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RESEARCH REPORT: RR 25670  
(CSI # 05 05 23)

Att: Tim Kaucher, P.E.  
(800) 999-5099

Expires: May 1, 2013  
Issued: January 1, 2012  
Code: 2011 LABC

**GENERAL APPROVAL** – Renewal - Quik Drive<sup>®</sup> Cold Formed Steel Screws.

**DETAILS**

Quik Drive<sup>®</sup> screws are manufactured from heat-treated C1022 steel wire, are case hardened, and have a corrosion resistant coating.

Screws are self-drilling tapping or self-piercing tapping, and available in lengths varying from 3/4 to 2 inches (19 to 45 mm). The screws are available as No. 6, 8, 10, and 12 screws with a hex washer head, a modified truss head, a pan head, a flat head, a bugle head, and a ribbed bugle head. The fastener illustration, specification, and application are listed in Table 1A and Table 1B of this report.

**Quik Drive<sup>®</sup> Steel to Steel Screws:**

Steel to Steel Screws are self-drilling tapping screws for use in steel to steel connections and comply with ASTM C1513. The screws are case hardened that allow direct penetration of steel.

XS HEX steel stitching screws series are manufactured as No. 10 and 12 screws with a #3 drill points and a hex washer head.

XS HEX steel decking screws are manufactured as a No. 12 screw with a #4 drill point and a hex washer head.

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Simpson Strong-Tie Co., Inc.  
Re: Quik Drive<sup>®</sup> Cold Formed Steel Screws.

TRSD series screws are manufactured as a No. 10 fine thread screw with a #2 drill point and a modified truss head.

PHSD screw is manufactured as a No. 8 fine thread screw with a #2 drill point and a pan head.

XS HEX steel stitching, TRSD, and PHSD screws have a zinc coating finish. Whereas, XS HEX steel decking screw have a corrosion resistant finish.

### **Fasteners:**

Allowable Load (ASD) and Load Resistance Factor Design Load (LRFD) screw shear and tension values are listed in Table 2 of this report. The loads are based on screw nominal strength divided by a factor of safety ( $\Omega$ ) or multiplied by a resistance factor ( $\Phi$ ) determined per AISI S100-2007.

### **Steel-to-Steel Connections:**

Shear, tension pull-over and tension pull-out load values are listed in Table 3 for ASD and Table 4 for LRFD.

These screws are typically used to connect Cold Formed Steel (CFS) members complying with Section 2209 of the 2011 Los Angeles City Building Code

For the values listed, steel sheets must conform with ASTM A 653-96, SS Grade 33, with a minimum 33,000 psi (228 MPa) yield strength for steel sheet of 18 mil to 43 mil (25 to 18 gauge); and with ASTM A 653-96, SS Grade 50 with 50,000 psi (345 MPa) minimum yield strength for steel sheet of 54 mil, 68 mil and 97 mil ( 16, 14, and 12 gauge).

### **Installation:**

Quik Drive<sup>®</sup> self-drilling tapping and self-piercing tapping screw fasteners are installed without pre-drilled holes. Fasteners are recommended to be installed with a variable-speed screw gun having a speed range of 1,000 rpm to 2,500 rpm. Drills must incorporate a depth-sensitive or torque-limiting nosepiece.

For connections to steel, the installed fasteners must extend through the steel connection a minimum of three (3) exposed threads per AISI S100-2007.

The minimum center-to-center spacing and edge distance shall be 3 times the nominal screw diameter. Minimum edge distance of screw fasteners shall be 1.5 times the nominal screw diameter. If the end distance is parallel to the force on the fastener, the nominal shear strength (resistance) per screw shall be limited by Section E4.3.2 of the AISI S100-2007

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Re: Quik Drive® Cold Formed Steel Screws.

For fasteners along the edges in shear panels shall be placed a minimum of 3/8 inch (9.5 mm) from the panel edges.

**The approval is subject to the following conditions:**

1. The use of the nominal strength values contained in this evaluation report, for the design of cold-formed steel diaphragms, is outside the scope of this report.
2. Fasteners are to be installed in accordance with the manufacturer's published installation instructions and this report. If there is a conflict between the manufacturer's published installation instructions and this report, this report governs.
3. The allowable loads are not to be increased when the fasteners are used to resist wind or seismic forces.
4. Calculations demonstrating that the applied loads are less than the allowable loads or factored loads described in this report shall be submitted to the plan check Engineer at the time of permit application. The calculations shall be prepared by a Civil or Structural Engineer registered in the State of California.
5. Drawings verifying compliance with this report and the 2011 Los Angeles Building Code must be submitted to the plan check engineer. The drawings shall be prepared by a Civil or Structural Engineer registered in the State of California.
6. Fastener packaging is imprinted with Simpson Strong-Tie® Logo and Quik Drive® Brand name and contact information. Also, included are types of fastener, fastener description, head style, size, length, quantity, country of origin.
7. Connections subject to combined tension and shear loading shall be designed in accordance with Section E4.5 of the AISI S100-2007.

**DISCUSSION**

The report is in compliance with the 2011 Los Angeles City Building Code.

The approval is based on calculations and tests in accordance with the ICC-ES Criteria for Tapping Screw Fasteners (AC118).

Simpson Strong-Tie Co., Inc.  
Re: Quik Drive® Cold Formed Steel Screws.

This general approval of an equivalent alternate to the Code is only valid where an Engineer and/or inspector of this Department has determined that all conditions of this approval have been met in the project in which it is to be used.

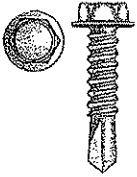
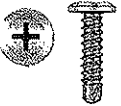
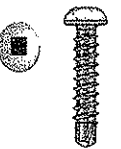
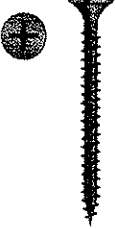
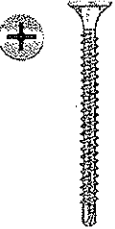
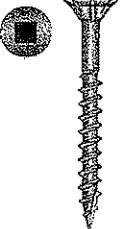
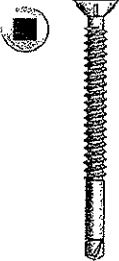
Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

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Attachment: Tables 1-4 (5 Pages)

**Table 1A: QUIK DRIVE® SCREWS ILLUSTRATION AND APPLICATION**

Steel-to-Steel	Drywall-to-Steel	Underlayment Fiber Cement Board-to-Steel	Wood-to-Steel
 <p><b>XS SERIES</b> <b>XQS Series</b></p>  <p><b>TRSD SERIES</b></p>  <p><b>PHSD SERIES</b></p>	 <p><b>DWF SERIES</b></p>  <p><b>DWFSD SERIES</b></p>	 <p><b>CB3BLG SERIES</b></p>	 <p><b>PPSD SERIES</b></p>

**TABLE 1B:**

**Quik Drive Screws Specification & Description**

Model Name	Screw Size	Shank Diameter (in)	Minor Diameter (in)	Major Diameter (in)	Overall Length (in)	Thread Length (in)	Drill Point Length (in)	Description
X1S1016 / XQ1S1016	#10	-	0.135	0.183	1.000	0.725	0.275	16 TPI, #3 drill point with hex washer head
X1S1214 / XQ1S1214	#12	-	0.162	0.215	1.000	0.650	0.35	14 TPI, #3 drill point with hex washer head
TRSD34S1012	#10	-	0.131	0.188	0.750	0.519	0.233	12 TPI, #2 drill point with modified truss head
TRSD34S1016	#10	-	0.135	0.183	0.750	0.519	0.233	16 TPI, #2 drill point with modified truss head
PHSD34S	#8	-	0.116	0.159	0.750	0.571	0.181	18 TPI, #2 drill point with pan head
DWF158PS	#6	0.102	0.081	0.136	1.625	1.390	thrd to point	Fine Threads, sharp point with bugle head
DWF114PS	#6	0.102	0.081	0.136	1.250	1.010	thrd to point	Fine Threads, sharp point with bugle head
DWFSD158PS	#6	0.104	0.099	0.136	1.625	1.390	0.157	Fine Threads, #2 drill point with bugle head
DWFSD114PS	#6	0.104	0.099	0.136	1.250	0.859	0.157	Fine Threads, #2 drill point with bugle head
CB3BLG134S	#10	0.138	0.106	0.190	1.750	1.350	thrd to point	Coarse thread, type 17 point with ribbed bugle head
CB3BLG112S	#10	0.138	0.106	0.190	1.500	1.100	thrd to point	Coarse thread, type 17 point with ribbed bugle head
PPSD11516S	#8	0.130	0.115	0.159	1.937	0.820	0.154	Fine threads, #2 drill point with flat head

**TABLE 2**

**Quik Drive Screws Shear and Tensile Loads**


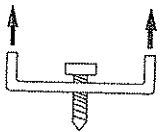
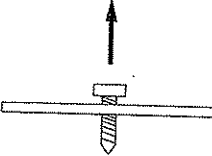
Quik Drive® Screw Model No.	Screw Size	Allowable Load (ASD)		Load Resistance Factor Design (LRFD)	
		Shear	Tensile	Shear	Tensile
X1S1016 / XQ1S1016	#10 x 1"	612	962	918	1443
X1S1214 / XQ1S1214	#12 x 1"	828	1348	1242	2022
TRSD34S1012	#10 x 3/4"	579	632	869	949
TRSD34S1016	#10 x 3/4"	629	706	943	1059
PHSD34S	#8 x 3/4"	498	603	748	905
DWF158PS	#6 x 1-5/8"	419	525	628	788
DWF114PS	#6 x 1-1/4"	419	525	628	788
DWFSD158PS	#6 x 1-5/8"	420	573	630	860
DWFSD114PS	#6 x 1-1/4"	420	573	630	860
CB3BLG134S	#10 x 1-3/4"	513	677	769	1015
CB3BLG112S	#10 x 1-1/2"	505	681	757	1022
PPSD11516S	#8 x 2"	522	719	783	1079

1) Screws have been tested per AISI Standard Test Method TS-04. The tabulated loads are based on the screw strength itself with a factor of safety ( $\Omega$ ) or resistance factor ( $\Phi$ ) determined per 2001 AISI NASPEC Supplement section E4.

\* ~~2) The ASD tabulated values may be increased by 1/3 for seismic or wind loading as applicable per codes.~~

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**TABLE 3**  
**Quik Drive Screws - Member Connections**  
**Allowable Loads**

QUIK DRIVE SCREW MODEL NO.	SIZE	DIA. (in)																			
			SHEAR						TENSION: PULL-OVER					TENSION: PULL-OUT							
			Steel Thickness: mil (ga) <sup>3</sup>						Steel Thickness: mil (ga) <sup>3</sup>					Steel Thickness: mil (ga) <sup>3</sup>							
			33-33 (20-20)	43-43 (18-18)	54-54 (16-16)	68-68 (14-14)	97-97 (12-12)	1/8"	1/4"	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	3/16"	1/4"
<b>PAN-HEAD SCREW</b>																					
PHSD34S	#8 x 3/4"	0.164	235	307	474	477	422	-	-	-	-	-	-	125	133	214	247	-	-	-	-
<b>HEX-HEAD SCREW</b>																					
X1S1016 / XQ1S1016	#10 x 1"	0.190	290	410	612	612	612	-	-	712	760	962	962	962	145	145	247	288	604	-	-
X1S1214 / XQ1S1214	#12 x 1"	0.216	291	397	723	828	828	-	-	453	680	999	1029	1348	136	146	221	246	544	-	-
<b>TRUSS HEAD SCREW</b>																					
TRSD34S1012	#10 x 3/4"	0.190	305	438	579	579	579	-	-	-	-	-	-	-	70	128	211	255	-	-	-
TRSD34S1016	#10 x 3/4"	0.190	293	398	545	629	629	-	-	-	-	-	-	-	100	121	187	217	-	-	-

- Screw connections have been tested per AISI Standard Test Method TS-05. The tabulated loads are based on the lower of the screw strength itself or the strength of the screw in the connected members per 2001 AISI NASPEC with 2004 NASPEC Supplement Section E4.
- Values are based on CFS (CFS) members with a minimum yield strength of  $F_y=33$  ksi and tensile strength of  $F_u=45$  ksi for 43 mils (18 ga) and thinner and a minimum yield strength of  $F_y=50$  ksi and  $F_u=65$  ksi for 54 mils (16 ga) and thicker.
- Minimum thickness represents 95% of the design thickness and is the minimum acceptable base metal thickness based on 2001 AISI NASPEC section A2.4. Design thicknesses for the steel sheets are: 33 mil=0.0346", 43 mil=0.0451", 54 mil=0.0566", 68 mil=0.0713" and 97 mil=0.1017".
- Screw diameters are based on AISI/NASPEC Commentary Table C-E4-1.
- Minimum required screw length is the lesser of 3/4" or the minimum length required for the screw to extend through the steel connection a minimum of (3) exposed threads per AISI General Provisions Standard Section D1.3.
- Larger of screw head or washer diameter,  $d_w$  for #10 and #12 screws is 0.375".
- ~~The Allowable Load (ASD) values may be increased by 1/3 for seismic or wind loading as applicable to code.~~
- For connections with different material thickness, use the tabulated loads under the thinner material.
- Values determined from 2001 AISI NASPEC Section E4 calculation are not to exceed the values shown in Table 2.


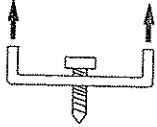
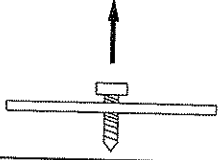
Screws Shear, Pull-Over, and Pull-Out Allowable Loads

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**TABLE 4**

**Quik Drive Screws - Member Connections  
Load Resistance Factor Design**

QUIK DRIVE SCREW MODEL NO.	SIZE	DIA. (in)																			
			SHEAR							TENSION: PULL-OVER					TENSION: PULL-OUT						
			Steel Thickness: mil (ga) <sup>3</sup>							Steel Thickness: mil (ga) <sup>3</sup>					Steel Thickness: mil (ga) <sup>3</sup>						
			33-33 (20-20)	43-43 (18-18)	54-54 (16-16)	68-68 (14-14)	97-97 (12-12)	1/8"	1/4"	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	33 (20)	43 (18)	54 (16)	68 (14)	97 (12)	3/16"	1/4"
<b>PAN HEAD SCREW</b>																					
PHSD34S	#8 x 3/4"	0.164	376	491	757	761	673	-	-	-	-	-	-	200	213	342	396	-	-	-	
<b>HEX HEAD SCREW</b>																					
X1S1016 / XQ1S1016	#10 x 1"	0.190	462	654	918	918	918	-	-	1137	1214	1443	1443	1443	231	231	395	460	964	-	-
X1S1214 / XQ1S1214	#12 x 1"	0.216	465	633	1154	1242	1242	-	-	723	1087	1596	1644	2022	217	234	353	393	870	-	-
<b>TRUSS HEAD SCREW</b>																					
TRSD34S1012	#10 x 3/4"	0.190	487	699	869	869	869	-	-	-	-	-	-	-	112	204	336	407	-	-	-
TRSD34S1016	#10 x 3/4"	0.190	467	635	872	943	943	-	-	-	-	-	-	-	161	193	300	346	-	-	-

- Screw connections have been tested per AISI Standard Test Method TS-05. The tabulated loads are based on the lower of the screw strength itself or the strength of the screw in the connected members per 2001 AISI NASPEC with 2004 NASPEC Supplement Section E4.
- Values are based on CFS (CFS) members with a minimum yield strength of Fy=33 ksi and tensile strength of Fu=45 ksi for 43 mils (18 ga) and thinner and a minimum yield strength of Fy=50 ksi and Fu=85 ksi for 54 mils (16 ga) and thicker.
- Minimum thickness represents 95% of the design thickness and is the minimum acceptable base metal thickness based on 2001 AISI NASPEC section A2.4. Design thicknesses for the steel sheets are: 33 mil=0.0346", 43 mil=0.0451", 54 mil=0.0566", 68 mil=0.0713" and 97 mil=0.1017".
- Screw diameters are based on AISI/NASPEC Commentary Table C-E4-1.
- Minimum required screw length is the lesser of 3/4" or the minimum length required for the screw to extend through the steel connection a minimum of (3) exposed threads per AISI General Provisions Standard Section D1.3.
- Larger of screw head or washer diameter, dw for #10 and #12 screws is 0.375".
- ~~The Allowable Load (AOD) values may be increased by 1/3 for seismic or wind loading as applicable to code.~~
- For connections with different material thickness, use the tabulated loads under the thinner material.
- Values determined from 2001 AISI NASPEC Section E4 calculation are not to exceed the values shown in Table 2.

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