

Guardian Fasteners for lightweight concrete

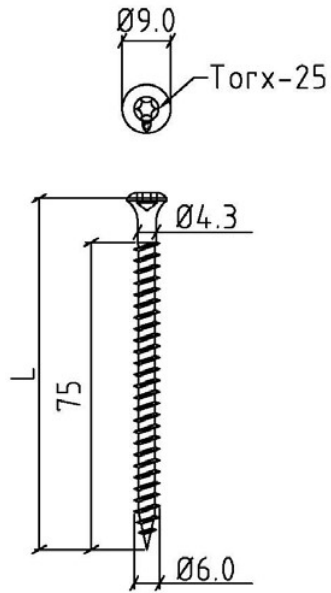


Fig. 26

LBS 6.0 screw for lightweight concrete, concrete and wooden substrates
 LBS-S 6.0 Stainless screw for lightweight concrete and wooden substrates

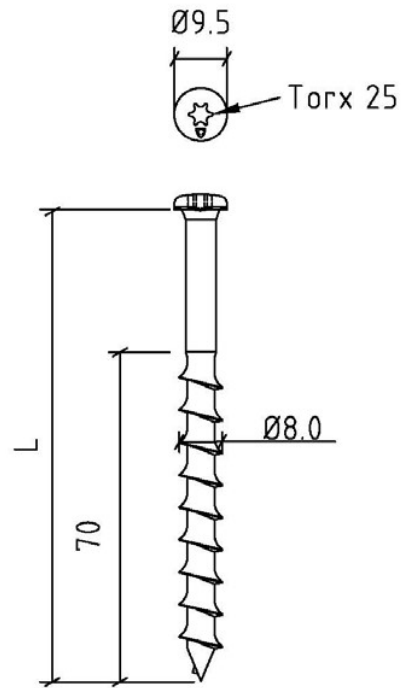


Fig. 27

LBS 8.0 screw for lightweight concrete

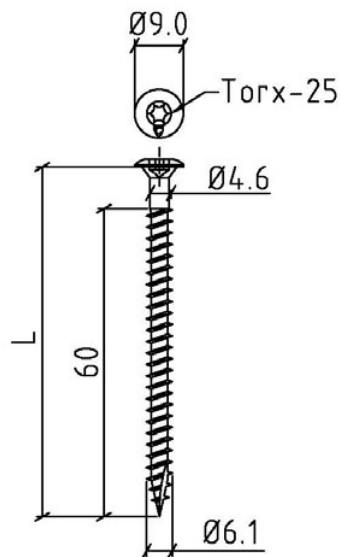


Fig. 28

HD 6.1 Screw for lightweight concrete, concrete and wooden substrates

Annex 2

Performance of Guardian Fastening system on different substrates

Characteristic values are calculated from the following formula:

$$R_k: \alpha (X_m - (k \times s))$$

where: R_k = characteristic y values of axial load resistance

α = corr. factor for tested substrate spec. compared with nominal substrate spec.

X_m = mean axial pull-out load for 10 specimens

$k = 1,92$ (according to Table D1 in EN-1990:2002)

s = standard deviation

Table 2: Concrete substrate ¹⁾

Fastener	Substrate	Washer	R _k : Characteristic values of axial load resistance (kN)
GUARDIAN CS 6.1 / ACS-6.1	C25-C30	SP 50	4.28
GUARDIAN B NRF 5.5	C25-C30	SP-50	1.79
GUARDIAN BN 5.6	C25-C30	SP 50	1.92
GUARDIAN CP & CPN (Polypropylene)	C25-C30	-	1.57
GUARDIAN HD 6.1	C25-C30	SP 50	4.83
GUARDIAN LBS 6.0	C20-C25	SP 50	2.92
GUARDIAN LBS 6.0	C25-C30	SP 50	3.26
GUARDIAN CS-S 6.1	C25-C30	-	2.92
GUARDIAN CS-S 6.1	C32-C40	-	3.29
GUARDIAN CS-S 6.1	C40-C50	-	3.69

¹⁾ See clause 2 regarding hole diameter and drill depth

Table 3: Light weight concrete substrate ²⁾

Fastener	Substrate	Washer	R _k : Characteristic values of axial load resistance (kN)
GUARDIAN LBS 6.0	Density 600 kg/m ³	SP 50	2.07
GUARDIAN LBS 8.0	Density 450 kg/m ³	SP-40-LBS	0.93
GUARDIAN LBS 8.0	Density 550 kg/m ³	SP-40-LBS	1.44
GUARDIAN HD 6.1	Density 600 kg/m ³	SP 50	1.36
GUARDIAN LBS-S 6.0	Density 450 kg/m ³	SP 50	1.34

²⁾ Autoclaved aerated concrete units according to EN 12602:2016

Table 5: Wood substrate

Fastener	Substrate	Washer	R _k : Characteristic values of axial load resistance (kN)
GUARDIAN HD 6.1	18 mm OSB/3 ⁷⁾	-	1.36
GUARDIAN HD 6.1	18 mm multilayer wood deck ¹²⁾	-	2.37
GUARDIAN HD 6.1	18 mm wood deck underlayment ¹¹⁾	-	1.94
GUARDIAN MTS 4.8	18 mm OSB/3 ⁷⁾	SP 50	1.16
GUARDIAN TS 5.2	17mm softwood ⁹⁾	SP 50	1.28
GUARDIAN TS 5.2	23mm softwood ⁹⁾	SP 50	1.90
GUARDIAN TS 5.2	18 mm OSB/3 ⁷⁾	SP 50	1.35
GUARDIAN TS 5.2	18 mm chipboard ¹⁰⁾	SP 50	1.18
GUARDIAN TS 5.2	18 mm multilayer wood deck ¹²⁾	SP 50	1.89
GUARDIAN TS 5.2	18 mm wood deck underlayment ¹¹⁾	SP 50	1.94
GUARDIAN LBS 6.0	18 mm OSB/3 ⁷⁾	SP 50	1.40
GUARDIAN LBS 6.0	23mm softwood ⁹⁾	SP 50	2.00
GUARDIAN LBS-S 6.0	18 mm OSB/3 ⁷⁾	SP 50	1.44
GUARDIAN LBS-S 6.0	18 mm Plywood ⁸⁾	SP 50	2.92
GUARDIAN BS 4.8	18 mm OSB/3 ⁷⁾	SP 50	1.05
GUARDIAN BS 4.8	18 mm Plywood ⁸⁾	SP 50	1.80
GUARDIAN BSRF 4.8	18 mm OSB/3 ⁷⁾	SP 50	1.05
GUARDIAN BSRF 4.8	18 mm Plywood ⁸⁾	SP 50	1.54
GUARDIAN DBTA 4.8	18 mm OSB/3 ⁷⁾	SP 50	1.05
GUARDIAN DBTA 4.8	18 mm Plywood ⁸⁾	SP 50	1.80

⁷⁾ OSB board type 3 according to EN 300

⁸⁾ Plywood according to EN 636-2, structural application

⁹⁾ Soft wood according to EN 338 C24

¹⁰⁾ Chipboard according to EN 312:2010 class P4 minimum

¹¹⁾ Multilayer wood deck Underlayment according to EN 636-2 Structural application

¹²⁾ Multilayer wood deck according to EN 636-2 Structural application

Table 6: Pullover test of washer

Washer	Fastener ¹³⁾ Guardian															R _k : Characteristic values of axial load resistance	Durability according to EAD 030351-00-0402	
	ACS 6.1	BS 4.8	BS 5.5	BS 6.1	BS 6.8	BSHD 4.8	BSRF 4.8	CS 6.1 / CS S 6.1	DB(A) 4.8	DBT(A) 4.8	DBT(A)-S 4.8	HD 6.1	LBS 6.0 / LBS S 6.0	LBS-8.0	PS 4.8			TS 5.2
SP-40 – D/F/DD/FD	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	3.88	Approved
SP-40-LBS	-													X			4.29	Approved
SP-50-D. F. S	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	4.83	Approved
SPB-50-S	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	4.83	Approved
SP-70-D. F. S	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	2.88	Approved
SP 8240-D/F/S	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	5.30	Approved
SPA 8240-D/F	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	5.00	Approved
STBS	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	3.68	Approved
Sleeve R23 – STBT	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	1.78	Approved
Sleeve R23 – STBS7T15	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	1.78	Approved
Guardian screw-STBS7T15	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	3.68	Approved
STBST	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	3.68	Approved
Sarnabar + R23	X	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	1.78	Approved
Sarnabar + Guardian screw	-	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	5.00	Approved
GWSP (*)-80-F2E	-	-	X	X	X	-	-	X	-	-	-	-	X	-	-	X	2.48	Approved
Sleeve GWT + GWSP (*)-80-F4E	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	3.17	Approved
Sleeve R 45	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	1.58	Approved
Sleeve RPA 45	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	3.00	Approved
Sleeve R 48	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	1.58	Approved
Sleeve RPA 48	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	3.00	Approved
Sleeve RB 48	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	1.58	Approved
Sleeve RBPA 48	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	3.00	Approved
Sleeve RBS 50	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	1.58	Approved
Sleeve R 75	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	1.58	Approved
Sleeve TBPP 8040	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	1.58	Approved
Sleeve TBPA 8040	-	X	X	X	X	X	X	X	-	-	-	X	X	-	X	X	2.52	Approved
PP 45	-	X	X	X	-	X	X	X	-	-	-	-	X	-	X	X	2.50	Approved
Sleeve HR 45	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.58	Approved
Sleeve HR 48	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.58	Approved
Sleeve HR 75	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.58	Approved
Sleeve R45-LN	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	1.58	Approved
Sleeve R48-LN	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	1.58	Approved
Sleeve R75-LN	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	1.58	Approved

¹³⁾Obtained values from the axial load test in different substrates (table 2 - 5) and the pullover test (table 6) of washers/sleeves are compared and the lowest of the two gives the characteristic value for the fastener / sleeve, washer combination of the application.