ICC EVALUATION SERVICE

Most Widely Accepted and Trusted

ICC-ES Evaluation Report

ESR-3179

Reissued October 2016

This report is subject to renewal October 2018.

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic and Composite Fastenings

REPORT HOLDER:

SCHRAUBENWERK GAISBACH GmbH (SWG)
AM BAHNHOF 50
D-74638 WALDENBURG
GERMANY
+49 7942 1000
info@swg-produktion.de
www.swg-produktion.de

Technical Support:
MYTICON TIMBER CONNECTORS INC.
(866) 899-4090
info@my-ti-con.com
www.my-ti-con.com

EVALUATION SUBJECT:

SWG ASSY 3.0 WOOD SCREWS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2012, 2009 and 2006 *International Building Code*® (IBC)
- * 2012, 2009 ~~and 2006~~ *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

SWG Assy 3.0 screws are alternate dowel-type threaded fasteners used in engineered wood-to-wood connections. The fasteners may be used under the IRC when an engineered design is submitted in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 General:

SWG Assy 3.0 screws have a gimlet point, and one of three head styles [hex (designated "Kombi"), washer (designated "SK"), or countersunk with milling pockets], as shown in Figures 1 through 3. The heads have a recess for use with an AW drive, which is a proprietary driving bit available from the report holder. The screws are available with nominal diameters of 6, 8, 10 and 12 mm ($^1/_4$, $^5/_{16}$, $^3/_8$ and $^1/_2$ inch). The screws are partially threaded, with a shank cutter design between the threads and the smooth shank, and are available in varying lengths as shown in Table 1. The specified diameters and other dimensions are provided in Table 1 for each screw. The screws are available in boxes of loose fasteners.

3.2 Materials:

3.2.1 SWG Assy 3.0 Screws: The screws are manufactured from carbon steel wire complying with the manufacturer's specifications. After the heads are formed and the threads are rolled, the screws are hardened, in accordance with the manufacturer's specifications. The hardened screws are then galvanized with a minimum zinc coating thickness of 5 µm and coated with a lubricant.

3.2.2 Wood Members: Wood side and main members must have a moisture content less than or equal to 19 percent at the time of screw installation and while in service. Sawn lumber must have an assigned specific gravity, as specified in Table 11.3.3.A of the 2012 ANSI/AWC *National Design Specification for Wood Construction*® (NDS) (Table 11.3.2A of the 2005 NDS) within the ranges given in Tables 2 and 3. Parallel strand lumber (PSL) must have a minimum equivalent specific gravity, given in the applicable ICC-ES evaluation report, of 0.50. The thickness of the wood main member, t_m, must be equal to or greater than the screw length less the thickness of the side member, t_s. The minimum thickness of both main and side members must also be as follows: 24 mm ($^{15}/_{16}$ inch) for 6 mm diameter screws; 30 mm ($1^3/_{16}$ inches) for 8 mm diameter screws; 40 mm ($1^9/_{16}$ inches) for 10 mm diameter screws; 80 mm ($3^3/_{16}$ inches) for 12 mm diameter screws.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The allowable lateral load for a single-screw connection is the lesser of: (a) the reference lateral design value described in Section 4.1.1, adjusted by all applicable adjustment factors, and (b) the allowable screw shear strength given in Table 1. The allowable load for a single-screw connection in which the screw is subject to tension is the least of: (a) the reference withdrawal design value described in Section 4.1.2, adjusted by all applicable adjustment factors; (b) the reference head pull-through design value described in Section 4.1.2, adjusted by all applicable adjustment factors; and (c) the allowable screw tension strength given in Table 1. Applicable adjustment factors for reference design values must be as specified for dowel-type fasteners and wood screws in Sections 10.3 and 11.5 of the NDS, respectively.

*Deleted by the City of Los Angeles

Connections containing multiple SWG Assy 3.0 screws must be designed in accordance with Sections 10.2.2 and 11.6 of the NDS. Where SWG Assy 3.0 screws are subjected to combined lateral and withdrawal loads, connections must be designed in accordance with Section 11.4.1 of the NDS. When designing a connection, the structural members must be checked for load-carrying capacity in accordance with Section 10.1.2 of the NDS, and local stresses within the connection must be checked against Appendix E of the NDS to ensure the capacity of the connection and fastener group.

4.1.1 Reference Lateral Design Values (*Z*): Reference lateral design values (*Z*) for single shear connections with the SWG Assy 3.0 screws loaded parallel or perpendicular to grain may be determined in accordance with Section 11.3.1 of the NDS using the following parameters and limitations:

1. The applicable specified bending yield strength from Table 1 must be used for design.
2. The side member thickness must be a minimum of $1^3/_4$ inches (45 mm).
3. The minimum fastener penetration into the main member, excluding tip length, must be 6D.
4. Reference lateral design values must be multiplied by all applicable adjustment factors, as applicable to dowel-type fasteners, in accordance with the NDS.
5. Use is limited to dry in-service conditions, such that the wet service factor, C_M, is 1.0 in accordance with the NDS.
6. For sawn lumber, the specific gravity used for design purposes must be the assigned specific gravity per NDS Table 11.3.3A (Table 11.3.2A of the 2005 NDS).
7. For PSL, the specific gravity used for design purposes must be the equivalent specific gravity for the PSL given in the applicable ICC-ES evaluation report.

Reference lateral design values (*Z*) for select connection configurations are given in Table 2.

4.1.2 Reference Withdrawal Design Values (*W*) and Head Pull-through (*P*) Design Values: Reference withdrawal design values (*W*) and head pull-through (*P*) design values for wood-to-wood connections with SWG Assy 3.0 screws are given in Tables 3 and 4, respectively.

4.2 Installation:

4.2.1 General: SWG Assy 3.0 screws must be installed in accordance with the manufacturer's published installation instructions and this report. Screws must be installed such that their main axis is oriented perpendicular to the wood grain. An appropriate screw length must be used, such that the screw will penetrate a minimum of 6 diameters into the main member for lateral connections and 8 diameters into the main member for tension connections. The side member must be in direct contact with the main member, such that no gap exists between the wood members.

Screws must be driven using the manufacturer-recommended drive bit, with a rotary drill, or a percussion drill set to rotary only mode. Upon installation, the flat surface of the countersunk heads and the top of the cylindrical heads must be flush with the surface of the side member. The screws must not be overdriven.

4.2.2 End Distance, Edge Distance and Spacing: Minimum end distances, edge distances and spacing of the screws must be sufficient to prevent splitting of the wood, or as required by Table 5, whichever is greater. When the screws are used in PSL, the minimum fastener end and edge distances and spacing must be in accordance with Table 5 or in accordance with the ICC-ES evaluation report on the PSL, whichever is more restrictive.

4.2.3 Pilot Holes: Typical installation of SWG Assy 3.0 screws does not require predrilling. Predrilling of holes to reduce splitting is recommended by the manufacturer for the following conditions:

1. For species which are prone to splitting, including fir, Douglas fir and spruce.
2. For lumber with thickness ≤ 35 mm ($1^1/_2$ inches).
3. For laterally loaded screws installed in lumber with a thickness ≤ 7D (≤ 14D for fir, Douglas fir and spruce).
4. For axially loaded screws installed in lumber with a thickness ≤ 10D and/or a width of less than 8D or 60 mm ($2^3/_8$ inches), whichever is greater.

For recommended sizes of predrilled holes, see Table 6.

5.0 CONDITIONS OF USE

The SWG Assy 3.0 screws described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The screws must be installed in accordance with the manufacturer's published installation instructions and this report. In case of a conflict between this report and the manufacturer's installation instructions, this report governs.

5.2 Calculations and details demonstrating compliance with this report must be submitted to the code official. The calculations and details must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.3 SWG Assy 3.0 screws must be installed and used in dry in-service conditions where the moisture content of the wood members does not exceed 19 percent.

5.4 Use of the screws in contact with preservative-treated or fire-retardant-treated wood is outside the scope of this report.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Alternate Dowel-type Threaded Fasteners (AC233), dated June 2014.

7.0 IDENTIFICATION

Individual SWG Assy 3.0 screws are identified in the field by their unique configurations. In addition, the countersunk screw heads are marked with the letters "ASSY", as shown in Figures 2 and 3. Packages of screws are identified with the manufacturer's name (SWG); product name (Assy 3.0); head type and drive size; screw diameter and length (in both inches and millimeters); and the evaluation report number (ICC-ES ESR-3179).

TABLE 1—FASTENER SPECIFICATIONS AND STRENGTHS – SWG ASSY 3.0 SCREWS

NOMINAL DIAMETER mm [inch]	HEAD STYLE	OUTSIDE THREAD DIAMETER mm [inch]	ROOT DIAMETER mm [inch]	SMOOTH SHANK DIAMETER mm [inch]	THREAD PITCH mm [inch]	HEAD DIAMETER mm [inch]	DRIVE TYPE AND SIZE	OVERALL LENGTH[1] (mm) [inches]	THREAD LENGTH mm [inch]	TIP LENGTH mm [inch]	SPECIFIED BENDING YIELD STRENGTH[2], F_{yb} (MPa) [psi]	ALLOWABLE FASTENER STRENGTH	
												Tension (kN) [lbf]	Shear (kN) [lbf]
6 (1/4)	Washer	6.0 [0.236]	3.9 [0.154]	4.4 [0.173]	3.60 [0.142]	14.0 [0.551]	AW 30	70 [2 3/4]	42 [1 5/8]	6.0 [0.236]	1169 [169,500]	5.07 [1150]	3.02 [685]
								80 to 90 [3 1/8 to 3 1/2]	50 [2]				
								100 [3 7/8]	60 [2 3/8]				
								110 to 300 [4 3/4 to 11 3/4]	70 [2 3/4]				
	Countersunk	6.0 [0.236]	3.9 [0.154]	4.4 [0.173]	3.60 [0.142]	12.0 [0.472]	AW 30	70 [2 3/4]	42 [1 5/8]				
								80 to 90 [3 1/8 to 3 1/2]	50 [2]				
								100 [3 7/8]	60 [2 3/8]				
								110 to 300 [4 3/4 to 11 3/4]	70 [2 3/4]				
8 (5/16)	Hex	8.0 [0.315]	5.3 [0.209]	5.8 [0.228]	5.6 [0.220]	11.9 [0.467] (width between parallel edges)	AW 40 or 12 mm hex socket	80 to 90 [3 1/8 to 3 1/2]	50 [2]	8.0 [0.315]	1036 [150,200]	8.59 [1950]	5.82 [1320]
								100 [3 7/8]	60 [2 3/8]				
								110 to 200 [4 3/4 to 7 7/8]	80 [3 1/8]				
								220 to 800 [8 5/8 to 31 1/2]	100 [3 7/8]				
	Washer	8.0 [0.315]	5.3 [0.209]	5.8 [0.228]	5.6 [0.220]	22.0 [0.866]	AW 40	80 to 90 [3 1/8 to 3 1/2]	50 [2]				
								100 [3 7/8]	60 [2 3/8]				
								110 to 200 [4 3/4 to 7 7/8]	80 [3 1/8]				
								220 to 800 [8 5/8 to 31 1/2]	100 [3 7/8]				
	Countersunk	8.0 [0.315]	5.3 [0.209]	5.8 [0.228]	5.6 [0.220]	14.8 [0.581]	AW 40	80 to 90 [3 1/8 to 3 1/2]	50 [2]				
								100 [3 7/8]	60 [2 3/8]				
								110 to 200 [4 3/4 to 7 7/8]	80 [3 1/8]				
								220 to 800 [8 5/8 to 31 1/2]	100 [3 7/8]				

TABLE 1—FASTENER SPECIFICATIONS AND STRENGTHS – SWG ASSY 3.0 SCREWS (Continued)

10 ($^3/_8$)	Hex	10.0 [0.394]	6.3 [0.248]	7.2 [0.283]	6.6 [0.260]	14.8 [0.583] (width between parallel edges)	AW 40 or 15 mm hex socket	100 [$3^7/_8$]	60 [$2^3/_8$]	10.0 [0.394]	942 [136,600]	12.24 [2780]	7.59 [1725]
								120 to 140 [$4^3/_4$ to $5^1/_2$]	80 [$3^1/_8$]				
								160 to 300 [$6^1/_4$ to $11^3/_4$]	100 [$3^7/_8$]				
								320 to 1000 [$12^5/_8$ to $39^3/_8$]	120 [$4^3/_4$]				
	Washer	10.0 [0.394]	6.3 [0.248]	7.2 [0.283]	6.6 [0.260]	25.0 [0.984]	AW 50	100 [$3^7/_8$]	60 [$2^3/_8$]				
								120 to 140 [$4^3/_4$ to $5^1/_2$]	80 [$3^1/_8$]				
								160 to 300 [$6^1/_4$ to $11^3/_4$]	100 [$3^7/_8$]				
								320 to 1000 [$12^5/_8$ to $39^3/_8$]	120 [$4^3/_4$]				
	Countersunk	10.0 [0.394]	6.3 [0.248]	7.2 [0.283]	6.6 [0.260]	18.1 [0.713]	AW 40	100 [$3^7/_8$]	60 [$2^3/_8$]				
								120 to 140 [$4^3/_4$ to $5^1/_2$]	80 [$3^1/_8$]				
								160 to 300 [$6^1/_4$ to $11^3/_4$]	100 [$3^7/_8$]				
								320 to 1000 [$12^5/_8$ to $39^3/_8$]	120 [$4^3/_4$]				
12 ($^1/_2$)	Hex	12.0 [0.472]	7.2 [0.283]	8.2 [0.323]	6.6 [0.260]	16.8 [0.661] (width between parallel edges)	AW 40 or 17 mm hex socket	100 [$3^7/_8$]	60 [$2^3/_8$]	12.0 [0.472]	1147 [166,300]	13.51 [3070]	9.21 [2095]
								120 to 140 [$4^3/_4$ to $5^1/_2$]	80 [$3^1/_8$]				
								160 to 200 [$6^1/_4$ to $7^8/_8$]	100 [$3^7/_8$]				
								220 to 360 [$8^5/_8$ to $14^1/_8$]	120 [$4^3/_4$]				
								380 to 520 [15 to $20^1/_2$]	145 [$5^{11}/_{16}$]				
	Washer	12.0 [0.472]	7.2 [0.283]	8.2 [0.323]	6.6 [0.260]	29.00 [1.142]	AW 50	100 [$3^7/_8$]	60 [$2^3/_8$]				
								120 to 140 [$4^3/_4$ to $5^1/_2$]	80 [$3^1/_8$]				
								160 to 200 [$6^1/_4$ to $7^8/_8$]	100 [$3^7/_8$]				
								220 to 360 [$8^5/_8$ to $14^1/_8$]	120 [$4^3/_4$]				
								380 to 520 [15 to $20^1/_2$]	145 [$5^{11}/_{16}$]				

[1]For Hex and Washer head styles, overall fastener length is measured from the underside of the head to bottom of tip. For the Countersunk head style, overall fastener length is measured from top of head to bottom of tip.

[2]Bending yield strength determined in accordance with ASTM F1575 using the root diameter.

TABLE 2—REFERENCE LATERAL DESIGN VALUES (Z)[1,2,3,4,5]

FASTENER DESIGNATION[1]	SIDE MEMBER THICKNESS (inches)	FASTENER PENETRATION INTO MAIN MEMBER (inches)	REFERENCE LATERAL DESIGN VALUE, Z (lbf) FOR SPECIFIC GRAVITIES OF											
			0.33			0.42			0.49			0.55		
			$Z_{\parallel}$	$Z_{\perp/\parallel}$	$Z_{\perp}$	$Z_{\parallel}$	$Z_{\perp/\parallel}$	$Z_{\perp}$	$Z_{\parallel}$	$Z_{\perp/\parallel}$	$Z_{\perp}$	$Z_{\parallel}$	$Z_{\perp/\parallel}$	$Z_{\perp}$
1/4" x 4"	2	1 3/4	131	131	131	185	185	185	213	213	213	237	237	237
1/4" x 4 3/4"	2	2 1/2	142	142	142	185	185	185	213	213	213	237	237	237
1/4" x 5 1/2"	2 3/4	2 1/2	148	148	148	185	185	185	213	213	213	237	237	237
1/4" x 6 1/4"	3 1/2	2 1/2	148	148	148	185	185	185	213	213	213	237	237	237
1/4" x 7 1/8"	4	2 7/8	148	148	148	185	185	185	213	213	213	237	237	237
1/4" x 7 7/8"	5 1/2	2 1/8	148	148	148	185	185	185	213	213	213	237	237	237
1/4" x 8 5/8"	6	2 3/8	148	148	148	185	185	185	213	213	213	237	237	237
1/4" x 9 1/2"	7	2 1/4	148	148	148	185	185	185	213	213	213	237	237	237
1/4" x 11 3/4"	7 1/2	4	148	148	148	185	185	185	213	213	213	237	237	237
1/4" x 11 3/4"	8	3 1/2	148	148	148	185	185	185	213	213	213	237	237	237
1/4" x 11 3/4"	9	2 1/2	148	148	148	185	185	185	213	213	213	237	237	237
5/16" x 4 3/4"	2	2 7/16	164	131	131	234	187	187	280	224	224	311	249	249
5/16" x 5 1/2"	2 3/4	2 7/16	185	148	148	243	194	194	280	224	224	311	249	249
5/16" x 6 1/4"	2 3/4	3 3/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 7 1/8"	3 1/2	3 5/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 7 1/8"	4	2 13/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 8 5/8"	5 1/2	2 13/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 9 1/2"	6	3 3/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 10 1/4"	7	2 15/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 11"	7 1/2	3 3/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 12 5/8"	8	4 5/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 13 3/8"	9	4 1/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 14 1/8"	10	3 13/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 15 3/4"	11	4 7/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 16 3/8"	12	4 1/16	194	156	156	243	194	194	280	224	224	311	249	249
5/16" x 18 7/8"	14	4 7/16	194	156	156	243	194	194	280	224	224	311	249	249
3/8" x 5 1/2"	2	3 1/8	292	180	160	353	227	213	396	265	252	419	300	288
3/8" x 5 1/2"	2 3/4	2 3/8	310	194	154	366	260	219	396	292	273	419	314	297
3/8" x 6 1/4"	2 3/4	3 1/8	325	208	176	366	265	244	396	292	273	419	314	297
3/8" x 6 1/4"	3 1/2	2 3/8	323	217	178	366	265	233	396	292	273	419	314	297
3/8" x 7 1/8"	3 1/2	3 1/4	325	227	202	366	265	244	396	292	273	419	314	297
3/8" x 7 1/8"	4	2 3/4	325	227	193	366	265	244	396	292	273	419	314	297
3/8" x 7 7/8"	4	3 1/2	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 8 5/8"	5 1/2	2 3/4	325	227	193	366	265	244	396	292	273	419	314	297
3/8" x 9 1/2"	5 1/2	3 5/8	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 11 3/4"	6	5 3/8	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 11 3/4"	7	4 3/8	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 12 5/8"	7 1/2	4 3/4	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 13 3/8"	8	5	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 13 3/8"	8 1/2	5 1/4	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 14 1/8"	9	5 5/8	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 14 1/8"	9 1/2	5 1/8	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 15"	10	4 5/8	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 15 3/4"	11	4 3/8	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 16 3/8"	11 1/2	4 1/2	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 17 1/4"	12	4 7/8	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 18 1/8"	13	4 3/4	325	227	205	366	265	244	396	292	273	419	314	297
3/8" x 20 1/2"	14	6 1/8	325	227	205	366	265	244	396	292	273	419	314	297
1/2" x 7 1/8"	3 1/2	3 1/8	456	278	212	526	372	301	569	412	377	602	443	412
1/2" x 7 7/8"	3 1/2	3 7/8	467	289	236	526	374	335	569	412	379	602	443	412
1/2" x 7 7/8"	4	3 3/8	467	307	237	526	374	337	569	412	379	602	443	412
1/2" x 9 1/2"	5 1/2	3 1/2	467	320	265	526	374	339	569	412	379	602	443	412
1/2" x 10 1/4"	5 1/2	4 1/4	467	320	285	526	374	339	569	412	379	602	443	412

TABLE 2—REFERENCE LATERAL DESIGN VALUES (Z)[1,2,3,4,5] (Continued)

FASTENER DESIGNATION[1]	SIDE MEMBER THICKNESS (inches)	FASTENER PENETRATION INTO MAIN MEMBER (inches)	REFERENCE LATERAL DESIGN VALUE, Z (lbf) FOR SPECIFIC GRAVITIES OF											
			0.33			0.42			0.49			0.55		
			$Z_{\parallel}$	$Z_{\perp/\parallel}$	$Z_{\perp}$	$Z_{\parallel}$	$Z_{\perp/\parallel}$	$Z_{\perp}$	$Z_{\parallel}$	$Z_{\perp/\parallel}$	$Z_{\perp}$	$Z_{\parallel}$	$Z_{\perp/\parallel}$	$Z_{\perp}$
1/2" x 11 3/4"	6	5 1/4	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 12 5/8"	7	5 1/8	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 12 5/8"	7 1/2	4 5/8	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 13 3/8"	8	4 7/8	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 13 3/8"	8 1/2	4 3/8	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 14 1/8"	9	4 5/8	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 14 1/8"	9 1/2	4 1/8	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 15"	10	4 1/2	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 15 3/4"	11	4 1/4	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 16 3/8"	11 1/2	4 3/8	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 17 1/4"	12	4 3/4	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 18 1/8"	13	4 5/8	467	320	285	526	374	339	569	412	379	602	443	412
1/2" x 20 1/2"	14	6	467	320	285	526	374	339	569	412	379	602	443	412

For SI: 1 inch = 25.4 mm, 1 lbf = 4.4 N.

[1]Fastener length shown is a minimum. Tabulated values may be applied to longer fasteners, with greater penetration into the main member.
[2]Tabulated reference lateral design values, *Z*, apply to screws driven into the side grain of the main member, such that the screws are oriented perpendicular to the grain and loaded as follows:

$Z_{\parallel}$: Both side and main members loaded parallel to grain.
$Z_{\perp/\parallel}$: Side member loaded perpendicular to grain; main member loaded parallel to grain
$Z_{\perp}$: Both side and main members loaded perpendicular to grain.

[3]Reference lateral design values must be multiplied by all adjustment factors applicable to wood screws, in accordance with the NDS.
[4]SWG Assy 3.0 screws must be installed and used in dry in-service conditions, such that the wet service factor, C_M, is 1.0 in accordance with the NDS.
[5]The specific gravity used for design purposes must be the assigned specific gravity for sawn lumber per NDS Table 11.3.3A (Table 11.3.2A of the 2005 NDS), or the equivalent specific gravity given in the applicable ICC-ES evaluation report on the PSL product.

TABLE 3—REFERENCE WITHDRAWAL DESIGN VALUES (*W*)[1,2,3,4] N/mm [lbf/in]

NOMINAL FASTENER DIAMETER (mm) [inch]	FOR SPECIFIC GRAVITIES (SG) AND EQUIVALENT SPECIFIC GRAVITIES (ESG) OF: [5]					
	SG ≥ 0.56	0.56 > SG ≥ 0.50	0.50 > SG ≥ 0.46	0.46 > SG ≥ 0.42	0.42 > SG ≥ 0.33	ESG ≥ 0.50
6 [0.236]	32 [183]	30 [171]	29 [166]	22 [126]	20 [114]	27 [154]
8 [0.315]	37 [211]	35 [200]	32 [183]	31 [177]	26 [148]	31 [177]
10 [0.394]	39 [223]	39 [223]	34 [194]	33 [188]	30 [171]	37 [211]
12 [0.472]	55 [314]	51 [291]	37 [211]	33 [188]	33 [188]	39 [223]

[1] Tabulated reference withdrawal design values, *W*, apply to screws driven into the side grain of the main member, such that the screws are oriented perpendicular to the grain and loaded in direct withdrawal.
[2] Values must be multiplied by all adjustment factors applicable to wood screws, in accordance with the NDS.
[3] SWG Assy 3.0 screws must be installed and used in dry in-service conditions, such that the wet service factor, C_M, is 1.0 in accordance with the NDS.
[4] Reference withdrawal design values are to be multiplied by the length of thread penetration into the main member. Main member penetration must be at least 8 times the nominal diameter. Threaded length must not include the length of the tip.
[5] The specific gravity used for design purposes must be the assigned specific gravity for sawn lumber per NDS Table 11.3.3A (Table 11.3.2A of the 2005 NDS), and the equivalent specific gravity (ESG) must be the equivalent specific gravity given in the applicable ICC-ES evaluation report on the PSL product.

TABLE 4—REFERENCE HEAD PULL-THROUGH DESIGN VALUES (P)[1,2,3] N [lbf]

NOMINAL FASTENER DIAMETER mm	HEAD TYPE	MINIMUM SIDE MEMBER THICKNESS, t_s (mm) [inches]	FOR SPECIFIC GRAVITIES (SG) AND EQUIVALENT SPECIFIC GRAVITIES (ESG) OF: [4]				
			SG ≥ 0.56	0.56 > SG ≥ 0.50	0.50 > SG ≥ 0.46	0.46 > SG ≥ 0.33	ESG ≥ 0.50
6 [0.236]	Washer	35 [$1^3/_8$]	1844 [415]	1450 [326]	1289 [290]	1218 [274]	1959 [440]
	Countersunk		1048 [236]	875 [197]	627 [141]	627 [141]	1167 [262]
8 [0.315]	Hex		1080 [243]	1055 [237]	710 [160]	667 [150]	1449 [326]
	Washer		2935 [660]	2517 [566]	2327 [523]	1556 [350]	3254 [732]
	Countersunk		1330 [299]	1330 [299]	887 [199]	797 [179]	1453 [327]
10 [0.394]	Hex		1602 [360]	1421 [319]	1239 [279]	975 [219]	1867 [420]
	Washer		3124 [702]	2939 [661]	2633 [592]	2138 [481]	3547 [797]
	Countersunk		1904 [428]	1672 [376]	1265 [284]	1033 [232]	2266 [509]
12 [0.472]	Hex		1668 [375]	1639 [368]	1314 [295]	1053 [237]	2108 [474]
	Washer		3736 [840]	3213 [722]	2729 [614]	2138 [481]	4177 [939]

[1] Tabulated head pull-through design values, P, must be multiplied by all adjustment factors applicable to wood screw withdrawal, in accordance with the NDS.
[2] Design values apply to connections with minimum side member thicknesses, t_s, as given above.
[3] SWG Assy 3.0 screws must be installed and used in dry in-service conditions, such that the wet service factor, C_M, is 1.0 in accordance with the NDS.
[4] The specific gravity (SG) used for design purposes must be the assigned specific gravity for sawn lumber per NDS Table 11.3.3A (Table 11.3.2A of the 2005 NDS), and the equivalent specific gravity (ESG) must be the equivalent specific gravity given in the applicable ICC-ES evaluation report on PSL product.

TABLE 5—CONNECTION GEOMETRY REQUIREMENTS[1]

CONDITION		MINIMUM DIMENSION (in terms of nominal screw diameter, D)			
		LATERALLY LOADED SCREWS		AXIALLY LOADED SCREWS	
		SG ≤ 0.42	0.42 < SG ≤ 0.55 and PSL	SG ≤ 0.42	0.42 < SG ≤ 0.55 and PSL
End distance		10D	15D (22.5D in D-Fir)	10D	15D (22.5D in D-Fir)
Edge distance	Lateral Loading parallel to grain	5D	7D	-	-
	Lateral Loading perpendicular to grain	10D	12D	-	-
	Axial Load on fastener	-	-	5D	7D
Spacing between fasteners in a row		5D	7D (10.5D in D-Fir)	5D	7D (10.5D in D-Fir)
Spacing between rows	Loading parallel or perpendicular to grain	5D	7D	-	-
	Axial Load on fastener	-	-	5D	7D

[1] End distances, edge distances and screw spacing must be sufficient to prevent splitting of the wood, or as required by this table, whichever is the more restrictive.

TABLE 6—RECOMMENDED DIAMETER OF PREDRILLED HOLES[1] mm [inches]

NOMINAL FASTENER DIAMETER (mm) [inches]	APPLICABLE LOAD CONDITION AND SPECIFIC GRAVITY		
	Screws Subject to Lateral Load		Screws Loaded Axially
	SG ≤ 0.5	SG > 0.5 and PSL	0.35 ≤ SG ≤ 0.55 and PSL
6 [0.236]	4 [5/32]	4 [5/32]	4 [5/32]
8 [0.315]	5 [13/64]	5.5 [7/32]	5 [13/64]
10 [0.394]	6 [15/64]	6.5 [1/4]	6 [15/64]
12 [0.472]	7 [17/64]	8 [5/16]	7 [17/64]

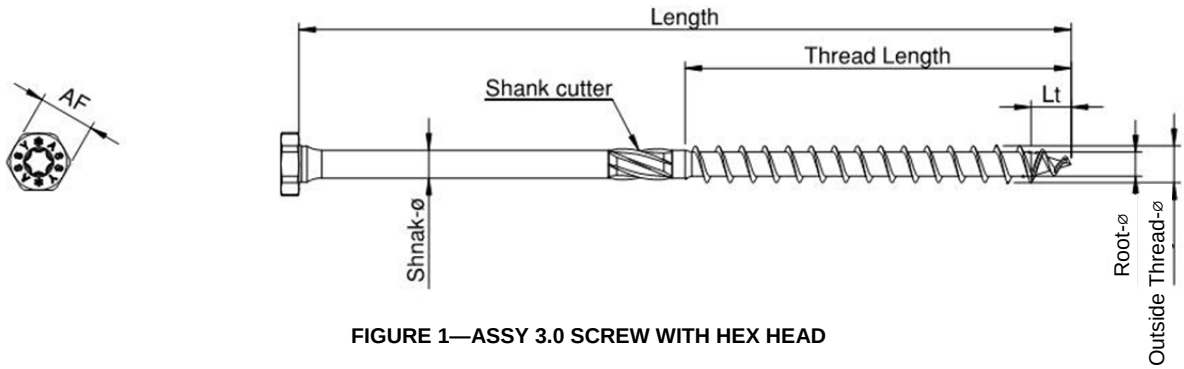

FIGURE 1—ASSY 3.0 SCREW WITH HEX HEAD

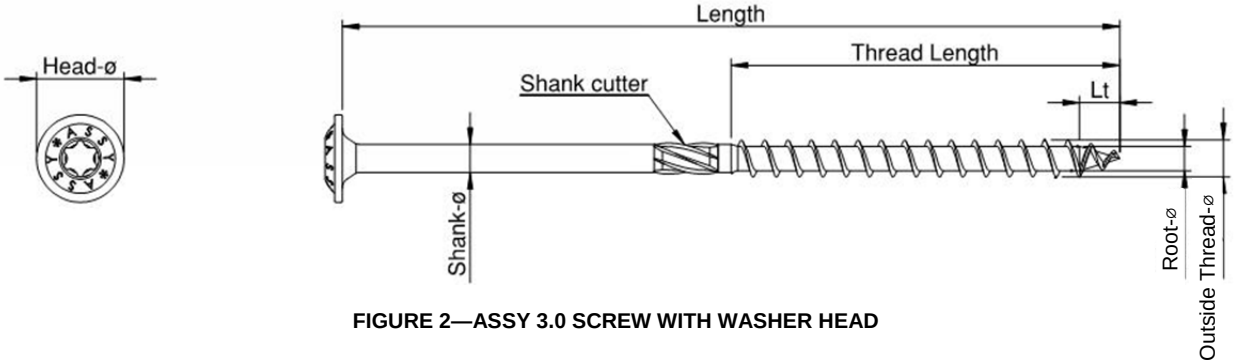

FIGURE 2—ASSY 3.0 SCREW WITH WASHER HEAD

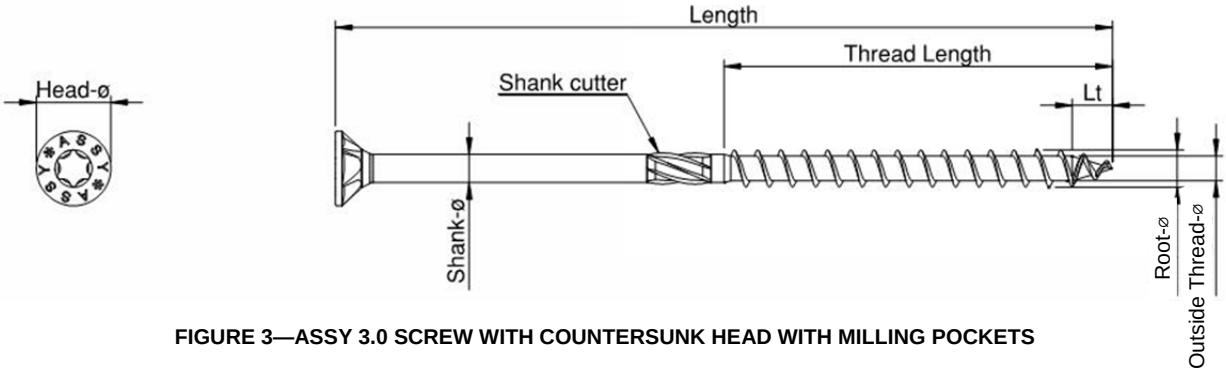

FIGURE 3—ASSY 3.0 SCREW WITH COUNTERSUNK HEAD WITH MILLING POCKETS