-ES AC257.

For more information, see p. 53, C-F-2019 Fastening Systems Catalog





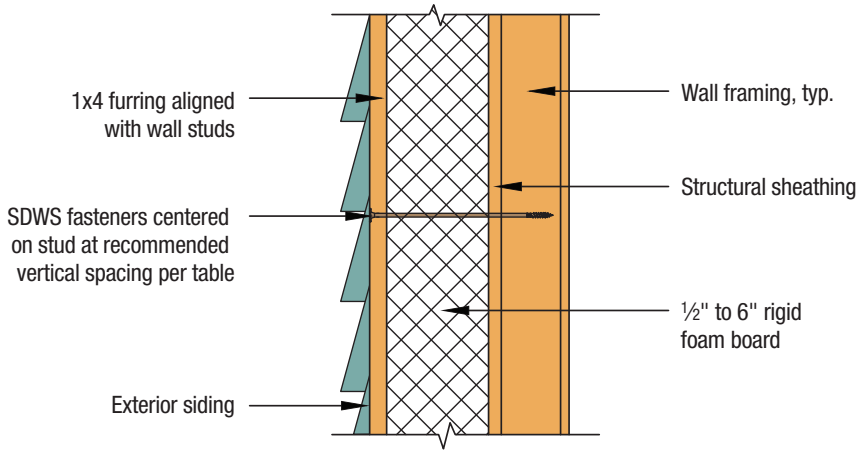
Roof connection, foundation and ground details incomplete for simplicity.

Caution: Fasteners can penetrate wiring, plumbing and other mechanical systems in exterior walls. All mechanical systems in the exterior wall involved with the fastening shall be mapped before driving screws.

Wall Cross-Section

Exterior Foam-to-Wood Fastening

Strong-Drive® SDWS **TIMBER** Screw for Attaching Exterior Foam Insulation (cont.)



Furring and Rigid Foam Attachment Detail

Recommended Vertical Fastener Spacing

Size (in.)	Model No.	Foam Thickness (in.)	Stud Spacing (in.)	Maximum Allowable Cladding Weight to be Supported (psf)		
				≤ 20	25	30
0.220 x 4	SDWS22400DB	½	16	24" o.c.	24" o.c.	24" o.c.
			24			
0.220 x 5	SDWS22500DB	1 to 1½	16			
			24			
0.220 x 6	SDWS22600DB	2	16			
			24			
0.220 x 8	SDWS22800DB SDWS22800	4	16			
			24			
0.220 x 10	SDWS221000DB SDWS221000	6	16			
			24		18" o.c.	18" o.c.

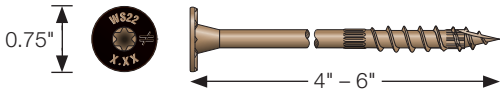
1. Caution: Fasteners can penetrate wiring, plumbing and other mechanical systems in exterior walls. All mechanical systems in the exterior wall involved with the fastening shall be mapped before driving screws.
2. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.
3. Wood wall framing (studs) shall be a minimum of 2" nominal thickness. Wood framing and furring shall be a minimum spruce-pine-fir species with specific gravity of 0.42 or greater. Table assumes furring strip thickness of ¾" and full thread embedment in the framing member.
4. Wood framing, furring and WSP sheathing shall meet the design requirements in accordance with the applicable building codes. WSP sheathing shall be fastened to the framing as required by the applicable building code.
5. Each fastener is capable of resisting 172 lb. of out-of-plane wind loading (C_D = 1.60) with no further increase allowed.
6. Spacing recommendations are based on a loading that produced 0.015" of assembly movement with 6"-thick rigid foam board insulation.
7. Maximum allowable cladding weight shall be the additive weight of furring, cladding including foam insulation, environmental effects (i.e. ice) and other supported materials.
8. Metal fasteners conduct heat, and it is recommended that exposed screw heads are covered with foam and sealed.
9. Screws shall be installed such that they close gaps between connected components. Furring and sheathing shall provide the required thickness and performance for siding manufacturer installation instructions.

Sole/Top Plate-to-Rim Fastening

Strong-Drive® SDWS TIMBER Screw

Sole-to-Rim Connections

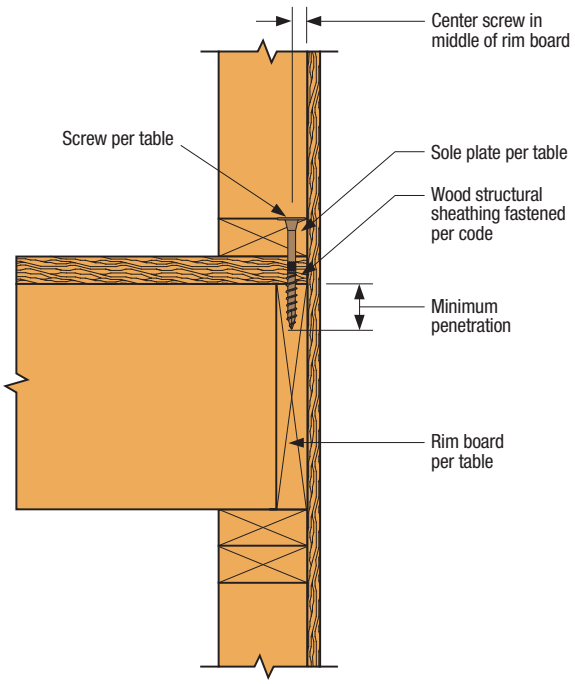
For more information, see p. 53, C-F-2019 Fastening Systems Catalog



SDWS Timber Screw — Allowable Shear Loads for Sole-to-Rim Connections

Size (in.)	Model No.	Sole Plate Nominal Thickness (in.)	Minimum Penetration into Rim Board (in.)	Reference Allowable Loads (lb.) per Screw							
				2x DFL/SP Rim Board		2x SPF/HF Rim Board		1¼" Min. LVL Rim Board		1¼" Min. LSL Rim Board	
				DFL/SP Sole Plate	SPF/HF Sole Plate	DFL/SP Sole Plate	SPF/HF Sole Plate	DFL/SP Sole Plate	SPF/HF Sole Plate	DFL/SP Sole Plate	SPF/HF Sole Plate
0.22 x 4	SDWS22400DB	2x	1.75	345	295	295	295	275	275	275	275
0.22 x 5	SDWS22500DB	2x	2	345	295	295	295	275	275	275	275
0.22 x 6	SDWS22600DB	2x, 3x, (2)-2x	2	345	295	295	295	275	275	275	275

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 SDWS is 6" o.c., minimum end distance is 6", and minimum edge distance is ⅝".
4. Wood structural panel up to 1⅛" thick (²³⁄₃₂" for SDWS22400DB) 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/top plate is permitted provided it is independently fastened per the code and the minimum screw penetration per the table is met.
6. Minimum rim board height shall be 9¼" when using SDWS screws for sole and top plate fastening.
7. Sole-to-rim loads can be achieved without a wall below.



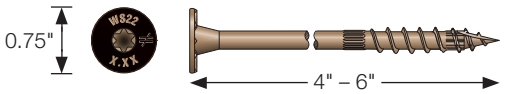
Sole-to-Rim Board Assembly
(Other fasteners not shown for clarity)

Sole/Top Plate-to-Rim Fastening

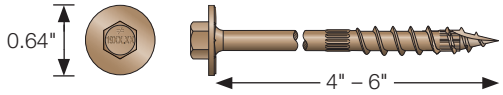
Strong-Drive®
SDWS **TIMBER** Screw and SDWH **TIMBER-HEX** Screw

Sole Plate/Top Plate to Rim/Blocking Shear Load Transfer with Reduced Fastener Spacing

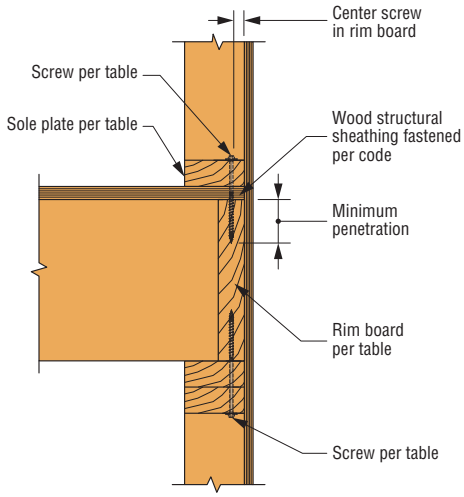
Strong-Drive SDWS Timber and Strong-Drive SDWH Timber-Hex structural screws may be used to attach a sole plate or top plate to a rim board and blocking material according to the following details and loading information. Allowable loads are based on testing per ICC-ES AC233 and are limited to parallel-to-grain or in-plane-shear loading. Each test assembly consisted of multiple fasteners, a sole plate, sheathing and a rim board or blocking material. Please see the following for allowable load tables.



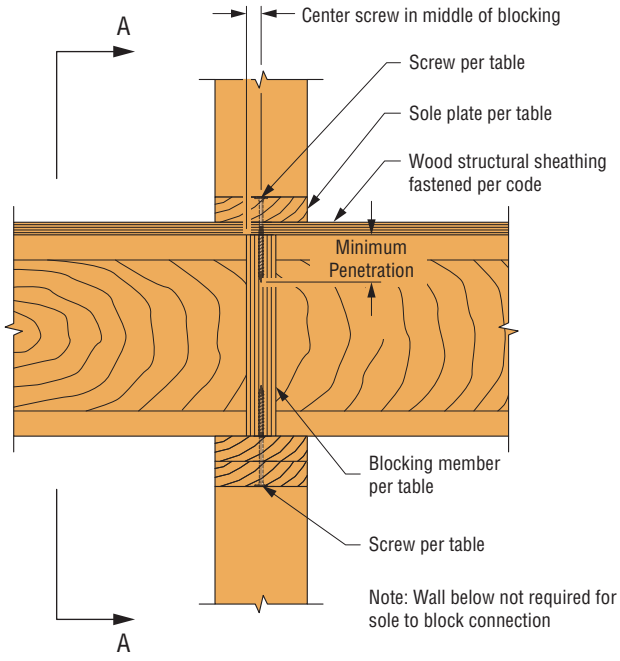
Strong-Drive SDWS TIMBER Screw



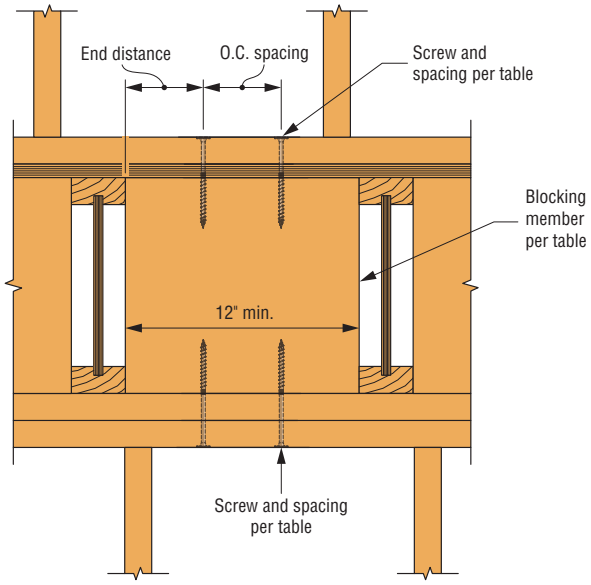
Strong-Drive SDWH TIMBER-HEX Screw



Sole-to-Rim and Top Plate-to-Rim Connection



Sole-to-Block and Top Plate-to-Block Connection



Sole-to-Block and Top Plate-to-Block Connection

Sole/Top Plate-to-Rim Fastening

Strong-Drive®
SDWS **TIMBER** Screw and SDWH **TIMBER-HEX** Screw (cont.)

SDWS Timber/SDWH Timber-Hex Single-Fastener, Allowable Loads for Sole-to-Rim (or Blocking) and Top Plate-to-Rim (or Blocking) Connection

Min. Screw Length (in)	Sole Plate or Top Plate Nominal Thickness		Model No.	Min. Penetration into Rim or Block (in.)	Reference Allowable Shear Loads (lb.) per Screw DFL/SP Sole Plate and Top Plate					
					Rim and Blocking Material					
					2x Min. DFL/SP		1¼" Min. LVL	1¾" Min. LVL	1¼" Min. LSL	1¾" Min. LSL
					6" O.C. 6" End Distance	3" O.C. 3" End Distance	6" O.C. 6" End Distance	4" O.C. 4" End Distance	6" O.C. 6" End Distance	4" O.C. 4" End Distance
4	Sole Plate	2x	SDWH19400DB	1.75	315	220	255	260	275	230
4		2x	SDWS22400DB	1.75	345	240	275	305	275	350
5		2x	SDWS22500DB	2	345	240	275	360	275	345
6		3x	SDWH19600DB	2	315	225	255	260	275	230
6		3x	SDWS22600DB	2	345	240	275	360	275	345
6		(2) 2x	SDWH19600DB	1.75	315	220	255	260	275	230
6		(2) 2x	SDWS22600DB	1.75	345	240	275	305	275	350
8		(2) 2x	SDWH19800DB	2	315	225	255	260	275	230
8		(2) 2x	SDWS22800DB	2	345	240	275	360	275	345
5	Top Plate	(2) 2x	SDWS22500DB	2	345	240	275	360	275	345
6		(2) 2x	SDWH19600DB	2	315	225	255	260	275	230
6		(2) 2x	SDWS22600DB	2	345	240	275	360	275	345

1. 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.
2. For 2x solid sawn members and 1¼" LVL or LSL members the minimum edge distance is ⅝". For 1¾" LVL or LSL members the minimum edge distance is ⅞".
3. Wood structural panel up to 1⅛" thick (²³⁄₃₂ for 4" fasteners) is permitted between 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/block is met.
4. Double sole plate and top plate fastened minimum per code.
5. Minimum rim height is 9¼" when using fasteners on the top and bottom. Sole to blocking loads can be achieved with or without a wall below.
6. For assemblies using SPF/HF lumber for the sole plate, top plate, or rim/blocking members, multiply table values by 0.86.

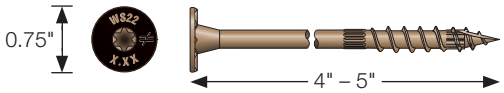
Spacing for Multiple Rows of Fasteners

Material	O.C. Spacing/ End Distance Spacing (in.)	Row Offset (in.)	Row Stagger (in.)
Solid Sawn	3	1¼	1¼
	6		
LVL or LSL	4	1¾	1¾
	6	1¼	1¼

1. The material must be wide enough to accommodate minimum edge distance, row offset and row stagger.

Deck Construction — Ledgers

Strong-Drive® SDWS TIMBER Screw

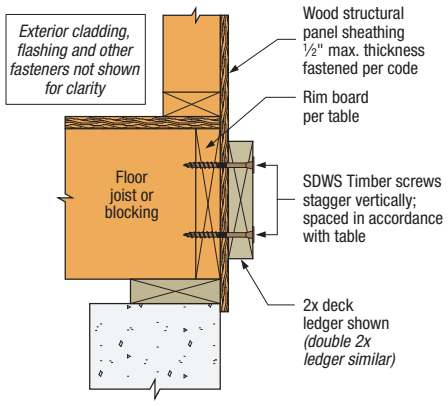


For more information, see p. 53, C-F-2019 Fastening Systems Catalog

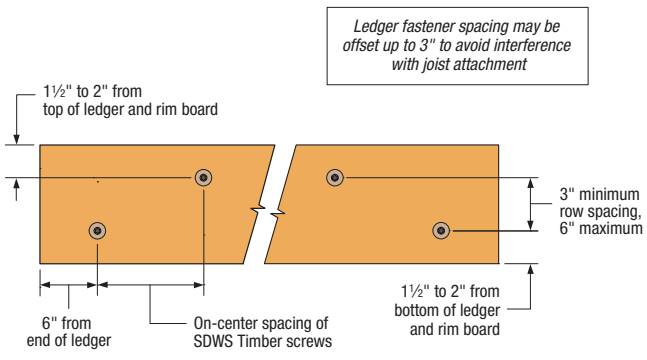
SDWS Timber Screw — 2015 and 2018 IRC Compliant Spacing for a Sawn Lumber Deck Ledger-to-Rim Board

Loading Condition	Nominal Ledger Size (in.)	Size (in.)	Model No.	Rim Board Material and Minimum Size	Maximum Deck Joist Span						
					Up to 6 ft.	Up to 8 ft.	Up to 10 ft.	Up to 12 ft.	Up to 14 ft.	Up to 16 ft.	Up to 18 ft.
					Maximum On-Center Spacing of Fasteners (in.)						
40 psf Live 10 psf Dead	2x	0.22 x 4	SDWS22400DB	1" OSB	14	10	8	7	6	5	5
				1" LVL							
				1⅛" OSB	16	12	10	8	7	6	5
				1⁵⁄₁₆" LVL							
				1¼" LSL							
				2x SP, DFL — 2x SPF, HF	22	16	13	11	9	8	7
60 psf Live 10 psf Dead	2x	0.22 x 4	SDWS22400DB	1" OSB	10	7	6	5	4	4	—
				1" LVL							
				1⅛" OSB	12	9	7	6	5	4	4
				1⁵⁄₁₆" LVL							
				1¼" LSL							
				2x SP, DFL — 2x SPF, HF	15	12	9	8	7	6	5
40 psf Live 10 psf Dead	(2) 2x	0.22 x 5	SDWS22500DB	1" OSB	15	12	9	8	7	6	5
				1" LVL							
				1⅛" OSB	16	12	10	8	7	6	5
				1⁵⁄₁₆" LVL							
				1¼" LSL							
				2x SP, DFL — 2x SPF, HF	16	12	10	8	7	6	5
60 psf Live 10 psf Dead	(2) 2x	0.22 x 5	SDWS22500DB	1" OSB	11	8	7	6	5	4	4
				1" LVL							
				1⅛" OSB	12	9	7	6	5	4	4
				1⁵⁄₁₆" LVL							
				1¼" LSL							
				2x SP, DFL — 2x SPF, HF	12	9	7	6	5	4	4

1. SDWS screw spacing values are equivalent to 2018 IRC Table R507.9.1.3(1) and 2015 IRC Table R507.2. The table above also provides SDWS screw spacing for a wide range of materials commonly used for rim board, and an alternate loading condition as required by some jurisdictions.
2. Sawn lumber rim board shall be spruce-pine-fir, hem-fir, Douglas fir–larch, or southern pine species. Ledger shall be hem-fir, Douglas fir–larch, or southern pine species.
3. Fastener spacings are based on the lesser of single fastener ICC-ES AC233 testing of the Strong-Drive SDWS Timber screw with a safety factor of 5.0 or ICC-ES AC13 assembly testing with a factor of safety of 5.0. Spacing includes NDS wet service factor adjustment.
4. Multiple ledger plies shall be fastened together per code independent of the SDWS screws.
5. Rows of screws shall be vertically offset and evenly staggered. Screws shall be placed 1½" to 2" from the top and bottom of the ledger or rim board with 3" minimum and 6" maximum between rows and spaced per the table. End screws shall be located 6" from the end and at 1½" to 2" from the bottom of the ledger. For screws located at least 2" but less than 6" from the end, use 50% of the load per screw and 50% of the table spacing between the end screw and the adjacent screw, and for screws located between 2" and 4" from the end, predrill using a ⁵⁄₃₂" drill.
6. Structural sheathing between the ledger and rim board shall be a maximum of ½" thick and fastened per code.
7. See pp. 109–110 for ledger-to-rim attachment with ½" gap.



Ledger-to-Rim Board Assembly
(wood-framed lower floor acceptable,concrete wall shown for illustration purposes; other fasteners not shown for clarity.)



SDWS Timber Screw Spacing Detail for Ledgers

Deck Construction — Ledgers

Strong-Drive® SDWH TIMBER-HEX and SDWS TIMBER Screw

2015 and 2018 IRC Compliant Spacing and Allowable Shear Loads for Fastening a Sawn Lumber Deck Ledger-to-Rim Board with ½" Gap

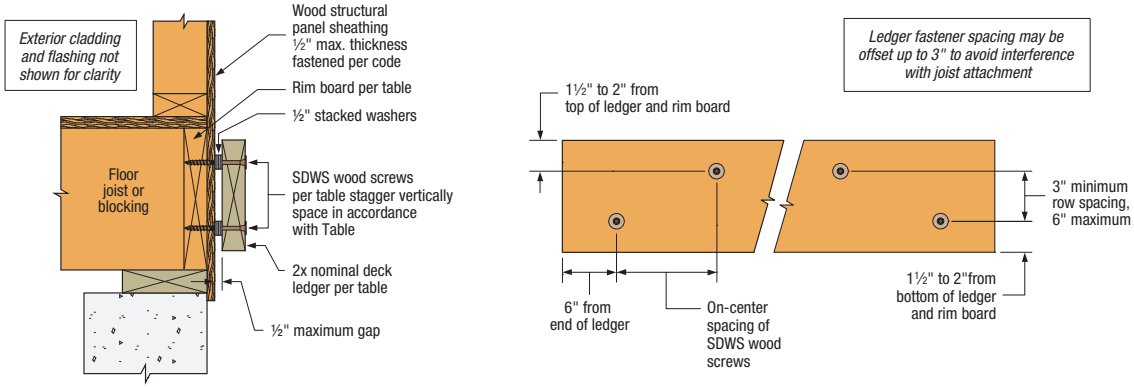


Table below lists the allowable shear loads for SDWS Timber screws and SDWH Timber-Hex screws when attaching a 2x ledger with up to ½" thickness of stacked washers to the listed rim board.

Single-Fastener Allowable Shear Loads for Fastening a Sawn Lumber Deck Ledger-to-Rim Board with ½" Gap

Nominal Ledger Size (in.)	Rim Board	Size (in.)	Model No.	Reference Allowable Load (lb.)
2x	2x SPF, DFL, SP #2	0.220 x 4	SDWS22400DB	270
		0.195 x 4	SDWH19400DB	260
	1⅛" LSL	0.220 x 4	SDWS22400DB	255
		0.195 x 4	SDWH19400DB	245
	1¾" LVL	0.220 x 4	SDWS22400DB	290
		0.195 x 4	SDWH19400DB	255

1. Sawn lumber 2x ledger shall have a minimum specific gravity of 0.42 (HF or SPF) and be grade No. 2 or better.
2. Rim board is to be dry lumber (specific gravity at least 0.42) or EWP rim board product (equivalent specific gravity of at least 0.42 for nails and screws installed in the face orientation).
3. Fastener spacings are based on the lesser of single fastener testing following ICC-ES AC233 or ledger assembly testing following ICC-ES AC13 using a safety factor of 5.0.
4. Screws shall be placed 1½" to 2" from the top and bottom of the ledger board or rim board, 6" from the end of the ledger with 3" minimum and 6" maximum between rows. Minimum on-center spacing is 4".
5. Wood structural panel sheathing between the ledger and rim board shall be a maximum of ½" thick and fastened per code.
6. Screws shall be tightened such that the washer stack is tightly compressed between the ledger and the rim board.
7. Maximum ½" gap created by stacked hot-dip galvanized or stainless-steel 5/16" Type A plain washers (N-narrow) with an outside diameter equal to 0.688" and inside diameter equal to 0.344".
8. Allowable loads are shown at the wood load duration factor of C_D = 1.0. Loads may be increased for load duration per the building code up to a C_D = 1.6. Tabulated values must be multiplied by all applicable adjustment factors per the NDS, including wet service factor.

Strong-Drive® SDWH TIMBER-HEX and SDWS TIMBER Screw (cont.)

2015 and 2018 IRC Compliant Spacing and Allowable Shear Loads for Fastening a Sawn Lumber Deck Ledger-to-Rim Board with ½" Gap

Strong-Drive® SDWS Timber screws and SDWH Timber-Hex screws are suitable for installing ledgers with up to ½" drainage gap between the ledger and the rim board. These fasteners do not require predrilling and have a double-barrier coating providing corrosion resistance equivalent to hot-dip galvanization. The gap is formed by stacking hot-dip galvanized or stainless-steel 5⁄16" Type A plain washers (0.688" outside diameter, 0.344" inside diameter) on the shank of the screws between the ledger and the rim board. Weather proofing shall be the responsibility of the installer. The table below lists the maximum on-center spacing of SDWS Timber screws and SDWH Timber-Hex screws when attaching a 2x ledger to the listed rim board of various widths with a maximum ½" gap between them.

Loading Condition: 40 PSF Live Load and 10 PSF Dead Load

Ledger Nominal Size (in.)	Rim Board Material (in.)	Size (in.)	Model No.	Maximum Deck Joist Span						
				Up to 6 ft.	Up to 8 ft.	Up to 10 ft.	Up to 12 ft.	Up to 14 ft.	Up to 16 ft.	Up to 18 ft.
				Maximum On-Center Spacing of Fasteners (in.)						
2x	2x DFL, SP, SPF #2	0.220 x 4	SDWS22400DB	15	11	9	7	6	5	5
		0.195 x 4	SDWH19400DB	14	11	8	7	6	5	4
	1.125" LSL	0.220 x 4	SDWS22400DB	14	10	8	7	6	5	4
		0.195 x 4	SDWH19400DB	13	10	8	6	5	5	4
	1.75" LVL	0.220 x 4	SDWS22400DB	16	12	9	8	7	6	5
		0.195 x 4	SDWH19400DB	14	10	8	7	6	5	4

1. Sawn lumber ledger shall have minimum specific gravity of 0.42 (HF or SPF) and shall be grade No. 2 or better. Rim board is to be dry lumber (specific gravity at least 0.42) or EWP rim board product (equivalent specific gravity of at least 0.42 for nails and screws installed in the face orientation).
2. Fastener spacings are based on the lesser of single fastener testing following ICC-ES AC233 or ledger assembly testing following ICC-ES AC13 using a safety factor of 5.0. Spacing includes NDS wet service factor adjustment.
3. Screws shall be placed 1½" to 2" from the top and bottom of the ledger board or rim board, 6" from the end of the ledger with 3" minimum and 6" maximum between rows. End screws shall be located near the bottom of the ledger. See figure on the following page.
4. Wood structural panel sheathing between the ledger and rim board shall be a maximum of ½" thick and fastened per code.
5. Screws shall be tightened such that the washer stacks are tightly compressed between the ledger and the rim board.
6. Maximum ½" gap formed by stacked hot-dip galvanized or stainless-steel 5⁄16" Type A plain washers (N-narrow) with a nominal outside diameter of 0.688" and inside diameter of 0.344".
7. The fastener specifications in this table meet the prescriptive deck ledger attachment solutions and loading requirements per 2018 IRC Table R507.9.1.3(1) and Table R507.2 of the 2012 and 2015 IRC.

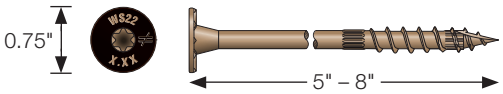
Deck Construction — Guard Posts

Strong-Drive® SDWS **TIMBER** Screw for Guard Post Installations

For more information, see p. 52, C-F-2019 Fastening Systems Catalog

Framed guard post installations fastened with SDWS Timber screws were tested in accordance with ICC-ES AC273 and met the 600 lb. concentrated ultimate load applied at the top of a single post in an outward direction and the post deflection limit at the 200 lb. design level. For a required uniform load of 150 plf in AC273 for guard and handrail systems, the screw was not tested as excepted for one- and two-family dwellings in IBC 2015 Section 1607.8.1. The following details were tested:

- Detail A: Interior Post on Rim Board
- Detail B: Interior Post at Corner
- Detail C: Interior Post on Rim Joist with Adjacent Joist
- Detail D: Interior Post on Rim Joist between Joists



The SDWS Timber screws are the subject of IAPMO-UES ER-192. The following table lists the SDWS Timber screw information and total quantity of fasteners required for each guard post detail. The guard post details are shown on pp. 116–118.

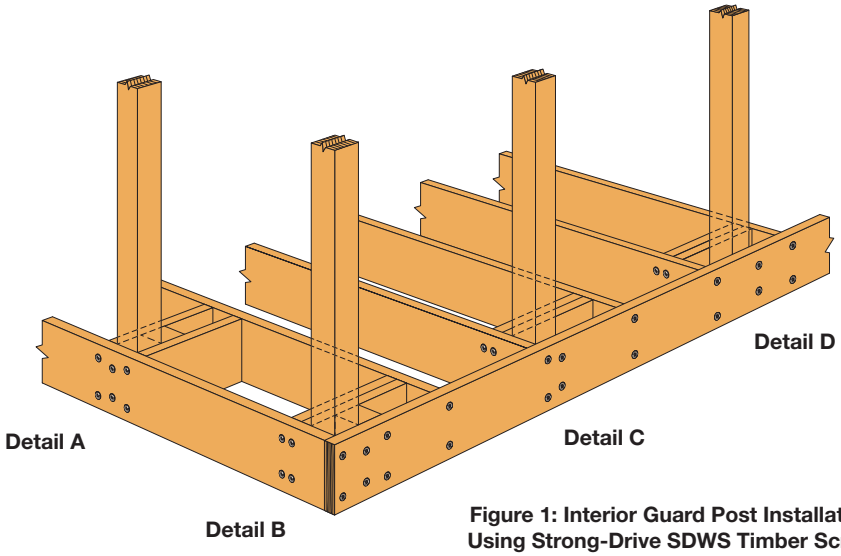


Figure 1: Interior Guard Post Installations Using Strong-Drive SDWS Timber Screws

Code-Compliant Guard Post Connection Details

Installation Scope:

For 36” Guard Post Height
(above deck surface, refer to T-F-GRDPSTRL)

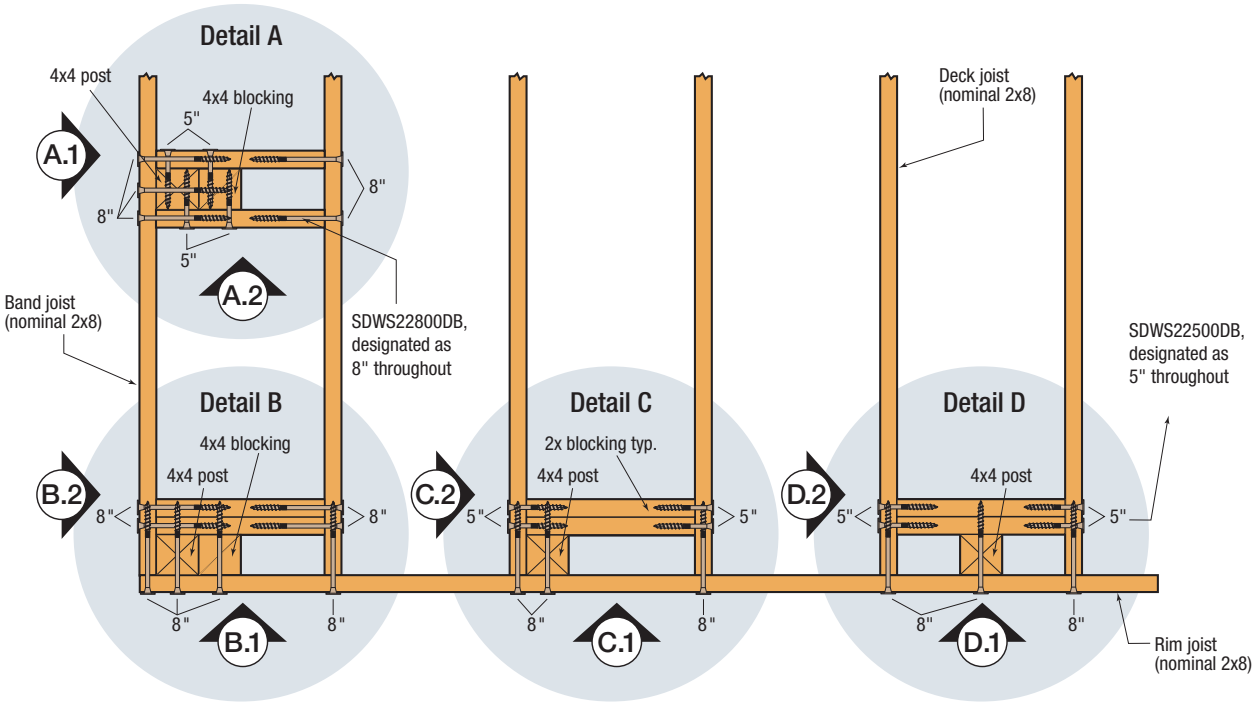
- Use Nominal 4” x 4” guard post
- Use Nominal 2” x 8” rim board/rim joist, 2x blocking and 4x blocking
- Framing lumber should be HF, DFL or SP, pressure treated with chemical retention not greater than UC4A
- Full-depth blocking required
- Interior post installation (post positioned inside the rim board, rim joist)
- Fastener position tolerance: ± 1⁄16”

For 42” Guard Post Height
(above deck surface, refer to L-F-SDWS42GRD)

- Use Nominal 4” x 4” guard post
- Use Nominal 2” x 8” rim board/rim joist, 2x blocking and 4x blocking
- Framing lumber should be DFL (No. 2 grade, minimum) or SP (Construction grade, minimum), pressure treated with chemical retention not greater than UC4A
- Full-depth blocking required
- Interior post installation (post positioned inside the rim board, rim joist)
- Fastener position tolerance: ± 1⁄16”

Deck Construction — Guard Posts

Strong-Drive® SDWS TIMBER Screw for Guard Post Installations (cont.)



Plan View Showing Details of Four Guard Post Connections Using Strong-Drive SDWS Timber Screws

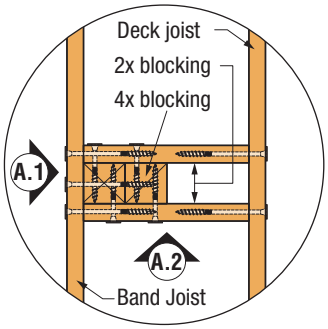
SDWS22DB Screw Information for Guard Post Details

Detail	Size (in.)	Model No.	Quantity Required
A	0.220 x 5	SDWS22500DB	4
	0.220 x 8	SDWS22800DB	10
B	0.220 x 8	SDWS22800DB	16
C	0.220 x 5	SDWS22500DB	8
	0.220 x 8	SDWS22800DB	6
D	0.220 x 5	SDWS22500DB	8
	0.220 x 8	SDWS22800DB	6

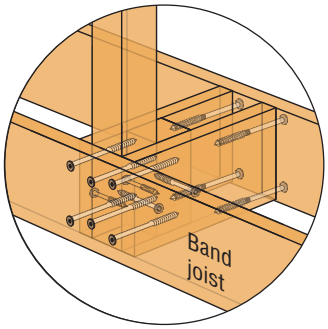
1. SDWS Timber screws install best with a low-speed ½" drill and a T-40 6-lobe bit. The matched bit included with the screws is recommended for best results.
2. Predrilling is typically not required. Where predrilling is necessary, use a 5⁄32" drill bit for Strong-Drive SDWS Timber screws.
3. Screw heads that are countersunk flush to the wood surface are acceptable if the screw has not spun out.
4. Deck joists shall be fastened to rim joist and ledger as required by the code. See p. 118 for rim joist connection.

Strong-Drive® SDWS TIMBER Screw for Guard Post Installations (cont.)

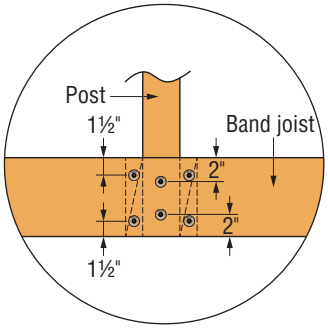
Detail A — Interior Post on Rim Board



Detail A Plan View

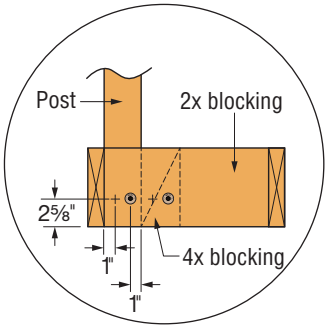


Detail A Isometric View



Detail A.1 Front Elevation

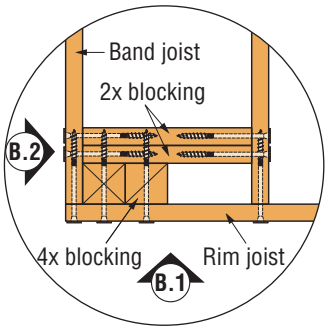
1. Rim board to 2x blocking 1½" from top and bottom edges using 8" SDWS22800DB.
2. Rim board to post and 4x blocking 2" from top and bottom edges using 8" SDWS22800DB.



Detail A.2 Side Elevation

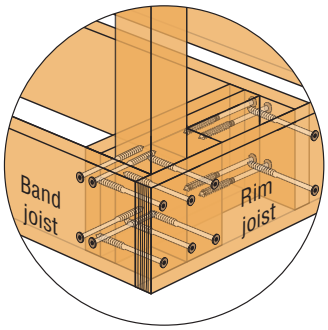
1. 2x blocking to post — opposing screws 1" from outer edges of post, 2⅝" from bottom edge of 2x blocking using 5" SDWS22500DB.
2. 2x blocking to 4x blocking — opposing screws 1" from outer edges of 4x blocking, 2⅝" from bottom edge of 2x blocking using 5" SDWS22500DB.

Detail B — Interior Post on Corner

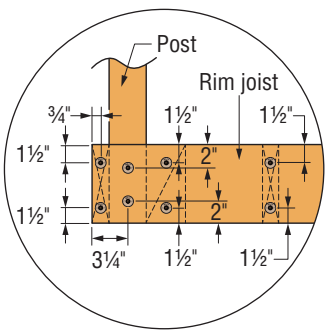


Detail B Plan View

Note: For fastening rim joist to rim board and deck joists, predrilling for the SDWS22800DB screws is recommended using a ⅝₃₂" drill bit.

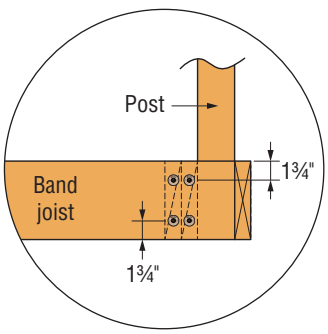


Detail B Isometric View



Detail B.1 Front Elevation

1. Rim joist to rim board or deck joists 1½" from top and bottom edges, ¾" from side edge using 8" SDWS22800DB.
2. Rim joist to post and 2x blocking 2" from top and bottom edges, centered on post using 8" SDWS22800DB.
3. Rim joist to 4x blocking and 2x blocking 1½" from top and bottom edges centered on 4x blocking using 8" SDWS22800DB.

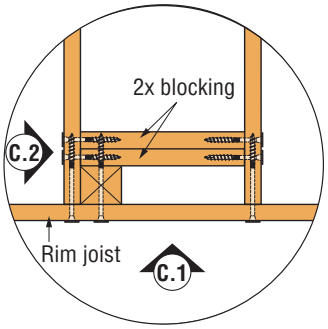


Detail B.2 Side Elevation

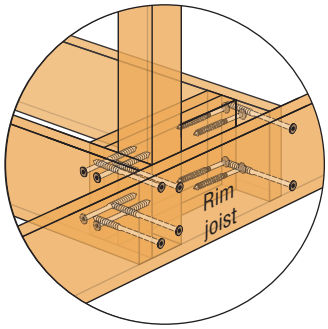
1. Rim board to 2x blocking 1¾" from top and bottom edges using 8" SDWS22800DB.

Strong-Drive® SDWS TIMBER Screw for Guard Post Installations (cont.)

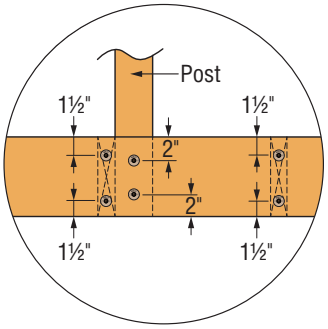
Detail C — Interior Post on Rim Joist with Adjacent Joist



Detail C Plan View

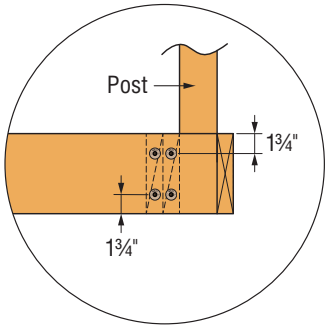


Detail C Isometric View



Detail C.1 Front Elevation

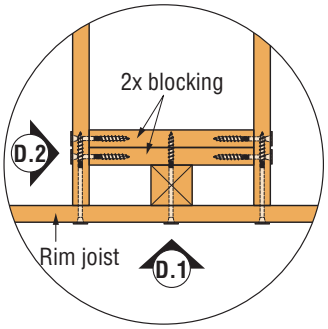
1. Rim joist to deck joist 1½" from top and bottom edges using 8" SDWS22800DB.
2. Rim joist to post and 2x blocking 2" from top and bottom edges using 8" SDWS22800DB.



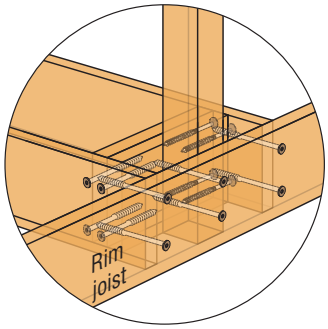
Detail C.2 Side Elevation

1. Deck joist to 2x blocking 1¾" from top and bottom edges using 5" SDWS22500DB.

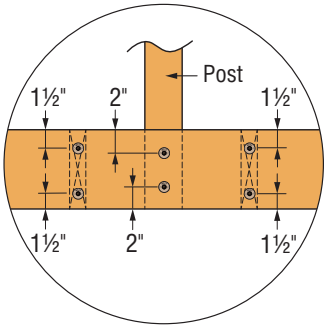
Detail D — Interior Post on Rim Joist Between Joists



Detail D Plan View

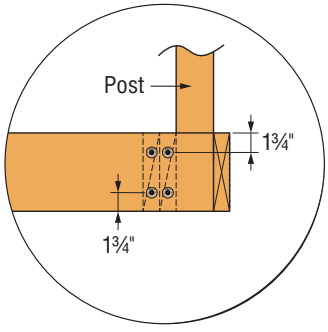


Detail D Isometric View



Detail D.1 Front Elevation

1. Rim joist to deck joists 1½" from top and bottom edges using 8" SDWS22800DB.
2. Rim joist to post and 2x blocking 2" from top and bottom edges using 8" SDWS22800DB.



Detail D.2 Side Elevation

1. Deck joist to 2x blocking 1¾" from top and bottom edges using 5" SDWS22500DB.