The following pages are an excerpt from the North American Product Technical Guide, Volume 1: Direct Fastening Technical Guide, Edition 24.

Please refer to the publication in its entirety for complete details on this product including data development, base materials, general suitability, installation, corrosion, and product specifications.

Direct Fastening Technical Guide, Edition 24

To consult directly with a team member regarding our direct fastening products, contact Hilti's team of technical support specialists between the hours of 7:00am - 5:00pm CST.

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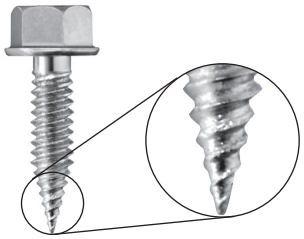
3.6.3 HVAC SCREWS

3.6.3.1 PRODUCT DESCRIPTION

For decades, the conventional screws utilized for HVAC duct fabrication and installation have gone unchanged. Many contractors prefer sharp point screws for their off angle fastening but the screws are limited to lighter gauge steel. Self-drilling screws cover heavier gauge steel but are prone to "walking." This can lead to lost productivity, especially when working in spaces with limited access.

Hilti has blended the best of both fasteners with the new S-MS HVAC zip screws. Although they function like and have the advantages of self-piercing screws, the sharp HVAC zip screws are engineered to handle heavier gauge steel, fastening sheet steel from 16 to 28 gauge with their innovative HyperThread technology. HVAC zip screws can draw the steel sheets together, pierce cleanly with almost no metal filings and feature high profile heads for secure driving.

Hilti also supplies high quality sharp point and self-drilling screws for HVAC applications.



S-MS HWH HVAC Zip Screws
(#8 and #10)

HWH HVAC Sharp Point Screws
(#8 and #10)

S-MD HWH HVAC
(#8, #10 and #12)

3.6.3.2 MATERIAL SPECIFICATIONS

Fastener	Fastener Material	Fastener Plating[4]
S-MS HWH HVAC Zip Screws (#8 Screw)	Carbon Steel	3 to 8 µm Zinc
S-MS HWH HVAC Zip Screws (#10 Screw)	Carbon Steel	5 µm Zinc[1]
HWH Sharp HVAC Screws (#8 and #10)	Carbon Steel	Zinc[3]
HWH Self-Drilling HVAC Screws (#8, #10 and #12)	Carbon Steel	5 µm Zinc[2]

1 EN/ISO 4042 A/3/E.
2 EN/ISO 4042 A3F.
3 Minimum 24 hours no red rust when tested in accordance with ASTM B117.
4 Reference Section 2.3.3.1 for more information on platings.

3.6.3.3 TECHNICAL DATA

Ultimate tensile strengths - pullout (tension), lb (kN)[1,2,4,5,6]

Screw designation	Thickness of member not in contact with the screw head, ga (in.)						
	28 (0.015)	26 (0.018)	24 (0.024)	22 (0.030)	20 (0.036)	18 (0.048)	16 (0.060)
S-MS 8-18x1/2 HWH	**110** (0.49)	**150** (0.67)	**200** (0.89)	**260** (1.16)	**330** (1.47)	–	–
S-MS 10-12x3/4 HWH	–	**160** (0.71)	**230** (1.02)	**305** (1.36)	**350** (1.56)	**450** (2.49)	–
#8 HWH Sharp	**110** (0.49)	**150** (0.67)	**200** (0.89)	**260** (1.16)	–	–	–
#10 HWH Sharp	**130** (0.58)	**160** (0.71)	**230** (1.02)	**305** (1.36)	**350** (1.56)	–	–
S-MD 8-18 HWH[3]	–	–	–	**190** (0.85)	**225** (1.00)	**300** (1.33)	**375** (1.67)
S-MD 10-16 HWH[3,7]	–	–	–	–	**260** (1.16)	**350** (1.56)	**435** (1.93)
S-MD 12-14 HWH[3,7]	–	–	–	–	**295** (1.31)	**395** (1.76)	**495** (2.20)

1 The lower of the ultimate pullout, pullover, and tension fastener strength of screw should be used for determination of allowable or factored resistance loads per footnote 4.
2 Unless otherwise noted, load values based upon testing completed in accordance with AISI S905.
3 Load values based upon calculations done in accordance with Section J4 of AISI S100. ANSI/ASME standard screw diameters were used in the calculations and are listed in the tables.
4 AISI S100 recommends a safety factor of 3.0 be applied for allowable strength design (ASD), a ϕ factor of 0.5 be applied for LRFD design or a Φ factor of 0.4 be applied for LSD design.
5 The load data in the table is based upon sheet steel with F_u = 45 ksi. For F_u = 55 ksi steel, multiply values by 1.22. For $F_u \geq 65$ ksi steel, multiply values by 1.44.
6 Refer to Section 3.6.3.5 to ensure optimal drilling capacities.
7 Load data for thicker steel connections available. Please reference Section 3.6.2.

Approvals/Listings

ICC-ES (International Code Council)
ESR-2196 with LABC/LARC Supplement (S-MD HWH Self-Drilling Screws)

Ultimate tensile strengths - pullover (tension), lb (kN)[1,2,4,5,6]

Screw designation	Washer or head diameter In.	Thickness of member in contact with the screw head, ga (in.)						
		28 (0.015)	26 (0.018)	24 (0.024)	22 (0.030)	20 (0.036)	18 (0.048)	16 (0.060)
S-MS 8-18x1/2 HWH[3]	0.335	335 (1.49)	405 (1.80)	540 (2.40)	675 (3.00)	815 (3.63)	–	–
S-MS 10-12x3/4 HWH[3]	0.399	–	480 (2.14)	645 (2.87)	805 (3.58)	970 (4.31)	1290 (5.74)	–
#8 HWH Sharp	0.335	335 (1.49)	405 (1.80)	540 (2.40)	675 (3.00)	–	–	–
#10 HWH Sharp	0.399	400 (1.78)	480 (2.14)	645 (2.87)	805 (3.58)	970 (4.31)	–	–
S-MD 8-18 HWH	0.335	–	–	–	675 (3.00)	815 (3.63)	1000 (4.45)	1000 (4.45)
S-MD 10-16 HWH[7]	0.399	–	–	–	805 (3.58)	970 (4.31)	1290 (5.74)	1370 (6.09)
S-MD 12-14 HWH[7]	0.415	–	–	–	835 (3.71)	1010 (4.49)	1340 (5.96)	1680 (7.47)

1 The lower of the ultimate pullout, pullover, and tension fastener strength of screw should be used for determination of allowable or factored resistance loads per footnote 4.
2 Unless noted otherwise, load values based upon calculations done in accordance with Section J4 of AISI S100. ANSI/ASME standard screw head diameters were used in the calculations and are listed in the tables.
3 Load values based upon testing completed in accordance with AISI S905.
4 AISI S100 recommends a safety factor of 3.0 be applied for allowable strength design (ASD), a Φ factor of 0.5 be applied for LRFD design and a Φ factor of 0.4 be applied for LSD design.
5 The load data in the table is based upon sheet steel with F_u = 45 ksi. For F_u = 55 ksi steel, multiply values by 1.22. For F_u ≥ 65 ksi steel, multiply values by 1.44.
6 Refer to Section 3.6.3.5 to ensure optimal drilling capacities.
7 Load data for thicker steel connections available. Please reference Section 3.6.2.

Nominal ultimate fastener strength of screw, lb (kN)[1,2,3]

Screw designation	Nominal diameter In.	Nominal fastener strength			
		Tension P_{ts}		Shear P_{ss}	
		lb	(kN)[1]	lb	(kN)[2,3]
S-MS 8-18x1/2 HWH	0.164	1915	(8.52)	1570	(6.98)
S-MS 10-12x3/4 HWH	0.190	1915	(8.52)	1905	(8.47)
#8 HWH Sharp	0.164	1610	(7.16)	860	(3.83)
#10 HWH Sharp	0.190	1915	(8.52)	1905	(8.47)
S-MD 8-18 HWH	0.164	1000	(4.45)	1170	(5.20)
S-MD 10-16 HWH	0.190	1370	(6.09)	1215	(5.40)
S-MD 12-14 HWH	0.216	2325	(10.34)	1880	(8.36)

1 The lower of the ultimate pullout, pullover, and tension fastener strength of screw should be used for design. The Pullout and Pullover tables in this section have already been adjusted where screw strength governs.
2 The lower of the ultimate shear fastener strength and shear bearing should be used for design. The Shear Bearing table in this section has already been adjusted where screw strength governs.
3 AISI S100 recommends a safety factor of 3.0 be applied for allowable strength design (ASD), a Φ factor of 0.5 be applied for LRFD design or a Φ factor of 0.4 be applied for LSD design.

Torsional strength[1,2]

Screw designation	Min. torsional strength in-lb (Nm)	
S-MS 8-18	57	(6.4)
S-MS 10-12	92	(10.4)
#8 HWH Sharp	42	(4.8)
#10 HWH Sharp	61	(6.9)
S-MD 8-18	42	(4.8)
S-MD 10-16	61	(6.9)
S-MD 12-14	92	(10.4)

1 Based on screw only. Does not consider base material limitations.
2 Values in table are ultimate torsional strengths. To obtain maximum setting torque, multiply values in table by 0.66.

Warning: Because of the potential for delayed hydrogen assisted stress corrosion cracking, many hardened steel fasteners are not recommended for use with dissimilar metals or chemically treated wood when moisture may be present or in corrosive environments. For further information, contact Hilti Technical Support at 1-877-749-6337.

Ultimate shear strengths - bearing (shear), lb (kN)[1,2,4,5,6]

Screw designation	Thickness of member in contact with screw head ga (In.)	Thickness of member not in contact with the screw head, ga (in.)						
		28 (0.015)	26 (0.018)	24 (0.024)	22 (0.030)	20 (0.036)	18 (0.048)	16 (0.060)
S-MS 8-18x1/2 HWH	28 (0.015)	220 (0.98)	260 (1.16)	315 (1.40)	320 (1.42)	320 (1.42)	–	–
	26 (0.018)	240 (1.07)	270 (1.20)	340 (1.51)	340 (1.51)	340 (1.51)	–	–
	24 (0.024)	245 (1.09)	270 (1.20)	445 (1.98)	475 (2.11)	475 (2.11)	–	–
	22 (0.030)	245 (1.09)	345 (1.53)	445 (1.98)	555 (2.47)	555 (2.47)	–	–
	20 (0.036)	320 (1.42)	345 (1.53)	555 (2.47)	710 (3.16)	860 (3.83)	–	–
S-MS 10-12x3/4 HWH	26 (0.018)	–	230 (1.02)	375 (1.67)	455 (2.02)	520 (2.31)	520 (2.31)	–
	24 (0.024)	–	230 (1.02)	410 (1.82)	570 (2.54)	660 (2.94)	760 (3.38)	–
	22 (0.030)	–	330 (1.47)	500 (2.22)	685 (3.05)	765 (3.40)	925 (4.11)	–
	20 (0.036)	–	365 (1.62)	500 (2.22)	685 (3.05)	895 (3.98)	1120 (4.98)	–
	18 (0.048)	–	365 (1.62)	570 (2.54)	725 (3.22)	895 (3.98)	1330 (5.92)	–
#8 HWH Sharp	28 (0.015)	115 (0.51)	115 (0.51)	115 (0.51)	115 (0.51)	–	–	–
	26 (0.018)	115 (0.51)	275 (1.22)	275 (1.22)	275 (1.22)	–	–	–
	24 (0.024)	115 (0.51)	275 (1.22)	425 (1.89)	425 (1.89)	–	–	–
	22 (0.030)	115 (0.51)	275 (1.22)	425 (1.89)	610 (2.71)	–	–	–
#10 HWH Sharp	28 (0.015)	115 (0.51)	115 (0.51)	115 (0.51)	115 (0.51)	115 (0.51)	–	–
	26 (0.018)	115 (0.51)	275 (1.22)	275 (1.22)	275 (1.22)	275 (1.22)	–	–
	24 (0.024)	115 (0.51)	275 (1.22)	440 (1.96)	440 (1.96)	440 (1.96)	–	–
	22 (0.030)	115 (0.51)	275 (1.22)	440 (1.96)	715 (3.18)	715 (3.18)	–	–
	20 (0.036)	115 (0.51)	275 (1.22)	440 (1.96)	715 (3.18)	895 (3.98)	–	–
S-MD 8-18 HWH[3,7]	22 (0.030)	–	–	–	400 (1.78)	525 (2.34)	600 (2.67)	600 (2.67)
	20 (0.036)	–	–	–	400 (1.78)	525 (2.34)	715 (3.18)	715 (3.18)
	18 (0.048)	–	–	–	400 (1.78)	525 (2.34)	805 (3.58)	955 (4.25)
	16 (0.060)	–	–	–	400 (1.78)	525 (2.34)	805 (3.58)	1120 (4.98)
S-MD 10-16 HWH[3,7]	22 (0.030)	–	–	–	–	565 (2.51)	695 (3.09)	695 (3.09)
	20 (0.036)	–	–	–	–	565 (2.51)	830 (3.69)	830 (3.69)
	18 (0.048)	–	–	–	–	565 (2.51)	865 (3.85)	1110 (4.94)
	≥ 16 (0.060)	–	–	–	–	565 (2.51)	865 (3.85)	1210 (5.38)
S-MD 12-14 HWH[3,7]	22 (0.030)	–	–	–	–	600 (2.67)	785 (3.49)	785 (3.49)
	20 (0.036)	–	–	–	–	600 (2.67)	930 (4.14)	945 (4.20)
	18 (0.048)	–	–	–	–	600 (2.67)	925 (4.11)	1260 (5.60)
	≥ 16 (0.060)	–	–	–	–	600 (2.67)	925 (4.11)	1290 (5.74)

1 The lower of the ultimate shear bearing and shear fastener strength of screw should be used for determination of allowable or factored resistance loads per footnote 4.

2 Unless otherwise noted, load values based upon testing completed in accordance with AISI S905.

3 Load values based upon calculations done in accordance with Section J4 of AISI S100. ANSI/ASME standard screw diameters were used in the calculations.

4 AISI S100 recommends a safety factor of 3.0 be applied for allowable strength design (ASD), a Φ factor of 0.5 be applied for LRFD design or a Φ factor of 0.4 be applied for LSD design.

5 The load data in the table is based upon sheet steel with F_u = 45 ksi. For F_u = 55 ksi steel, multiply values by 1.22. For F_u ≥ 65 ksi steel, multiply values by 1.44.

6 Refer to Section 3.6.3.5 to ensure optimal drilling capacities.

7 Load data for thicker steel connections available. Please reference Section 3.6.2.

3.6.3.4 INSTALLATION INSTRUCTIONS

For general discussion of Hilti screw fastener installation, reference Section 3.6.1.7.

Warning: Because of the potential for delayed hydrogen assisted stress corrosion cracking, many hardened steel fasteners are not recommended for use with dissimilar metals or chemically treated wood when moisture may be present or in corrosive environments. For further information, contact Hilti Technical Support at 1-877-749-6337.

3.6.3.5 ORDERING INFORMATION

S-MS HWH HVAC Zip Screws

Description[1]	Gauge range[2]	Maximum total thickness (MT), in.	Qty
S-MS 8-18 x 1/2" HWH HVAC Zip Screw (small)	20-28	0.072	1,000
S-MS 8-18 x 1/2" HWH HVAC Zip Screw (bulk)	20-28	0.072	10,000
S-MS 10-12 x 3/4" HWH HVAC Zip Screw (small)	18-26	0.100	1,000
S-MS 10-12 x 3/4" HWH HVAC Zip Screw (bulk)	18-26	0.100	4,500

HWH/SHWH HVAC Sharp Point Screws

Description[1]	Gauge range[2]	Maximum total thickness (MT), in.	Qty
#6 X 3/8" HWH Sheet Metal Screw	20-28	0.072	20,000
#7 X 1/2" SHWH Sheet Metal Screw	20-28	0.072	15,000
#8 X 1/2" SHWH Sheet Metal Screw	20-28	0.072	13,000
#8 X 3/4" SHWH Sheet Metal Screw	20-28	0.072	10,000
#8 X 1 1/2" SHWH Sheet Metal Screw	20-28	0.072	5,000
#8 X 2" SHWH Sheet Metal Screw	20-28	0.072	4,000
#10 X 3/4" HWH Sheet Metal Screw	20-28	0.072	9,000
#10 X 3/4" SHWH 1/4" Drive Sheet Metal Screw	20-28	0.072	9,000
#10 X 1" SHWH Sheet Metal Screw	20-28	0.072	6,000
#10 X 2" SHWH Sheet Metal Screw	20-28	0.072	3,000

S-MD HWH HVAC Self-Drilling Screws

Description[1]	Gauge range[2]	Maximum total thickness (MT), in.	Qty
Self-Drilling Screw S-MD 8-18x1/2 HWH2	16-22	0.125	1,000
Self-Drilling Screw S-MD 10-16X5/8 HWH 3	14-20	0.175	7,500
Self-Drilling Screw S-MD 10-16X3/4 HHWH3	14-20	0.175	6,500
Self-Drilling Screw S-MD 10-16X3/4 HWH3	14-20	0.175	6,500
Self-Drilling Screw S-MD 10-16X1 HWH 3	14-20	0.175	5,000
Self-Drilling Screw S-MD 10-16X1 1/4 HWH	14-20	0.175	4,000
Self-Drilling Screw S-MD 10-16X1 1/2 HWH	14-20	0.175	4,000

S-MD HWH HVAC Self-Drilling Screws with Kwik-Seal Washers

Description[1]	Gauge range[2]	Maximum total thickness (MT), in.	Qty
Self-Drilling Screw 12-14X3/4 HWH 3 KS	12-20	0.210	3,000
Self-Drilling Screw 12-14 X 1 HWH 3 KS	12-20	0.210	2,500
Self-Drilling Screw 12-14X1 1/4 HWH 3 KS	12-20	0.210	2,000
Self-Drilling Screw 12-14X1 1/2 HWH 3 KS	12-20	0.210	2,000
Self-Drilling Screw 12-14X2 HWH 3 KS	12-20	0.210	1,500

HWH Self-Drilling Screws in AISI 410 Stainless Steel

Description[1]	Gauge range[2]	Maximum total thickness (MT), in.	Qty
Self-Drilling Screw 10-16 x 3/4" HWH 410 SS	14-20	0.175	TBD

1 Other sizes available. Please contact Hilti Customer Service for details.
2 Gauge range is for 2 layers of the same gauge. For multiple layers of different gauges, use maximum total thickness and load tables to determine appropriate fastener.