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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

MEMBER OF EOTA

European Technical Assessment ETA-18/0880 of 2020/08/10

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:	Hilti S-MD; Hilti S-MDW; Hilti S-MP; Hilti S-MS
Product family to which the above construction product belongs:	Fastening screws for metal members and sheeting
Manufacturer:	Hilti AG Feldkircherstrasse 100 FL 9494 SCHAAN Principality of Liechtenstein
Manufacturing plant:	Hilti AG – Plant 2855 Hilti AG – Plant 4330 Hilti AG – Plant 7855
This European Technical Assessment contains:	100 pages including 90 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	EAD 330046-01-0602, Fastening Screws for Metal Members and Sheeting
This version replaces:	The ETA with the same number issued on 2019-05-14

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of the product and intended use

Technical description of the product

The fastening screws are self-drilling, self-piercing or self-tapping screws made of austenitic stainless steel A2 or A4 according to EN ISO 3506 (listed in Table 1). The fastening screws are normally completed with sealing washers consisting of metal washer made of austenitic stainless steel A2 according to EN ISO 3506 and EPDM seal.

Table 1 – Fastening screws of the corresponding ETA and their field of application

Annex	Product	Washer	Component I	Component II
1	General Annex - Terms and explanations			
2	General Annex - Design			
3	General Annex – Installation and additional provisions			
4 - 7	Drawings and materials of the screws			
8	Regulations for perforated steel sheets			
9	Regulations for perforated steel sheets			
10	S-MS 01 S 4,8xL S-MS 01 SS 4,8xL S-MS 01 PS 4,8xL S-MS 01 PSS 4,8xL	none	Steel S280GD to S350GD 0,40 mm ≤ t_I ≤ 1,25 mm	Steel S280GD to S350GD 0,40 mm ≤ t_{II} ≤ 1,25 mm
11			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_I ≤ 1,20 mm	Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_{II} ≤ 1,20 mm
12			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_I ≤ 1,20 mm	Steel S280GD to S350GD 0,50 mm ≤ t_{II} ≤ 1,25 mm
13			Steel S280GD to S350GD 0,40 mm ≤ t_I ≤ 1,25 mm	Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_I ≤ 1,20 mm
14	S-MS 41 S 4,8xL S-MS 41 SS 4,8xL S-MS 51 S 4,8xL S-MS 51 SS 4,8xL S-MS 41 PS 4,8xL S-MS 41 PSS 4,8xL S-MS 51 PS 4,8xL S-MS 51 PSS 4,8xL	14 mm and 16 mm	Steel S280GD to S350GD 0,40 mm ≤ t_I ≤ 1,25 mm	Steel S280GD to S350GD 0,40 mm ≤ t_{II} ≤ 1,25 mm
15			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 Steel S280GD to S350GD 0,50 mm ≤ t_I ≤ 1,20 mm	Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_{II} ≤ 1,20 mm
16			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_I ≤ 1,20 mm	Steel S280GD to S350GD 0,50 mm ≤ t_{II} ≤ 1,25 mm
17	S-MS 31 PS 4,8xL S-MS 31 PSS 4,8xL	12 mm	Steel S280GD to S350GD 0,40 mm ≤ t_I ≤ 1,25 mm	Steel S280GD to S350GD 0,40 mm ≤ t_{II} ≤ 1,25 mm
18			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 Steel S280GD to S350GD 0,50 mm ≤ t_I ≤ 1,20 mm	Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_{II} ≤ 1,20 mm
19			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_I ≤ 1,20 mm	Steel S280GD to S350GD 0,50 mm ≤ t_{II} ≤ 1,25 mm
20	S-MD 01 S 4,8xL S-MD 01 SS 4,8xL	none	Steel S280GD to S350GD 0,63 mm ≤ t_I ≤ 1,25 mm	Steel S235 to S355 Steel S280GD to S350GD 0,63 mm ≤ t_{II} ≤ 1,25 mm

Annex	Product	Washer	Component I	Component II
21	S-MD 51 S 4,8xL S-MD 51 SS 4,8xL S-MD 61 S 4,8xL S-MD 61 SS 4,8xL	16 mm and 19 mm	Steel S280GD to S320GD 0,63 mm ≤ t_I ≤ 1,25 mm	Steel S235 Steel S280GD to S320GD 0,63 mm ≤ t_{II} ≤ 1,25 mm
22	S-MD 31 PS 4,8xL S-MD 31 PSS 4,8xL	12 mm	Steel S280GD to S350GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S350GD 0,63 mm ≤ t_{II} ≤ 2,00 mm Structural timber
23			Aluminium alloy with R_m ≥ 185 N/mm² Steel S280GD to S350GD 0,50 mm ≤ t_I ≤ 1,50 mm	Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_{II} ≤ 1,50 mm Structural timber
24	S-MD 01 S 5,5xL S-MD 01 SS 5,5xL	none	Steel S280GD to S350GD 0,63 mm ≤ t_I ≤ 1,50 mm	Steel S235 to S355 Steel S280GD to S350GD 0,63 mm ≤ t_{II} ≤ 2,00 mm
25	S-MD 51 S 5,5xL S-MD 51 SS 5,5xL	16 mm	Steel S280GD to S320GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S320GD 0,63 mm ≤ t_{II} ≤ 2,00 mm
26			Steel S320GD to S350GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S275 Steel S320GD to S350GD 0,63 mm ≤ t_{II} ≤ 2,00 mm
27	S-MD 51 S 5,5xL S-MD 51 SS 5,5xL S-MD 61 S 5,5xL S-MD 61 SS 5,5xL S-MD 71 S 5,5xL S-MD 71 SS 5,5xL	16 mm, 19 mm and 22 mm	Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 1,30 mm Steel S280GD to S350GD 0,40 mm ≤ t_I ≤ 1,25 mm	Structural timber
28	S-MD 31 PS 5,5xL S-MD 31 PSS 5,5xL	12 mm	Steel S280GD to S350GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S350GD 0,63 mm ≤ t_{II} ≤ 1,75 mm or 2x0,63 mm ≤ t_{II} ≤ 2x1,13 mm
29			Aluminium alloy with R_m ≥ 185 N/mm² Steel S280GD to S350GD 0,50 mm ≤ t_I ≤ 1,50 mm	Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_{II} ≤ 2,00 mm
30			Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S350GD 0,63 mm ≤ t_{II} ≤ 1,75 mm or 2x0,63 mm ≤ t_{II} ≤ 2x1,13 mm
31	S-MD 01 LS 5,5xL S-MD 01 LSS 5,5xL S-MD 01 LPS 5,5xL S-MD 01 LPSS 5,5xL	none	Steel S320GD to S350GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S275 to S355 Steel S320GD to S350GD 0,63 mm ≤ t_{II} ≤ 1,75 mm
32	S-MD 01 LS 5,5xL S-MD 01 LSS 5,5xL	none	Aluminium alloy with R_m ≥ 185 N/mm² 1,00 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_{II} ≤ 2,00 mm
33			Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S275 to S355 Steel S320GD to S390GD 0,63 mm ≤ t_{II} ≤ 2,00 mm
34			Steel S320GD to S350GD 0,63 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² 1,00 mm ≤ t_{II} ≤ 3,00 mm
35	S-MD 01 LPS 5,5xL S-MD 01 LPSS 5,5xL	none	Aluminium alloy with R_m ≥ 185 N/mm² 1,00 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_{II} ≤ 2,00 mm
36			Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S350GD 0,63 mm ≤ t_{II} ≤ 2,00 mm
37			Steel S320GD to S350GD 0,63 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_{II} ≤ 2,00 mm

Annex	Product	Washer	Component I	Component II
38	S-MD 31 LPS 5,5xL S-MD 31 LPSS 5,5xL	12 mm	Steel S280GD to S320GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S320GD 2x0,63 mm ≤ t_{II} ≤ 2x1,75 mm
39			Steel S320GD to S350GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S275 Steel S320GD to S350GD 2x0,63 mm ≤ t_{II} ≤ 2x1,75 mm
40			Steel S280GD to S320GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S320GD 0,63 mm ≤ t_{II} ≤ 1,75 mm
41			Steel S320GD to S350GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S275 Steel S320GD to S350GD 0,63 mm ≤ t_{II} ≤ 1,75 mm
42			Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S350GD 0,63 mm ≤ t_{II} ≤ 1,50 mm 2x0,63 mm ≤ t_{II} ≤ 2x1,50 mm
43			Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_{II} ≤ 2,00 mm
44			Steel S280GD to S350GD 0,63 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² 1,00 mm ≤ t_{II} ≤ 3,00 mm
45	S-MD 41 LS 5,5xL S-MD 51 LS 5,5xL S-MD 51 LSS 5,5xL S-MD 61 LS 5,5xL S-MD 61 LSS 5,5xL S-MD 71 LS 5,5xL S-MD 71 LSS 5,5xL S-MD 41 LPS 5,5xL S-MD 51 LPS 5,5xL S-MD 51 LPSS 5,5xL S-MD 61 LPS 5,5xL S-MD 61 LPSS 5,5xL S-MD 71 LPS 5,5xL S-MD 71 LPSS 5,5xL	14 mm, 16 mm, 19 mm and 22 mm	Steel S280GD to S320GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S320GD 2x0,63 mm ≤ t_{II} ≤ 2x1,50 mm
46			Steel S320GD to S350GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S275 Steel S320GD to S350GD 2x0,63 mm ≤ t_{II} ≤ 2x1,50 mm
47			Steel S280GD to S320GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S320GD 0,63 mm ≤ t_{II} ≤ 1,75 mm
48			Steel S320GD to S350GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S275 Steel S320GD to S350GD 0,63 mm ≤ t_{II} ≤ 1,75 mm
49			Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S350GD 0,63 mm ≤ t_{II} ≤ 1,50 mm 2x0,63 mm ≤ t_{II} ≤ 2x1,50 mm
50			Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_{II} ≤ 2,00 mm
51			Steel S280GD to S350GD 0,63 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² 1,00 mm ≤ t_{II} ≤ 3,00 mm
52	S-MD 03 S 5,5xL S-MD 03 SS 5,5xL S-MD 03 PS 5,5xL S-MD 03 PSS 5,5xL	none	Steel S280GD to S390GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 Steel S280GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm
53	S-MD 03 S 5,5xL S-MD 03 SS 5,5xL	none	Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² 1,50 mm ≤ t_{II} ≤ 4,00 mm
54			Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 Steel S280GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm
55			Steel S280GD to S390GD 0,63 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² 1,50 mm ≤ t_{II} ≤ 4,00 mm

Annex	Product	Washer	Component I	Component II
56	S-MD 03 PS 5,5xL S-MD 03 PSS 5,5xL	none	Aluminium alloy with R_m ≥ 185 N/mm^2 0,50 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm^2 1,00 mm ≤ t_{II} ≤ 4,00 mm
57			Aluminium alloy with R_m ≥ 185 N/mm^2 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 Steel S280GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm
58			Steel S280GD to S390GD 0,63 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm^2 1,00 mm ≤ t_{II} ≤ 4,00 mm
59	S-MD 53 S 5,5xL S-MD 53 SS 5,5xL S-MD 63 S 5,5xL S-MD 63 SS 5,5xL S-MD 73 S 5,5xL S-MD 73 SS 5,5xL	16 mm, 19 mm and 22 mm	Steel S280GD to S390GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 Steel S280GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm
60			Steel S320GD to S390GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S275 to S355 Steel S320GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm
61	S-MD 43 S 5,5xL S-MD 43 SS 5,5xL S-MD 53 S 5,5xL S-MD 53 SS 5,5xL S-MD 63 S 5,5xL S-MD 63 SS 5,5xL S-MD 73 S 5,5xL S-MD 73 SS 5,5xL	14 mm, 16 mm, 19 mm and 22 mm	Aluminium alloy with R_m ≥ 185 N/mm^2 Steel S280GD to S350GD 0,50 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm^2 Steel S280GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm
62	S-MD 43 S 5,5xL S-MD 43 SS 5,5xL	14 mm	Steel S280GD to S390GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 Steel S280GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm
63			Steel S320GD to S390GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S275 to S355 Steel S320GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm
64	S-MD 33 PS 5,5xL S-MD 33 PSS 5,5xL	12 mm	Steel S280GD to S390GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 Steel S280GD to S390GD 0,75 mm ≤ t_{II} ≤ 1,25 mm or 2x0,75 mm ≤ t_{II} ≤ 2x1,25 mm
65			Steel S280GD to S390GD 0,63 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm^2 1,00 mm ≤ t_{II} ≤ 4,00 mm
66			Aluminium alloy with R_m ≥ 185 N/mm^2 0,50 mm ≤ t_I ≤ 1,50 mm	Aluminium alloy with R_m ≥ 185 N/mm^2 1,00 mm ≤ t_{II} ≤ 5,00 mm
67			Aluminium alloy with R_m ≥ 185 N/mm^2 0,50 mm ≤ t_I ≤ 1,50 mm	Steel S235 to S355 Steel S280GD to S390GD 0,75 mm ≤ t_{II} ≤ 1,25 mm or 2x0,75 mm ≤ t_{II} ≤ 2x1,25 mm
68	S-MD 03 S 6,3xL S-MD 03 SS 6,3xL	none	Steel S280GD to S390GD 0,63 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 Steel S280GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm
69	S-MD 53 S 6,3xL S-MD 53 SS 6,3xL S-MD 63 S 6,3xL S-MD 63 SS 6,3xL S-MD 73 S 6,3xL S-MD 73 SS 6,3xL	16 mm, 19 mm and 22 mm	Steel S280GD to S390GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 Steel S280GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm
70			Steel S320GD to S390GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S275 to S355 Steel S320GD to S390GD 1,50 mm ≤ t_{II} ≤ 4,00 mm

Annex	Product	Washer	Component I	Component II
71	S-MD 05 S 5,5xL S-MD 05 SS 5,5xL S-MD 05 PS 5,5xL S-MD 05 PSS 5,5xL	none	Steel S280GD to S350GD 0,40 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 with R_m ≤ 560 N/mm^2 4,00 mm ≤ t_{II} ≤ 13,00 mm Steel S280GD to S450GD 2x0,50 mm ≤ t_{II} ≤ 2x2,00 mm
72			Steel S390GD to S450GD 0,40 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 with R_m ≤ 560 N/mm^2 4,00 mm ≤ t_{II} ≤ 13,00 mm Steel S390GD to S450GD 2x0,50 mm ≤ t_{II} ≤ 2x2,00 mm
73		none	Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 with R_m ≤ 560 N/mm^2 4,00 mm ≤ t_{II} ≤ 13,00 mm Steel S280GD to S450GD 2x0,50 mm ≤ t_{II} ≤ 2x2,00 mm
74			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 Steel S280GD to S450GD 0,50 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 4,00 mm ≤ t_{II} ≤ 12,00 mm
75	S-MD 55 S 5,5xL S-MD 55 SS 5,5xL S-MD 65 S 5,5xL S-MD 65 SS 5,5xL S-MD 75 S 5,5xL S-MD 75 SS 5,5xL S-MD 55 PS 5,5xL S-MD 55 PSS 5,5xL S-MD 65 PS 5,5xL S-MD 65 PSS 5,5xL S-MD 75 PS 5,5xL S-MD 75 PSS 5,5xL	16 mm, 19 mm and 22 mm	Steel S280GD to S350GD 0,40 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 with R_m ≤ 560 N/mm^2 4,00 mm ≤ t_{II} ≤ 13,00 mm Steel S280GD to S450GD 2x0,50 mm ≤ t_{II} ≤ 2x2,00 mm
76			Steel S390GD to S450GD 0,40 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 with R_m ≤ 560 N/mm^2 4,00 mm ≤ t_{II} ≤ 13,00 mm Steel S390GD to S450GD 2x0,50 mm ≤ t_{II} ≤ 2x2,00 mm
77			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 with R_m ≤ 560 N/mm^2 4,00 mm ≤ t_{II} ≤ 13,00 mm Steel S280GD to S450GD 2x0,50 mm ≤ t_{II} ≤ 2x2,00 mm
78			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 Steel S280GD to S450GD 0,50 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 4,00 mm ≤ t_{II} ≤ 12,00 mm
79	S-MD 35 PS 5,5xL S-MD 35 PSS 5,5xL	12 mm	Steel S280GD to S350GD 0,40 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 with R_m ≤ 560 N/mm^2 4,00 mm ≤ t_{II} ≤ 13,00 mm Steel S280GD to S450GD 2x0,50 mm ≤ t_{II} ≤ 2x2,00 mm
80			Steel S390GD to S450GD 0,40 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 with R_m ≤ 560 N/mm^2 4,00 mm ≤ t_{II} ≤ 13,00 mm Steel S390GD to S450GD 2x0,50 mm ≤ t_{II} ≤ 2x2,00 mm
81			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 with R_m ≤ 560 N/mm^2 4,00 mm ≤ t_{II} ≤ 13,00 mm Steel S280GD to S450GD 2x0,50 mm ≤ t_{II} ≤ 2x2,00 mm
82			Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 Steel S280GD to S450GD 0,50 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 165 N/mm^2 or R_m ≥ 215 N/mm^2 4,00 mm ≤ t_{II} ≤ 12,00 mm

Annex	Product	Washer	Component I	Component II
83	S-MDW 01 S 6,5xL S-MDW 01 SS 6,5xL S-MDW 01 PS 6,5xL S-MDW 01 PSS 6,5xL	none	Steel S280GD to S450GD 0,40 mm ≤ t_I ≤ 1,50 mm	Structural timber
84	S-MDW 51 S 6,5xL S-MDW 51 SS 6,5xL S-MDW 51 PS 6,5xL S-MDW 51 PSS 6,5xL	16 mm	Steel S280GD to S450GD 0,40 mm ≤ t_I ≤ 1,50 mm	Structural timber
85	S-MDW 61 S 6,5xL S-MDW 61 SS 6,5xL S-MDW 71 S 6,5xL S-MDW 71 SS 6,5xL S-MDW 61 PS 6,5xL S-MDW 61 PSS 6,5xL S-MDW 71 PS 6,5xL S-MDW 71 PSS 6,5xL	19 mm and 22 mm	Steel S280GD to S450GD 0,40 mm ≤ t_I ≤ 1,50 mm	Structural timber
86	S-MDW 01 S 6,5xL S-MDW 01 SS 6,5xL S-MDW 51 S 6,5xL S-MDW 51 SS 6,5xL S-MDW 61 S 6,5xL S-MDW 61 SS 6,5xL S-MDW 71 S 6,5xL S-MDW 71 SS 6,5xL S-MDW 01 PS 6,5xL S-MDW 01 PSS 6,5xL S-MDW 51 PS 6,5xL S-MDW 51 PSS 6,5xL S-MDW 61 PS 6,5xL S-MDW 61 PSS 6,5xL S-MDW 71 PS 6,5xL S-MDW 71 PSS 6,5xL	None, 16 mm, 19 mm and 22 mm	Aluminium alloy with R_m ≥ 185 N/mm² 0,40 mm ≤ t_I ≤ 1,50 mm	Structural timber
87	S-MP 52 S 6,3xL S-MP 52 SS 6,3xL S-MP 62 S 6,3xL S-MP 62 SS 6,3xL S-MP 72 S 6,3xL S-MP 72 SS 6,3xL	16 mm, 19 mm and 22 mm	Steel S280GD to S320GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S320GD t_{II} ≥ 1,25 mm
88	S-MP 54 S 6,3xL S-MP 54 SS 6,3xL S-MP 64 S 6,3xL S-MP 64 SS 6,3xL S-MP 74 S 6,3xL S-MP 74 SS 6,3xL	16 mm, 19 mm and 22 mm	Steel S280GD to S420GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 to S355 Steel S280GD to S420GD t_{II} ≥ 1,25 mm
89	S-MP 53 S 6,5xL S-MP 53 SS 6,5xL S-MP 63 S 6,5xL S-MP 63 SS 6,5xL S-MP 73 S 6,5xL S-MP 73 SS 6,5xL	16 mm, 19 mm and 22 mm	Steel S280GD to S320GD 0,50 mm ≤ t_I ≤ 2,00 mm	Steel S235 Steel S280GD to S320GD 0,63 mm ≤ t_{II} ≤ 3,00 mm Structural timber
90			Aluminium alloy with R_m ≥ 185 N/mm² 0,50 mm ≤ t_I ≤ 2,00 mm	Aluminium alloy with R_m ≥ 185 N/mm² Steel S280GD to S350GD 0,50 mm ≤ t_{II} ≤ 3,00 mm Structural timber

2 Specification of the intended use in accordance with the applicable EAD 330046-01-0602

The fastening screws are intended to be used for fastening metal sheeting made of steel according to EN 10346 or aluminium alloy according to EN 485 or EN 573 to substructures made of steel according to EN 10025 or EN 10346, aluminium alloy according to EN 485 or EN 573 or structural timber according to EN 14081. The sheeting can either be used as wall or roof cladding or as load bearing wall and roof element. The fastening screws can also be used for the fastening of any other thin gauge metal members. The intended use comprises fastening screws and connections for indoor and outdoor applications.

Fastening screws which are intended to be used in external environments with ≥ C2 corrosion according to the standard EN ISO 12944-2 are made of stainless steel. Furthermore, the intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads). The fastening screws are not intended for re-use.

The performances given in Section 3 are only valid if the fastening screws are used in compliance with the specifications and conditions given in Annex 1 to 90.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the screws of 25 years.

The indications given on the intended working life cannot be interpreted as a guarantee given by the producer or the Technical Assessment Body, but are to be regarded only as a means for selecting the appropriate products in relation to the expected economically reasonable working life of the works.

The real working life might be, in normal use conditions, considerably longer without major degradation affecting the Basic requirements for construction works.

3 Performance of the product and references to the methods used for its assessment

Performances of the fasteners, related to the basic requirements for construction works (hereinafter BWR), were determined according to EAD 330046-01-0602.

These performances, given in the following paragraphs, are valid as long as the components are the ones described in § 1 and Annexes 1 to 90 of this ETA.

Characteristic		Assessment of characteristic
3.1	**Mechanical resistance and stability (BWR 1)**	
	Shear Resistance of the Connection	See Annex to this ETA
	Tension Resistance of the Connection	See Annex to this ETA
	Design Resistance in case of combined Tension and Shear Forces (interaction)	See Annex 2 to this ETA
	Check of Deformation Capacity in case of constraining forces due to temperature	See Annex 2 to this ETA
	Durability	See Annex 4 to 7, material of the fasteners
3.2	**Safety in case of fire (BWR2)**	
	Reaction to fire	The screws are made from steel classified as Euroclass A1 in accordance with EN 13501-1 and Commission Delegated Regulation 2016/364

4 Attestation and verification of constancy of performance (AVCP)

4.1 AVCP system

According to the decision 1998/214/EC of the European Commission 1, as amended by 2001/596/EC, the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is:

2+

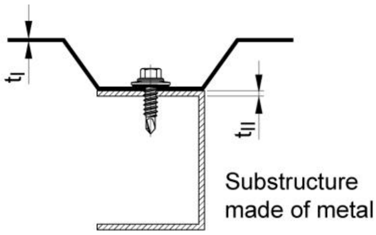
5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

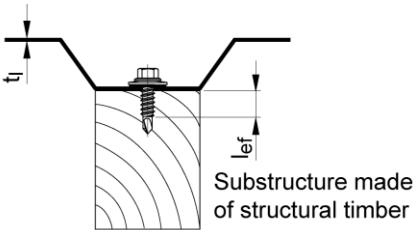
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2020-08-10 by

Thomas Bruun
Managing Director, ETA-Danmark

Examples of execution of a connection





Materials and dimensions

Design relevant materials and dimensions are indicated in the Annexes of the fastening screws:

Fastener	Material of the fastening screw
Washer	Material of the sealing washer
Component I	Material of the metal member or sheeting
Component II	Material of the substructure
t_I	Thickness of component I
t_{II}	Thickness of component II made of metal
l_{ef}	Effective screw-in length in component II made of structural timber (without drill point)
d_{pd}	Predrill diameter of component I and component II
$d_{pd,I}$	Predrill diameter of component I

The thickness t_{II} corresponds to the load-bearing screw-in length of the fastening screw in component II, if the load-bearing screw-in length does not cover the entire component thickness.

Performance characteristics

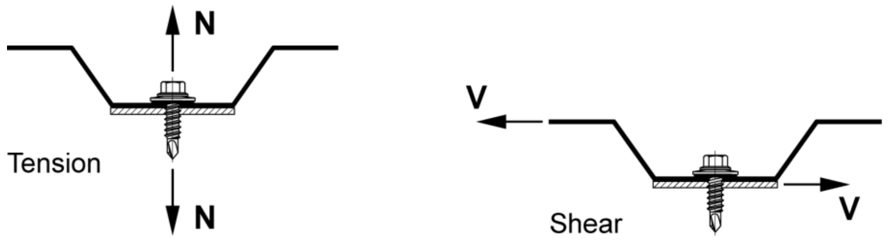
The design relevant performance characteristics of a connection are indicated in the Annexes of the fastening screws:

$N_{R,k}$	Characteristic value of tension resistance
$V_{R,k}$	Characteristic value of shear resistance

In some cases component-specific performance characteristics are indicated for an individual calculation of the design relevant performance characteristics of a connection:

$N_{R,I,k}$	Characteristic value of pull-through resistance for component I
$N_{R,II,k}$	Characteristic value of pull-out resistance for component II
$V_{R,I,k}$	Characteristic value of hole bearing resistance for component I
$V_{R,II,k}$	Characteristic value of hole bearing resistance for component II
$M_{y,Rk}$	Characteristic value of yield moment of the fastening screw (for component II made of structural timber)
$f_{ax,k}$	Characteristic value of withdrawal strength for component II made of structural timber
$f_{h,k}$	Characteristic value of embedding strength for component II made of structural timber

Occurred loadings of a connection



Design values

The design values of tension and shear resistance of a connection have to be determined as follows:

$$N_{R,d} = \frac{N_{R,k}}{\gamma_M} \qquad V_{R,d} = \frac{V_{R,k}}{\gamma_M}$$

$N_{R,d}$	Design value of tension resistance
$V_{R,d}$	Design value of shear resistance
γ_M	Partial safety factor

The recommended partial safety factor γ_M is 1,33, provided no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

Special conditions

If the component thickness t_I or t_{II} lies in between two indicated component thicknesses, the characteristic value may be calculated by linear interpolation.

For asymmetric components II made of metal (e.g. Z- or C-shaped profiles) with component thickness t_{II} < 5 mm, the characteristic value $N_{R,k}$ has to be reduced to 70%.

In case of combined loading by tension and shear forces the following interaction equation has to be taken into account:

$$\frac{N_{S,d}}{N_{R,d}} + \frac{V_{S,d}}{V_{R,d}} \leq 1{,}0$$

$N_{S,d}$	Design value of the applied tension forces
$V_{S,d}$	Design value of the applied shear forces

Types of connection

For the types of connection (a, b, c, d) given in the Annexes of the fastening screws, it is not necessary to take into account the effect of constraints due to temperature. For other types of connection, the effect of constraints have to be taken into account, unless they do not occur or are not significant (e.g. sufficient flexibility of the substructure).

Installation conditions

The installation is carried out according to manufacturer's instruction.

The load bearing screw-in length of the fastening screw specified by the manufacturer has to be taken into account.

The fastening screws have to be processed with suitable drill driver (e.g. cordless drill driver with depth stop). The use of impact wrench is not allowed.

The fastening screws have to be fixed rectangular to the surface of the component.

Component I and component II have to be in direct contact to each other. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

Component I made is of perforated sheeting

The characteristic values of tension or shear resistance of the connection may be determined as follows:

$$N_{R,k} = \min \begin{cases} N_{R,I,k} \\ N_{R,k} \text{ or } N_{R,II,k} \end{cases} \qquad V_{R,k} = \min \begin{cases} V_{R,I,k} \\ V_{R,k} \end{cases}$$

$N_{R,I,k}$ and $V_{R,I,k}$ are given in Annex 8 and 9.
$N_{R,II,k}$, $N_{R,k}$ and $V_{R,k}$ are given in the corresponding Annexes 10-90.

Component I and/or component II are made of aluminum alloy

The characteristic value of tension resistance may be determined as follows:

$$N_{R,k} = \min \begin{cases} N_{R,I,k} \\ N_{R,II,k} \end{cases}$$

$N_{R,I,k}$ is determined according to EN 1999-1-4:2007 + AC:2009, equation (8.13).
$N_{R,II,k}$ is given in the annex of the fastening screw.
The characteristic value of shear resistance $V_{R,k}$ is given in the corresponding Annexes 10-90.

Component II made of timber

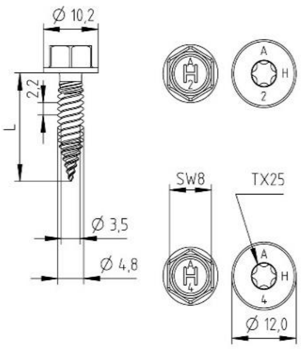
The characteristic values of tension and shear resistance for other k_{mod} or ρ_k as indicated in the Annex of the fastening screw can be determined as follows:

$$N_{R,k} = \min \begin{cases} N_{R,I,k} \\ N_{R,II,k} * k_{mod} \end{cases} \qquad V_{R,k} = \min \begin{cases} V_{R,I,k} \\ V_{R,II,k} * k_{mod} \end{cases}$$

$N_{R,I,k}$ and $V_{R,I,k}$ are given in the annex of the fastening screw.

$N_{R,II,k}$ is determined according to EN 1995-1-1:2004 + A1:2008, equation (8.40a), with $f_{ax,k}$ given in the Annex of the fastening screw.

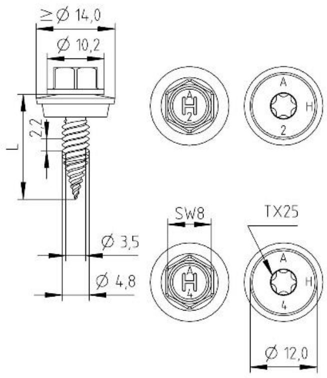
$V_{R,II,k}$ is determined according to EN 1995-1-1:2004 + A1:2008, equation (8.9), with $M_{y,Rk}$ given in the Annex of the fastening screw.



stainless steel A2 -
EN ISO 3506
Hilti S-MS 01 S 4,8xL
Hilti S-MS 01 PS 4,8xL

stainless steel A4 -
EN ISO 3506
Hilti S-MS 01 SS 4,8xL
Hilti S-MS 01 PSS 4,8xL

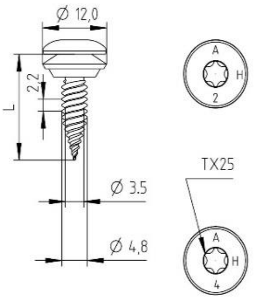
with hexagon or round head
without sealing washer
drilling capacity $\Sigma t_i \leq 2{,}50$ mm



stainless steel A2 -
EN ISO 3506
Hilti S-MS 41 S 4,8xL
Hilti S-MS 51 S 4,8xL
Hilti S-MS 41 PS 4,8xL
Hilti S-MS 51 PS 4,8xL

stainless steel A4 -
EN ISO 3506
Hilti S-MS 41 SS 4,8xL
Hilti S-MS 51 SS 4,8xL
Hilti S-MS 41 PSS 4,8xL
Hilti S-MS 51 PSS 4,8xL

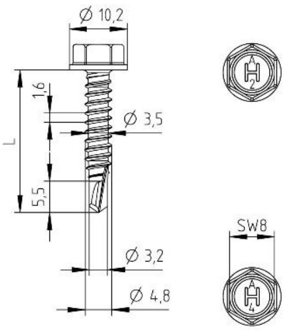
with hexagon or round head
with sealing washer Ø14 mm,
Ø16 mm
drilling capacity $\Sigma t_i \leq 2{,}50$ mm



stainless steel A2 -
EN ISO 3506
Hilti S-MS 31 PS 4,8xL

stainless steel A4 -
EN ISO 3506
Hilti S-MS 31 PSS 4,8xL

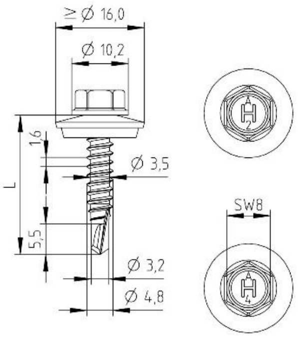
with round head
with sealing washer Ø12 mm
drilling capacity $\Sigma t_i \leq 2{,}50$ mm



stainless steel A2 -
EN ISO 3506
Hilti S-MD 01 S 4,8xL

stainless steel A4 -
EN ISO 3506
Hilti S-MD 01 SS 4,8xL

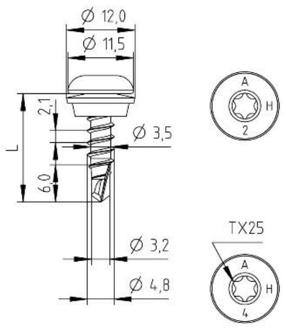
with hexagon head
without sealing washer
drilling capacity $\Sigma t_i \leq 2{,}00$ mm



stainless steel A2 -
EN ISO 3506
Hilti S-MD 51 S 4,8xL
Hilti S-MD 61 S 4,8xL

stainless steel A4 -
EN ISO 3506
Hilti S-MD 51 SS 4,8xL
Hilti S-MD 61 SS 4,8xL

with hexagon head
with sealing washer Ø16 mm,
Ø19 mm
drilling capacity $\Sigma t_i \leq 2{,}00$ mm

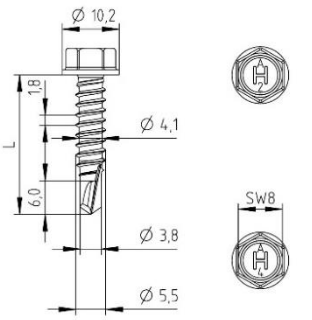


stainless steel A2 -
EN ISO 3506
Hilti S-MD 31 PS 4,8xL

stainless steel A4 -
EN ISO 3506
Hilti S-MD 31 PSS 4,8xL

with round head
with sealing washer Ø12 mm
drilling capacity $\Sigma t_i \leq 2{,}75$ mm

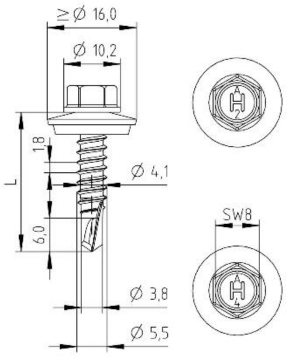
Drawings and materials	**Annex 4**
Fastening of screws for metal members and sheeting	



stainless steel A2 -
EN ISO 3506
Hilti S-MD 01 S 5,5xL

stainless steel A4 -
EN ISO 3506
Hilti S-MD 01 SS 5,5xL

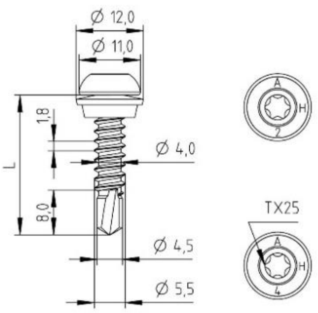
with hexagon head
without sealing washer
drilling capacity $\Sigma t_i \le 3{,}00$ mm



stainless steel A2 -
EN ISO 3506
Hilti S-MD 51 S 5,5xL
Hilti S-MD 61 S 5,5xL
Hilti S-MD 71 S 5,5xL

stainless steel A4 -
EN ISO 3506
Hilti S-MD 51 SS 5,5xL
Hilti S-MD 61 SS 5,5xL
Hilti S-MD 71 SS 5,5xL

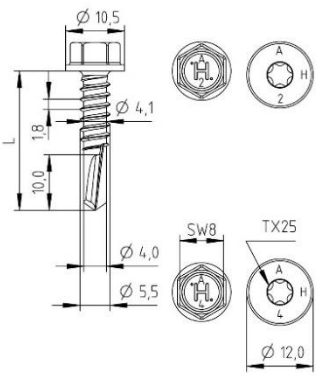
with hexagon head
with sealing washer Ø16 mm,
Ø19 mm, Ø22 mm
drilling capacity $\Sigma t_i \le 3{,}00$ mm



stainless steel A2 -
EN ISO 3506
Hilti S-MD 31 PS 5,5xL

stainless steel A4 -
EN ISO 3506
Hilti S-MD 31 PSS 5,5xL

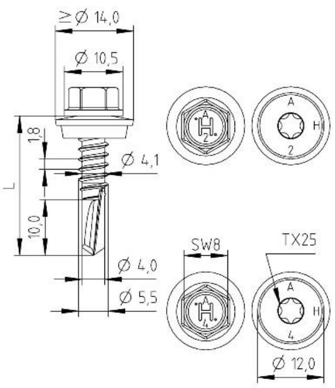
with round head
with sealing washer Ø12 mm
drilling capacity $\Sigma t_i \le 3{,}00$ mm



stainless steel A2 -
EN ISO 3506
Hilti S-MD 01 LS 5,5xL
Hilti S-MD 01 LPS 5,5xL

stainless steel A4 -
EN ISO 3506
Hilti S-MD 01 LSS 5,5xL
Hilti S-MD 01 LPSS 5,5xL

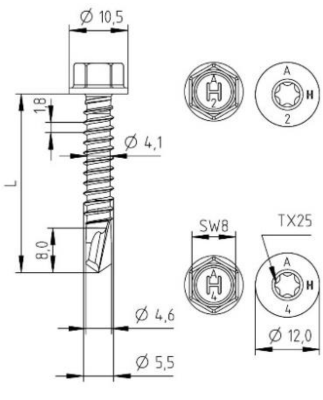
with hexagon head or round head
without sealing washer
drilling capacity $\Sigma t_i \le 4{,}00$ mm



stainless steel A2 -
EN ISO 3506
Hilti S-MD 41 LS 5,5xL
Hilti S-MD 51 LS 5,5xL
Hilti S-MD 61 LS 5,5xL
Hilti S-MD 71 LS 5,5xL
Hilti S-MD 41 LPS 5,5xL
Hilti S-MD 51 LPS 5,5xL
Hilti S-MD 61 LPS 5,5xL
Hilti S-MD 71 LPS 5,5xL

stainless steel A4 -
EN ISO 3506
Hilti S-MD 41 LSS 5,5xL
Hilti S-MD 51 LSS 5,5xL
Hilti S-MD 61 LSS 5,5xL
Hilti S-MD 71 LSS 5,5xL
Hilti S-MD 41 LPSS 5,5xL
Hilti S-MD 51 LPSS 5,5xL
Hilti S-MD 61 LPSS 5,5xL
Hilti S-MD 71 LPSS 5,5xL

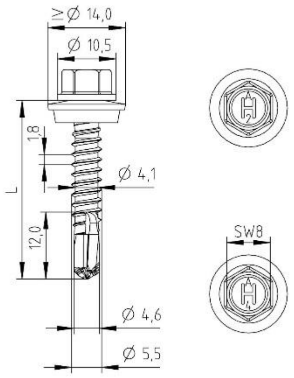
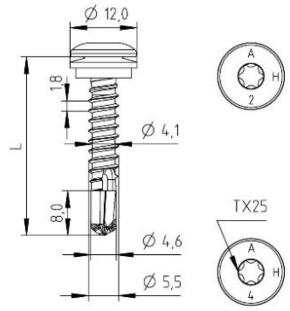
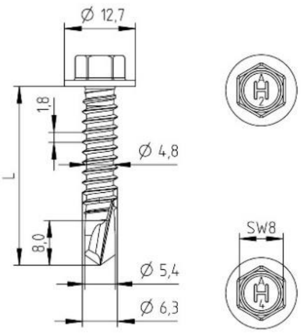
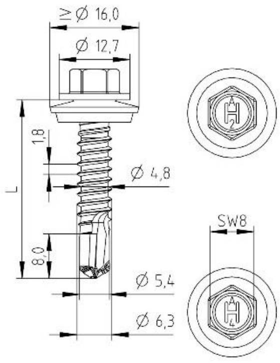
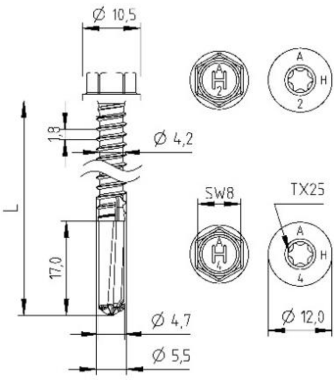
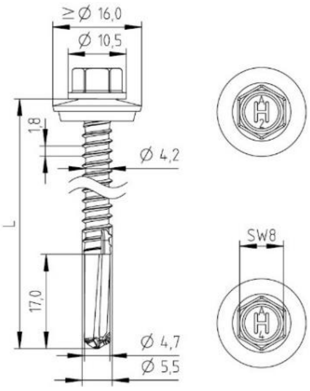
with hexagon head or round head
with sealing washer Ø14 mm,
Ø16 mm, Ø19 mm, Ø22 mm
drilling capacity $\Sigma t_i \le 4{,}00$ mm



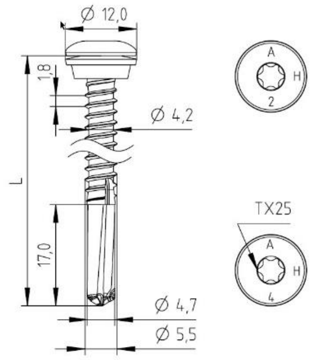
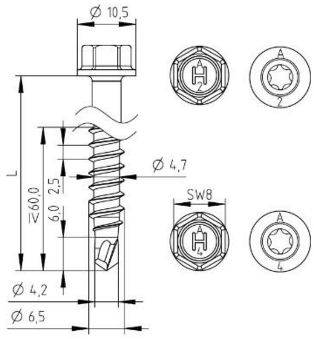
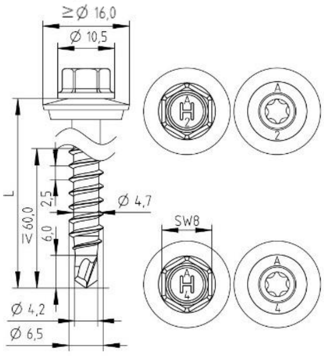
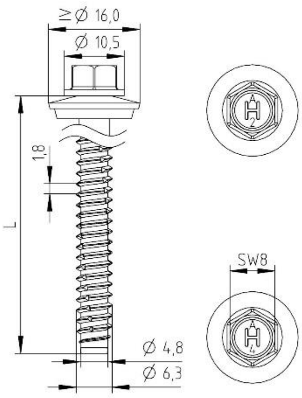
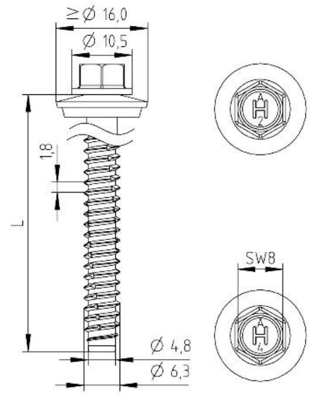
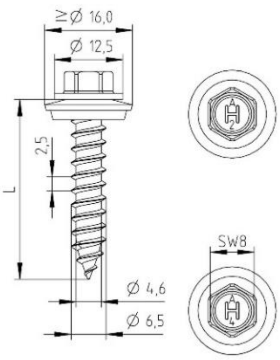
stainless steel A2 -
EN ISO 3506
Hilti S-MD 03 S 5,5xL
Hilti S-MD 03 PS 5,5xL

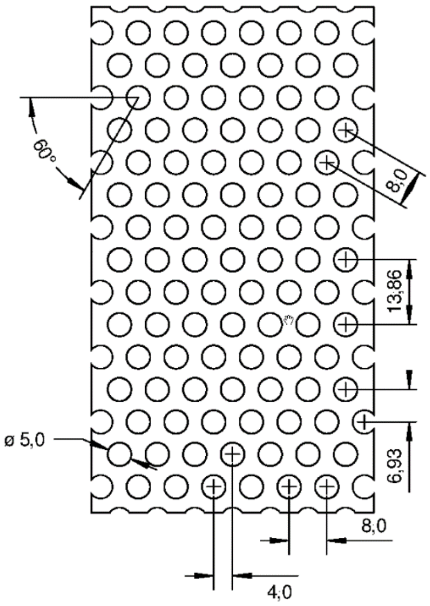
stainless steel A4 -
EN ISO 3506
Hilti S-MD 03 SS 5,5xL
Hilti S-MD 03 PSS 5,5xL

with hexagon head or round head
without sealing washer
drilling capacity $\Sigma t_i \le 6{,}00$ mm

	stainless steel A2 - EN ISO 3506 **Hilti S-MD 43 S 5,5xL** **Hilti S-MD 53 S 5,5xL** **Hilti S-MD 63 S 5,5xL** **Hilti S-MD 73 S 5,5xL** stainless steel A4 - EN ISO 3506 **Hilti S-MD 43 SS 5,5xL** **Hilti S-MD 53 SS 5,5xL** **Hilti S-MD 63 SS 5,5xL** **Hilti S-MD 73 SS 5,5xL** with hexagon head with sealing washer Ø14 mm, Ø16 mm, Ø19 mm, Ø22 mm drilling capacity $\Sigma t_i \leq$ 6,00 mm		stainless steel A2 - EN ISO 3506 **Hilti S-MD 33 PS 5,5xL** stainless steel A4 - EN ISO 3506 **Hilti S-MD 33 PSS 5,5xL** with round head with sealing washer Ø12 mm drilling capacity $\Sigma t_i \leq$ 6,00 mm
	stainless steel A2 - EN ISO 3506 **Hilti S-MD 03 S 6,3xL** stainless steel A4 - EN ISO 3506 **Hilti S-MD 03 SS 6,3xL** with hexagon head without sealing washer drilling capacity $\Sigma t_i \leq$ 6,00 mm		stainless steel A2 - EN ISO 3506 **Hilti S-MD 53 S 6,3xL** **Hilti S-MD 63 S 6,3xL** **Hilti S-MD 73 S 6,3xL** stainless steel A4 - EN ISO 3506 **Hilti S-MD 53 SS 6,3xL** **Hilti S-MD 63 SS 6,3xL** **Hilti S-MD 73 SS 6,3xL** with hexagon head with sealing washer Ø16 mm, Ø19 mm, Ø22 mm drilling capacity $\Sigma t_i \leq$ 6,00 mm
	stainless steel A2 - EN ISO 3506 **Hilti S-MD 05 S 5,5xL** **Hilti S-MD 05 PS 5,5xL** stainless steel A4 - EN ISO 3506 **Hilti S-MD 05 SS 5,5xL** **Hilti S-MD 05 PSS 5,5xL** with hexagon head or round head without sealing washer drilling capacity $\Sigma t_i \leq$ 15,00 mm		stainless steel A2 - EN ISO 3506 **Hilti S-MD 55 S 5,5xL** **Hilti S-MD 65 S 5,5xL** **Hilti S-MD 75 S 5,5xL** stainless steel A4 - EN ISO 3506 **Hilti S-MD 55 SS 5,5xL** **Hilti S-MD 65 SS 5,5xL** **Hilti S-MD 75 SS 5,5xL** with hexagon head with sealing washer Ø16 mm, Ø19 mm, Ø22 mm drilling capacity $\Sigma t_i \leq$ 15,00 mm

Drawings and materials	**Annex 6**
Fastening of screws for metal members and sheeting	

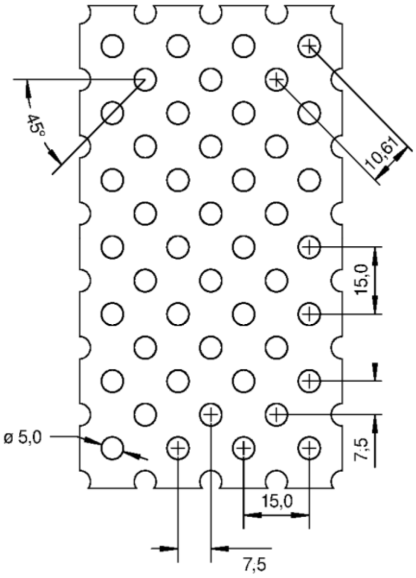
	stainless steel A2 - EN ISO 3506 **Hilti S-MD 35 PS 5,5xL** stainless steel A4 - EN ISO 3506 **Hilti S-MD 35 PSS 5,5xL** with round head with sealing washer Ø12 mm drilling capacity $\Sigma t_i \leq$ 15 mm		stainless steel A2 - EN ISO 3506 **Hilti S-MDW 01 S 6,5xL** **Hilti S-MDW 01 PS 6,5xL** stainless steel A4 - EN ISO 3506 **Hilti S-MDW 01 SS 6,5xL** **Hilti S-MDW 01 PSS 6,5xL** with hexagon head or round head without sealing washer drilling capacity $\Sigma t_i \leq$ 2,00 mm
	stainless steel A2 - EN ISO 3506 **Hilti S-MDW 51 S 6,5xL** **Hilti S-MDW 61 S 6,5xL** **Hilti S-MDW 71 S 6,5xL** **Hilti S-MDW 51 PS 6,5xL** **Hilti S-MDW 61 PS 6,5xL** **Hilti S-MDW 71 PS 6,5xL** stainless steel A4 - EN ISO 3506 **Hilti S-MDW 51 SS 6,5xL** **Hilti S-MDW 61 SS 6,5xL** **Hilti S-MDW 71 SS 6,5xL** **Hilti S-MDW 51 PSS 6,5xL** **Hilti S-MDW 61 PSS 6,5xL** **Hilti S-MDW 71 PSS 6,5xL** with hexagon head or round head with sealing washer Ø16 mm, Ø19 mm, Ø22 mm drilling capacity $\Sigma t_i \leq$ 2,00 mm		stainless steel A2 - EN ISO 3506 **Hilti S-MP 52 S 6,3xL** **Hilti S-MP 62 S 6,3xL** **Hilti S-MP 72 S 6,3xL** stainless steel A4 - EN ISO 3506 **Hilti S-MP 52 SS 6,3xL** **Hilti S-MP 62 SS 6,3xL** **Hilti S-MP 72 SS 6,3xL** with hexagon head with sealing washer Ø16 mm, Ø19 mm, Ø22 mm
	stainless steel A2 - EN ISO 3506 **Hilti S-MP 54 S 6,3xL** **Hilti S-MP 64 S 6,3xL** **Hilti S-MP 74 S 6,3xL** stainless steel A4 - EN ISO 3506 **Hilti S-MP 54 SS 6,3xL** **Hilti S-MP 64 SS 6,3xL** **Hilti S-MP 74 SS 6,3xL** with hexagon head with sealing washer Ø16 mm, Ø19 mm, Ø22 mm		stainless steel A2 - EN ISO 3506 **Hilti S-MP 53 S 6,5xL** **Hilti S-MP 63 S 6,5xL** **Hilti S-MP 73 S 6,5xL** stainless steel A4 - EN ISO 3506 **Hilti S-MP 53 SS 6,5xL** **Hilti S-MP 63 SS 6,5xL** **Hilti S-MP 73 SS 6,5xL** with hexagon head with sealing washer Ø16 mm, Ø19 mm, Ø22 mm



Fastening screws:	Self tapping screws from Ø 6,3 mm to Ø 6,5 mm and Self drilling screws from Ø 5,5 mm to Ø 6,3 mm
Materials:	
Fastener:	Stainless steel – A2 or A4 – EN ISO 3506
Washer:	Stainless steel – A2 or A4 – EN ISO 3506 with EPDM sealing washer
Component I:	S280GD to S450GD – EN 10346
Component II:	According to the Annex of the fastening screw

Sheet		Perforated sheets S280GD with $R_{m,min}$ = 360 N/mm²				Perforated sheets S320GD with $R_{m,min}$ = 390 N/mm²				Perforated sheets ≥ S350GD with $R_{m,min}$ ≥ 420 N/mm²			
Ø washer [mm]		16	19	22	25	16	19	22	25	16	19	22	25
$V_{R,I,k}$ [kN] for t_I [mm]	0,75	2,16	2,22	2,24	2,38	2,34	2,40	2,44	2,58	2,54	2,60	2,62	2,78
	0,88	2,56	2,64	2,64	2,78	2,78	2,86	2,86	3,02	3,00	3,10	3,10	3,26
	1,00	2,92	3,04	3,02	3,16	3,16	3,30	3,26	3,42	3,42	3,65	3,52	3,68
	1,13	3,32	3,48	3,42	3,56	3,60	3,76	3,70	3,86	3,88	4,10	4,00	4,16
	1,25	3,70	3,88	3,80	3,94	4,00	4,20	4,10	4,26	4,32	4,54	4,42	4,60
	1,50	4,46	4,74	4,56	4,72	4,84	5,12	4,96	5,10	5,22	5,54	5,34	5,50
$N_{R,I,k}$ [kN] for t_I [mm]	0,75	1,40	1,94	2,14	2,22	1,52	2,08	3,32	2,42	1,64	2,26	2,50	2,60
	0,88	1,82	2,34	2,62	2,70	1,96	2,54	2,82	2,92	2,12	2,74	3,04	3,14
	1,00	2,24	2,74	3,06	3,14	2,44	2,96	3,32	3,42	2,62	3,20	3,58	3,68
	1,13	2,74	3,18	3,58	3,64	2,98	3,44	3,88	3,96	3,20	3,70	4,18	4,26
	1,25	3,24	3,58	4,08	4,12	3,52	3,88	4,40	4,46	3,78	4,18	4,76	4,80
	1,50	4,36	4,46	5,12	5,12	4,74	4,84	5,56	5,56	5,10	5,22	5,98	5,98

The characteristic values $N_{R,k}$ and $V_{R,k}$ can be determined according to Annex 3.
The thickness t_I shall be at least 1,00 mm if component I is exposed to wind loads.



Fastening screws: Self tapping screws from Ø 6,3 mm to Ø 6,5 mm
and
Self drilling screws from Ø 5,5 mm to Ø 6,3 mm

Materials:

Fastener: Stainless steel – A2 or A4 – EN ISO 3506

Washer: Stainless steel – A2 or A4 – EN ISO 3506
with EPDM sealing washer

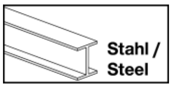
Component I: S280GD to S450GD – EN 10346

Component II: According to the Annex of the fastening screw

Sheet		Perforated sheets S280GD with $R_{m,min}$ = 360 N/mm²				Perforated sheets S320GD with $R_{m,min}$ = 390 N/mm²				Perforated sheets ≥ S350GD with $R_{m,min}$ ≥ 420 N/mm²			
Ø washer [mm]		16	19	22	25	16	19	22	25	16	19	22	25
$V_{R,I,k}$ [kN] for t_I [mm]	0,75	2,38	2,52	2,84	2,76	2,58	2,73	3,08	2,99	2,78	2,94	3,31	3,22
	0,88	3,02	3,12	3,42	3,32	3,27	3,38	3,70	3,60	3,52	3,64	3,99	3,87
	1,00	3,56	3,70	3,84	3,84	3,86	4,01	4,16	4,16	4,15	4,31	4,48	4,48
	1,13	4,14	4,26	4,40	4,40	4,48	4,61	4,77	4,77	4,83	4,97	5,13	5,13
	1,25	4,68	4,84	4,92	4,94	5,07	5,24	5,33	5,35	5,46	5,64	5,74	5,76
	1,50	5,76	6,04	5,90	6,10	6,24	6,54	6,39	6,61	6,72	7,04	6,88	7,11
$N_{R,I,k}$ [kN] for t_I [mm]	0,75	2,86	3,16	3,24	3,14	3,10	3,42	3,51	3,40	3,33	3,68	3,78	3,66
	0,88	3,40	3,72	3,76	3,70	3,68	4,03	4,07	4,01	3,96	4,34	4,38	4,31
	1,00	3,90	4,28	4,28	4,20	4,22	4,64	4,64	4,55	4,55	4,99	4,99	4,90
	1,13	4,44	4,86	4,88	4,72	4,81	5,26	5,29	5,11	5,18	5,67	5,69	5,50
	1,25	4,94	5,42	5,42	5,26	5,35	5,87	5,87	5,70	5,76	6,32	6,32	6,13
	1,50	6,00	6,60	6,60	6,38	6,50	7,15	7,15	6,91	7,00	7,70	7,70	7,44

The characteristic values $N_{R,k}$ and $V_{R,k}$ can be determined according to Annex 3.
The thickness t_I shall be at least 1,00 mm if component I is exposed to wind loads.

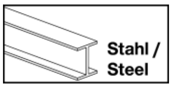
Application range:



Steel S280GD to S350GD

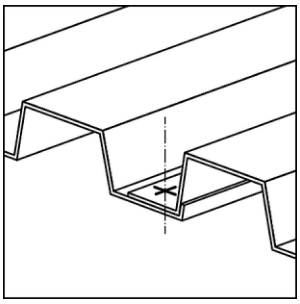
Component I: t_I = 0,40 to 1,25 mm

Component II: t_{II} = 0,40 to 1,25 mm



Steel S280GD to S350GD

Typical application:



Fastener:

S-MS 01 S(S) 4,8 x L
S-MS 01 PS(S) 4,8 x L

Washer: none

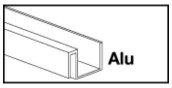
Drilling capacity in metal: $\Sigma t_i \leq 2,50$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,40	0,50	0,55	0,63	0,75	0,88	1,00	1,25
$V_{R,k}$ [kN]	**0,40**	0,78 —	0,91 —	0,98 —	1,09 —	1,25 ac	1,25 ac	1,25 ac	1,25 ac
	0,50	0,78 —	1,00 —	1,05 —	1,13 —	1,25 ac	1,25 ac	1,25 ac	1,25 ac
	0,55	0,78 —	1,00 —	1,30 —	1,30 —	1,30 —	1,30 —	1,30 —	1,30 —
	0,63	0,78 —	1,00 —	1,30 —	1,78 —	1,78 —	1,78 —	1,78 —	1,78 —
	0,75	0,78 —	1,00 —	1,30 —	1,78 —	2,50 —	2,50 —	2,50 —	2,50 —
	0,88	0,78 —	1,00 —	1,30 —	1,78 —	2,50 —	3,47 —	3,47 —	3,47 —
	1,00	0,78 —	1,00 —	1,30 —	1,78 —	2,50 —	3,47 —	4,37 —	4,37 —
	1,25	0,78 —	1,00 —	1,30 —	1,78 —	2,50 —	3,47 —	4,37 —	4,71 —
$N_{R,k}$ [kN]	**0,40**	0,46 —	0,76 —	0,77 —	0,77 —	0,77 —	0,77 —	0,77 —	0,77 —
	0,50	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,34 —	1,34 —	1,34 —
	0,55	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,53 —	1,53 —	1,53 —
	0,63	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,82 —	1,82 —
	0,75	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,27 —
	0,88	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,27 —
	1,00	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,27 —
	1,25	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,27 —

If both components I and II are made of S320GD or S350GD the grey highlighted values may be increased by 8,0%.

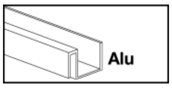
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

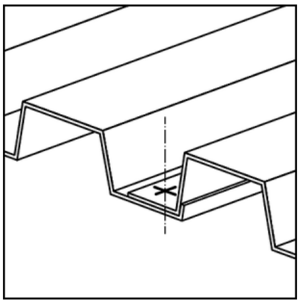
Component I: t_I = 0,50 to 1,20 mm

Component II: t_{II} = 0,50 to 1,20 mm



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

Typical application:



Fastener:

S-MS 01 S(S) 4,8 x L
S-MS 01 PS(S) 4,8 x L

Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 2{,}50$ mm

Performance for timber substructures not determined

Component I and component II made of aluminium alloy with $R_m \geq 165$ N/mm²

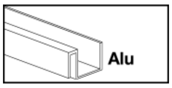
t_I [mm]		**t_{II}** [mm]					
		0,50	**0,60**	**0,70**	**0,80**	**1,00**	**1,20**
$V_{R,k}$ [kN]	**0,50**	1,01	1,01	1,01	1,01	1,01	1,01
	0,60	1,01	1,05	1,05	1,05	1,05	1,05
	0,70	1,01	1,05	1,08	1,08	1,08	1,08
	0,80	1,01	1,05	1,08	1,12	1,12	1,12
	1,00	1,01	1,05	1,08	1,12	1,72	1,72
	1,20	1,01	1,05	1,08	1,12	1,72	2,03
$N_{R,II,k}$ [kN]		0,27	0,38	0,48	0,59	0,76	1,03

Component I and component II made of aluminium alloy with $R_m \geq 215$ N/mm²

t_I [mm]		**t_{II}** [mm]					
		0,50	**0,60**	**0,70**	**0,80**	**1,00**	**1,20**
$V_{R,k}$ [kN]	**0,50**	1,32	1,32	1,32	1,32	1,32	1,32
	0,60	1,32	1,37	1,37	1,37	1,37	1,37
	0,70	1,32	1,37	1,41	1,41	1,41	1,41
	0,80	1,32	1,37	1,41	1,46	1,46	1,46
	1,00	1,32	1,37	1,41	1,46	2,25	2,25
	1,20	1,32	1,37	1,41	1,46	2,25	2,53
$N_{R,II,k}$ [kN]		0,35	0,49	0,63	0,77	1,00	1,29

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

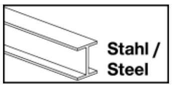
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm^2
Aluminium alloy with $R_m \geq 215$ N/mm^2

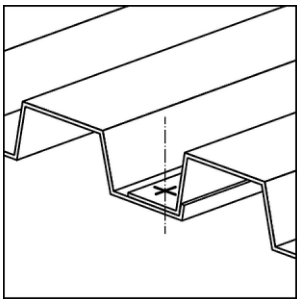
Component I: t_I = 0,50 to 1,20 mm

Component II: t_{II} = 0,50 to 1,25 mm



Steel S280GD to S350GD

Typical application:



Fastener:

S-MS 01 S(S) 4,8 x L
S-MS 01 PS(S) 4,8 x L

Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 2{,}50$ mm

Performance for timber substructures not determined

Component I of aluminium alloy with $R_m \geq 165$ N/mm^2

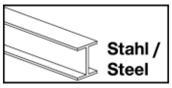
t_I [mm]	t_{II} [mm] 0,50	0,55	0,63	0,75	0,88	1,00	1,25
$V_{R,k}$ [kN] **0,50**	1,01 —	1,01 —	1,01 —	1,01 —	1,01 —	1,01 —	1,01 —
0,60	1,01 —	1,01 —	1,05 —	1,05 —	1,05 —	1,05 —	1,05 —
0,70	1,01 —	1,01 —	1,05 —	1,08 —	1,08 —	1,08 —	1,08 —
0,80	1,01 —	1,01 —	1,05 —	1,08 —	1,12 —	1,12 —	1,12 —
1,00	1,01 —	1,01 —	1,05 —	1,08 —	1,12 —	1,72 —	1,72 —
1,20	1,01 —	1,01 —	1,05 —	1,08 —	1,12 —	1,72 —	2,03 —
$N_{R,II,k}$ [kN]	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,49 —

Component I of aluminium alloy with $R_m \geq 215$ N/mm^2

t_I [mm]	t_{II} [mm] 0,50	0,55	0,63	0,75	0,88	1,00	1,25
$V_{R,k}$ [kN] **0,50**	1,32 —	1,32 —	1,32 —	1,32 —	1,32 —	1,32 —	1,32 —
0,60	1,32 —	1,32 —	1,37 —	1,37 —	1,37 —	1,37 —	1,37 —
0,70	1,32 —	1,32 —	1,37 —	1,41 —	1,41 —	1,41 —	1,41 —
0,80	1,32 —	1,32 —	1,37 —	1,41 —	1,46 —	1,46 —	1,46 —
1,00	1,32 —	1,32 —	1,37 —	1,41 —	1,46 —	2,25 —	2,25 —
1,20	1,32 —	1,32 —	1,37 —	1,41 —	1,46 —	2,25 —	2,53 —
$N_{R,II,k}$ [kN]	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,49 —

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

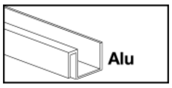
Application range:



Steel S280GD to S350GD

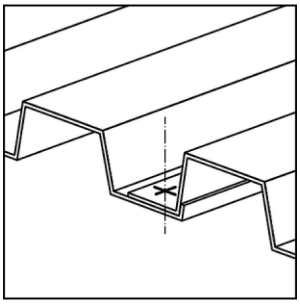
Component I: t_I = 0,40 to 1,25 mm

Component II: t_{II} = 0,50 to 1,20 mm



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

Typical application:



Fastener:
S-MS 01 S(S) 4,8 x L
S-MS 01 PS(S) 4,8 x L

Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 2,50$ mm

Performance for timber substructures not determined

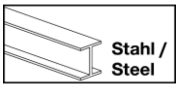
Component II made of aluminium alloy with $R_m \geq 165$ N/mm²

	t_I [mm]	t_{II} [mm] 0,50	0,60	0,70	0,80	1,00	1,20
$V_{R,k}$ [kN]	**0,40**	1,01	1,05	1,08	1,08	1,08	1,08
	0,50	1,01	1,05	1,08	1,12	1,72	1,72
	0,55	1,01	1,05	1,08	1,12	1,72	1,84
	0,63	1,01	1,05	1,08	1,12	1,72	2,03
	0,75	1,01	1,05	1,08	1,12	1,72	2,03
	0,88	1,01	1,05	1,08	1,12	1,72	2,03
$N_{R,k}$ [kN]	**0,40**	0,27	0,38	0,48	0,59	0,76	0,77
	0,50	0,27	0,38	0,48	0,59	0,76	1,03
	0,55	0,27	0,38	0,48	0,59	0,76	1,03
	0,63	0,27	0,38	0,48	0,59	0,76	1,03
	0,75	0,27	0,38	0,48	0,59	0,76	1,03
	0,88	0,27	0,38	0,48	0,59	0,76	1,03
	1,00	0,27	0,38	0,48	0,59	0,76	1,03
	1,25	0,27	0,38	0,48	0,59	0,76	1,03

Component II made of aluminium alloy with $R_m \geq 215$ N/mm²

	t_I [mm]	t_{II} [mm] 0,50	0,60	0,70	0,80	1,00	1,20
$V_{R,k}$ [kN]	**0,40**	1,32	1,37	1,37	1,37	1,37	1,37
	0,50	1,32	1,37	1,41	1,41	1,41	1,41
	0,55	1,32	1,37	1,41	1,46	1,46	1,46
	0,63	1,32	1,37	1,41	1,46	2,25	2,25
	0,75	1,32	1,37	1,41	1,46	2,25	2,53
	0,88	1,32	1,37	1,41	1,46	2,25	2,53
$N_{R,k}$ [kN]	**0,40**	0,35	0,49	0,63	0,77	0,77	0,77
	0,50	0,35	0,49	0,63	0,77	1,00	1,29
	0,55	0,35	0,49	0,63	0,77	1,00	1,29
	0,63	0,35	0,49	0,63	0,77	1,00	1,29
	0,75	0,35	0,49	0,63	0,77	1,00	1,29
	0,88	0,35	0,49	0,63	0,77	1,00	1,29
	1,00	0,35	0,49	0,63	0,77	1,00	1,29
	1,25	0,35	0,49	0,63	0,77	1,00	1,29

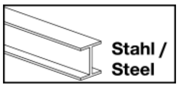
Application range:



Steel S280GD to S350GD

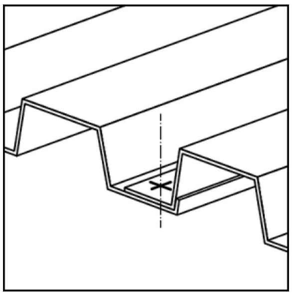
Component I: t_I = 0,40 to 1,25 mm

Component II: t_{II} = 0,40 to 1,25 mm



Steel S280GD to S350GD

Typical application:



Fastener:

S-MS 41 S(S) 4,8 x L
S-MS 51 S(S) 4,8 x L
S-MS 41 PS(S) 4,8 x L
S-MS 51 PS(S) 4,8 x L

Washer: Ø14 / Ø16

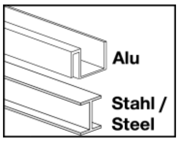
Drilling capacity in metal: $\Sigma t_i \leq$ 2,50 mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,40		0,50		0,55		0,63		0,75		0,88		1,00		1,25	
$V_{R,k}$ [kN]	**0,40**	0,81	—	0,87	—	0,90	—	0,95	—	1,03	ac	1,03	ac	1,03	ac	1,03	ac
	0,50	0,81	—	1,01	—	1,01	—	1,02	—	1,03	ac	1,03	ac	1,03	ac	1,03	ac
	0,55	0,81	—	1,01	—	1,26	—	1,26	—	1,26	—	1,26	—	1,26	—	1,26	—
	0,63	0,81	—	1,01	—	1,26	—	1,66	—	1,66	—	1,66	—	1,66	—	1,66	—
	0,75	0,81	—	1,01	—	1,26	—	1,66	—	2,26	—	2,26	—	2,26	—	2,26	—
	0,88	0,81	—	1,01	—	1,26	—	1,66	—	2,26	—	2,77	—	2,77	—	2,77	—
	1,00	0,81	—	1,01	—	1,26	—	1,66	—	2,26	—	2,77	—	3,24	—	3,24	—
	1,25	0,81	—	1,01	—	1,26	—	1,66	—	2,26	—	2,77	—	3,24	—	4,24	—
$N_{R,k}$ [kN]	**0,40**	0,46	—	0,76	—	0,86	—	1,03	—	1,27	—	1,43	—	1,43	—	1,43	—
	0,50	0,46	—	0,76	—	0,86	—	1,03	—	1,27	—	1,60	—	1,80	—	1,80	—
	0,55	0,46	—	0,76	—	0,86	—	1,03	—	1,27	—	1,60	—	1,90	—	1,90	—
	0,63	0,46	—	0,76	—	0,86	—	1,03	—	1,27	—	1,60	—	1,90	—	2,34	—
	0,75	0,46	—	0,76	—	0,86	—	1,03	—	1,27	—	1,60	—	1,90	—	2,49	—
	0,88	0,46	—	0,76	—	0,86	—	1,03	—	1,27	—	1,60	—	1,90	—	2,49	—
	1,00	0,46	—	0,76	—	0,86	—	1,03	—	1,27	—	1,60	—	1,90	—	2,49	—
	1,25	0,46	—	0,76	—	0,86	—	1,03	—	1,27	—	1,60	—	1,90	—	2,49	—

If both components I and II are made of S320GD or S350GD the grey highlighted values may be increased by 8,0%.

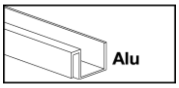
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²
Steel S280GD to S350GD

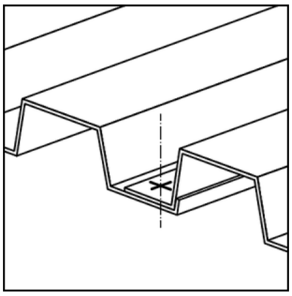
Component I: t_I = 0,50 to 1,20 mm

Component II: t_{II} = 0,50 to 1,20 mm



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

Typical application:



Fastener:

S-MS 41 S(S) 4,8 x L
S-MS 51 S(S) 4,8 x L
S-MS 41 PS(S) 4,8 x L
S-MS 51 PS(S) 4,8 x L

Washer: Ø14 / Ø16

Drilling capacity in metal: $\Sigma t_i \leq 2{,}50$ mm

Performance for timber substructures not determined

Component I made of steel or aluminium alloy with $R_m \geq 165$ N/mm²
Component II made of aluminium alloy with $R_m \geq 165$ N/mm²

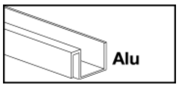
	t_I [mm]	t_{II} [mm] 0,50	0,60	0,70	0,80	1,00	1,20
$V_{R,k}$ [kN]	0,50	0,55 —	0,55 —	0,55 —	0,55 —	0,55 —	0,55 —
	0,60	0,55 —	0,71 —	0,71 —	0,71 —	0,71 —	0,71 —
	0,70	0,55 —	0,71 —	0,88 —	0,88 —	0,88 —	0,88 —
	0,80	0,55 —	0,71 —	0,88 —	1,04 —	1,04 —	1,04 —
	1,00	0,55 —	0,71 —	0,88 —	1,04 —	1,44 —	1,44 —
	1,20	0,55 —	0,71 —	0,88 —	1,04 —	1,44 —	1,83 —
$N_{R,k}$ [kN]	0,50	0,27 —	0,38 —	0,40 —	0,40 —	0,40 —	0,40 —
	0,60	0,27 —	0,38 —	0,48 —	0,48 —	0,48 —	0,48 —
	0,70	0,27 —	0,38 —	0,48 —	0,56 —	0,56 —	0,56 —
	0,80	0,27 —	0,38 —	0,48 —	0,59 —	0,64 —	0,64 —
	1,00	0,27 —	0,38 —	0,48 —	0,59 —	0,76 —	0,80 —
	1,20	0,27 —	0,38 —	0,48 —	0,59 —	0,76 —	0,96 —
$N_{R,II,k}$ [kN]		0,27	0,38	0,48	0,59	0,76	1,03

Component I made of steel or aluminium alloy with $R_m \geq 215$ N/mm²
Component II made of aluminium alloy with $R_m \geq 215$ N/mm²

	t_I [mm]	t_{II} [mm] 0,50	0,60	0,70	0,80	1,00	1,20
$V_{R,k}$ [kN]	0,50	0,71 —	0,71 —	0,71 —	0,71 —	0,71 —	0,71 —
	0,60	0,71 —	0,92 —	0,92 —	0,92 —	0,92 —	0,92 —
	0,70	0,71 —	0,92 —	1,14 —	1,14 —	1,14 —	1,14 —
	0,80	0,71 —	0,92 —	1,14 —	1,35 —	1,35 —	1,35 —
	1,00	0,71 —	0,92 —	1,14 —	1,35 —	1,88 —	1,88 —
	1,20	0,71 —	0,92 —	1,14 —	1,35 —	1,88 —	2,28 —
$N_{R,k}$ [kN]	0,50	0,35 —	0,49 —	0,52 —	0,52 —	0,52 —	0,52 —
	0,60	0,35 —	0,49 —	0,63 —	0,63 —	0,63 —	0,63 —
	0,70	0,35 —	0,49 —	0,63 —	0,73 —	0,73 —	0,73 —
	0,80	0,35 —	0,49 —	0,63 —	0,77 —	0,84 —	0,84 —
	1,00	0,35 —	0,49 —	0,63 —	0,77 —	1,00 —	1,05 —
	1,20	0,35 —	0,49 —	0,63 —	0,77 —	1,00 —	1,26 —
$N_{R,II,k}$ [kN]		0,35	0,49	0,63	0,77	1,00	1,29

The grey highlighted values $N_{R,k}$ may be increased by 6,9% when using the type „S-MS 5x“.

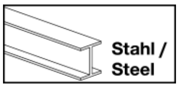
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

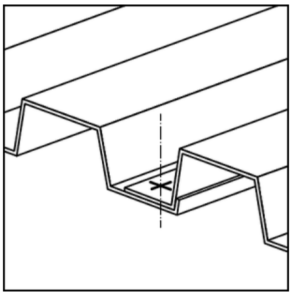
Component I: t_I = 0,50 to 1,20 mm

Component II: t_{II} = 0,50 to 1,25 mm



Steel S280GD to S350GD

Typical application:



Fastener:

S-MS 41 S(S) 4,8 x L
S-MS 51 S(S) 4,8 x L
S-MS 41 PS(S) 4,8 x L
S-MS 51 PS(S) 4,8 x L

Washer: Ø14 / Ø16

Drilling capacity in metal: $\Sigma t_i \leq 2,50$ mm

Performance for timber substructures not determined

Component I of aluminium alloy with $R_m \geq 165$ N/mm²

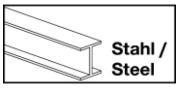
	t_I [mm]	t_{II} [mm] 0,50		0,55		0,63		0,75		0,88		1,00		1,25	
$V_{R,k}$ [kN]	**0,50**	0,55	—	0,55	—	0,55	—	0,55	—	0,55	—	0,55	—	0,55	—
	0,60	0,55	—	0,55	—	0,71	—	0,71	—	0,71	—	0,71	—	0,71	—
	0,70	0,55	—	0,55	—	0,71	—	0,88	—	0,88	—	0,88	—	0,88	—
	0,80	0,55	—	0,55	—	0,71	—	0,88	—	1,04	—	1,04	—	1,04	—
	1,00	0,55	—	0,55	—	0,71	—	0,88	—	1,04	—	1,44	—	1,44	—
	1,20	0,55	—	0,55	—	0,71	—	0,88	—	1,04	—	1,44	—	1,83	—
$N_{R,k}$ [kN]	**0,50**	0,40	—	0,40	—	0,40	—	0,40	—	0,40	—	0,40	—	0,40	—
	0,60	0,48	—	0,48	—	0,48	—	0,48	—	0,48	—	0,48	—	0,48	—
	0,70	0,56	—	0,56	—	0,56	—	0,56	—	0,56	—	0,56	—	0,56	—
	0,80	0,64	—	0,64	—	0,64	—	0,64	—	0,64	—	0,64	—	0,64	—
	1,00	0,76	—	0,80	—	0,80	—	0,80	—	0,80	—	0,80	—	0,80	—
	1,20	0,76	—	0,87	—	0,96	—	0,96	—	0,96	—	0,96	—	0,96	—
$N_{R,II,k}$ [kN]		0,76		0,87		1,04		1,29		1,56		1,82		2,34	

Component I of aluminium alloy with $R_m \geq 215$ N/mm²

	t_I [mm]	t_{II} [mm] 0,50		0,55		0,63		0,75		0,88		1,00		1,25	
$V_{R,k}$ [kN]	**0,50**	0,71	—	0,71	—	0,71	—	0,71	—	0,71	—	0,71	—	0,71	—
	0,60	0,71	—	0,71	—	0,92	—	0,92	—	0,92	—	0,92	—	0,92	—
	0,70	0,71	—	0,71	—	0,92	—	1,14	—	1,14	—	1,14	—	1,14	—
	0,80	0,71	—	0,71	—	0,92	—	1,14	—	1,35	—	1,35	—	1,35	—
	1,00	0,71	—	0,71	—	0,92	—	1,14	—	1,35	—	1,88	—	1,88	—
	1,20	0,71	—	0,71	—	0,92	—	1,14	—	1,35	—	1,88	—	2,28	—
$N_{R,k}$ [kN]	**0,50**	0,52	—	0,52	—	0,52	—	0,52	—	0,52	—	0,52	—	0,52	—
	0,60	0,63	—	0,63	—	0,63	—	0,63	—	0,63	—	0,63	—	0,63	—
	0,70	0,73	—	0,73	—	0,73	—	0,73	—	0,73	—	0,73	—	0,73	—
	0,80	0,76	—	0,84	—	0,84	—	0,84	—	0,84	—	0,84	—	0,84	—
	1,00	0,76	—	0,87	—	1,04	—	1,05	—	1,05	—	1,05	—	1,05	—
	1,20	0,76	—	0,87	—	1,04	—	1,26	—	1,26	—	1,26	—	1,26	—
$N_{R,II,k}$ [kN]		0,76		0,87		1,04		1,29		1,56		1,82		2,34	

The grey highlighted values $N_{R,k}$ may be increased by 6,9% when using the type „S-MS 5x".

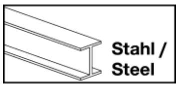
Application range:



Steel S280GD to S350GD

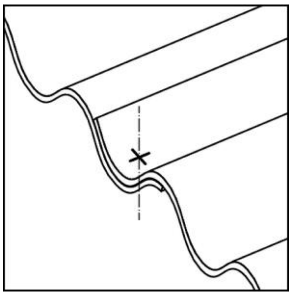
Component I: t_I = 0,40 to 1,25 mm

Component II: t_{II} = 0,40 to 1,25 mm



Steel S280GD to S350GD

Typical application:



Fastener:

S-MS 31 PS(S) 4,8 x L

Washer: Ø12

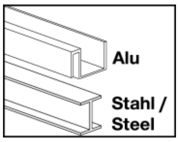
Drilling capacity in metal: $\Sigma t_i \leq 2{,}50$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,40	0,50	0,55	0,63	0,75	0,88	1,00	1,25
$V_{R,k}$ [kN]	**0,40**	0,68 —	0,75 —	0,79 —	0,85 —	0,94 —	0,94 —	0,94 —	0,94 —
	0,50	0,68 —	0,94 —	0,94 —	0,94 —	0,94 —	0,94 —	0,94 —	0,94 —
	0,55	0,68 —	0,94 —	1,23 —	1,23 —	1,23 —	1,23 —	1,23 —	1,23 —
	0,63	0,68 —	0,94 —	1,23 —	1,70 —	1,70 —	1,70 —	1,70 —	1,70 —
	0,75	0,68 —	0,94 —	1,23 —	1,70 —	2,40 —	2,40 —	2,40 —	2,40 —
	0,88	0,68 —	0,94 —	1,23 —	1,70 —	2,40 —	2,95 —	2,95 —	2,95 —
	1,00	0,68 —	0,94 —	1,23 —	1,70 —	2,40 —	2,95 —	3,46 —	3,46 —
	1,25	0,68 —	0,94 —	1,23 —	1,70 —	2,40 —	2,95 —	3,46 —	4,17 —
$N_{R,k}$ [kN]	**0,40**	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,49 —	1,49 —	1,49 —
	0,50	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	1,93 —
	0,55	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,19 —
	0,63	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,49 —
	0,75	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,49 —
	0,88	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,49 —
	1,00	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,49 —
	1,25	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —	2,49 —

If both components I and II are made of S320GD or S350GD the grey highlighted values may be increased by 8,0%.

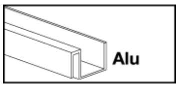
Application range:



Aluminium alloy with R_m ≥ 165 N/mm²
Aluminium alloy with R_m ≥ 215 N/mm²
Steel S280GD to S350GD

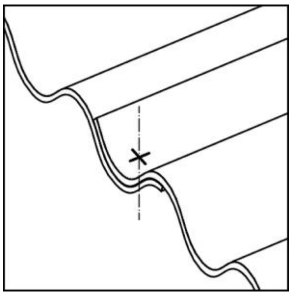
Component I: t_I = 0,50 to 1,20 mm

Component II: t_{II} = 0,50 to 1,20 mm



Aluminium alloy with R_m ≥ 165 N/mm²
Aluminium alloy with R_m ≥ 215 N/mm²

Typical application:



Fastener:

S-MS 31 PS(S) 4,8 x L

Washer: Ø12

Drilling capacity in metal: Σt_i ≤ 2,50 mm

Performance for timber substructures not determined

Component I made of steel or aluminium alloy with R_m ≥ 165 N/mm²
Component II made of aluminium alloy with R_m ≥ 165 N/mm²

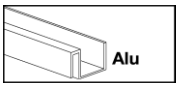
t_I [mm]	t_{II} [mm] 0,50	0,60	0,70	0,80	1,00	1,20
$V_{R,k}$ [kN] 0,50	0,45 —	0,45 —	0,45 —	0,45 —	0,45 —	0,45 —
0,60	0,45 —	0,63 —	0,63 —	0,63 —	0,63 —	0,63 —
0,70	0,45 —	0,63 —	0,82 —	0,82 —	0,82 —	0,82 —
0,80	0,45 —	0,63 —	0,82 —	1,00 —	1,00 —	1,00 —
1,00	0,45 —	0,63 —	0,82 —	1,00 —	1,44 —	1,44 —
1,20	0,45 —	0,63 —	0,82 —	1,00 —	1,44 —	1,77 —
$N_{R,II,k}$ [kN]	0,27 —	0,38 —	0,48 —	0,59 —	0,76 —	1,03 —

Component I made of steel or aluminium alloy with R_m ≥ 215 N/mm²
Component II made of aluminium alloy with R_m ≥ 215 N/mm²

t_I [mm]	t_{II} [mm] 0,50	0,60	0,70	0,80	1,00	1,20
$V_{R,k}$ [kN] 0,50	0,59 —	0,59 —	0,59 —	0,59 —	0,59 —	0,59 —
0,60	0,59 —	0,83 —	0,83 —	0,83 —	0,83 —	0,83 —
0,70	0,59 —	0,83 —	1,07 —	1,07 —	1,07 —	1,07 —
0,80	0,59 —	0,83 —	1,07 —	1,31 —	1,31 —	1,31 —
1,00	0,59 —	0,83 —	1,07 —	1,31 —	1,87 —	1,87 —
1,20	0,59 —	0,83 —	1,07 —	1,31 —	1,87 —	2,21 —
$N_{R,II,k}$ [kN]	0,35 —	0,49 —	0,63 —	0,77 —	1,00 —	1,29 —

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

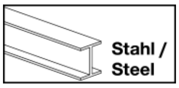
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

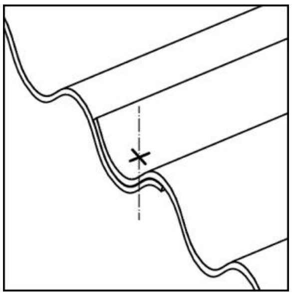
Component I: t_I = 0,50 to 1,20 mm

Component II: t_{II} = 0,50 to 1,25 mm



Steel S280GD to S350GD

Typical application:



Fastener:

S-MS 31 PS(S) 4,8 x L

Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 2{,}50$ mm

Performance for timber substructures not determined

Component I of aluminium alloy with $R_m \geq 165$ N/mm²

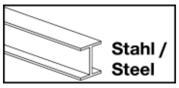
t_I [mm]		t_{II} [mm]													
		0,50		**0,55**		**0,63**		**0,75**		**0,88**		**1,00**		**1,25**	
$V_{R,k}$ [kN]	**0,50**	0,45	—	0,45	—	0,45	—	0,45	—	0,45	—	0,45	—	0,45	—
	0,60	0,45	—	0,45	—	0,63	—	0,63	—	0,63	—	0,63	—	0,63	—
	0,70	0,45	—	0,45	—	0,63	—	0,82	—	0,82	—	0,82	—	0,82	—
	0,80	0,45	—	0,45	—	0,63	—	0,82	—	1,00	—	1,00	—	1,00	—
	1,00	0,45	—	0,45	—	0,63	—	0,82	—	1,00	—	1,44	—	1,44	—
	1,20	0,45	—	0,45	—	0,63	—	0,82	—	1,00	—	1,44	—	1,77	—
$N_{R,II,k}$ [kN]		0,76	—	0,86	—	1,03	—	1,27	—	1,60	—	1,90	—	2,49	—

Component I of aluminium alloy with $R_m \geq 215$ N/mm²

t_I [mm]		t_{II} [mm]													
		0,50		**0,55**		**0,63**		**0,75**		**0,88**		**1,00**		**1,25**	
$V_{R,k}$ [kN]	**0,50**	0,59	—	0,59	—	0,59	—	0,59	—	0,59	—	0,59	—	0,59	—
	0,60	0,59	—	0,59	—	0,83	—	0,83	—	0,83	—	0,83	—	0,83	—
	0,70	0,59	—	0,59	—	0,83	—	1,07	—	1,07	—	1,07	—	1,07	—
	0,80	0,59	—	0,59	—	0,83	—	1,07	—	1,31	—	1,31	—	1,31	—
	1,00	0,59	—	0,59	—	0,83	—	1,07	—	1,31	—	1,87	—	1,87	—
	1,20	0,59	—	0,59	—	0,83	—	1,07	—	1,31	—	1,87	—	2,21	—
$N_{R,II,k}$ [kN]		0,76	—	0,86	—	1,03	—	1,27	—	1,60	—	1,90	—	2,49	—

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

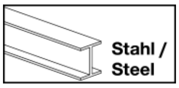
Application range:



Steel S280GD to S350GD

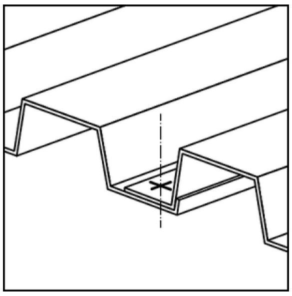
Component I: t_I = 0,63 to 1,25 mm

Component II: t_{II} = 0,63 to 1,25 mm



Steel S235 to S355
Steel S280GD to S350GD

Typical application:



Fastener:

S-MD 01 S(S) 4,8 x L

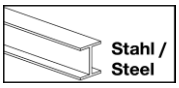
Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 2{,}00$ mm

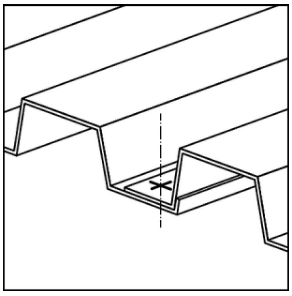
Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,63		0,75		0,88		1,00		1,13		1,25		1,50		2,00	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,00	—	1,50	—	1,80	—	2,00	a	2,00	a	2,00	a	—	—	—	—
	0,75	1,00	—	1,80	—	2,10	—	2,40	—	2,40	a	2,40	a	—	—	—	—
	0,88	1,20	—	1,90	—	2,30	—	2,80	—	2,80	—	—	—	—	—	—	—
	1,00	1,40	—	2,10	—	2,60	—	3,10	—	—	—	—	—	—	—	—	—
	1,13	1,40	—	2,10	—	2,60	—	—	—	—	—	—	—	—	—	—	—
	1,25	1,40	—	2,10	—	—	—	—	—	—	—	—	—	—	—	—	—
	1,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1,75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2,00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,80	—	1,00	—	1,20	—	1,40	a	1,70	a	1,70	a	—	—	—	—
	0,75	0,80	—	1,00	—	1,20	—	1,40	—	1,70	a	2,00	a	—	—	—	—
	0,88	0,80	—	1,00	—	1,20	—	1,40	—	1,70	—	—	—	—	—	—	—
	1,00	0,80	—	1,00	—	1,20	—	1,40	—	—	—	—	—	—	—	—	—
	1,13	0,80	—	1,00	—	1,20	—	—	—	—	—	—	—	—	—	—	—
	1,25	0,80	—	1,00	—	—	—	—	—	—	—	—	—	—	—	—	—
	1,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1,75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2,00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															

Application range:	Typical application:	Fastener:
		S-MD 51 S(S) 4,8 x L S-MD 61 S(S) 4,8 x L Washer: Ø16 / Ø19

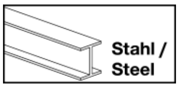


Steel S280GD to S320GD



Component I: t_I = 0,63 to 1,25 mm

Component II: t_{II} = 0,63 to 1,25 mm



Steel S235 to S355
Steel S280GD to S350GD

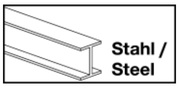
Drilling capacity in metal: $\Sigma t_i \leq 2{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,63		0,75		0,88		1,00		1,13		1,25		1,50		2,00	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,00	—	1,50	—	1,80	—	2,00	a	2,00	a	2,00	a	—	—	—	—
	0,75	1,00	—	1,80	—	2,10	—	2,40	—	2,40	a	2,40	a	—	—	—	—
	0,88	1,20	—	1,90	—	2,30	—	2,80	—	2,80	—	—	—	—	—	—	—
	1,00	1,40	—	2,10	—	2,60	—	3,10	—	—	—	—	—	—	—	—	—
	1,13	1,40	—	2,10	—	2,60	—	—	—	—	—	—	—	—	—	—	—
	1,25	1,40	—	2,10	—	—	—	—	—	—	—	—	—	—	—	—	—
	1,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1,75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2,00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	0,43	—	0,54	—	0,65	—	0,76	a	0,92	a	1,08	a	—	—	—	—
	0,55	0,55	—	0,68	—	0,82	—	0,95	a	1,16	a	1,36	a	—	—	—	—
	0,63	0,80	—	1,00	—	1,20	—	1,40	a	1,70	a	2,00	a	—	—	—	—
	0,75	0,80	—	1,00	—	1,20	—	1,40	—	1,70	a	2,00	a	—	—	—	—
	0,88	0,80	—	1,00	—	1,20	—	1,40	—	1,70	—	—	—	—	—	—	—
	1,00	0,80	—	1,00	—	1,20	—	1,40	—	—	—	—	—	—	—	—	—
	1,13	0,80	—	1,00	—	1,20	—	—	—	—	—	—	—	—	—	—	—
	1,25	0,80	—	1,00	—	—	—	—	—	—	—	—	—	—	—	—	—
	1,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1,75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2,00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															

If both components I and II are made of S320GD or S350GD the grey highlighted values may be increased by 8,0%.

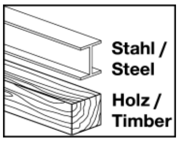
Application range:



Steel S280GD to S350GD

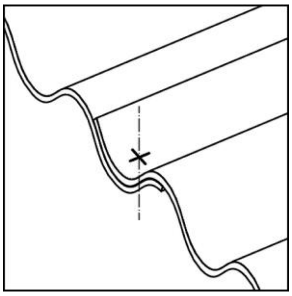
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 0,63 to 2,00 mm



Steel S235
Steel S280GD to S350GD
Structural timber

Typical application:



Fastener:
S-MD 31 PS(S) 4,8 x L
Washer: Ø12

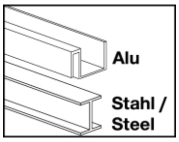
Drilling capacity in metal: $\Sigma t_i \leq 2{,}75$ mm

Performance for timber substructures determined with:
$M_{y,Rk}$ = 4,429 Nm
$f_{ax,k}$ = 8,575 N/mm² for C24 and $l_{ef} \geq 20{,}0$ mm

	t_I [mm]	t_{II} [mm] 0,50	0,55	0,63	0,75	0,88	1,00	1,13	1,25	1,50	1,75	2,00	$V_{R,I,k}$ / $N_{R,I,k}$
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	1,36
	0,55	—	—	—	—	—	—	—	—	—	—	—	2,22
	0,63	—	—	1,12	1,12	1,12	1,12	1,12	1,12	1,12	1,12	1,12	2,22
	0,75	—	—	1,12	1,31	1,31	1,31	1,31	1,31	1,31	1,31	1,31	2,22
	0,88	—	—	1,12	1,31	1,92	1,92	1,92	1,92	1,92	1,92	—	2,22
	1,00	—	—	1,12	1,31	1,92	2,53	2,53	2,53	2,53	2,53	—	2,22
	1,13	—	—	1,12	1,31	1,92	2,53	2,53	2,53	2,53	—	—	2,22
	1,25	—	—	1,12	1,31	1,92	2,53	2,53	2,53	2,53	—	—	2,22
	1,50	—	—	1,12	1,31	1,92	2,53	2,53	2,53	—	—	—	2,22
	1,75	—	—	1,12	1,31	1,92	2,53	—	—	—	—	—	2,22
	2,00	—	—	1,12	1,31	—	—	—	—	—	—	—	2,22
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	2,34
	0,55	—	—	—	—	—	—	—	—	—	—	—	2,34
	0,63	—	—	0,59	0,87	1,12	1,37	1,37	1,37	1,37	1,37	1,37	2,34
	0,75	—	—	0,59	0,87	1,12	1,37	1,37	1,37	1,37	1,37	1,37	2,34
	0,88	—	—	0,59	0,87	1,12	1,37	1,37	1,37	1,37	1,37	—	2,34
	1,00	—	—	0,59	0,87	1,12	1,37	1,37	1,37	1,37	1,37	—	2,34
	1,13	—	—	0,59	0,87	1,12	1,37	1,37	1,37	1,37	—	—	2,34
	1,25	—	—	0,59	0,87	1,12	1,37	1,37	1,37	1,37	—	—	2,34
	1,50	—	—	0,59	0,87	1,12	1,37	1,37	1,37	—	—	—	2,34
	1,75	—	—	0,59	0,87	1,12	1,37	—	—	—	—	—	2,34
	2,00	—	—	0,59	0,87	—	—	—	—	—	—	—	2,34

The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see Annex 3.

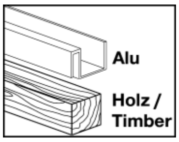
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm^2
Steel S280GD to S350GD

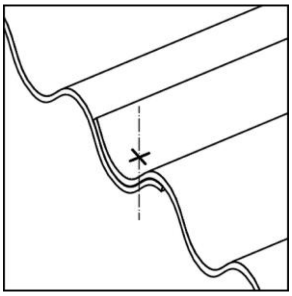
Component I: t_I = 0,50 to 1,50 mm

Component II: t_{II} = 0,50 to 1,50 mm



Aluminium alloy with $R_m \geq 185$ N/mm^2
Structural timber

Typical application:



Fastener:

S-MD 31 PS(S) 4,8 x L

Washer: Ø12

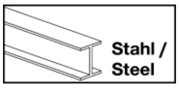
Drilling capacity in metal: $\Sigma t_i \leq 2,75$ mm

Performance for timber substructures determined with:
$M_{y,Rk}$ = 4,429 Nm
$f_{ax,k}$ = 8,575 N/mm^2 for C24 and $l_{ef} \geq 20,0$ mm

	t_I [mm]	**t_{II} [mm]**											**$V_{R,I,k}$**
		0,50	**0,60**	**0,70**	**0,80**	**0,90**	**1,00**	**1,10**	**1,20**	**1,30**	**1,40**	**1,50**	**$N_{R,I,k}$**
$V_{R,k}$ [kN]	**0,50**	0,31	0,31	0,31	0,31	0,31	0,31	0,31	0,31	0,31	0,31	0,31	0,79
	0,60	0,31	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,93
	0,70	0,31	0,42	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	1,06
	0,80	0,31	0,42	0,53	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	1,28
	0,90	0,31	0,42	0,53	0,70	0,88	0,88	0,88	0,88	0,88	0,88	0,88	1,49
	1,00	0,31	0,42	0,53	0,70	0,88	1,05	1,05	1,05	1,05	1,05	1,05	1,71
	1,10	0,31	0,42	0,53	0,70	0,88	1,05	1,05	1,05	1,05	1,05	1,05	1,71
	1,20	0,31	0,42	0,53	0,70	0,88	1,05	1,05	1,05	1,05	1,05	1,05	1,71
	1,30	0,31	0,42	0,53	0,70	0,88	1,05	1,05	1,05	1,05	1,05	—	1,71
	1,40	0,31	0,42	0,53	0,70	0,88	1,05	1,05	1,05	1,05	—	—	1,71
	1,50	0,31	0,42	0,53	0,70	0,88	1,05	1,05	1,05	—	—	—	1,71
$N_{R,k}$ [kN]	**0,50**	0,17	0,26	0,35	0,46	0,55	0,61	0,61	0,61	0,61	0,61	0,61	0,61
	0,60	0,17	0,26	0,35	0,46	0,55	0,61	0,70	0,70	0,70	0,70	0,70	0,70
	0,70	0,17	0,26	0,35	0,46	0,55	0,61	0,73	0,82	0,83	0,83	0,83	0,83
	0,80	0,17	0,26	0,35	0,46	0,55	0,61	0,73	0,82	0,91	0,99	0,99	0,99
	0,90	0,17	0,26	0,35	0,46	0,55	0,61	0,73	0,82	0,91	1,00	1,05	1,19
	1,00	0,17	0,26	0,35	0,46	0,55	0,61	0,73	0,82	0,91	1,00	1,05	1,42
	1,10	0,17	0,26	0,35	0,46	0,55	0,61	0,73	0,82	0,91	1,00	1,05	1,70
	1,20	0,17	0,26	0,35	0,46	0,55	0,61	0,73	0,82	0,91	1,00	1,05	2,02
	1,30	0,17	0,26	0,35	0,46	0,55	0,61	0,73	0,82	0,91	1,00	—	2,02
	1,40	0,17	0,26	0,35	0,46	0,55	0,61	0,73	0,82	0,91	—	—	2,02
	1,50	0,17	0,26	0,35	0,46	0,55	0,61	0,73	0,82	—	—	—	2,02

The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m^3). For other combinations of k_{mod} and timber strength grades see Annex 3.

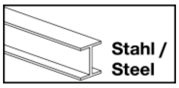
Application range:



Steel S280GD to S350GD

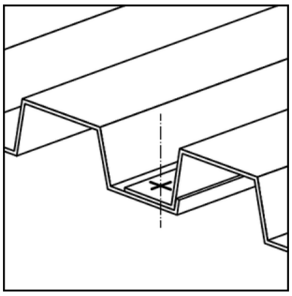
Component I: t_I = 0,63 to 1,50 mm

Component II: t_{II} = 0,63 to 2,00 mm



Steel S235 to S355
Steel S280GD to S350GD

Typical application:



Fastener:

S-MD 01 S(S) 5,5 x L

Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 3{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,63		0,75		0,88		1,00		1,13		1,25		1,50		2,00	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,00	—	1,30	—	1,70	—	2,00	—	2,40	—	2,80	ac	3,00	ac	3,00	a
	0,75	1,30	—	1,80	—	2,10	—	2,40	—	2,70	—	3,00	—	3,80	—	3,80	a
	0,88	1,30	—	1,80	—	2,10	—	2,70	—	2,70	—	3,00	—	3,80	—	4,50	—
	1,00	1,30	—	1,80	—	2,40	—	3,00	—	3,00	—	3,00	—	3,80	—	5,20	—
	1,13	1,30	—	1,80	—	2,40	—	3,40	—	3,40	—	3,40	—	4,40	—	—	—
	1,25	1,40	—	1,80	—	2,80	—	3,80	—	3,90	—	4,10	—	5,00	—	—	—
	1,50	1,40	—	1,80	—	2,80	—	3,80	—	3,90	—	4,70	—	5,00	—	—	—
	1,75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2,00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,70	ac	1,70	ac	1,70	a
	0,75	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,30	—	2,30	a
	0,88	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	2,90	—
	1,00	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	3,50	—
	1,13	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	—	—
	1,25	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	—	—
	1,50	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	—	—
	1,75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2,00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															

Application range:

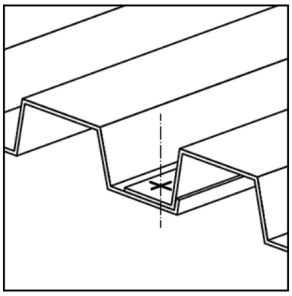
Stahl / Steel — Steel S280GD to S320GD

Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,63 to 2,00 mm

Stahl / Steel — Steel S235
Steel S280GD to S320GD

Typical application:



Fastener:

S-MD 51 S(S) 5,5 x L

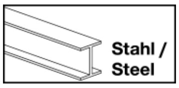
Washer: Ø16

Drilling capacity in metal: $\Sigma t_i \leq 3{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,63		0,75		0,88		1,00		1,13		1,25		1,50		2,00	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,00	—	1,30	—	1,70	—	2,00	—	2,40	—	2,80	ac	3,00	ac	3,00	a
	0,75	1,30	—	1,80	—	2,10	—	2,40	—	2,70	—	3,00	—	3,80	—	3,80	a
	0,88	1,30	—	1,80	—	2,10	—	2,70	—	2,70	—	3,00	—	3,80	—	4,50	—
	1,00	1,30	—	1,80	—	2,40	—	3,00	—	3,00	—	3,00	—	3,80	—	5,20	—
	1,13	1,30	—	1,80	—	2,40	—	3,40	—	3,40	—	3,40	—	4,40	—	—	—
	1,25	1,40	—	1,80	—	2,80	—	3,80	—	3,90	—	4,10	—	5,00	—	—	—
	1,50	1,40	—	1,80	—	2,80	—	3,80	—	3,90	—	4,70	—	5,00	—	—	—
	1,75	1,40	—	1,80	—	2,80	—	3,80	—	3,90	—	4,70	—	—	—	—	—
	2,00	1,40	—	1,80	—	2,80	—	3,80	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	0,38	—	0,49	—	0,59	—	0,76	—	0,92	—	1,03	ac	1,24	ac	1,24	a
	0,55	0,48	—	0,61	—	0,75	—	0,95	—	1,16	—	1,30	ac	1,57	ac	1,57	a
	0,63	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	ac	2,30	ac	2,30	a
	0,75	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	3,30	a
	0,88	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	3,70	—
	1,00	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	3,70	—
	1,13	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	—	—
	1,25	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	—	—
	1,50	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	2,50	—	—	—
	1,75	0,70	—	0,90	—	1,10	—	1,40	—	1,70	—	1,90	—	—	—	—	—
	2,00	0,70	—	0,90	—	1,10	—	1,40	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															

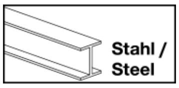
Application range:



Steel S320GD to S350GD

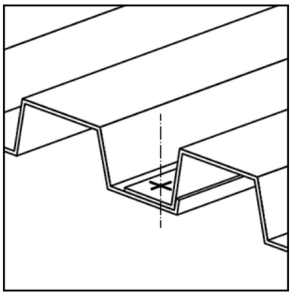
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,63 to 2,00 mm



Steel S275
Steel S320GD to S350GD

Typical application:



Fastener:

S-MD 51 S(S) 5,5 x L

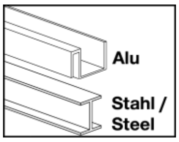
Washer: Ø16

Drilling capacity in metal: $\Sigma t_i \leq 3,00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,63		0,75		0,88		1,00		1,13		1,25		1,50		2,00	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,10	—	1,40	—	1,80	—	2,20	—	2,60	—	3,00	ac	3,30	ac	3,30	a
	0,75	1,40	—	1,90	—	2,20	—	2,60	—	2,90	—	3,10	—	4,20	—	4,20	a
	0,88	1,40	—	1,90	—	2,20	—	2,90	—	2,90	—	3,10	—	4,20	—	4,80	—
	1,00	1,40	—	1,90	—	2,50	—	3,20	—	3,20	—	3,20	—	4,20	—	5,50	—
	1,13	1,50	—	1,90	—	2,50	—	3,60	—	3,60	—	3,60	—	4,80	—	—	—
	1,25	1,50	—	1,90	—	3,00	—	4,00	—	4,20	—	4,40	—	5,40	—	—	—
	1,50	1,50	—	1,90	—	3,00	—	4,00	—	4,20	—	5,10	—	5,40	—	—	—
	1,75	1,50	—	1,90	—	3,00	—	4,00	—	4,20	—	5,10	—	—	—	—	—
	2,00	1,50	—	1,90	—	3,00	—	4,00	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	0,38	—	0,54	—	0,70	—	0,86	—	0,97	—	1,13	ac	1,46	ac	1,46	a
	0,55	0,48	—	0,68	—	0,89	—	1,09	—	1,23	—	1,43	ac	1,84	ac	1,84	a
	0,63	0,70	—	1,00	—	1,30	—	1,60	—	1,80	—	2,10	ac	2,70	ac	2,70	a
	0,75	0,70	—	1,00	—	1,30	—	1,60	—	1,80	—	2,10	—	2,80	—	3,80	a
	0,88	0,70	—	1,00	—	1,30	—	1,60	—	1,80	—	2,10	—	2,80	—	4,10	—
	1,00	0,70	—	1,00	—	1,30	—	1,60	—	1,80	—	2,10	—	2,80	—	4,10	—
	1,13	0,70	—	1,00	—	1,30	—	1,60	—	1,80	—	2,10	—	2,80	—	—	—
	1,25	0,70	—	1,00	—	1,30	—	1,60	—	1,80	—	2,10	—	2,80	—	—	—
	1,50	0,70	—	1,00	—	1,30	—	1,60	—	1,80	—	2,10	—	2,80	—	—	—
	1,75	0,70	—	1,00	—	1,30	—	1,60	—	1,80	—	2,10	—	—	—	—	—
	2,00	0,70	—	1,00	—	1,30	—	1,60	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															

Application range:



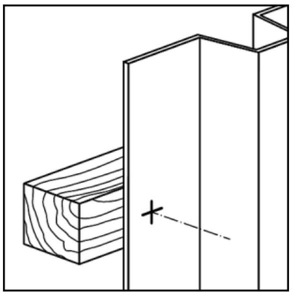
Aluminium alloy with $R_m \geq 185$ N/mm²
Steel S280GD to S350GD

Component I: t_I = 0,50 to 1,30 mm
t_I = 0,40 to 1,25 mm

Component II:

Structural timber

Typical application:



Fastener:

S-MD 51 S(S) 5,5 x L
S-MD 61 S(S) 5,5 x L
S-MD 71 S(S) 5,5 x L

Washer: Ø16 / Ø19 / Ø22

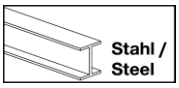
Drilling capacity in metal: $\Sigma t_i \leq 3{,}00$ mm

Performance for timber substructures determined with:
$M_{y,Rk}$ = 6,310 Nm
$f_{ax,k}$ = 7,856 N/mm² for C24 and $l_{ef} \geq 22{,}0$ mm

	t_I [mm]	Al-Alloy, R_{min} = 185 N/mm²	Al-Alloy, R_{min} = 195 N/mm²	Al-Alloy, R_{min} = 215 N/mm²	t_I [mm]	SxxxGD, R_{min} = 360 N/mm²	SxxxGD, R_{min} = 390 N/mm²	SxxxGD, R_{min} = 420 N/mm²
$V_{R,I,k}$ [kN]	**0,50**	0,87	0,94	1,08	**0,40**	1,29	1,42	1,53
	0,60	1,12	1,20	1,35	**0,50**	1,68	1,80	1,92
	0,70	1,36	1,44	1,59	**0,55**	1,89	2,01	2,11
	0,80	1,58	1,66	1,82	**0,63**	2,06	2,17	2,25
	0,90	1,77	1,85	1,99	**0,75**	2,30	2,30	2,30
	1,00	1,94	2,01	2,15	**0,88**	2,30	2,30	2,30
	1,10	2,07	2,14	2,26	**1,00**	2,30	2,30	2,30
	1,20	2,19	2,25	2,28	**1,13**	2,30	2,30	2,30
	1,30	2,28	2,28	2,28	**1,25**	2,30	2,30	2,30
$N_{R,I,k}$ [kN]	**0,50**	0,48	0,51	0,56	**0,40**	—	—	—
	0,60	0,58	0,61	0,67	**0,50**	1,24	1,34	1,34
	0,70	0,67	0,71	0,78	**0,55**	1,57	1,70	1,70
	0,80	0,77	0,81	0,89	**0,63**	2,30	2,48	2,48
	0,90	0,87	0,91	1,01	**0,75**	3,30	3,56	3,56
	1,00	0,96	1,01	1,12	**0,88**	3,70	4,00	4,00
	1,10	1,06	1,12	1,23	**1,00**	3,70	4,00	4,00
	1,20	1,15	1,22	1,34	**1,13**	3,70	4,00	4,00
	1,30	1,25	1,32	1,45	**1,25**	3,70	4,00	4,00

The grey highlighted values $N_{R,k}$ may be increased by 9.0% when using the types “S-MD 6x” and by 17.3% when using the types “S-MD 7x”.The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see Annex 3.

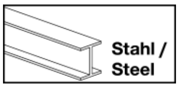
Application range:



Steel S280GD to S350GD

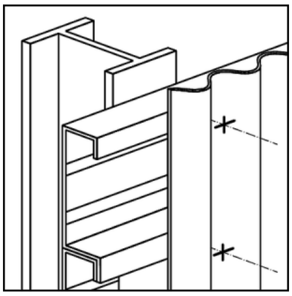
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 0,63 to 1,75 mm
t_{II} = 2 x 0,63 to 2 x 1,13 mm



Steel S235
Steel S280GD to S350GD

Typical application:



Fastener:

S-MD 31 PS(S) 5,5 x L

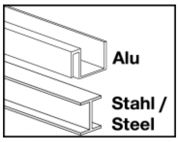
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 3{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,63	0,75	0,88	1,00	1,13	1,25	1,50	1,75	2 x 0,63	2 x 0,75	2 x 0,88	2 x 1,00	2 x 1,13
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,13	1,38	1,38	1,38	1,38	1,38	1,38	1,38	2,04	2,04	2,04	2,04	2,04
	0,75	1,21	1,74	1,74	1,74	1,74	1,74	1,74	1,74	2,04	2,41	2,41	2,41	—
	0,88	1,21	1,74	2,19	2,19	2,19	2,19	2,19	2,19	2,04	2,41	2,41	2,41	—
	1,00	1,21	1,74	2,19	2,63	2,63	2,63	2,63	2,63	2,04	2,41	2,41	3,07	—
	1,13	1,21	1,74	2,19	2,63	2,63	2,63	2,63	2,63	2,04	2,41	2,41	—	—
	1,25	1,21	1,74	2,19	2,63	2,63	2,63	2,63	2,63	2,04	2,41	—	—	—
	1,50	1,21	1,74	2,19	2,63	2,63	2,63	2,63	—	2,04	2,41	—	—	—
	1,75	1,21	1,74	2,19	2,63	2,63	2,63	—	—	—	—	—	—	—
	2,00	1,21	1,74	2,19	2,63	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,66	0,89	1,14	1,39	1,66	1,91	1,91	1,91	1,37	2,15	2,34	2,34	2,34
	0,75	0,66	0,89	1,14	1,39	1,66	1,91	1,91	1,91	1,37	2,15	2,34	2,34	—
	0,88	0,66	0,89	1,14	1,39	1,66	1,91	1,91	1,91	1,37	2,15	2,34	2,34	—
	1,00	0,66	0,89	1,14	1,39	1,66	1,91	1,91	1,91	1,37	2,15	2,34	2,34	—
	1,13	0,66	0,89	1,14	1,39	1,66	1,91	1,91	1,91	1,37	2,15	2,34	—	—
	1,25	0,66	0,89	1,14	1,39	1,66	1,91	1,91	1,91	1,37	2,15	—	—	—
	1,50	0,66	0,89	1,14	1,39	1,66	1,91	1,91	—	1,37	2,15	—	—	—
	1,75	0,66	0,89	1,14	1,39	1,66	1,91	—	—	—	—	—	—	—
	2,00	0,66	0,89	1,14	1,39	—	—	—	—	—	—	—	—	—

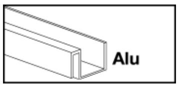
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²
Steel S280GD to S350GD

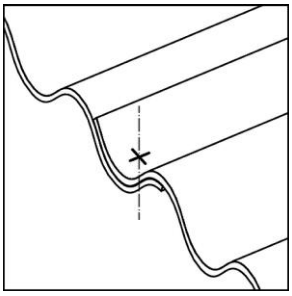
Component I: t_I = 0,50 to 1,50 mm

Component II: t_{II} = 0,50 to 2,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 31 PS(S) 5,5 x L

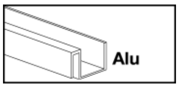
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 3,00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,50	0,60	0,70	0,80	0,90	1,00	1,50	2,00
$V_{R,k}$ [kN]	**0,50**	0,35	0,48	0,60	0,60	0,60	0,60	0,60	0,60
	0,60	0,37	0,48	0,60	0,60	0,60	0,60	0,60	0,60
	0,70	0,39	0,50	0,60	0,60	0,60	0,60	0,60	0,60
	0,80	0,39	0,50	0,60	0,80	0,80	0,80	0,80	0,80
	0,90	0,39	0,50	0,60	0,80	1,00	1,00	1,00	1,00
	1,00	0,39	0,50	0,60	0,80	1,00	1,20	1,20	1,20
	1,10	0,39	0,50	0,60	0,80	1,00	1,20	1,20	—
	1,20	0,39	0,50	0,60	0,80	1,00	1,20	1,20	—
	1,30	0,39	0,50	0,60	0,80	1,00	1,20	1,20	—
	1,40	0,39	0,50	0,60	0,80	1,00	1,20	1,20	—
	1,50	0,39	0,50	0,60	0,80	1,00	1,20	1,20	—
$N_{R,k}$ [kN]	**0,50**	0,23	0,31	0,39	0,53	0,61	0,61	0,61	0,61
	0,60	0,23	0,31	0,39	0,53	0,64	0,69	0,70	0,70
	0,70	0,23	0,31	0,39	0,53	0,64	0,69	0,83	0,83
	0,80	0,23	0,31	0,39	0,53	0,64	0,69	0,99	0,99
	0,90	0,23	0,31	0,39	0,53	0,64	0,69	1,19	1,19
	1,00	0,23	0,31	0,39	0,53	0,64	0,69	1,25	1,25
	1,10	0,23	0,31	0,39	0,53	0,64	0,69	1,25	—
	1,20	0,23	0,31	0,39	0,53	0,64	0,69	1,25	—
	1,30	0,23	0,31	0,39	0,53	0,64	0,69	1,25	—
	1,40	0,23	0,31	0,39	0,53	0,64	0,69	1,25	—
	1,50	0,23	0,31	0,39	0,53	0,64	0,69	1,25	—

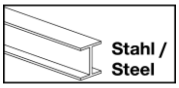
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

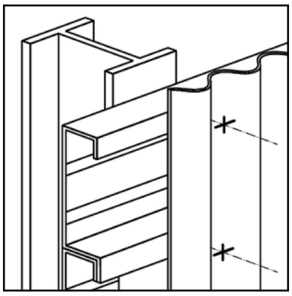
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,63 to 1,75 mm
t_{II} = 2 x 0,63 to 2 x 1,13 mm



Steel S235
Steel S280GD to S350GD

Typical application:



Fastener:

S-MD 31 PS(S) 5,5 x L

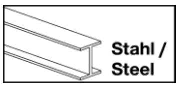
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 3,00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm]												
		0,63	**0,75**	**0,88**	**1,00**	**1,13**	**1,25**	**1,50**	**1,75**	**2 x 0,63**	**2 x 0,75**	**2 x 0,88**	**2 x 1,00**	**2 x 1,13**
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	0,94	0,94	0,94	0,94	0,94
	0,55	—	—	—	—	—	—	—	—	0,94	0,94	0,94	0,94	0,94
	0,63	—	—	—	—	—	—	—	—	0,94	1,21	1,21	1,21	1,21
	0,75	—	—	—	—	—	—	—	—	0,94	1,21	1,21	1,21	—
	0,88	—	—	—	—	—	—	—	—	0,94	1,21	1,21	1,21	—
	1,00	—	—	—	—	—	—	—	—	0,94	1,21	1,21	1,21	—
	1,13	—	—	—	—	—	—	—	—	0,94	1,21	1,21	—	—
	1,25	—	—	—	—	—	—	—	—	0,94	1,21	1,21	—	—
	1,50	—	—	—	—	—	—	—	—	0,94	1,21	—	—	—
	1,75	—	—	—	—	—	—	—	—	0,94	1,21	—	—	—
	2,00	—	—	—	—	—	—	—	—	0,94	1,21	—	—	—
$N_{R,k}$ [kN]	**0,50**	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61
	0,60	0,66	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70
	0,70	0,66	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83
	0,80	0,66	0,89	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,99	—
	0,90	0,66	0,89	1,14	1,19	1,19	1,19	1,19	1,19	1,19	1,19	1,19	1,19	—
	1,00	0,66	0,89	1,14	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	—
	1,10	0,66	0,89	1,14	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	—	—
	1,20	0,66	0,89	1,14	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	—	—
	1,30	0,66	0,89	1,14	1,25	1,25	1,25	1,25	—	1,25	1,25	—	—	—
	1,40	0,66	0,89	1,14	1,25	1,25	1,25	—	—	1,25	1,25	—	—	—
	1,50	0,66	0,89	1,14	1,25	—	—	—	—	1,25	1,25	—	—	—

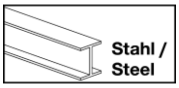
Application range:



Steel S320GD to S350GD

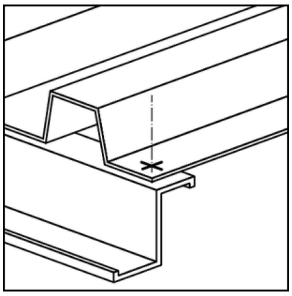
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 0,63 to 1,75 mm



Steel S275 to S355
Steel S320GD to S350GD

Typical application:



Fastener:

S-MD 01 LS(S) 5,5 x L
S-MD 01 LPS(S) 5,5 x L

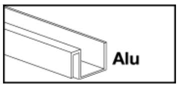
Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,63		0,75		0,88		1,00		1,13		1,25		1,50		1,75	
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,08	—	1,46	—	1,71	—	1,95	—	2,16	—	2,38	—	2,38	—	2,38	—
	0,75	1,42	—	1,61	—	1,99	—	1,99	—	2,18	—	2,38	—	2,38	—	2,38	—
	0,88	1,45	—	1,86	—	2,28	—	2,28	—	2,33	—	2,38	—	2,38	—	2,38	—
	1,00	1,48	—	1,86	—	2,28	—	2,95	—	2,95	—	2,95	—	2,95	—	2,95	—
	1,13	1,51	—	1,86	—	2,28	—	2,95	—	3,64	—	3,64	—	3,64	—	3,64	—
	1,25	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
	1,50	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
	1,75	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
	2,00	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
$N_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,50	—	0,72	—	1,04	—	1,35	—	1,70	—	1,70	—	1,70	—	1,70	—
	0,75	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	0,88	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,00	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,13	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,25	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,50	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,75	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	2,00	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
$M_{t,nom}$ [Nm]		5 Nm															

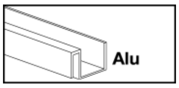
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

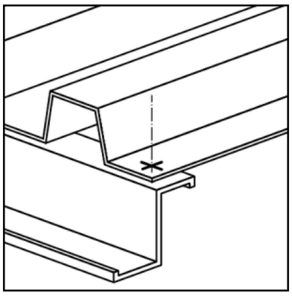
Component I: t_I = 1,00 to 2,00 mm

Component II: t_{II} = 0,50 to 2,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 01 LS(S) 5,5 x L

Washer: none

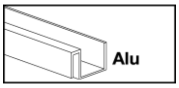
Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

t_I [mm]	t_{II} [mm]										
	0,50	**0,60**	**0,70**	**0,80**	**0,90**	**1,00**	**1,20**	**1,40**	**1,60**	**1,80**	**2,00**
$V_{R,k}$ [kN] **0,50**	—	—	—	—	—	—	—	—	—	—	—
0,60	—	—	—	—	—	—	—	—	—	—	—
0,70	—	—	—	—	—	—	—	—	—	—	—
0,80	—	—	—	—	—	—	—	—	—	—	—
0,90	—	—	—	—	—	—	—	—	—	—	—
1,00	—	—	—	—	—	1,16	1,16	1,16	1,16	1,16	1,16
1,20	—	—	—	—	—	1,16	1,71	1,71	1,71	1,71	1,71
1,40	—	—	—	—	—	1,16	1,71	2,22	2,22	2,22	2,22
1,60	—	—	—	—	—	1,16	1,71	2,22	2,69	2,69	2,69
1,80	—	—	—	—	—	1,16	1,71	2,22	2,69	3,11	3,11
2,00	—	—	—	—	—	1,16	1,71	2,22	2,69	3,11	3,49
$N_{R,II,k}$ [kN]	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

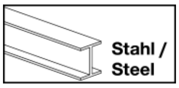
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

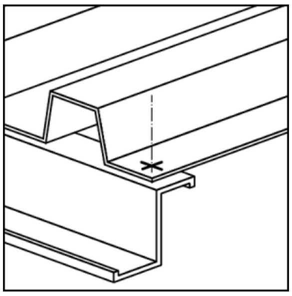
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,63 to 2,00 mm



Steel S275 to S355
Steel S320GD to S390GD

Typical application:



Fastener:

S-MD 01 LS(S) 5,5 x L

Washer: none

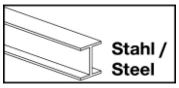
Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

t_I [mm]	**t_{II}** [mm]								
	0,63	**0,75**	**0,88**	**1,00**	**1,13**	**1,25**	**1,50**	**1,75**	**2,00**
$V_{R,k}$ [kN] **0,50**	0,83	0,84	0,85	0,86	0,87	0,87	0,89	0,89	0,89
0,60	0,92	0,94	0,97	1,01	1,01	1,02	1,04	1,04	1,04
0,70	0,99	1,04	1,10	1,16	1,16	1,17	1,19	1,19	1,19
0,80	1,07	1,14	1,23	1,31	1,32	1,33	1,34	1,34	1,34
1,00	1,22	1,35	1,49	1,62	1,62	1,63	1,65	1,65	1,65
1,20	1,35	1,47	1,60	1,73	1,79	1,84	1,95	1,95	1,95
1,30	1,41	1,53	1,66	1,79	1,87	1,94	2,10	2,10	2,10
1,50	1,52	1,65	1,78	1,90	2,03	2,15	2,41	2,41	2,41
1,60	1,57	1,68	1,79	1,90	2,03	2,15	2,41	2,41	2,41
1,80	1,66	1,74	1,82	1,90	2,03	2,15	2,41	2,41	2,41
2,00	1,74	1,79	1,85	1,90	2,03	2,15	2,41	2,41	2,41
$N_{R,II,k}$ [kN]	0,50	0,72	1,04	1,35	1,71	2,07	2,07	2,07	2,07

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

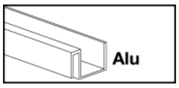
Application range:



Steel S320GD to S350GD

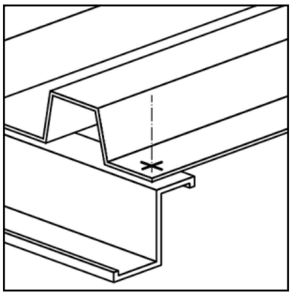
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 1,00 to 3,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 01 LS(S) 5,5 x L

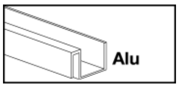
Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 1,00	1,20	1,40	1,60	1,80	2,00	3,00
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	1,12	1,32	1,51	1,71	1,91	2,10	2,59
	0,75	1,16	1,38	1,60	1,83	2,04	2,26	2,63
	0,88	1,20	1,45	1,70	1,94	2,19	2,43	2,68
	1,00	1,24	1,51	1,79	2,06	2,33	2,60	2,72
	1,13	1,28	1,58	1,88	2,18	2,47	2,77	—
	1,25	1,32	1,64	1,96	2,29	2,60	2,92	—
	1,50	1,40	1,77	2,15	2,52	2,89	3,26	—
	1,75	1,48	1,90	2,32	2,74	3,16	3,58	—
	2,00	1,56	2,03	2,51	2,98	3,45	3,92	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	0,75	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	0,88	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	1,00	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	1,13	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	1,25	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	1,50	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	1,75	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	2,00	0,69	0,90	1,10	1,21	1,21	1,21	1,21

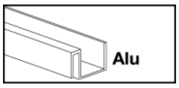
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

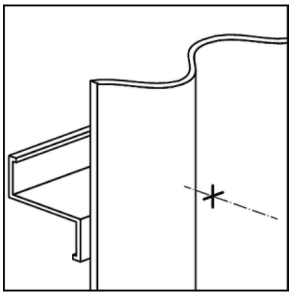
Component I: t_I = 1,00 to 2,00 mm

Component II: t_{II} = 0,50 to 2,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 01 LPS(S) 5,5 x L

Washer: none

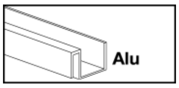
Drilling capacity in metal: $\Sigma t_i \leq 6,00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm]										
		0,50	**0,60**	**0,70**	**0,80**	**0,90**	**1,00**	**1,20**	**1,40**	**1,60**	**1,80**	**2,00**
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—
	0,60	—	—	—	—	—	—	—	—	—	—	—
	0,70	—	—	—	—	—	—	—	—	—	—	—
	0,80	—	—	—	—	—	—	—	—	—	—	—
	0,90	—	—	—	—	—	—	—	—	—	—	—
	1,00	—	—	—	—	—	1,16	1,16	1,16	1,16	1,16	1,16
	1,20	—	—	—	—	—	1,16	1,71	1,71	1,71	1,71	1,71
	1,40	—	—	—	—	—	1,16	1,71	2,22	2,22	2,22	2,22
	1,60	—	—	—	—	—	1,16	1,71	2,22	2,69	2,69	2,69
	1,80	—	—	—	—	—	1,16	1,71	2,22	2,69	3,11	3,11
	2,00	—	—	—	—	—	1,16	1,71	2,22	2,69	3,11	3,49
$N_{R,II,k}$ [kN]		0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

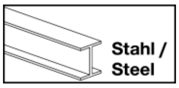
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

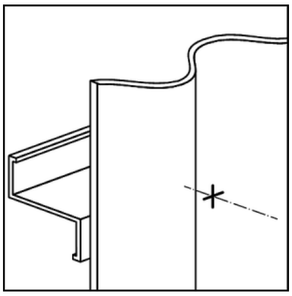
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,63 to 2,00 mm



Steel S235
Steel S320GD to S390GD

Typical application:



Fastener:

S-MD 01 LPS(S) 5,5 x L

Washer: none

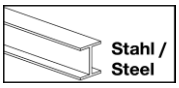
Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

t_I [mm]	**t_{II} [mm]**								
	0,63	**0,75**	**0,88**	**1,00**	**1,13**	**1,25**	**1,50**	**1,75**	**2,00**
$V_{R,k}$ [kN] **0,50**	0,83	0,84	0,85	0,86	0,87	0,87	0,89	0,89	0,89
0,60	0,92	0,94	0,97	1,01	1,01	1,02	1,04	1,04	1,04
0,70	0,99	1,04	1,10	1,16	1,16	1,17	1,19	1,19	1,19
0,80	1,07	1,14	1,23	1,31	1,32	1,33	1,34	1,34	1,34
1,00	1,22	1,35	1,49	1,62	1,62	1,63	1,65	1,65	1,65
1,20	1,35	1,47	1,60	1,73	1,79	1,84	1,95	1,95	1,95
1,30	1,41	1,53	1,66	1,79	1,87	1,94	2,10	2,10	2,10
1,50	1,52	1,65	1,78	1,90	2,03	2,15	2,41	2,41	2,41
1,60	1,57	1,68	1,79	1,90	2,03	2,15	2,41	2,41	2,41
1,80	1,66	1,74	1,82	1,90	2,03	2,15	2,41	2,41	2,41
2,00	1,74	1,79	1,85	1,90	2,03	2,15	2,41	2,41	2,41
$N_{R,II,k}$ [kN]	0,46	0,67	0,96	1,25	1,59	1,92	1,92	1,92	1,92

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

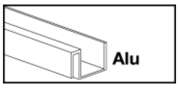
Application range:



Steel S320GD to S350GD

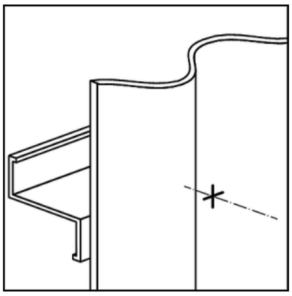
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 0,50 to 2,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 01 LPS(S) 5,5 x L

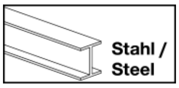
Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,50	0,60	0,70	0,80	0,90	1,00	1,20	1,40	1,60	1,80	2,00
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—
	0,63	—	—	—	—	—	1,12	1,32	1,51	1,71	1,91	2,10
	0,75	—	—	—	—	—	1,16	1,38	1,60	1,83	2,04	2,26
	0,88	—	—	—	—	—	1,20	1,45	1,70	1,94	2,19	2,43
	1,00	—	—	—	—	—	1,24	1,51	1,79	2,06	2,33	2,60
	1,13	—	—	—	—	—	1,28	1,58	1,88	2,18	2,47	2,77
	1,25	—	—	—	—	—	1,32	1,64	1,96	2,29	2,60	2,92
	1,50	—	—	—	—	—	1,40	1,77	2,15	2,52	2,89	3,26
	1,75	—	—	—	—	—	1,48	1,90	2,32	2,74	3,16	3,58
	2,00	—	—	—	—	—	1,56	2,03	2,51	2,98	3,45	3,92
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	0,75	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	0,88	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,00	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,13	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,25	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,50	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,75	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	2,00	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21

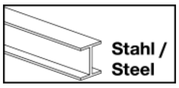
Application range:



Steel S280GD to S320GD

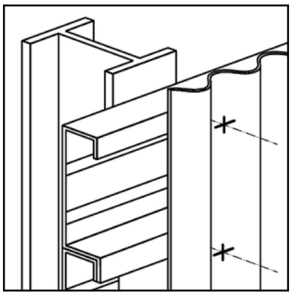
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 2 x 0,63 to 2 x 1,75 mm



Steel S235
Steel S280GD to S320GD

Typical application:



Fastener:

S-MD 31 LPS(S) 5,5 x L

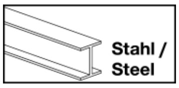
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm]															
		2 x 0,63		**2 x 0,75**		**2 x 0,88**		**2 x 1,00**		**2 x 1,13**		**2 x 1,25**		**2 x 1,50**		**2 x 1,75**	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,20	—	2,70	—	2,70	—	2,70	—	2,90	—	3,10	—	3,10	—	—	—
	0,75	2,40	—	3,10	—	3,10	—	3,10	—	3,30	—	3,60	—	3,60	—	—	—
	0,88	2,70	—	3,10	—	3,10	—	3,10	—	3,50	—	4,00	—	4,00	—	—	—
	1,00	3,10	—	3,20	—	3,20	—	3,20	—	3,80	—	4,40	—	4,40	—	—	—
	1,13	3,40	—	3,40	—	3,80	—	4,20	—	4,50	—	4,90	—	—	—	—	—
	1,25	3,70	—	3,70	—	4,40	—	5,10	—	5,30	—	5,40	—	—	—	—	—
	1,50	3,70	—	3,70	—	4,40	—	5,10	—	5,30	—	5,40	—	—	—	—	—
	1,75	3,70	—	3,70	—	4,40	—	5,10	—	—	—	—	—	—	—	—	—
	2,00	3,70	—	3,70	—	4,40	—	5,10	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,90	—	2,10	—	2,34	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—
	0,75	1,90	—	2,10	—	2,34	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—
	0,88	1,90	—	2,10	—	2,34	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—
	1,00	1,90	—	2,10	—	2,34	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—
	1,13	1,90	—	2,10	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—	—	—
	1,25	1,90	—	2,10	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—	—	—
	1,50	1,90	—	2,10	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—	—	—
	1,75	1,90	—	2,10	—	2,34	—	2,34	—	—	—	—	—	—	—	—	—
	2,00	1,90	—	2,10	—	2,34	—	2,34	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															

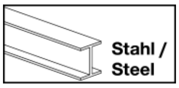
Application range:



Steel S320GD to S350GD

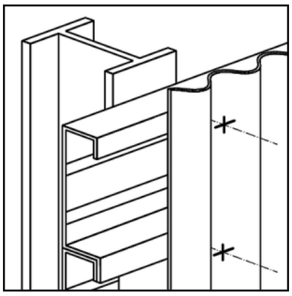
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 2 x 0,63 to 2 x 1,75 mm



Steel S275
Steel S320GD to S350GD

Typical application:



Fastener:

S-MD 31 LPS(S) 5,5 x L

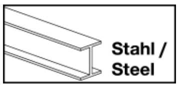
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq$ 4,00 mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 2 x 0,63		2 x 0,75		2 x 0,88		2 x 1,00		2 x 1,13		2 x 1,25		2 x 1,50		2 x 1,75	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,40	—	2,90	—	2,90	—	2,90	—	3,10	—	3,30	—	3,30	—	—	—
	0,75	2,60	—	3,30	—	3,30	—	3,30	—	3,60	—	3,90	—	3,90	—	—	—
	0,88	3,00	—	3,00	—	3,30	—	3,30	—	3,80	—	4,30	—	4,30	—	—	—
	1,00	3,30	—	3,50	—	3,50	—	3,50	—	4,10	—	4,70	—	4,70	—	—	—
	1,13	3,70	—	3,70	—	4,10	—	4,50	—	4,90	—	5,30	—	—	—	—	—
	1,25	4,00	—	4,00	—	4,80	—	5,50	—	5,70	—	5,90	—	—	—	—	—
	1,50	4,00	—	4,00	—	4,80	—	5,50	—	5,70	—	5,90	—	—	—	—	—
	1,75	4,00	—	4,00	—	4,80	—	5,50	—	—	—	—	—	—	—	—	—
	2,00	4,00	—	4,00	—	4,80	—	5,50	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,00	—	2,20	—	2,34	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—
	0,75	2,00	—	2,20	—	2,34	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—
	0,88	2,00	—	2,20	—	2,34	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—
	1,00	2,00	—	2,20	—	2,34	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—
	1,13	2,00	—	2,20	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—	—	—
	1,25	2,00	—	2,20	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—	—	—
	1,50	2,00	—	2,20	—	2,34	—	2,34	—	2,34	—	2,34	—	—	—	—	—
	1,75	2,00	—	2,20	—	2,34	—	2,34	—	—	—	—	—	—	—	—	—
	2,00	2,00	—	2,20	—	2,34	—	2,34	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															

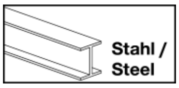
Application range:



Steel S280GD to S320GD

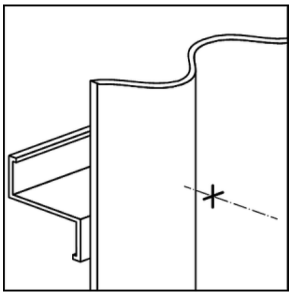
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 0,63 to 1,75 mm



Steel S235
Steel S280GD to S320GD

Typical application:



Fastener:

S-MD 31 LPS(S) 5,5 x L

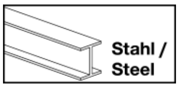
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,63		0,75		0,88		1,00		1,13		1,25		1,50		1,75	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,99	—	1,35	—	1,58	—	1,80	—	2,00	—	2,20	—	2,20	—	2,20	—
	0,75	1,31	—	1,48	—	1,84	—	1,84	—	2,02	—	2,20	—	2,20	—	2,20	—
	0,88	1,34	—	1,72	—	2,10	—	2,10	—	2,15	—	2,20	—	2,20	—	2,20	—
	1,00	1,36	—	1,72	—	2,10	—	2,72	—	2,72	—	2,72	—	2,72	—	2,72	—
	1,13	1,39	—	1,72	—	2,10	—	2,72	—	3,36	—	3,36	—	3,36	—	3,36	—
	1,25	1,41	—	1,72	—	2,10	—	2,72	—	3,36	—	4,00	—	4,00	—	4,00	—
	1,50	1,41	—	1,72	—	2,10	—	2,72	—	3,36	—	4,00	—	4,00	—	4,00	—
	1,75	1,41	—	1,72	—	2,10	—	2,72	—	3,36	—	4,00	—	4,00	—	4,00	—
	2,00	1,41	—	1,72	—	2,10	—	2,72	—	3,36	—	4,00	—	4,00	—	4,00	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	0,75	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	0,88	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	1,00	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	1,13	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	1,25	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	1,50	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	1,75	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	2,00	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
$M_{t,nom}$ [Nm]		5 Nm															

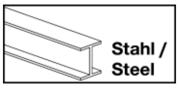
Application range:



Steel S320GD to S350GD

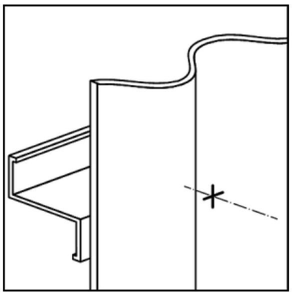
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 0,63 to 1,75 mm



Steel S275
Steel S320GD to S350GD

Typical application:

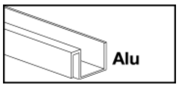


Fastener:
S-MD 31 LPS(S) 5,5 x L
Washer: Ø12

Drilling capacity in metal: Σt_i ≤ 4,00 mm
Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm]															
		0,63		0,75		0,88		1,00		1,13		1,25		1,50		1,75	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,08	—	1,46	—	1,71	—	1,95	—	2,16	—	2,38	—	2,38	—	2,38	—
	0,75	1,42	—	1,61	—	1,99	—	1,99	—	2,18	—	2,38	—	2,38	—	2,38	—
	0,88	1,45	—	1,86	—	2,28	—	2,28	—	2,33	—	2,38	—	2,38	—	2,38	—
	1,00	1,48	—	1,86	—	2,28	—	2,95	—	2,95	—	2,95	—	2,95	—	2,95	—
	1,13	1,51	—	1,86	—	2,28	—	2,95	—	3,64	—	3,64	—	3,64	—	3,64	—
	1,25	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
	1,50	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
	1,75	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
	2,00	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	0,75	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	0,88	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,00	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,13	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,25	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,50	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,75	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	2,00	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
$M_{t,nom}$ [Nm]		5 Nm															

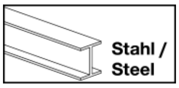
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

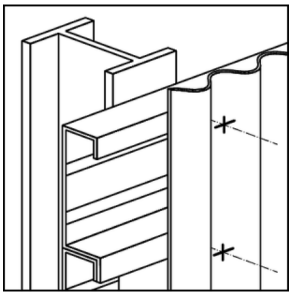
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,63 to 1,50 mm
t_{II} = 2 x 0,63 to 2 x 1,50 mm



Steel S235
Steel S280GD to S350GD

Typical application:



Fastener:

S-MD 31 LPS(S) 5,5 x L

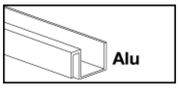
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 4,00$ mm

Performance for timber substructures not determined

	t_I [mm]	**t_{II}** [mm]													
		0,63	**0,75**	**0,88**	**1,00**	**1,13**	**1,25**	**1,50**	**2 x 0,63**	**2 x 0,75**	**2 x 0,88**	**2 x 1,00**	**2 x 1,13**	**2 x 1,25**	**2 x 1,50**
$V_{R,k}$ [kN]	**0,50**	0,83	0,84	0,85	0,86	0,87	0,87	0,89	0,74	0,90	1,07	1,23	1,23	1,23	1,24
	0,60	0,92	0,94	0,97	1,01	1,01	1,02	1,04	0,86	1,03	1,20	1,36	1,37	1,37	1,38
	0,70	0,99	1,04	1,10	1,16	1,16	1,17	1,19	0,98	1,15	1,33	1,50	1,50	1,50	1,51
	0,80	1,07	1,14	1,23	1,31	1,32	1,33	1,34	1,11	1,29	1,47	1,64	1,64	1,65	1,66
	1,00	1,22	1,35	1,49	1,62	1,62	1,63	1,65	1,37	1,55	1,74	1,92	1,92	1,93	1,93
	1,20	1,35	1,47	1,60	1,73	1,79	1,84	1,95	1,39	1,57	1,75	1,93	2,00	2,06	—
	1,30	1,41	1,53	1,66	1,79	1,87	1,94	2,10	1,40	1,58	1,76	1,93	2,04	2,13	—
	1,50	1,52	1,65	1,78	1,90	2,03	2,15	2,41	1,43	1,60	1,78	1,95	2,11	2,27	—
	1,60	1,57	1,68	1,79	1,90	2,03	2,15	2,41	—	—	—	—	—	—	—
	1,80	1,66	1,74	1,82	1,90	2,03	2,15	2,41	—	—	—	—	—	—	—
	2,00	1,74	1,79	1,85	1,90	2,03	2,15	2,41	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	0,46	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61	0,61
	0,60	0,46	0,67	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70
	0,70	0,46	0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58
	0,80	0,46	0,67	0,67	0,67	0,67	0,67	0,67	0,67	0,67	0,67	0,67	0,67	0,67	0,67
	1,00	0,46	0,67	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83
	1,20	0,46	0,67	0,96	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	—
	1,30	0,46	0,67	0,96	1,08	1,08	1,08	1,08	1,08	1,08	1,08	1,08	1,08	1,08	—
	1,50	0,46	0,67	0,96	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	—
	1,60	0,46	0,67	0,96	1,25	1,25	1,25	1,25	—	—	—	—	—	—	—
	1,80	0,46	0,67	0,96	1,25	1,25	1,25	1,25	—	—	—	—	—	—	—
	2,00	0,46	0,67	0,96	1,25	1,25	1,25	1,25	—	—	—	—	—	—	—

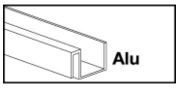
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

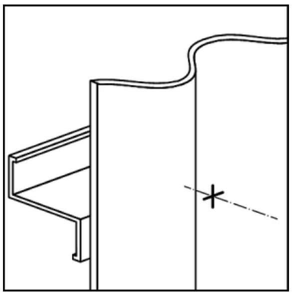
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,50 to 2,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 31 LPS(S) 5,5 x L

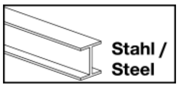
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,50	0,60	0,70	0,80	0,90	1,00	1,20	1,40	1,60	1,80	2,00
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—
	0,60	—	—	—	—	—	—	—	—	—	—	—
	0,70	—	—	—	—	—	—	—	—	—	—	—
	0,80	—	—	—	—	—	—	—	—	—	—	—
	0,90	—	—	—	—	—	—	—	—	—	—	—
	1,00	—	—	—	—	—	1,16	1,16	1,16	1,16	1,16	1,16
	1,20	—	—	—	—	—	1,16	1,71	1,71	1,71	1,71	1,71
	1,40	—	—	—	—	—	1,16	1,71	2,22	2,22	2,22	2,22
	1,60	—	—	—	—	—	1,16	1,71	2,22	2,69	2,69	2,69
	1,80	—	—	—	—	—	1,16	1,71	2,22	2,69	3,11	3,11
	2,00	—	—	—	—	—	1,16	1,71	2,22	2,69	3,11	3,49
$N_{R,k}$ [kN]	0,50	0,17	0,27	0,37	0,48	0,58	0,61	0,61	0,61	0,61	0,61	0,61
	0,60	0,17	0,27	0,37	0,48	0,58	0,69	0,70	0,70	0,70	0,70	0,70
	0,70	0,17	0,27	0,37	0,48	0,58	0,69	0,83	0,83	0,83	0,83	0,83
	0,80	0,17	0,27	0,37	0,48	0,58	0,69	0,90	0,99	0,99	0,99	0,99
	0,90	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,19	1,19	1,19
	1,00	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,20	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,40	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,60	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,80	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	2,00	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21

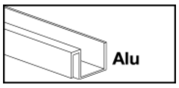
Application range:



Steel S280GD to S350GD

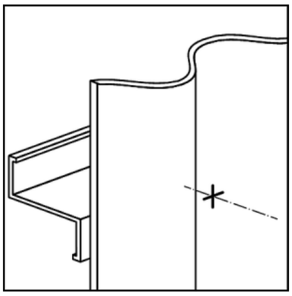
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 1,00 to 3,00 mm



Aluminium alloy with $R_m \geq 185\ N/mm^2$

Typical application:



Fastener:

S-MD 31 LPS(S) 5,5 x L

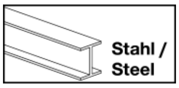
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 1,00	1,20	1,40	1,60	1,80	2,00	3,00
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	1,12	1,32	1,51	1,71	1,91	2,10	2,59
	0,75	1,16	1,38	1,60	1,83	2,04	2,26	2,63
	0,88	1,20	1,45	1,70	1,94	2,19	2,43	2,68
	1,00	1,24	1,51	1,79	2,06	2,33	2,60	2,72
	1,13	1,28	1,58	1,88	2,18	2,47	2,77	—
	1,25	1,32	1,64	1,96	2,29	2,60	2,92	—
	1,50	1,40	1,77	2,15	2,52	2,89	3,26	—
	1,75	1,48	1,90	2,32	2,74	3,16	3,58	—
	2,00	1,56	2,03	2,51	2,98	3,45	3,92	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	0,75	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	0,88	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	1,00	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	1,13	0,69	0,90	1,10	1,21	1,21	1,21	—
	1,25	0,69	0,90	1,10	1,21	1,21	1,21	—
	1,50	0,69	0,90	1,10	1,21	1,21	1,21	—
	1,75	0,69	0,90	1,10	1,21	1,21	1,21	—
	2,00	0,69	0,90	1,10	1,21	1,21	1,21	—

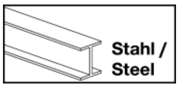
Application range:



Steel S280GD to S320GD

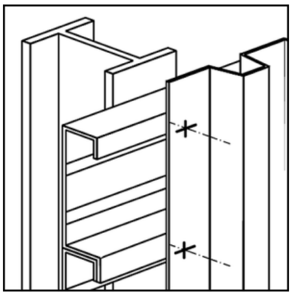
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 2 x 0,63 to 2 x 1,50 mm



Steel S235
Steel S280GD to S320GD

Typical application:



Fastener:

S-MD 51 LS(S) 5,5 x L
S-MD 61 LS(S) 5,5 x L
S-MD 71 LS(S) 5,5 x L
S-MD 51 LPS(S) 5,5 x L
S-MD 61 LPS(S) 5,5 x L
S-MD 71 LPS(S) 5,5 x L

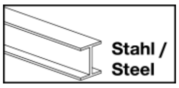
Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq 4,00$ mm

Performance for timber substructures not determined

	t_I [mm]	**t_{II}** [mm]															
		2 x 0,63		**2 x 0,75**		**2 x 0,88**		**2 x 1,00**		**2 x 1,13**		**2 x 1,25**		**2 x 1,50**		**2 x 1,75**	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,20	—	2,70	—	2,70	—	2,70	—	2,90	—	3,10	—	3,10	—	—	—
	0,75	2,40	—	3,10	—	3,10	—	3,10	—	3,30	—	3,60	—	3,60	—	—	—
	0,88	2,70	—	3,10	—	3,10	—	3,10	—	3,50	—	4,00	—	4,00	—	—	—
	1,00	3,10	—	3,20	—	3,20	—	3,20	—	3,80	—	4,40	—	4,40	—	—	—
	1,13	3,40	—	3,40	—	3,80	—	4,20	—	4,50	—	4,90	—	—	—	—	—
	1,25	3,70	—	3,70	—	4,40	—	5,10	—	5,30	—	5,40	—	—	—	—	—
	1,50	3,70	—	3,70	—	4,40	—	5,10	—	5,30	—	5,40	—	—	—	—	—
	1,75	3,70	—	3,70	—	4,40	—	5,10	—	—	—	—	—	—	—	—	—
	2,00	3,70	—	3,70	—	4,40	—	5,10	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	1,03	—	1,13	—	1,24	—	1,24	—	1,24	—	1,24	—	1,24	—	—	—
	0,55	1,30	—	1,43	—	1,57	—	1,57	—	1,57	—	1,57	—	1,57	—	—	—
	0,63	1,90	—	2,10	—	2,30	—	2,30	—	2,30	—	2,30	—	2,30	—	—	—
	0,75	1,90	—	2,10	—	2,40	—	2,80	—	3,30	—	3,30	—	3,30	—	—	—
	0,88	1,90	—	2,10	—	2,40	—	2,80	—	3,30	—	3,80	—	4,30	—	—	—
	1,00	1,90	—	2,10	—	2,40	—	2,80	—	3,30	—	3,80	—	4,80	—	—	—
	1,13	1,90	—	2,10	—	2,40	—	2,80	—	3,30	—	3,80	—	—	—	—	—
	1,25	1,90	—	2,10	—	2,40	—	2,80	—	3,30	—	3,80	—	—	—	—	—
	1,50	1,90	—	2,10	—	2,40	—	2,80	—	3,30	—	3,80	—	—	—	—	—
	1,75	1,90	—	2,10	—	2,40	—	2,80	—	—	—	—	—	—	—	—	—
	2,00	1,90	—	2,10	—	2,40	—	2,80	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															

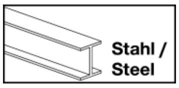
Application range:



Steel S320GD to S350GD

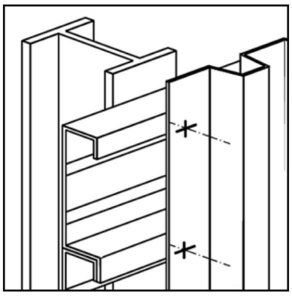
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 2 x 0,63 to 2 x 1,50 mm



Steel S275
Steel S320GD to S350GD

Typical application:



Fastener:

S-MD 51 LS(S) 5,5 x L
S-MD 61 LS(S) 5,5 x L
S-MD 71 LS(S) 5,5 x L
S-MD 51 LPS(S) 5,5 x L
S-MD 61 LPS(S) 5,5 x L
S-MD 71 LPS(S) 5,5 x L

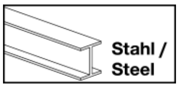
Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 2 x 0,63		2 x 0,75		2 x 0,88		2 x 1,00		2 x 1,13		2 x 1,25		2 x 1,50		2 x 1,75	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,40	—	2,90	—	2,90	—	2,90	—	3,10	—	3,30	—	3,30	—	—	—
	0,75	2,60	—	3,30	—	3,30	—	3,30	—	3,60	—	3,90	—	3,90	—	—	—
	0,88	3,00	—	3,00	—	3,30	—	3,30	—	3,80	—	4,30	—	4,30	—	—	—
	1,00	3,30	—	3,50	—	3,50	—	3,50	—	4,10	—	4,70	—	4,70	—	—	—
	1,13	3,70	—	3,70	—	4,10	—	4,50	—	4,90	—	5,30	—	—	—	—	—
	1,25	4,00	—	4,00	—	4,80	—	5,50	—	5,70	—	5,90	—	—	—	—	—
	1,50	4,00	—	4,00	—	4,80	—	5,50	—	5,70	—	5,90	—	—	—	—	—
	1,75	4,00	—	4,00	—	4,80	—	5,50	—	—	—	—	—	—	—	—	—
	2,00	4,00	—	4,00	—	4,80	—	5,50	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	1,08	—	1,19	—	1,40	—	1,46	—	1,46	—	1,46	—	1,46	—	—	—
	0,55	1,36	—	1,50	—	1,77	—	1,84	—	1,84	—	1,84	—	1,84	—	—	—
	0,63	2,00	—	2,20	—	2,60	—	2,70	—	2,70	—	2,70	—	2,70	—	—	—
	0,75	2,00	—	2,20	—	2,60	—	3,10	—	3,70	—	3,80	—	3,80	—	—	—
	0,88	2,00	—	2,20	—	2,60	—	3,10	—	3,70	—	4,30	—	4,80	—	—	—
	1,00	2,00	—	2,20	—	2,60	—	3,10	—	3,70	—	4,30	—	4,80	—	—	—
	1,13	2,00	—	2,20	—	2,60	—	3,10	—	3,70	—	4,30	—	—	—	—	—
	1,25	2,00	—	2,20	—	2,60	—	3,10	—	3,70	—	4,30	—	—	—	—	—
	1,50	2,00	—	2,20	—	2,60	—	3,10	—	3,70	—	4,30	—	—	—	—	—
	1,75	2,00	—	2,20	—	2,60	—	3,10	—	—	—	—	—	—	—	—	—
	2,00	2,00	—	2,20	—	2,60	—	3,10	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															

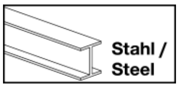
Application range:



Steel S280GD to S320GD

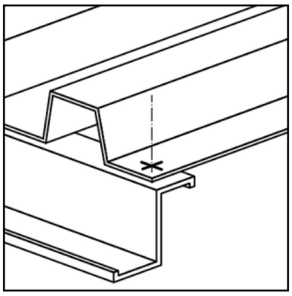
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,63 to 1,75 mm



Steel S235
Steel S280GD to S320GD

Typical application:



Fastener:

S-MD 51 LS(S) 5,5 x L
S-MD 61 LS(S) 5,5 x L
S-MD 71 LS(S) 5,5 x L
S-MD 51 LPS(S) 5,5 x L
S-MD 61 LPS(S) 5,5 x L
S-MD 71 LPS(S) 5,5 x L

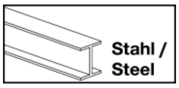
Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq$ 4,00 mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,63		0,75		0,88		1,00		1,13		1,25		1,50		1,75	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,99	—	1,35	—	1,58	—	1,80	—	2,00	—	2,20	—	2,20	—	2,20	—
	0,75	1,31	—	1,48	—	1,84	—	1,84	—	2,02	—	2,20	—	2,20	—	2,20	—
	0,88	1,34	—	1,72	—	2,10	—	2,10	—	2,15	—	2,20	—	2,20	—	2,20	—
	1,00	1,36	—	1,72	—	2,10	—	2,72	—	2,72	—	2,72	—	2,72	—	2,72	—
	1,13	1,39	—	1,72	—	2,10	—	2,72	—	3,36	—	3,36	—	3,36	—	3,36	—
	1,25	1,41	—	1,72	—	2,10	—	2,72	—	3,36	—	4,00	—	4,00	—	4,00	—
	1,50	1,41	—	1,72	—	2,10	—	2,72	—	3,36	—	4,00	—	4,00	—	4,00	—
	1,75	1,41	—	1,72	—	2,10	—	2,72	—	3,36	—	4,00	—	4,00	—	4,00	—
	2,00	1,41	—	1,72	—	2,10	—	2,72	—	3,36	—	4,00	—	4,00	—	4,00	—
$N_{R,k}$ [kN]	**0,50**	0,46	—	0,67	—	0,96	—	1,24	—	1,24	—	1,24	—	1,24	—	1,24	—
	0,55	0,46	—	0,67	—	0,96	—	1,25	—	1,57	—	1,57	—	1,57	—	1,57	—
	0,63	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	0,75	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	0,88	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	1,00	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	1,13	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	1,25	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	1,50	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	1,75	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
	2,00	0,46	—	0,67	—	0,96	—	1,25	—	1,59	—	1,92	—	1,92	—	1,92	—
$M_{t,nom}$ [Nm]		5 Nm															

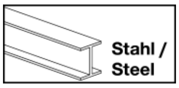
Application range:



Steel S320GD to S350GD

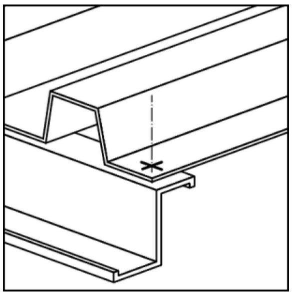
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,63 to 1,75 mm



Steel S275
Steel S320GD to S350GD

Typical application:



Fastener:

S-MD 51 LS(S) 5,5 x L
S-MD 61 LS(S) 5,5 x L
S-MD 71 LS(S) 5,5 x L
S-MD 51 LPS(S) 5,5 x L
S-MD 61 LPS(S) 5,5 x L
S-MD 71 LPS(S) 5,5 x L

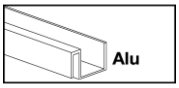
Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	**t_{II} [mm]**															
		0,63		**0,75**		**0,88**		**1,00**		**1,13**		**1,25**		**1,50**		**1,75**	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,08	—	1,46	—	1,71	—	1,95	—	2,16	—	2,38	—	2,38	—	2,38	—
	0,75	1,42	—	1,61	—	1,99	—	1,99	—	2,18	—	2,38	—	2,38	—	2,38	—
	0,88	1,45	—	1,86	—	2,28	—	2,28	—	2,33	—	2,38	—	2,38	—	2,38	—
	1,00	1,48	—	1,86	—	2,28	—	2,95	—	2,95	—	2,95	—	2,95	—	2,95	—
	1,13	1,51	—	1,86	—	2,28	—	2,95	—	3,64	—	3,64	—	3,64	—	3,64	—
	1,25	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
	1,50	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
	1,75	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
	2,00	1,53	—	1,86	—	2,28	—	2,95	—	3,64	—	4,34	—	4,34	—	4,34	—
$N_{R,k}$ [kN]	**0,50**	0,50	—	0,72	—	1,04	—	1,35	—	1,46	—	1,46	—	1,46	—	1,46	—
	0,55	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	1,84	—	1,84	—	1,84	—
	0,63	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	0,75	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	0,88	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,00	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,13	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,25	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,50	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	1,75	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
	2,00	0,50	—	0,72	—	1,04	—	1,35	—	1,71	—	2,07	—	2,07	—	2,07	—
$M_{t,nom}$ [Nm]		5 Nm															

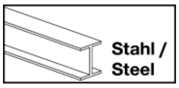
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

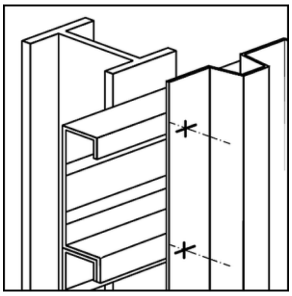
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,63 to 1,50 mm
t_{II} = 2 x 0,63 to 2 x 1,50 mm



Steel S235
Steel S280GD to S350GD

Typical application:



Fastener:

S-MD 41 LS(S) 5,5 x L
S-MD 51 LS(S) 5,5 x L
S-MD 61 LS(S) 5,5 x L
S-MD 71 LS(S) 5,5 x L
S-MD 41 LPS(S) 5,5 x L
S-MD 51 LPS(S) 5,5 x L
S-MD 61 LPS(S) 5,5 x L
S-MD 71 LPS(S) 5,5 x L

Washer: Ø14 / Ø16 / Ø19 / Ø22

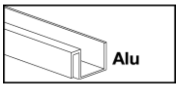
Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm]													
		0,63	**0,75**	**0,88**	**1,00**	**1,13**	**1,25**	**1,50**	**2 x 0,63**	**2 x 0,75**	**2 x 0,88**	**2 x 1,00**	**2 x 1,13**	**2 x 1,25**	**2 x 1,50**
$V_{R,k}$ [kN]	**0,50**	0,83	0,84	0,85	0,86	0,87	0,87	0,89	0,74	0,90	1,07	1,23	1,23	1,23	1,24
	0,60	0,92	0,94	0,97	1,01	1,01	1,02	1,04	0,86	1,03	1,20	1,36	1,37	1,37	1,38
	0,70	0,99	1,04	1,10	1,16	1,16	1,17	1,19	0,98	1,15	1,33	1,50	1,50	1,50	1,51
	0,80	1,07	1,14	1,23	1,31	1,32	1,33	1,34	1,11	1,29	1,47	1,64	1,64	1,65	1,66
	1,00	1,22	1,35	1,49	1,62	1,62	1,63	1,65	1,37	1,55	1,74	1,92	1,92	1,93	1,93
	1,20	1,35	1,47	1,60	1,73	1,79	1,84	1,95	1,39	1,57	1,75	1,93	2,00	2,06	—
	1,30	1,41	1,53	1,66	1,79	1,87	1,94	2,10	1,40	1,58	1,76	1,93	2,04	2,13	—
	1,50	1,52	1,65	1,78	1,90	2,03	2,15	2,41	1,43	1,60	1,78	1,95	2,11	2,27	—
	1,60	1,57	1,68	1,79	1,90	2,03	2,15	2,41	—	—	—	—	—	—	—
	1,80	1,66	1,74	1,82	1,90	2,03	2,15	2,41	—	—	—	—	—	—	—
	2,00	1,74	1,79	1,85	1,90	2,03	2,15	2,41	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45
	0,60	0,46	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54
	0,70	0,46	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63
	0,80	0,46	0,67	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72
	1,00	0,46	0,67	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90
	1,20	0,46	0,67	0,96	1,08	1,08	1,08	1,08	1,08	1,08	1,08	1,08	1,08	1,08	—
	1,30	0,46	0,67	0,96	1,17	1,17	1,17	1,17	1,17	1,17	1,17	1,17	1,17	1,17	—
	1,50	0,46	0,67	0,96	1,25	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	—
	1,60	0,46	0,67	0,96	1,25	1,35	1,35	1,35	—	—	—	—	—	—	—
	1,80	0,46	0,67	0,96	1,25	1,35	1,35	1,35	—	—	—	—	—	—	—
	2,00	0,46	0,67	0,96	1,25	1,35	1,35	1,35	—	—	—	—	—	—	—

The grey highlighted values $N_{R,k}$ may be increased by 6.9% when using the types “S-MD 5x”, by 16.5% when using the types “S-MD 6x” and 25.4% when using the types “S-MD 7x”.

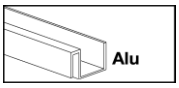
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

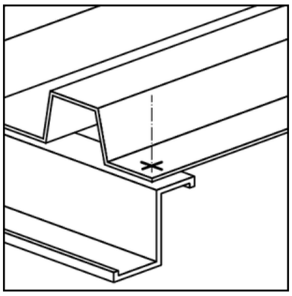
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,50 to 2,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 41 LS(S) 5,5 x L
S-MD 51 LS(S) 5,5 x L
S-MD 61 LS(S) 5,5 x L
S-MD 71 LS(S) 5,5 x L
S-MD 41 LPS(S) 5,5 x L
S-MD 51 LPS(S) 5,5 x L
S-MD 61 LPS(S) 5,5 x L
S-MD 71 LPS(S) 5,5 x L

Washer: Ø14 / Ø16 / Ø19 / Ø22

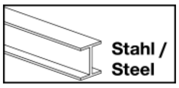
Drilling capacity in metal: $\Sigma t_i \leq 4,00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,50	0,60	0,70	0,80	0,90	1,00	1,20	1,40	1,60	1,80	2,00
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—
	0,60	—	—	—	—	—	—	—	—	—	—	—
	0,70	—	—	—	—	—	—	—	—	—	—	—
	0,80	—	—	—	—	—	—	—	—	—	—	—
	0,90	—	—	—	—	—	—	—	—	—	—	—
	1,00	—	—	—	—	—	1,16	1,16	1,16	1,16	1,16	1,16
	1,20	—	—	—	—	—	1,16	1,71	1,71	1,71	1,71	1,71
	1,40	—	—	—	—	—	1,16	1,71	2,22	2,22	2,22	2,22
	1,60	—	—	—	—	—	1,16	1,71	2,22	2,69	2,69	2,69
	1,80	—	—	—	—	—	1,16	1,71	2,22	2,69	3,11	3,11
	2,00	—	—	—	—	—	1,16	1,71	2,22	2,69	3,11	3,49
$N_{R,k}$ [kN]	0,50	0,17	0,27	0,37	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45
	0,60	0,17	0,27	0,37	0,48	0,54	0,54	0,54	0,54	0,54	0,54	0,54
	0,70	0,17	0,27	0,37	0,48	0,58	0,63	0,63	0,63	0,63	0,63	0,63
	0,80	0,17	0,27	0,37	0,48	0,58	0,69	0,72	0,72	0,72	0,72	0,72
	0,90	0,17	0,27	0,37	0,48	0,58	0,69	0,81	0,81	0,81	0,81	0,81
	1,00	0,17	0,27	0,37	0,48	0,58	0,69	0,90	0,90	0,90	0,90	0,90
	1,20	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,08	1,08	1,08	1,08
	1,40	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,60	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	1,80	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21
	2,00	0,17	0,27	0,37	0,48	0,58	0,69	0,90	1,10	1,21	1,21	1,21

The grey highlighted values $N_{R,k}$ may be increased by 6.9% when using the types “S-MD 5x”, by 16.5% when using the types “S-MD 6x” and 25.4% when using the types “S-MD 7x”.

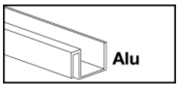
Application range:



Steel S280GD to S350GD

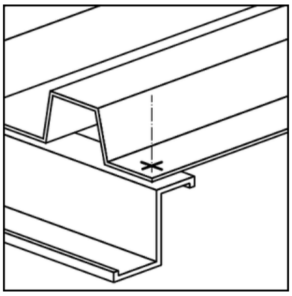
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 1,00 to 3,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 51 LS(S) 5,5 x L
S-MD 61 LS(S) 5,5 x L
S-MD 71 LS(S) 5,5 x L
S-MD 51 LPS(S) 5,5 x L
S-MD 61 LPS(S) 5,5 x L
S-MD 71 LPS(S) 5,5 x L

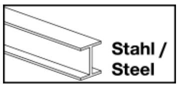
Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq 4{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 1,00	1,20	1,40	1,60	1,80	2,00	3,00
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	1,12	1,32	1,51	1,71	1,91	2,10	2,59
	0,75	1,16	1,38	1,60	1,83	2,04	2,26	2,63
	0,88	1,20	1,45	1,70	1,94	2,19	2,43	2,68
	1,00	1,24	1,51	1,79	2,06	2,33	2,60	2,72
	1,13	1,28	1,58	1,88	2,18	2,47	2,77	—
	1,25	1,32	1,64	1,96	2,29	2,60	2,92	—
	1,50	1,40	1,77	2,15	2,52	2,89	3,26	—
	1,75	1,48	1,90	2,32	2,74	3,16	3,58	—
	2,00	1,56	2,03	2,51	2,98	3,45	3,92	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	0,75	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	0,88	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	1,00	0,69	0,90	1,10	1,21	1,21	1,21	1,21
	1,13	0,69	0,90	1,10	1,21	1,21	1,21	—
	1,25	0,69	0,90	1,10	1,21	1,21	1,21	—
	1,50	0,69	0,90	1,10	1,21	1,21	1,21	—
	1,75	0,69	0,90	1,10	1,21	1,21	1,21	—
	2,00	0,69	0,90	1,10	1,21	1,21	1,21	—

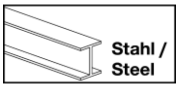
Application range:



Steel S280GD to S390GD

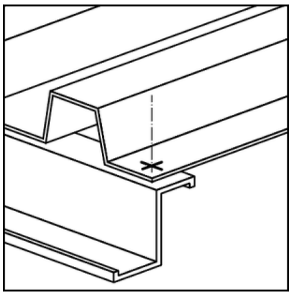
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Steel S235 to S355
Steel S280GD to S390GD

Typical application:



Fastener:

S-MD 03 S(S) 5,5 x L
S-MD 03 PS(S) 5,5 x L

Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 6,00$ mm

Performance for timber substructures not determined

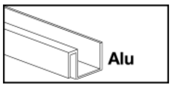
	t_I [mm]	t_{II} [mm] 1,50		2,00		2,50		3,00		4,00		6,00		—		—	
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,10	ac	2,60	ac	3,00	ac	3,40	ac	3,40	ac	—	—	—	—	—	—
	0,75	2,50	ac	3,00	ac	3,50	ac	4,00	ac	4,00	ac	—	—	—	—	—	—
	0,88	2,70	—	3,40	ac	4,00	ac	4,60	ac	4,60	a	—	—	—	—	—	—
	1,00	2,90	—	4,80	ac	5,00	ac	5,20	ac	5,20	a	—	—	—	—	—	—
	1,13	3,30	—	5,10	—	5,40	—	6,00	—	6,00	—	—	—	—	—	—	—
	1,25	3,60	—	5,30	—	5,80	—	6,80	—	6,80	—	—	—	—	—	—	—
	1,50	4,40	—	5,90	—	6,60	—	7,20	—	7,20	—	—	—	—	—	—	—
	1,75	4,40	—	5,90	—	6,60	—	7,20	—	7,20	—	—	—	—	—	—	—
	2,00	5,40	—	6,50	—	6,60	—	7,20	—	7,20	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,70	ac	1,70	ac	1,70	ac	1,70	ac	1,70	ac	—	—	—	—	—	—
	0,75	1,70	ac	2,20	ac	2,20	ac	2,20	ac	2,20	ac	—	—	—	—	—	—
	0,88	1,70	—	2,60	ac	2,90	ac	2,90	ac	2,90	a	—	—	—	—	—	—
	1,00	1,70	—	2,60	ac	3,50	ac	3,50	ac	3,50	a	—	—	—	—	—	—
	1,13	1,70	—	2,60	—	3,60	—	4,30	—	4,30	—	—	—	—	—	—	—
	1,25	1,70	—	2,60	—	3,60	—	4,60	—	5,10	—	—	—	—	—	—	—
	1,50	1,70	—	2,60	—	3,60	—	4,60	—	6,00	—	—	—	—	—	—	—
	1,75	1,70	—	2,60	—	3,60	—	4,60	—	6,00	—	—	—	—	—	—	—
	2,00	1,70	—	2,60	—	3,60	—	4,60	—	6,00	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		$\Sigma t \leq 3,00$ mm: 2 Nm								$\Sigma t > 3,00$ mm: 5 Nm							

Self drilling screw

Hilti S-MD 03 S 5,5 x L / Hilti S-MD 03 SS 5,5 x L
Hilti S-MD 03 PS 5,5 x L / Hilti S-MD 03 PSS 5,5 x L
with hexagon head or round head

Annex 52

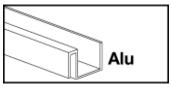
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

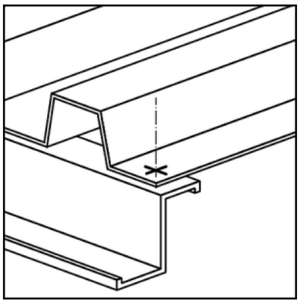
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 03 S(S) 5,5 x L

Washer: none

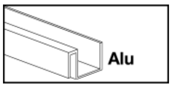
Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	**t_{II}** [mm]					
		1,50	**1,70**	**2,00**	**2,50**	**3,00**	**4,00**
$V_{R,k}$ [kN]	**0,50**	0,82	0,82	0,82	0,82	0,82	0,82
	0,60	0,94	0,94	0,94	0,94	0,94	0,94
	0,70	1,05	1,05	1,05	1,05	1,05	1,05
	0,80	1,17	1,17	1,17	1,17	1,17	1,17
	0,90	1,27	1,27	1,27	1,27	1,27	1,27
	1,00	1,37	1,40	1,45	1,53	1,61	1,61
	1,20	1,55	1,55	1,55	1,55	1,61	1,61
	1,40	1,70	1,70	1,70	1,70	1,70	1,70
	1,60	1,83	1,83	1,83	1,83	1,83	1,83
	1,80	1,93	1,93	1,93	1,93	1,93	1,93
	2,00	2,00	2,00	2,00	2,00	2,00	3,05
$N_{R,II,k}$ [kN]		0,98	1,26	1,65	1,65	1,65	1,65

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

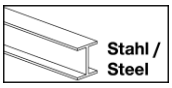
Application range:



Aluminium alloy with R_m ≥ 185 N/mm²

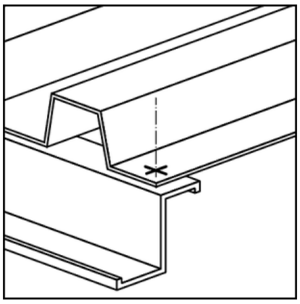
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Steel S235 to S355
Steel S280GD to S390GD

Typical application:



Fastener:

S-MD 03 S(S) 5,5 x L

Washer: none

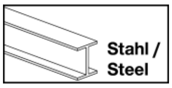
Drilling capacity in metal: Σt_i ≤ 6,00 mm

Performance for timber substructures not determined

	t_I [mm]	**t_{II}** [mm]					
		1,50	**1,70**	**2,00**	**2,50**	**3,00**	**4,00**
$V_{R,k}$ [kN]	**0,50**	0,82	0,82	0,82	0,82	0,82	0,82
	0,60	0,94	0,94	0,94	0,94	0,94	0,94
	0,70	1,05	1,05	1,05	1,05	1,05	1,05
	0,80	1,17	1,17	1,17	1,17	1,17	1,17
	0,90	1,27	1,27	1,27	1,27	1,27	1,27
	1,00	1,37	1,40	1,45	1,53	1,61	1,61
	1,20	1,55	1,55	1,55	1,55	1,61	1,61
	1,40	1,70	1,70	1,70	1,70	1,70	1,70
	1,60	1,83	1,83	1,83	1,83	1,83	1,83
	1,80	1,93	1,93	1,93	1,93	1,93	1,93
	2,00	2,00	2,00	2,00	2,00	2,00	3,05
$N_{R,II,k}$ [kN]		1,70	2,15	2,60	3,60	4,60	6,00

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

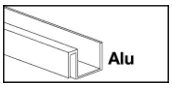
Application range:



Steel S280GD to S390GD

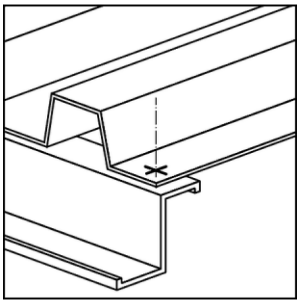
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 03 S(S) 5,5 x L

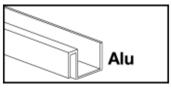
Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	**t_{II} [mm]**					
		1,50	**1,70**	**2,00**	**2,50**	**3,00**	**4,00**
$V_{R,k}$ [kN]	**0,50**	1,27	1,27	1,27	1,27	1,27	1,27
	0,55	1,37	1,40	1,45	1,53	1,61	1,61
	0,63	1,50	1,52	1,55	1,60	1,65	1,65
	0,75	1,70	1,70	1,70	1,70	1,70	1,70
	0,88	1,83	1,83	1,83	1,83	1,83	1,83
	1,00	1,93	1,93	1,93	1,93	1,93	1,93
	1,13	2,00	2,00	2,00	2,00	2,00	3,05
	1,25	2,00	2,00	2,00	2,00	2,00	3,05
	1,50	2,00	2,00	2,00	2,00	2,00	3,05
	1,75	2,00	2,00	2,00	2,00	2,00	3,05
	2,00	2,00	2,00	2,00	2,00	2,00	3,05
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—
	0,55	—	—	—	—	—	—
	0,63	0,98	1,26	1,65	1,65	1,65	1,65
	0,75	0,98	1,26	1,65	1,65	1,65	1,65
	0,88	0,98	1,26	1,65	1,65	1,65	1,65
	1,00	0,98	1,26	1,65	1,65	1,65	1,65
	1,13	0,98	1,26	1,65	1,65	1,65	1,65
	1,25	0,98	1,26	1,65	1,65	1,65	1,65
	1,50	0,98	1,26	1,65	1,65	1,65	1,65
	1,75	0,98	1,26	1,65	1,65	1,65	1,65
	2,00	0,98	1,26	1,65	1,65	1,65	1,65

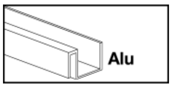
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

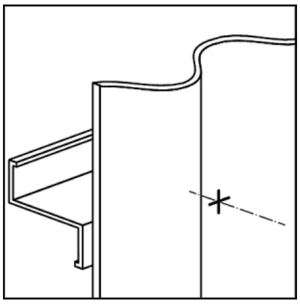
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,00 to 4,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 03 PS(S) 5,5 x L

Washer: none

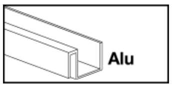
Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

t_I [mm]	**t_{II}** [mm]						
	1,00	**1,50**	**1,70**	**2,00**	**2,50**	**3,00**	**4,00**
$V_{R,k}$ [kN] **0,50**	0,56	0,79	0,79	0,79	0,79	0,79	0,79
0,60	0,65	0,91	0,91	0,91	0,91	0,91	0,91
0,70	0,74	1,03	1,03	1,03	1,03	1,03	1,03
0,80	0,85	1,10	1,10	1,10	1,10	1,10	1,10
0,90	0,96	1,18	1,18	1,18	1,18	1,18	1,18
1,00	1,07	1,25	1,25	1,25	1,25	1,25	1,25
1,20	1,07	1,25	1,25	1,25	1,25	1,25	1,25
1,40	1,07	1,25	1,25	1,25	1,25	1,25	1,25
1,60	1,07	1,25	1,25	1,25	1,25	1,25	1,25
1,80	1,07	1,25	1,25	1,25	1,25	1,25	1,25
2,00	1,07	1,25	1,25	1,25	1,25	1,25	1,25
$N_{R,II,k}$ [kN]	0,34	0,98	1,26	1,65	1,65	1,65	1,65

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

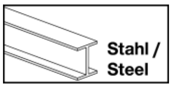
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

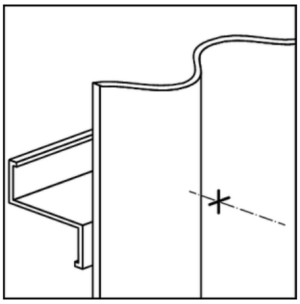
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Steel S235 to S355
Steel S280GD to S390GD

Typical application:



Fastener:

S-MD 03 PS(S) 5,5 x L

Washer: none

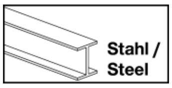
Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

t_I [mm]		t_{II} [mm]					
		1,50	**1,75**	**2,00**	**2,50**	**3,00**	**4,00**
$V_{R,k}$ [kN]	**0,50**	1,20	1,20	1,20	1,20	1,20	1,20
	0,55	1,28	1,28	1,28	1,28	1,28	1,28
	0,63	1,36	1,36	1,36	1,36	1,36	1,36
	0,75	1,46	1,46	1,46	1,46	1,46	1,46
	0,88	1,57	1,57	1,57	1,57	1,57	1,57
	1,00	1,68	1,73	1,78	1,88	1,98	1,98
	1,13	1,93	1,93	1,93	1,93	1,98	1,98
	1,25	2,22	2,22	2,22	2,22	2,22	2,22
	1,50	2,54	2,54	2,54	2,54	2,54	2,54
	1,75	2,90	2,90	2,90	2,90	2,90	2,90
	2,00	3,28	3,28	3,28	3,28	3,28	3,86
$N_{R,II,k}$ [kN]		1,70	2,15	2,60	3,60	4,60	6,00

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.

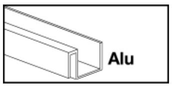
Application range:



Steel S280GD to S390GD

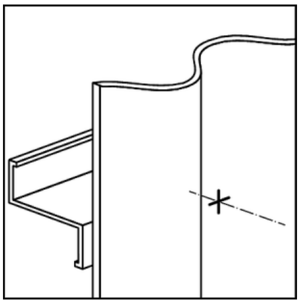
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 1,00 to 4,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 03 PS(S) 5,5 x L

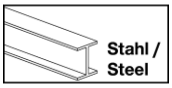
Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 6,00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 1,00	1,50	1,70	2,00	2,50	3,00	4,00
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	1,10	1,10	1,10	1,10	1,10	1,10	1,10
	0,75	1,28	1,46	1,46	1,46	1,46	1,46	1,46
	0,88	1,32	1,73	1,73	1,73	1,73	1,73	1,73
	1,00	1,36	1,99	1,99	1,99	1,99	1,99	1,99
	1,13	1,36	1,99	1,99	1,99	1,99	1,99	1,99
	1,25	1,36	1,99	1,99	1,99	1,99	1,99	1,99
	1,50	1,36	1,99	1,99	1,99	1,99	1,99	1,99
	1,75	1,36	1,99	1,99	1,99	1,99	1,99	—
	2,00	1,36	1,99	1,99	1,99	1,99	1,99	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	0,34	0,98	1,26	1,65	1,65	1,65	1,65
	0,75	0,34	0,98	1,26	1,65	1,65	1,65	1,65
	0,88	0,34	0,98	1,26	1,65	1,65	1,65	1,65
	1,00	0,34	0,98	1,26	1,65	1,65	1,65	1,65
	1,13	0,34	0,98	1,26	1,65	1,65	1,65	1,65
	1,25	0,34	0,98	1,26	1,65	1,65	1,65	1,65
	1,50	0,34	0,98	1,26	1,65	1,65	1,65	1,65
	1,75	0,34	0,98	1,26	1,65	1,65	1,65	1,65
	2,00	0,34	0,98	1,26	1,65	1,65	1,65	1,65

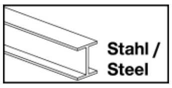
Application range:



Steel S280GD to S390GD

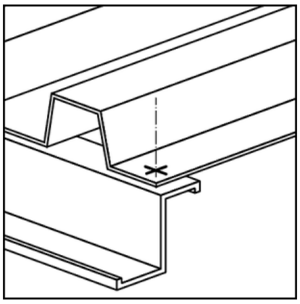
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Steel S235 to S355
Steel S280GD to S390GD

Typical application:



Fastener:

S-MD 53 S(S) 5,5 x L
S-MD 63 S(S) 5,5 x L
S-MD 73 S(S) 5,5 x L

Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

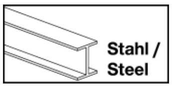
	t_I [mm]	t_{II} [mm] 1,50		2,00		2,50		3,00		4,00		6,00		—		—	
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,10	ac	2,60	ac	3,00	ac	3,40	ac	3,40	ac	—	—	—	—	—	—
	0,75	2,50	ac	3,00	ac	3,50	ac	4,00	ac	4,00	ac	—	—	—	—	—	—
	0,88	2,70	—	3,40	ac	4,00	ac	4,60	ac	4,60	a	—	—	—	—	—	—
	1,00	2,90	—	4,80	ac	5,00	ac	5,20	ac	5,20	a	—	—	—	—	—	—
	1,13	3,30	—	5,10	—	5,40	—	6,00	—	6,00	—	—	—	—	—	—	—
	1,25	3,60	—	5,30	—	5,80	—	6,80	—	6,80	—	—	—	—	—	—	—
	1,50	4,40	—	5,90	—	6,60	—	7,20	—	7,20	—	—	—	—	—	—	—
	1,75	4,40	—	5,90	—	6,60	—	7,20	—	7,20	—	—	—	—	—	—	—
	2,00	5,40	—	6,50	—	6,60	—	7,20	—	7,20	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	0,50	0,92	ac	1,35	ac	1,35	ac	1,35	ac	1,35	ac	—	—	—	—	—	—
	0,55	1,16	ac	1,71	ac	1,71	ac	1,71	ac	1,71	ac	—	—	—	—	—	—
	0,63	1,70	ac	2,50	ac	2,50	ac	2,50	ac	2,50	ac	—	—	—	—	—	—
	0,75	1,70	ac	2,60	ac	3,30	ac	3,30	ac	3,30	ac	—	—	—	—	—	—
	0,88	1,70	—	2,60	ac	3,60	ac	4,10	ac	4,10	a	—	—	—	—	—	—
	1,00	1,70	—	2,60	ac	3,60	ac	4,60	ac	4,70	a	—	—	—	—	—	—
	1,13	1,70	—	2,60	—	3,60	—	4,60	—	5,40	—	—	—	—	—	—	—
	1,25	1,70	—	2,60	—	3,60	—	4,60	—	5,90	—	—	—	—	—	—	—
	1,50	1,70	—	2,60	—	3,60	—	4,60	—	6,00	—	—	—	—	—	—	—
	1,75	1,70	—	2,60	—	3,60	—	4,60	—	6,00	—	—	—	—	—	—	—
	2,00	1,70	—	2,60	—	3,60	—	4,60	—	6,00	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		$\Sigma t \leq 3{,}00$ mm: 2 Nm								$\Sigma t > 3{,}00$ mm: 5 Nm							

Self drilling screw

Hilti S-MD 53/63/73 S 5,5 x L / Hilti S-MD 53/63/73 SS 5,5 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 59

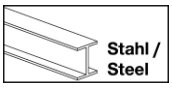
Application range:



Steel S320GD to S390GD

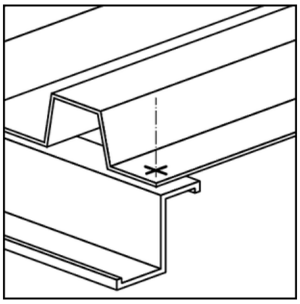
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Steel S275 to S355
Steel S320GD to S390GD

Typical application:



Fastener:

S-MD 53 S(S) 5,5 x L
S-MD 63 S(S) 5,5 x L
S-MD 73 S(S) 5,5 x L

Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

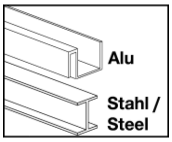
	t_I [mm]	t_{II} [mm] 1,50		2,00		2,50		3,00		4,00		6,00		—		—	
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,30	ac	2,80	ac	3,20	ac	3,70	ac	3,70	ac	—	—	—	—	—	—
	0,75	2,70	ac	3,20	ac	3,80	ac	4,30	ac	4,30	ac	—	—	—	—	—	—
	0,88	2,90	—	3,60	ac	4,30	ac	5,00	ac	5,00	a	—	—	—	—	—	—
	1,00	3,20	—	5,20	ac	5,40	ac	5,70	ac	5,70	a	—	—	—	—	—	—
	1,13	3,60	—	5,40	—	5,80	—	6,50	—	6,50	—	—	—	—	—	—	—
	1,25	3,90	—	5,70	—	6,20	—	7,40	—	7,40	—	—	—	—	—	—	—
	1,50	4,80	—	6,20	—	7,00	—	7,80	—	7,80	—	—	—	—	—	—	—
	1,75	4,80	—	6,20	—	7,00	—	7,80	—	7,80	—	—	—	—	—	—	—
	2,00	5,90	—	6,80	—	7,00	—	7,80	—	7,80	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	0,50	1,03	ac	1,51	ac	1,51	ac	1,51	ac	1,51	ac	—	—	—	—	—	—
	0,55	1,30	ac	1,91	ac	1,91	ac	1,91	ac	1,91	ac	—	—	—	—	—	—
	0,63	1,90	ac	2,80	ac	2,80	ac	2,80	ac	2,80	ac	—	—	—	—	—	—
	0,75	1,90	ac	2,90	ac	3,60	ac	3,60	ac	3,60	ac	—	—	—	—	—	—
	0,88	1,90	—	2,90	ac	4,00	ac	4,40	ac	4,40	a	—	—	—	—	—	—
	1,00	1,90	—	2,90	ac	4,00	ac	5,10	ac	5,10	a	—	—	—	—	—	—
	1,13	1,90	—	2,90	—	4,00	—	5,10	—	5,80	—	—	—	—	—	—	—
	1,25	1,90	—	2,90	—	4,00	—	5,10	—	6,30	—	—	—	—	—	—	—
	1,50	1,90	—	2,90	—	4,00	—	5,10	—	6,60	—	—	—	—	—	—	—
	1,75	1,90	—	2,90	—	4,00	—	5,10	—	6,60	—	—	—	—	—	—	—
	2,00	1,90	—	2,90	—	4,00	—	5,10	—	6,60	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		$\Sigma t \leq 3{,}00$ mm: 2 Nm								$\Sigma t > 3{,}00$ mm: 5 Nm							

Self drilling screw

Hilti S-MD 53/63/73 S 5,5 x L / Hilti S-MD 53/63/73 SS 5,5 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 60

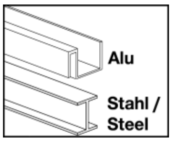
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm^2
Steel S280GD to S390GD

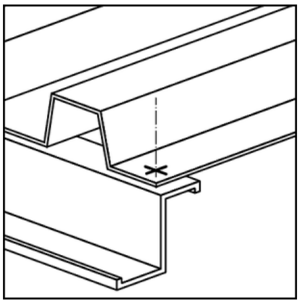
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm^2
Steel S280GD to S390GD

Typical application:



Fastener:

S-MD 43 S(S) 5,5 x L
S-MD 53 S(S) 5,5 x L
S-MD 63 S(S) 5,5 x L
S-MD 73 S(S) 5,5 x L

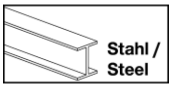
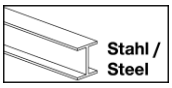
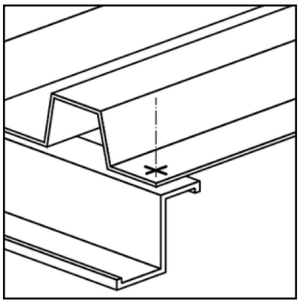
Washer: Ø14 / Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	$t_{II,St}$ [mm]						$t_{II,Al}$ [mm]					
		1,50	**1,75**	**2,00**	**2,50**	**3,00**	**4,00**	**1,50**	**1,70**	**2,00**	**2,50**	**3,00**	**4,00**
$V_{R,k}$ [kN]	**0,50**	1,20	1,20	1,20	1,20	1,20	1,20	0,82	0,82	0,82	0,82	0,82	0,82
	0,60	1,28	1,28	1,28	1,28	1,28	1,28	0,94	0,94	0,94	0,94	0,94	0,94
	0,70	1,36	1,36	1,36	1,36	1,36	1,36	1,05	1,05	1,05	1,05	1,05	1,05
	0,80	1,46	1,46	1,46	1,46	1,46	1,46	1,17	1,17	1,17	1,17	1,17	1,17
	0,90	1,57	1,57	1,57	1,57	1,57	1,57	1,27	1,27	1,27	1,27	1,27	1,27
	1,00	1,68	1,73	1,78	1,88	1,98	1,98	1,37	1,40	1,45	1,53	1,61	1,61
	1,20	1,93	1,93	1,93	1,93	1,98	1,98	1,55	1,55	1,55	1,55	1,61	1,61
	1,40	2,22	2,22	2,22	2,22	2,22	2,22	1,70	1,70	1,70	1,70	1,70	1,70
	1,60	2,54	2,54	2,54	2,54	2,54	2,54	1,83	1,83	1,83	1,83	1,83	1,83
	1,80	2,90	2,90	2,90	2,90	2,90	2,90	1,93	1,93	1,93	1,93	1,93	1,93
	2,00	3,28	3,28	3,28	3,28	3,28	3,86	2,00	2,00	2,00	2,00	2,00	3,05
$N_{R,k}$ [kN]	**0,50**	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45
	0,60	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54
	0,70	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63
	0,80	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72
	0,90	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81
	1,00	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90
	1,20	1,08	1,08	1,08	1,08	1,08	1,08	0,98	1,08	1,08	1,08	1,08	1,08
	1,40	1,26	1,26	1,26	1,26	1,26	1,26	0,98	1,26	1,26	1,26	1,26	1,26
	1,60	1,35	1,35	1,35	1,35	1,35	1,35	0,98	1,26	1,35	1,35	1,35	1,35
	1,80	1,35	1,35	1,35	1,35	1,35	1,35	0,98	1,26	1,35	1,35	1,35	1,35
	2,00	1,35	1,35	1,35	1,35	1,35	1,35	0,98	1,26	1,35	1,35	1,35	1,35

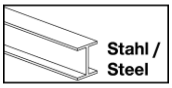
The grey highlighted values $N_{R,k}$ may be increased by 6.9% when using the types “S-MD 5x”, by 16.5% when using the types “S-MD 6x” and 25.4% when using the types “S-MD 7x”.

Application range:	Typical application:	Fastener:
 Steel S280GD to S390GD Component I: t_I = 0,63 to 2,00 mm Component II: t_{II} = 1,50 to 4,00 mm  Steel S235 to S355 Steel S280GD to S390GD		S-MD 43 S(S) 5,5 x L Washer: Ø14
	Drilling capacity in metal: Σt_i ≤ 6,00 mm Performance for timber substructures not determined	

	t_I [mm]	**t_{II}** [mm]															
		1,50		**2,00**		**2,50**		**3,00**		**4,00**		**6,00**		**—**		**—**	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,50	—	2,50	ac	2,60	ac	2,70	ac	2,70	ac	—	—	—	—	—	—
	0,75	2,80	—	2,80	ac	2,80	ac	2,80	ac	3,70	ac	—	—	—	—	—	—
	0,88	3,00	—	3,00	ac	3,00	ac	3,00	ac	3,70	a	—	—	—	—	—	—
	1,00	3,30	—	3,70	ac	4,30	ac	4,90	ac	4,90	a	—	—	—	—	—	—
	1,13	3,50	—	3,90	—	4,60	—	5,30	—	5,30	—	—	—	—	—	—	—
	1,25	3,80	—	4,10	—	4,90	—	5,80	—	5,80	—	—	—	—	—	—	—
	1,50	3,80	—	5,30	—	5,60	—	5,90	—	6,40	—	—	—	—	—	—	—
	1,75	3,80	—	5,30	—	5,60	—	5,90	—	6,40	—	—	—	—	—	—	—
	2,00	5,60	—	5,60	—	5,60	—	5,90	—	6,40	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,90	—	2,30	ac	2,30	ac	2,30	ac	2,30	ac	—	—	—	—	—	—
	0,75	1,90	—	2,50	ac	3,20	ac	3,20	ac	3,20	ac	—	—	—	—	—	—
	0,88	1,90	—	2,50	ac	3,30	ac	4,10	ac	4,10	a	—	—	—	—	—	—
	1,00	1,90	—	2,50	ac	3,30	ac	4,20	ac	4,90	a	—	—	—	—	—	—
	1,13	1,90	—	2,50	—	3,30	—	4,20	—	5,60	—	—	—	—	—	—	—
	1,25	1,90	—	2,50	—	3,30	—	4,20	—	5,60	—	—	—	—	—	—	—
	1,50	1,90	—	2,50	—	3,30	—	4,20	—	5,60	—	—	—	—	—	—	—
	1,75	1,90	—	2,50	—	3,30	—	4,20	—	5,60	—	—	—	—	—	—	—
	2,00	1,90	—	2,50	—	3,30	—	4,20	—	5,60	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		Σt ≤ 3,00 mm: 2 Nm								Σt > 3,00 mm: 5 Nm							

Self drilling screw	**Annex 62**
Hilti S-MD 43 S 5,5 x L / Hilti S-MD 43 SS 5,5 x L with hexagon head and sealing washer Ø14 mm	

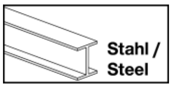
Application range:



Steel S320GD to S390GD

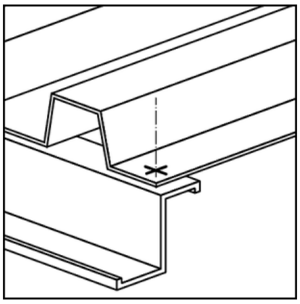
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Steel S275 to S355
Steel S320GD to S390GD

Typical application:



Fastener:

S-MD 43 S(S) 5,5 x L

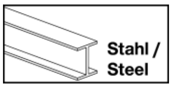
Washer: Ø14

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm]															
		1,50		2,00		2,50		3,00		4,00		6,00		—		—	
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,70	—	2,70	ac	2,80	ac	2,90	ac	2,90	ac	—	—	—	—	—	—
	0,75	3,00	—	3,00	ac	3,30	ac	3,70	ac	3,70	ac	—	—	—	—	—	—
	0,88	3,30	—	3,30	ac	3,90	ac	4,50	ac	4,50	ac	—	—	—	—	—	—
	1,00	3,50	—	4,00	ac	4,70	ac	5,30	ac	5,30	ac	—	—	—	—	—	—
	1,13	3,80	—	4,20	—	5,00	—	5,80	—	5,80	—	—	—	—	—	—	—
	1,25	4,10	—	4,40	—	5,30	—	6,30	—	6,30	—	—	—	—	—	—	—
	1,50	4,80	—	5,70	—	6,10	—	6,40	—	7,00	—	—	—	—	—	—	—
	1,75	4,80	—	5,70	—	6,10	—	6,40	—	7,00	—	—	—	—	—	—	—
	2,00	6,10	—	6,10	—	6,10	—	6,40	—	7,00	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,10	—	2,60	ac	2,60	ac	2,60	ac	2,60	ac	—	—	—	—	—	—
	0,75	2,10	—	2,80	ac	3,60	ac	3,60	ac	3,60	ac	—	—	—	—	—	—
	0,88	2,10	—	2,80	ac	3,70	ac	4,50	ac	4,50	ac	—	—	—	—	—	—
	1,00	2,10	—	2,80	ac	3,70	ac	4,70	ac	5,30	ac	—	—	—	—	—	—
	1,13	2,10	—	2,80	—	3,70	—	4,70	—	6,10	—	—	—	—	—	—	—
	1,25	2,10	—	2,80	—	3,70	—	4,70	—	6,40	—	—	—	—	—	—	—
	1,50	2,10	—	2,80	—	3,70	—	4,70	—	6,40	—	—	—	—	—	—	—
	1,75	2,10	—	2,80	—	3,70	—	4,70	—	6,40	—	—	—	—	—	—	—
	2,00	2,10	—	2,80	—	3,70	—	4,70	—	6,40	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		$\Sigma t \leq 3{,}00$ mm: 2 Nm								$\Sigma t > 3{,}00$ mm: 5 Nm							

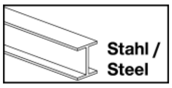
Application range:



Steel S280GD to S390GD

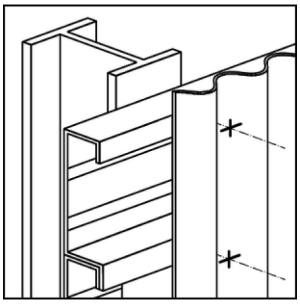
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 0,75 to 1,25 mm
t_{II} = 2 x 0,75 to 2 x 1,25 mm



Steel S235 to S355
Steel S280GD to S390GD

Typical application:

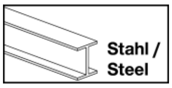


Fastener:
S-MD 33 PS(S) 5,5 x L
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm
Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm]							
		0,75	**0,88**	**1,00**	**1,25**	**2 x 0,75**	**2 x 0,88**	**2 x 1,00**	**2 x 1,25**
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—
	0,63	—	—	—	—	—	—	—	—
	0,75	1,29	1,29	1,29	1,29	2,05	2,05	2,05	2,05
	0,88	1,29	1,81	1,81	1,81	2,05	2,56	2,56	2,56
	1,00	1,29	1,81	2,32	2,32	2,05	2,56	3,07	3,07
	1,13	1,29	1,81	2,32	2,32	2,05	2,56	3,07	3,07
	1,25	1,29	1,81	2,32	2,32	2,05	2,56	3,07	3,07
	1,50	1,29	1,81	2,32	2,32	2,05	2,56	3,07	3,07
	1,75	1,29	1,81	2,32	2,32	2,05	2,56	3,07	3,07
	2,00	1,29	1,81	2,32	2,32	2,05	2,56	3,07	3,07
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—
	0,63	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	0,75	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	0,88	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	1,00	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	1,13	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	1,25	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	1,50	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	1,75	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	2,00	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91

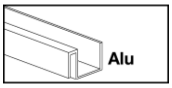
Application range:



Steel S280GD to S390GD

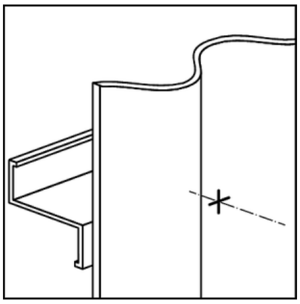
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 1,00 to 4,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 33 PS(S) 5,5 x L

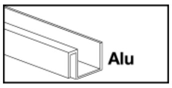
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 1,00	1,50	2,00	2,50	3,00	4,00	5,00	—
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—
	0,63	1,10	1,10	1,10	1,10	1,10	1,10	1,10	—
	0,75	1,28	1,46	1,46	1,46	1,46	1,46	1,46	—
	0,88	1,32	1,73	1,73	1,73	1,73	1,73	1,73	—
	1,00	1,36	1,99	1,99	1,99	1,99	1,99	1,99	—
	1,13	1,36	1,99	1,99	1,99	1,99	1,99	—	—
	1,25	1,36	1,99	1,99	1,99	1,99	1,99	—	—
	1,50	1,36	1,99	1,99	1,99	1,99	1,99	—	—
	1,75	1,36	1,99	1,99	1,99	1,99	—	—	—
	2,00	1,36	1,99	1,99	1,99	1,99	—	—	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—
	0,63	0,34	0,78	1,17	1,66	2,34	2,34	2,34	—
	0,75	0,34	0,78	1,17	1,66	2,34	2,34	2,34	—
	0,88	0,34	0,78	1,17	1,66	2,34	2,34	2,34	—
	1,00	0,34	0,78	1,17	1,66	2,34	2,34	2,34	—
	1,13	0,34	0,78	1,17	1,66	2,34	2,34	—	—
	1,25	0,34	0,78	1,17	1,66	2,34	2,34	—	—
	1,50	0,34	0,78	1,17	1,66	2,34	2,34	—	—
	1,75	0,34	0,78	1,17	1,66	2,34	—	—	—
	2,00	0,34	0,78	1,17	1,66	2,34	—	—	—

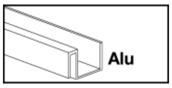
Application range:



Aluminium alloy with $R_m \geq 185$ N/mm²

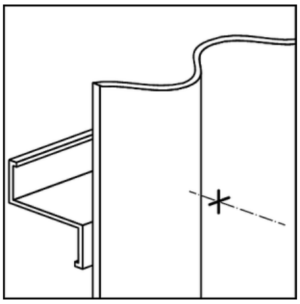
Component I: t_I = 0,50 to 1,50 mm

Component II: t_{II} = 1,00 to 5,00 mm



Aluminium alloy with $R_m \geq 185$ N/mm²

Typical application:



Fastener:

S-MD 33 PS(S) 5,5 x L

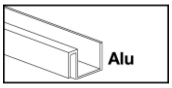
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 1,00	1,50	2,00	2,50	3,00	4,00	5,00	—
$V_{R,k}$ [kN]	**0,50**	0,56	0,79	0,79	0,79	0,79	0,79	0,79	—
	0,60	0,65	0,91	0,91	0,91	0,91	0,91	—	—
	0,70	0,74	1,03	1,03	1,03	1,03	1,03	—	—
	0,80	0,85	1,10	1,10	1,10	1,10	1,10	—	—
	0,90	0,96	1,18	1,18	1,18	1,18	1,18	—	—
	1,00	1,07	1,25	1,25	1,25	1,25	1,25	—	—
	1,10	1,07	1,25	1,25	1,25	1,25	1,25	—	—
	1,20	1,07	1,25	1,25	1,25	1,25	1,25	—	—
	1,30	1,07	1,25	1,25	1,25	1,25	1,25	—	—
	1,40	1,07	1,25	1,25	1,25	1,25	1,25	—	—
	1,50	1,07	1,25	1,25	1,25	1,25	1,25	—	—
$N_{R,k}$ [kN]	**0,50**	0,34	0,61	0,61	0,61	0,61	0,61	0,61	—
	0,60	0,34	0,70	0,70	0,70	0,70	0,70	—	—
	0,70	0,34	0,78	0,83	0,83	0,83	0,83	—	—
	0,80	0,34	0,78	0,99	0,99	0,99	0,99	—	—
	0,90	0,34	0,78	1,17	1,19	1,19	1,19	—	—
	1,00	0,34	0,78	1,17	1,42	1,42	1,42	—	—
	1,10	0,34	0,78	1,17	1,66	1,70	1,70	—	—
	1,20	0,34	0,78	1,17	1,66	2,02	2,02	—	—
	1,30	0,34	0,78	1,17	1,66	2,02	2,02	—	—
	1,40	0,34	0,78	1,17	1,66	2,02	2,02	—	—
	1,50	0,34	0,78	1,17	1,66	2,02	2,02	—	—

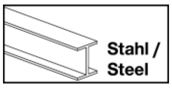
Application range:



Aluminium alloy with $R_m \geq 185\ N/mm^2$

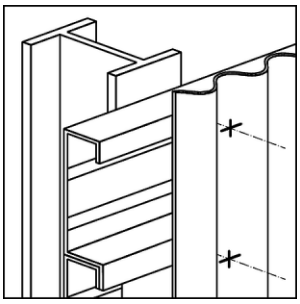
Component I: t_I = 0,50 to 1,50 mm

Component II: t_{II} = 0,75 to 1,25 mm
t_{II} = 2 x 0,75 to 2 x 1,25 mm



Steel S235 to S355
Steel S280GD to S390GD

Typical application:



Fastener:

S-MD 33 PS(S) 5,5 x L

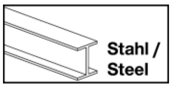
Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 6,00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 0,75	0,88	1,00	1,25	2 x 0,75	2 x 0,88	2 x 1,00	2 x 1,25
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—
	0,60	—	—	—	—	—	—	—	—
	0,70	0,99	0,99	0,99	0,99	1,18	1,18	1,18	1,18
	0,80	0,99	0,99	0,99	0,99	1,18	1,18	1,18	1,18
	0,90	0,99	0,99	0,99	0,99	1,18	1,18	1,18	1,18
	1,00	0,99	0,99	1,31	1,31	1,18	1,18	1,18	1,18
	1,10	0,99	0,99	1,31	1,31	1,18	1,18	1,18	1,18
	1,20	0,99	0,99	1,31	1,31	1,18	1,18	1,18	1,18
	1,30	0,99	0,99	1,31	1,31	1,18	1,18	1,18	1,18
	1,40	0,99	0,99	1,31	1,31	1,18	1,18	1,18	1,18
	1,50	0,99	0,99	1,31	1,31	1,18	1,18	1,18	1,18
$N_{R,k}$ [kN]	**0,50**	0,45	0,61	0,61	0,61	0,61	0,61	0,61	0,61
	0,60	0,45	0,65	0,70	0,70	0,70	0,70	0,70	0,70
	0,70	0,45	0,65	0,83	0,83	0,83	0,83	0,83	0,83
	0,80	0,45	0,65	0,85	0,99	0,97	0,99	0,99	0,99
	0,90	0,45	0,65	0,85	1,08	0,97	1,19	1,19	1,19
	1,00	0,45	0,65	0,85	1,08	0,97	1,24	1,42	1,42
	1,10	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,70
	1,20	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	1,30	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	1,40	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91
	1,50	0,45	0,65	0,85	1,08	0,97	1,24	1,51	1,91

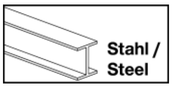
Application range:



Steel S280GD to S390GD

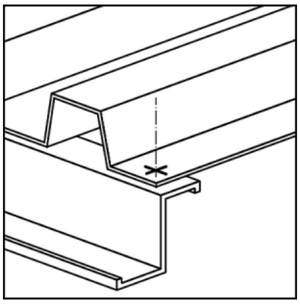
Component I: t_I = 0,63 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Steel S235 to S355
Steel S280GD to S390GD

Typical application:



Fastener:

S-MD 03 S(S) 6,3 x L

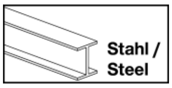
Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 1,50		2,00		2,50		3,00		4,00		6,00		—		—	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,20	—	2,50	ac	2,80	ac	3,00	ac	3,00	ac	—	—	—	—	—	—
	0,75	2,70	—	3,20	ac	3,60	ac	4,10	ac	4,10	ac	—	—	—	—	—	—
	0,88	3,00	—	3,70	ac	4,50	ac	5,30	ac	5,30	ac	—	—	—	—	—	—
	1,00	3,30	—	4,00	ac	5,20	ac	6,40	ac	6,40	ac	—	—	—	—	—	—
	1,13	3,70	—	4,70	—	5,70	—	6,70	—	6,70	—	—	—	—	—	—	—
	1,25	4,10	—	5,10	—	6,00	—	6,90	—	6,90	—	—	—	—	—	—	—
	1,50	5,00	—	6,30	—	6,90	—	7,50	—	8,10	—	—	—	—	—	—	—
	1,75	5,00	—	6,30	—	6,90	—	7,50	—	8,10	—	—	—	—	—	—	—
	2,00	6,70	—	6,70	—	6,90	—	7,50	—	8,10	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,40	—	1,90	ac	1,90	ac	1,90	ac	1,90	ac	—	—	—	—	—	—
	0,75	1,40	—	2,60	ac	2,60	ac	2,60	ac	2,60	ac	—	—	—	—	—	—
	0,88	1,40	—	2,70	ac	3,40	ac	3,40	ac	3,40	ac	—	—	—	—	—	—
	1,00	1,40	—	2,70	ac	4,00	ac	4,30	ac	4,30	ac	—	—	—	—	—	—
	1,13	1,40	—	2,70	—	4,00	—	5,30	—	5,30	—	—	—	—	—	—	—
	1,25	1,40	—	2,70	—	4,00	—	5,40	—	6,40	—	—	—	—	—	—	—
	1,50	1,40	—	2,70	—	4,00	—	5,40	—	6,90	—	—	—	—	—	—	—
	1,75	1,40	—	2,70	—	4,00	—	5,40	—	6,90	—	—	—	—	—	—	—
	2,00	1,40	—	2,70	—	4,00	—	5,40	—	7,20	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		$\Sigma t \leq 3{,}00$ mm: 2 Nm								$\Sigma t > 3{,}00$ mm: 5 Nm							

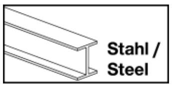
Application range:



Steel S280GD to S390GD

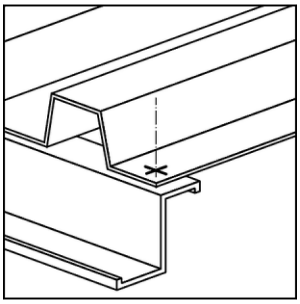
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Steel S235 to S355
Steel S280GD to S390GD

Typical application:



Fastener:

S-MD 53 S(S) 6,3 x L
S-MD 63 S(S) 6,3 x L
S-MD 73 S(S) 6,3 x L

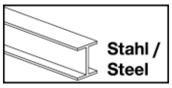
Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq 6{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 1,50		2,00		2,50		3,00		4,00		6,00		—		—	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,20	—	2,50	ac	2,80	ac	3,00	ac	3,00	ac	—	—	—	—	—	—
	0,75	2,70	—	3,20	ac	3,60	ac	4,10	ac	4,10	ac	—	—	—	—	—	—
	0,88	3,00	—	3,70	ac	4,50	ac	5,30	ac	5,30	ac	—	—	—	—	—	—
	1,00	3,30	—	4,00	ac	5,20	ac	6,40	ac	6,40	ac	—	—	—	—	—	—
	1,13	3,70	—	4,70	—	5,70	—	6,70	—	6,70	—	—	—	—	—	—	—
	1,25	4,10	—	5,10	—	6,00	—	6,90	—	6,90	—	—	—	—	—	—	—
	1,50	5,00	—	6,30	—	6,90	—	7,50	—	8,10	—	—	—	—	—	—	—
	1,75	5,00	—	6,30	—	6,90	—	7,50	—	8,10	—	—	—	—	—	—	—
	2,00	6,70	—	6,70	—	6,90	—	7,50	—	8,10	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	0,76	—	1,46	ac	1,62	ac	1,62	ac	1,62	ac	—	—	—	—	—	—
	0,55	0,95	—	1,84	ac	2,05	ac	2,05	ac	2,05	ac	—	—	—	—	—	—
	0,63	1,40	—	2,70	ac	3,00	ac	3,00	ac	3,00	ac	—	—	—	—	—	—
	0,75	1,40	—	2,70	ac	3,90	ac	3,90	ac	3,90	ac	—	—	—	—	—	—
	0,88	1,40	—	2,70	ac	4,00	ac	4,80	ac	4,80	ac	—	—	—	—	—	—
	1,00	1,40	—	2,70	ac	4,00	ac	5,40	ac	5,60	ac	—	—	—	—	—	—
	1,13	1,40	—	2,70	—	4,00	—	5,40	—	6,20	—	—	—	—	—	—	—
	1,25	1,40	—	2,70	—	4,00	—	5,40	—	6,80	—	—	—	—	—	—	—
	1,50	1,40	—	2,70	—	4,00	—	5,40	—	7,20	—	—	—	—	—	—	—
	1,75	1,40	—	2,70	—	4,00	—	5,40	—	7,20	—	—	—	—	—	—	—
	2,00	1,40	—	2,70	—	4,00	—	5,40	—	7,20	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		$\Sigma t \leq 3{,}00$ mm: 2 Nm								$\Sigma t > 3{,}00$ mm: 5 Nm							

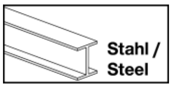
Application range:



Steel S320GD to S390GD

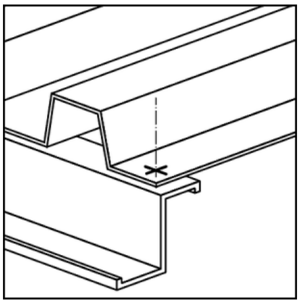
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,50 to 4,00 mm



Steel S275 to S355
Steel S320GD to S390GD

Typical application:



Fastener:

S-MD 53 S(S) 6,3 x L
S-MD 63 S(S) 6,3 x L
S-MD 73 S(S) 6,3 x L

Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq$ 6,00 mm

Performance for timber substructures not determined

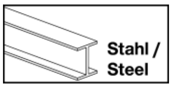
	t_I [mm]	**t_{II}** [mm]															
		1,50		**2,00**		**2,50**		**3,00**		**4,00**		**6,00**		**—**		**—**	
$V_{R,k}$ [kN]	**0,50**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,40	—	2,70	ac	3,00	ac	3,30	ac	3,30	ac	—	—	—	—	—	—
	0,75	2,90	—	3,40	ac	3,90	ac	4,50	ac	4,50	ac	—	—	—	—	—	—
	0,88	3,20	—	4,10	ac	4,90	ac	5,70	ac	5,70	ac	—	—	—	—	—	—
	1,00	3,50	—	4,30	ac	5,60	ac	6,90	ac	6,90	ac	—	—	—	—	—	—
	1,13	4,00	—	5,10	—	6,20	—	7,20	—	7,20	—	—	—	—	—	—	—
	1,25	4,50	—	5,50	—	6,50	—	7,50	—	7,50	—	—	—	—	—	—	—
	1,50	5,40	—	6,80	—	7,40	—	8,10	—	8,80	—	—	—	—	—	—	—
	1,75	5,40	—	6,80	—	7,40	—	8,10	—	8,80	—	—	—	—	—	—	—
	2,00	7,20	—	7,20	—	7,40	—	8,10	—	8,80	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	**0,50**	0,92	—	1,67	ac	1,84	ac	1,84	ac	1,84	ac	—	—	—	—	—	—
	0,55	1,16	—	2,11	ac	2,32	ac	2,32	ac	2,32	ac	—	—	—	—	—	—
	0,63	1,70	—	3,10	ac	3,40	ac	3,40	ac	3,40	ac	—	—	—	—	—	—
	0,75	1,70	—	3,10	ac	4,30	ac	4,30	ac	4,30	ac	—	—	—	—	—	—
	0,88	1,70	—	3,10	ac	4,50	ac	5,20	ac	5,20	ac	—	—	—	—	—	—
	1,00	1,70	—	3,10	ac	4,50	ac	6,00	ac	6,00	ac	—	—	—	—	—	—
	1,13	1,70	—	3,10	—	4,50	—	6,00	—	6,60	—	—	—	—	—	—	—
	1,25	1,70	—	3,10	—	4,50	—	6,00	—	7,20	—	—	—	—	—	—	—
	1,50	1,70	—	3,10	—	4,50	—	6,00	—	7,90	—	—	—	—	—	—	—
	1,75	1,70	—	3,10	—	4,50	—	6,00	—	7,90	—	—	—	—	—	—	—
	2,00	1,70	—	3,10	—	4,50	—	6,00	—	7,90	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]		$\Sigma t \leq$ 3,00 mm: 2 Nm								$\Sigma t >$ 3,00 mm: 5 Nm							

Self drilling screw

Hilti S-MD 53/63/73 S 6,3 x L / Hilti S-MD 53/63/73 SS 6,3 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 70

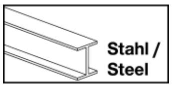
Application range:



Steel S280GD to S350GD

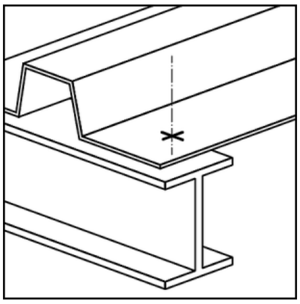
Component I: t_I = 0,40 to 2,00 mm

Component II: t_{II} = 4,00 to 13,00 mm
t_{II} = 2 x 0,50 to 2 x 2,00 mm



Steel S235 to S355 with R_m ≤ 560 N/mm²
Steel S280GD to S450GD

Typical application:



Fastener:
S-MD 05 S(S) 5,5 x L
S-MD 05 PS(S) 5,5 x L

Washer: none

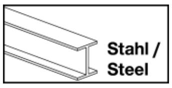
Drilling capacity in metal: Σt_i ≤ 15,00 mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 4,00	5,00	≥ 6,00	2 x 0,50	2 x 0,63	2 x 0,75	2 x 1,00	2 x 1,25	2 x 1,50	2 x 1,75	2 x 2,00
$V_{R,k}$ [kN]	**0,40**	1,33	1,33	1,33	1,33	1,33	1,33	1,33	1,33	1,33	1,33	1,33
	0,50	1,59	1,59	1,59	1,59	1,59	1,59	1,59	1,59	1,59	1,59	1,59
	0,55	2,00	2,00	2,00	1,62	1,62	1,62	1,62	1,62	1,62	1,62	1,62
	0,63	2,65	2,65	2,65	1,68	1,68	1,68	1,68	1,68	1,68	1,68	1,68
	0,75	3,63[3)]	3,63[3)]	3,63[3)]	1,76[4)]	1,76[4)]	1,76[4)]	1,76[4)]	1,76[4)]	1,76[4)]	1,76[4)]	1,76[4)]
	0,88	4,25[3)]	4,25[3)]	4,25[3)]	2,08[4)]	2,08[4)]	2,08[4)]	2,08[4)]	2,08[4)]	2,08[4)]	2,08[4)]	2,08[4)]
	1,00	4,82[3)]	4,82[3)]	4,82[3)]	2,38[4)]	2,69[5)]	2,98[5)]	2,98[5)]	2,98[5)]	2,98[5)]	2,98[5)]	2,98[5)]
	1,25	6,26	6,26	6,26	2,38[4)]	2,94[5)]	3,46[5)]	3,46[5)]	3,46[5)]	3,46[5)]	3,46[5)]	3,46[5)]
	1,50	7,70	7,70	7,70	2,38[4)]	3,19[5)]	3,94[5)]	3,94[5)]	3,94[5)]	3,94[5)]	3,94[5)]	3,94[5)]
	1,75	7,70	7,70	7,70	2,38[4)]	3,55[5)]	4,63[5)]	4,63[5)]	4,63[5)]	4,63[5)]	4,63[5)]	4,63[5)]
	2,00	7,70	7,70	7,70	2,38[4)]	3,90[5)]	5,31[5)]	5,31[5)]	5,31[5)]	5,31[5)]	5,31[5)]	5,31[5)]
$N_{R,k}$ [kN]	**0,40**	1,09	1,09	1,09	0,81	1,09	1,09	1,09	1,09	1,09	1,09	1,09
	0,50	1,44[2)]	1,44[2)]	1,44[2)]	0,81	1,11[5)]	1,38[5)]	1,44[4)]	1,44[4)]	1,44[4)]	1,44[4)]	1,44[4)]
	0,55	1,67[3)]	1,67[3)]	1,67[3)]	0,81	1,11[5)]	1,38[5)]	1,67[5)]	1,67[5)]	1,67[5)]	1,67[5)]	1,67[5)]
	0,63	2,03[3)]	2,03[3)]	2,03[3)]	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,03[5)]	2,03[5)]	2,03[5)]	2,03[5)]
	0,75	2,57[3)]	2,57[3)]	2,57[3)]	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,57[5)]	2,57[5)]	2,57[5)]	2,57[5)]
	0,88	3,40	3,40	3,40	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,40	3,40	3,40
	1,00	4,17	4,17	4,17	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,17	4,17
	1,25	5,07	5,07	5,07	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,52[5)]	5,07
	1,50	6,46	6,87	6,87	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,52[4)]	5,50[4)]
	1,75	6,46[1)]	7,04	7,04	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,52[4)]	5,50[4)]
	2,00	6,46[1)]	7,21[2)]	7,21[2)]	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,52[4)]	5,50[4)]
$N_{R,II,k}$ [kN]		6,46[1)]	8,73	11,0	0,81	1,11	1,38	1,77[1)]	2,81	3,53	4,52[1)]	5,50[1)]

1) For component II made of S320GD, the value may be increased by 8%.
For component II made of S350GD, the value may be increased by 16%.
2) For component I made of S320GD, the value may be increased by 8%.
For component I made of S350GD, the value may be increased by 16%.
3) For component I made of S320GD, the value may be increased by 8%.
4) For component I and component II made of S320GD, the value may be increased by 8%.
For component I and component II made of S350GD, the value may be increased by 16%.
5) For component I and component II made of S320GD, the value may be increased by 8%.

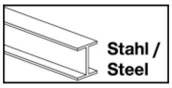
Application range:



Steel S390GD to S450GD

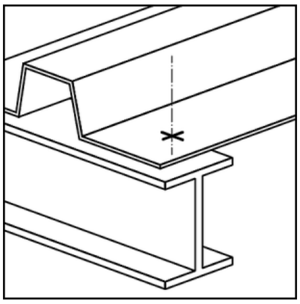
Component I: t_I = 0,40 to 2,00 mm

Component II: t_{II} = 4,00 to 13,00 mm
t_{II} = 2 x 0,50 to 2 x 2,00 mm



Steel S235 to S355 with R_m ≤ 560 N/mm²
Steel S390GD to S450GD

Typical application:



Fastener:

S-MD 05 S(S) 5,5 x L
S-MD 05 PS(S) 5,5 x L

Washer: none

Drilling capacity in metal: Σt_i ≤ 15,00 mm

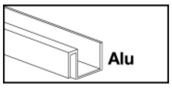
Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 4,00	5,00	≥ 6,00	2 x 0,50	2 x 0,63	2 x 0,75	2 x 1,00	2 x 1,25	2 x 1,50	2 x 1,75	2 x 2,00
$V_{R,k}$ [kN]	0,40	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35
	0,50	1,70	1,70	1,70	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73
	0,55	2,15	2,15	2,15	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80
	0,63	2,86	2,86	2,86	1,91	1,91	1,91	1,91	1,91	1,91	1,91	1,91
	0,75	3,93	3,93	3,93	2,07	2,07	2,07	2,07	2,07	2,07	2,07	2,07
	0,88	4,79	4,79	4,79	2,45	2,45	2,45	2,45	2,45	2,45	2,45	2,45
	1,00	5,59	5,59	5,59	2,80	3,02	3,22	3,22	3,22	3,22	3,22	3,22
	1,25	7,09	7,09	7,09	2,80	3,29	3,74	3,74	3,74	3,74	3,74	3,74
	1,50	8,59 2)	8,59 2)	8,59 2)	2,80	3,56	4,26	4,26	4,26	4,26	4,26	4,26
	1,75	8,68	8,68	8,68	2,80	3,94	5,00	5,00	5,00	5,00	5,00	5,00
	2,00	8,77	8,77	8,77	2,80	4,33	5,74	5,74	5,74	5,74	5,74	5,74
$N_{R,k}$ [kN]	0,40	1,11	1,11	1,11	0,87	1,11	1,11	1,11	1,11	1,11	1,11	1,11
	0,50	1,69	1,69	1,69	0,87	1,19	1,49	1,69	1,69	1,69	1,69	1,69
	0,55	1,91	1,91	1,91	0,87	1,19	1,49	1,91	1,91	1,91	1,91	1,91
	0,63	2,26	2,26	2,26	0,87	1,19	1,49	2,05	2,26	2,26	2,26	2,26
	0,75	2,78	2,78	2,78	0,87	1,19	1,49	2,05	2,78	2,78	2,78	2,78
	0,88	3,62	3,62	3,62	0,87	1,19	1,49	2,05	2,88	3,62	3,62	3,62
	1,00	4,40	4,40	4,40	0,87	1,19	1,49	2,05	2,88	4,04	4,40	4,40
	1,25	5,20	5,20	5,20	0,87	1,19	1,49	2,05	2,88	4,04	5,20	5,20
	1,50	6,46	7,55 2)	7,55 2)	0,87	1,19	1,49	2,05	2,88	4,04	5,29	6,53
	1,75	6,46	8,05	8,05	0,87	1,19	1,49	2,05	2,88	4,04	5,29	6,53
	2,00	6,46	8,55	8,55	0,87	1,19	1,49	2,05	2,88	4,04	5,29	6,53
$N_{R,II,k}$ [kN]		6,46 1)	8,73	11,0	0,87	1,19	1,49	2,05	2,88	4,04	5,29	6,53

1) For component II made of S320GD, the value may be increased by 8%.
For component II made of S350GD, the value may be increased by 16%.
For component II made of S390GD, the value may be increased by 21%.

2) For component I made of S420GD, the value may be increased by 4%.

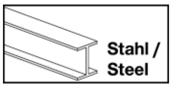
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

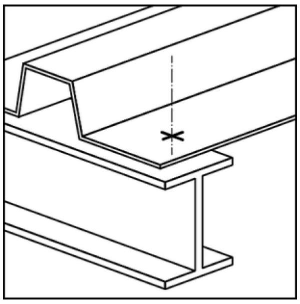
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 4,00 to 13,00 mm
t_{II} = 2 x 0,50 to 2 x 2,00 mm



Steel S235 to S355 with $R_m \leq 560$ N/mm²
Steel S280GD to S450GD

Typical application:



Fastener:

S-MD 05 S(S) 5,5 x L
S-MD 05 PS(S) 5,5 x L

Washer: none

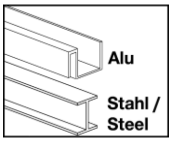
Drilling capacity in metal: $\Sigma t_i \leq 15,00$ mm

Performance for timber substructures not determined

t_I [mm]			t_{II} [mm]									
			4,00	5,00	≥ 6,00	2 x 0,50	2 x 0,63	2 x 0,75	2 x 1,00	2 x 1,25	2 x 1,50	2 x 1,75	2 x 2,00
Al-Alloy, $R_m \geq 165$ N/mm²	$V_{R,k}$ [kN]	**0,50**	0,84	0,84	0,84	0,67	0,67	0,67	0,67	0,67	0,67	0,67	0,67
		0,60	1,10	1,10	1,10	0,82	0,82	0,82	0,82	0,82	0,82	0,82	0,82
		0,70	1,37	1,37	1,37	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96
		0,80	1,63	1,63	1,63	1,11	1,11	1,11	1,11	1,11	1,11	1,11	1,11
		0,90	1,82	1,82	1,82	1,17	1,17	1,17	1,17	1,17	1,17	1,17	1,17
		1,00	2,01	2,01	2,01	1,22	1,22	1,22	1,22	1,22	1,22	1,22	1,22
		1,20	2,63	2,63	2,63	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32
		1,50	3,56	3,56	3,56	1,46	1,91	1,91	1,91	1,91	1,91	1,91	1,91
		2,00	4,62	4,62	4,62	1,46	2,31	2,31	2,31	2,31	2,31	2,31	2,31
Al-Alloy, $R_m \geq 215$ N/mm²	$V_{R,k}$ [kN]	**0,50**	1,10	1,10	1,10	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88
		0,60	1,44	1,44	1,44	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07
		0,70	1,79	1,79	1,79	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26
		0,80	2,13	2,13	2,13	1,45	1,45	1,45	1,45	1,45	1,45	1,45	1,45
		0,90	2,38	2,38	2,38	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52
		1,00	2,62	2,62	2,62	1,59	1,59	1,59	1,59	1,59	1,59	1,59	1,59
		1,20	3,43	3,43	3,43	1,71	1,71	1,71	1,71	1,71	1,71	1,71	1,71
		1,50	4,64	4,64	4,64	1,90	2,48	2,48	2,48	2,48	2,48	2,48	2,48
		2,00	6,02	6,02	6,02	1,90	3,01	3,01	3,01	3,01	3,01	3,01	3,01
$N_{R;II;k}$ [kN]			6,46 2)	8,73	11,0	0,81	1,11 1)	1,38 1)	1,77 2)	2,81	3,53 1)	4,52 2)	5,50 2)

1) For component II made of S320GD, the value may be increased by 8%.
2) For component II made of S320GD, the value may be increased by 8%.
For component II made of S350GD, the value may be increased by 16%.

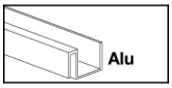
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²
Steel S280GD to S450GD

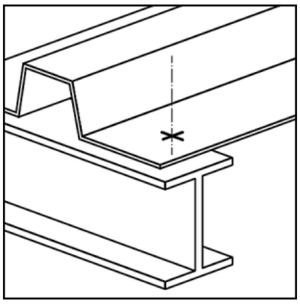
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 4,00 to 12,00 mm



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

Typical application:



Fastener:

S-MD 05 S(S) 5,5 x L
S-MD 05 PS(S) 5,5 x L

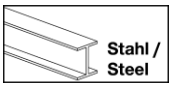
Washer: none

Drilling capacity in metal: $\Sigma t_i \leq 15{,}00$ mm

Performance for timber substructures not determined

t_I [mm]			t_{II} [mm] Al-Alloy, $R_m \geq 165$ N/mm²						Al-Alloy, $R_m \geq 215$ N/mm²					
			4,00	5,00	6,00	8,00	10,0	12,0	4,00	5,00	6,00	8,00	10,0	12,0
Al-Alloy, $R_m \geq 165$ N/mm²	$V_{R,k}$ [kN]	**0,50**	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91
		0,60	1,13	1,13	1,13	1,13	1,13	1,13	1,13	1,13	1,13	1,13	1,13	1,13
		0,70	1,34	1,34	1,34	1,34	1,34	1,34	1,34	1,34	1,34	1,34	1,34	1,34
		0,80	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56
		0,90	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80
		1,00	2,04	2,04	2,04	2,04	2,04	2,04	2,04	2,04	2,04	2,04	2,04	2,04
		1,20	2,55	2,55	2,55	2,55	2,55	2,55	2,55	2,55	2,55	2,55	2,55	2,55
		1,50	3,31	3,31	3,31	3,31	3,31	3,31	3,31	3,31	3,31	3,31	3,31	3,31
		2,00	3,83	3,83	3,83	3,83	3,83	3,83	3,83	3,83	3,83	3,83	3,83	3,83
Al-Alloy, Rm ≥ 215 N/mm2 Stahl S280GD bis S450GD	$V_{R,k}$ [kN]	**0,50**	1,18	1,18	1,18	1,18	1,18	1,18	1,18	1,18	1,18	1,18	1,18	1,18
		0,60	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47
		0,70	1,75	1,75	1,75	1,75	1,75	1,75	1,75	1,75	1,75	1,75	1,75	1,75
		0,80	2,04	2,04	2,04	2,04	2,04	2,04	2,04	2,04	2,04	2,04	2,04	2,04
		0,90	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35
		1,00	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65
		1,20	3,31	3,31	3,31	3,31	3,31	3,31	3,31	3,31	3,31	3,31	3,31	3,31
		1,50	4,31	4,31	4,31	4,31	4,31	4,31	4,31	4,31	4,31	4,31	4,31	4,31
		2,00	4,99	4,99	4,99	4,99	4,99	4,99	4,99	4,99	4,99	4,99	4,99	4,99
$N_{R,II,k}$ [kN]			2,87	4,41	5,94	8,07	8,74	9,41	3,74	5,74	7,74	10,52	10,76	11,00

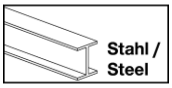
Application range:



Steel S280GD to S350GD

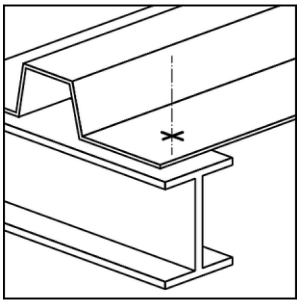
Component I: t_I = 0,40 to 2,00 mm

Component II: t_{II} = 4,00 to 13,00 mm
t_{II} = 2 x 0,50 to 2 x 2,00 mm



Steel S235 to S355 with R_m ≤ 560 N/mm²
Steel S280GD to S450GD

Typical application:



Fastener:

S-MD 55 S(S) 5,5 x L
S-MD 65 S(S) 5,5 x L
S-MD 75 S(S) 5,5 x L
S-MD 55 PS(S) 5,5 x L
S-MD 65 PS(S) 5,5 x L
S-MD 75 PS(S) 5,5 x L

Washer: Ø16 / Ø19 / Ø22

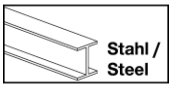
Drilling capacity in metal: Σt_i ≤ 15,00 mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm]										
		4,00	5,00	≥ 6,00	2 x 0,50	2 x 0,63	2 x 0,75	2 x 1,00	2 x 1,25	2 x 1,50	2 x 1,75	2 x 2,00
$V_{R,k}$ [kN]	0,40	1,68	1,68	1,68	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23
	0,50	1,99	1,99	1,99	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47
	0,55	2,38	2,38	2,38	1,55	1,55	1,55	1,55	1,55	1,55	1,55	1,55
	0,63	2,99	2,99	2,99	1,68	1,68	1,68	1,68	1,68	1,68	1,68	1,68
	0,75	3,92	3,92	3,92	1,87[4)]	1,87[4)]	1,87[4)]	1,87[4)]	1,87[4)]	1,87[4)]	1,87[4)]	1,87[4)]
	0,88	4,47[3)]	4,47[3)]	4,47[3)]	2,19[4)]	2,19[4)]	2,19[4)]	2,19[4)]	2,19[4)]	2,19[4)]	2,19[4)]	2,19[4)]
	1,00	4,98[3)]	4,98[3)]	4,98[3)]	2,48[4)]	2,89[5)]	3,27[5)]	3,27[5)]	3,27[5)]	3,27[5)]	3,27[5)]	3,27[5)]
	1,25	5,98	5,98	5,98	2,48[4)]	3,23[5)]	3,92[5)]	3,92[5)]	3,92[5)]	3,92[5)]	3,92[5)]	3,92[5)]
	1,50	6,97	6,97	6,97	2,48[4)]	3,57[5)]	4,57	4,57	4,57	4,57	4,57	4,57
	1,75	6,81	6,81	6,81	2,48[4)]	3,71[5)]	4,85	4,85	4,85	4,85	4,85	4,85
	2,00	6,65[2)]	6,65[2)]	6,65[2)]	2,48[4)]	3,85[5)]	5,12[5)]	5,12[5)]	5,12[5)]	5,12[5)]	5,12[5)]	5,12[5)]
$N_{R,k}$ [kN]	0,40	1,35	1,35	1,35	0,81	1,11[5)]	1,35	1,35	1,35	1,35	1,35	1,35
	0,50	1,64	1,64	1,64	0,81	1,11[5)]	1,38[5)]	1,64	1,64	1,64	1,64	1,64
	0,55	2,00	2,00	2,00	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,00	2,00	2,00	2,00
	0,63	2,57	2,57	2,57	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,57	2,57	2,57	2,57
	0,75	3,42	3,42	3,42	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,42[5)]	3,42[5)]	3,42[5)]
	0,88	3,72	3,72	3,72	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	3,72[5)]	3,72[5)]
	1,00	4,00[3)]	4,00[3)]	4,00[3)]	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,00[4)]	4,00[4)]
	1,25	6,06[2)]	6,06[2)]	6,06[2)]	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,52[4)]	5,50[5)]
	1,50	6,46	7,33	7,33	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,52[4)]	5,50[4)]
	1,75	6,46	7,33	7,33	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,52[4)]	5,50[4)]
	2,00	6,46	7,33	7,33	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,52[4)]	5,50[4)]
$N_{R\,II\,k}$ [kN]		6,46[1)]	8,73	11,0	0,81	1,11[5)]	1,38[5)]	1,77[4)]	2,81	3,53[5)]	4,52[4)]	5,50[1)]

1) For component II made of S320GD, the value may be increased by 8%.
For component II made of S350GD, the value may be increased by 16%.
2) For component I made of S320GD, the value may be increased by 8%.
For component I made of S350GD, the value may be increased by 16%.
3) For component I made of S320GD, the value may be increased by 8%.
4) For component I and component II made of S320GD, the value may be increased by 8%.
For component I and component II made of S350GD, the value may be increased by 16%.
5) For component I and component II made of S320GD, the value may be increased by 8%.

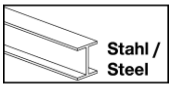
Application range:



Steel S390GD to S450GD

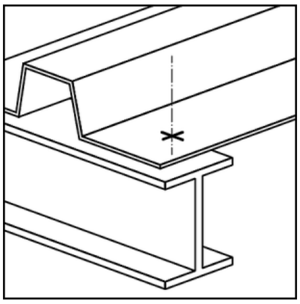
Component I: t_I = 0,40 to 2,00 mm

Component II: t_{II} = 4,00 to 13,00 mm
t_{II} = 2 x 0,50 to 2 x 2,00 mm



Steel S235 to S355 with R_m ≤ 560 N/mm²
Steel S390GD to S450GD

Typical application:



Fastener:

S-MD 55 S(S) 5,5 x L
S-MD 65 S(S) 5,5 x L
S-MD 75 S(S) 5,5 x L
S-MD 55 PS(S) 5,5 x L
S-MD 65 PS(S) 5,5 x L
S-MD 75 PS(S) 5,5 x L

Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: Σt_i ≤ 15,00 mm

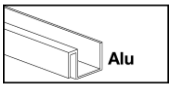
Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 4,00	5,00	≥ 6,00	2 x 0,50	2 x 0,63	2 x 0,75	2 x 1,00	2 x 1,25	2 x 1,50	2 x 1,75	2 x 2,00
$V_{R,k}$ [kN]	**0,40**	1,71	1,71	1,71	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25
	0,50	2,03	2,03	2,03	1,49	1,49	1,49	1,49	1,49	1,49	1,49	1,49
	0,55	2,47	2,47	2,47	1,63	1,63	1,63	1,63	1,63	1,63	1,63	1,63
	0,63	3,17	3,17	3,17	1,86	1,86	1,86	1,86	1,86	1,86	1,86	1,86
	0,75	4,23	4,23	4,23	2,20	2,20	2,20	2,20	2,20	2,20	2,20	2,20
	0,88	5,03	5,03	5,03	2,57	2,57	2,57	2,57	2,57	2,57	2,57	2,57
	1,00	5,77	5,77	5,77	2,91	3,24	3,54	3,54	3,54	3,54	3,54	3,54
	1,25	6,86	6,86	6,86	2,91	3,60	4,24	4,24	4,24	4,24	4,24	4,24
	1,50	7,66[2)]	7,66[2)]	7,66[2)]	2,91	3,96	4,93	4,93	4,93	4,93	4,93	4,93
	1,75	7,91	7,91	7,91	2,91	4,12	5,23	5,23	5,23	5,23	5,23	5,23
	2,00	7,88	7,88	7,88	2,91	4,27	5,53	5,53	5,53	5,53	5,53	5,53
$N_{R,k}$ [kN]	**0,40**	1,38	1,38	1,38	0,87	1,19	1,38	1,38	1,38	1,38	1,38	1,38
	0,50	1,80	1,80	1,80	0,87	1,19	1,49	1,80	1,80	1,80	1,80	1,80
	0,55	2,18	2,18	2,18	0,87	1,19	1,49	2,05	2,18	2,18	2,18	2,18
	0,63	2,78	2,78	2,78	0,87	1,19	1,49	2,05	2,78	2,78	2,78	2,78
	0,75	3,69	3,69	3,69	0,87	1,19	1,49	2,05	2,88	3,69	3,69	3,69
	0,88	4,18	4,18	4,18	0,87	1,19	1,49	2,05	2,88	4,04	4,18	4,18
	1,00	4,64	4,64	4,64	0,87	1,19	1,49	2,05	2,88	4,04	4,64	4,64
	1,25	6,21	6,21	6,21	0,87	1,19	1,49	2,05	2,88	4,04	5,29	6,21
	1,50	6,46	7,33	7,33	0,87	1,19	1,49	2,05	2,88	4,04	5,29	6,53
	1,75	6,46	7,33	7,33	0,87	1,19	1,49	2,05	2,88	4,04	5,29	6,53
	2,00	6,46	7,33	7,33	0,87	1,19	1,49	2,05	2,88	4,04	5,29	6,53
$N_{R,II,k}$ [kN]		6,46[1)]	8,73	11,0	0,87	1,19	1,49	2,05	2,88	4,04	5,29	6,53

1) For component II made of S320GD, the value may be increased by 8%.
For component II made of S350GD, the value may be increased by 16%.
For component II made of S390GD, the value may be increased by 21%.

2) For component I made of S420GD, the value may be increased by 4%.

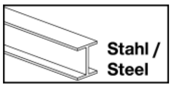
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

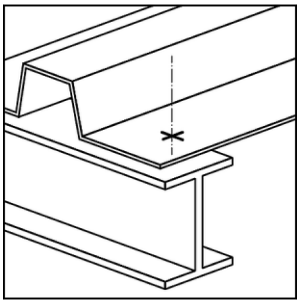
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 4,00 to 13,00 mm
t_{II} = 2 x 0,50 to 2 x 2,00 mm



Steel S235 to S355 with $R_m \leq 560$ N/mm²
Steel S280GD to S450GD

Typical application:



Fastener:

S-MD 55 S(S) 5,5 x L
S-MD 65 S(S) 5,5 x L
S-MD 75 S(S) 5,5 x L
S-MD 55 PS(S) 5,5 x L
S-MD 65 PS(S) 5,5 x L
S-MD 75 PS(S) 5,5 x L

Washer: Ø16 / Ø19 / Ø22

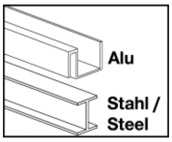
Drilling capacity in metal: $\Sigma t_i \leq 15{,}00$ mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 4,00	5,00	≥ 6,00	2 x 0,50	2 x 0,63	2 x 0,75	2 x 1,00	2 x 1,25	2 x 1,50	2 x 1,75	2 x 2,00
Al-Alloy, $R_m \geq 165$ N/mm², $V_{R,k}$ [kN]	**0,50**	0,84	0,84	0,84	0,67	0,67	0,67	0,67	0,67	0,67	0,67	0,67
	0,60	1,10	1,10	1,10	0,82	0,82	0,82	0,82	0,82	0,82	0,82	0,82
	0,70	1,37	1,37	1,37	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96
	0,80	1,63	1,63	1,63	1,11	1,11	1,11	1,11	1,11	1,11	1,11	1,11
	0,90	1,82	1,82	1,82	1,17	1,17	1,17	1,17	1,17	1,17	1,17	1,17
	1,00	2,01	2,01	2,01	1,22	1,22	1,22	1,22	1,22	1,22	1,22	1,22
	1,20	2,63	2,63	2,63	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32
	1,50	3,56	3,56	3,56	1,46	1,91	1,91	1,91	1,91	1,91	1,91	1,91
	2,00	4,62	4,62	4,62	1,46	2,31	2,31	2,31	2,31	2,31	2,31	2,31
Al-Alloy, $R_m \geq 215$ N/mm², $V_{R,k}$ [kN]	**0,50**	1,10	1,10	1,10	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88
	0,60	1,44	1,44	1,44	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07
	0,70	1,79	1,79	1,79	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26
	0,80	2,13	2,13	2,13	1,45	1,45	1,45	1,45	1,45	1,45	1,45	1,45
	0,90	2,38	2,38	2,38	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52
	1,00	2,62	2,62	2,62	1,59	1,59	1,59	1,59	1,59	1,59	1,59	1,59
	1,20	3,43	3,43	3,43	1,71	1,71	1,71	1,71	1,71	1,71	1,71	1,71
	1,50	4,64	4,64	4,64	1,90	2,48	2,48	2,48	2,48	2,48	2,48	2,48
	2,00	6,02	6,02	6,02	1,90	3,01	3,01	3,01	3,01	3,01	3,01	3,01
$N_{R,II,k}$ [kN]		6,46 2)	8,73	11,0	0,81	1,11 1)	1,38 1)	1,77 2)	2,81	3,53 1)	4,52 2)	5,50 2)

1) For component II made of S320GD, the value may be increased by 8%.
2) For component II made of S320GD, the value may be increased by 8%.
For component II made of S350GD, the value may be increased by 16%.

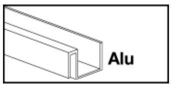
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²
Steel S280GD to S450GD

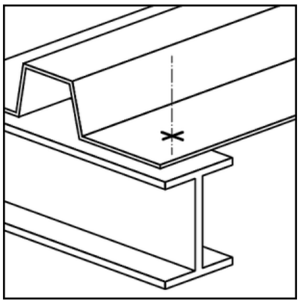
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 4,00 to 12,00 mm



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

Typical application:



Fastener:

S-MD 55 S(S) 5,5 x L
S-MD 65 S(S) 5,5 x L
S-MD 75 S(S) 5,5 x L
S-MD 55 PS(S) 5,5 x L
S-MD 65 PS(S) 5,5 x L
S-MD 75 PS(S) 5,5 x L

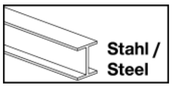
Washer: Ø16 / Ø19 / Ø22

Drilling capacity in metal: $\Sigma t_i \leq 15{,}00$ mm

Performance for timber substructures not determined

t_I [mm]			t_{II} [mm] Al-Alloy, $R_m \geq 165$ N/mm²						Al-Alloy, $R_m \geq 215$ N/mm²					
			4,00	**5,00**	**6,00**	**8,00**	**10,0**	**12,0**	**4,00**	**5,00**	**6,00**	**8,00**	**10,0**	**12,0**
Al-Alloy, $R_m \geq 165$ N/mm²	**$V_{R,k}$ [kN]**	**0,50**	0,95	0,95	0,95	0,95	0,95	0,95	0,95	0,95	0,95	0,95	0,95	0,95
		0,60	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14
		0,70	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32
		0,80	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51
		0,90	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76
		1,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00
		1,20	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,22
		1,50	2,56	2,56	2,56	2,56	2,56	2,56	2,56	2,56	2,56	2,56	2,56	2,56
		2,00	3,85	3,85	3,85	3,85	3,85	3,85	3,85	3,85	3,85	3,85	3,85	3,85
Al-Alloy, Rm ≥ 215 N/mm2 Stahl S280GD bis S450GD	**$V_{R,k}$ [kN]**	**0,50**	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24
		0,60	1,48	1,48	1,48	1,48	1,48	1,48	1,48	1,48	1,48	1,48	1,48	1,48
		0,70	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73
		0,80	1,97	1,97	1,97	1,97	1,97	1,97	1,97	1,97	1,97	1,97	1,97	1,97
		0,90	2,29	2,29	2,29	2,29	2,29	2,29	2,29	2,29	2,29	2,29	2,29	2,29
		1,00	2,61	2,61	2,61	2,61	2,61	2,61	2,61	2,61	2,61	2,61	2,61	2,61
		1,20	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90
		1,50	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33
		2,00	5,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02
$N_{R,II,k}$ [kN]			2,87	4,41	5,94	8,07	8,74	9,41	3,74	5,74	7,74	10,52	10,76	11,00

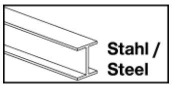
Application range:



Steel S280GD to S350GD

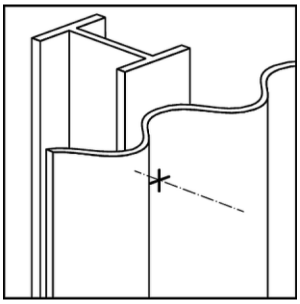
Component I: t_I = 0,40 to 2,00 mm

Component II: t_{II} = 4,00 to 13,00 mm
t_{II} = 2 x 0,50 to 2 x 2,00 mm



Steel S235 to S355 with R_m ≤ 560 N/mm²
Steel S280GD to S450GD

Typical application:



Fastener:

S-MD 35 PS(S) 5,5 x L

Washer: Ø12

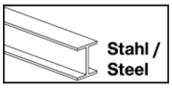
Drilling capacity in metal: Σt_i ≤ 15,00 mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm]										
		4,00	**5,00**	**≥ 6,00**	**2 x 0,50**	**2 x 0,63**	**2 x 0,75**	**2 x 1,00**	**2 x 1,25**	**2 x 1,50**	**2 x 1,75**	**2 x 2,00**
$V_{R,k}$ [kN]	**0,40**	1,68	1,68	1,68	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23
	0,50	1,99	1,99	1,99	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47
	0,55	2,38	2,38	2,38	1,55	1,55	1,55	1,55	1,55	1,55	1,55	1,55
	0,63	2,99	2,99	2,99	1,68	1,68	1,68	1,68	1,68	1,68	1,68	1,68
	0,75	3,92	3,92	3,92	1,87[4]	1,87[4]	1,87[4]	1,87[4]	1,87[4]	1,87[4]	1,87[4]	1,87[4]
	0,88	4,47[3]	4,47[3]	4,47[3]	2,19[4]	2,19[4]	2,19[4]	2,19[4]	2,19[4]	2,19[4]	2,19[4]	2,19[4]
	1,00	4,98[3]	4,98[3]	4,98[3]	2,48[4]	2,89[5]	3,27[5]	3,27[5]	3,27[5]	3,27[5]	3,27[5]	3,27[5]
	1,25	5,98	5,98	5,98	2,48[4]	3,23[5]	3,92[5]	3,92[5]	3,92[5]	3,92[5]	3,92[5]	3,92[5]
	1,50	6,97	6,97	6,97	2,48[4]	3,57[5]	4,57	4,57	4,57	4,57	4,57	4,57
	1,75	6,81	6,81	6,81	2,48[4]	3,71[5]	4,85	4,85	4,85	4,85	4,85	4,85
	2,00	6,65[2]	6,65[2]	6,65[2]	2,48[4]	3,85[5]	5,12[5]	5,12[5]	5,12[5]	5,12[5]	5,12[5]	5,12[5]
$N_{R,k}$ [kN]	**0,40**	—	—	—	—	—	—	—	—	—	—	—
	0,50	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,34	2,34	2,34	0,81	1,11	1,38	1,77	2,34	2,34	2,34	2,34
	0,75	2,34	2,34	2,34	0,81	1,11	1,38	1,77	2,34	2,34	2,34	2,34
	0,88	2,34	2,34	2,34	0,81	1,11	1,38	1,77	2,34	2,34	2,34	2,34
	1,00	2,34	2,34	2,34	0,81	1,11	1,38	1,77	2,34	2,34	2,34	2,34
	1,25	2,34	2,34	2,34	0,81	1,11	1,38	1,77	2,34	2,34	2,34	2,34
	1,50	2,34	2,34	2,34	0,81	1,11	1,38	1,77	2,34	2,34	2,34	2,34
	1,75	2,34	2,34	2,34	0,81	1,11	1,38	1,77	2,34	2,34	2,34	2,34
	2,00	2,34	2,34	2,34	0,81	1,11	1,38	1,77	2,34	2,34	2,34	2,34
$N_{R,II,k}$ [kN]		6,46[1]	8,73	11,0	0,81	1,11[5]	1,38[5]	1,77[4]	2,81	3,53[5]	4,52[4]	5,50[1]

1) For component II made of S320GD, the value may be increased by 8%.
   For component II made of S350GD, the value may be increased by 16%.
2) For component I made of S320GD, the value may be increased by 8%.
   For component I made of S350GD, the value may be increased by 16%.
3) For component I made of S320GD, the value may be increased by 8%.
4) For component I and component II made of S320GD, the value may be increased by 8%.
   For component I and component II made of S350GD, the value may be increased by 16%.
5) For component I and component II made of S320GD, the value may be increased by 8%.

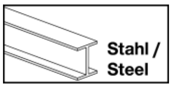
Application range:



Steel S390GD to S450GD

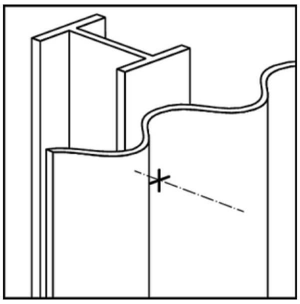
Component I: t_I = 0,40 to 2,00 mm

Component II: t_{II} = 4,00 to 13,00 mm
t_{II} = 2 x 0,50 to 2 x 2,00 mm



Steel S235 to S355 with R_m ≤ 560 N/mm²
Steel S390GD to S450GD

Typical application:



Fastener:

S-MD 35 PS(S) 5,5 x L

Washer: Ø12

Drilling capacity in metal: Σt_i ≤ 15,00 mm

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 4,00	5,00	≥ 6,00	2 x 0,50	2 x 0,63	2 x 0,75	2 x 1,00	2 x 1,25	2 x 1,50	2 x 1,75	2 x 2,00
$V_{R,k}$ [kN]	0,40	1,71	1,71	1,71	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25
	0,50	2,03	2,03	2,03	1,49	1,49	1,49	1,49	1,49	1,49	1,49	1,49
	0,55	2,47	2,47	2,47	1,63	1,63	1,63	1,63	1,63	1,63	1,63	1,63
	0,63	3,17	3,17	3,17	1,86	1,86	1,86	1,86	1,86	1,86	1,86	1,86
	0,75	4,23	4,23	4,23	2,20	2,20	2,20	2,20	2,20	2,20	2,20	2,20
	0,88	5,03	5,03	5,03	2,57	2,57	2,57	2,57	2,57	2,57	2,57	2,57
	1,00	5,77	5,77	5,77	2,91	3,24	3,54	3,54	3,54	3,54	3,54	3,54
	1,25	6,86	6,86	6,86	2,91	3,60	4,24	4,24	4,24	4,24	4,24	4,24
	1,50	7,66 2)	7,66 2)	7,66 2)	2,91	3,96	4,93	4,93	4,93	4,93	4,93	4,93
	1,75	7,91	7,91	7,91	2,91	4,12	5,23	5,23	5,23	5,23	5,23	5,23
	2,00	7,88	7,88	7,88	2,91	4,27	5,53	5,53	5,53	5,53	5,53	5,53
$N_{R,k}$ [kN]	0,40	—	—	—	—	—	—	—	—	—	—	—
	0,50	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,34	2,34	2,34	0,87	1,19	1,49	2,05	2,34	2,34	2,34	2,34
	0,75	2,34	2,34	2,34	0,87	1,19	1,49	2,05	2,34	2,34	2,34	2,34
	0,88	2,34	2,34	2,34	0,87	1,19	1,49	2,05	2,34	2,34	2,34	2,34
	1,00	2,34	2,34	2,34	0,87	1,19	1,49	2,05	2,34	2,34	2,34	2,34
	1,25	2,34	2,34	2,34	0,87	1,19	1,49	2,05	2,34	2,34	2,34	2,34
	1,50	2,34	2,34	2,34	0,87	1,19	1,49	2,05	2,34	2,34	2,34	2,34
	1,75	2,34	2,34	2,34	0,87	1,19	1,49	2,05	2,34	2,34	2,34	2,34
	2,00	2,34	2,34	2,34	0,87	1,19	1,49	2,05	2,34	2,34	2,34	2,34
$N_{R,II,k}$ [kN]		6,46 1)	8,73	11,0	0,87	1,19	1,49	2,05	2,88	4,04	5,29	6,53

1) For component II made of S320GD, the value may be increased by 8%.
For component II made of S350GD, the value may be increased by 16%.
For component II made of S390GD, the value may be increased by 21%.

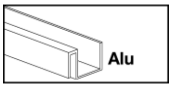
2) For component I made of S420GD, the value may be increased by 4%.

Self drilling screw

Hilti S-MD 35 PS 5,5 x L / Hilti S-MD 35 PSS 5,5 x L
with round head and sealing washer Ø12 mm

Annex 80

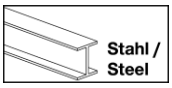
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

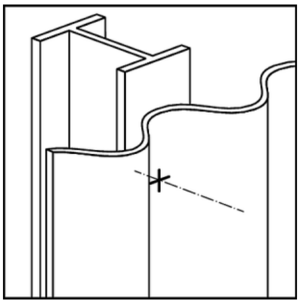
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 4,00 to 13,00 mm
t_{II} = 2 x 0,50 to 2 x 2,00 mm



Steel S235 to S355 with $R_m \leq 560$ N/mm²
Steel S280GD to S450GD

Typical application:



Fastener:

S-MD 35 PS(S) 5,5 x L

Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 15,00$ mm

Performance for timber substructures not determined

		t_I [mm]	t_{II} [mm] 4,00	5,00	≥ 6,00	2 x 0,50	2 x 0,63	2 x 0,75	2 x 1,00	2 x 1,25	2 x 1,50	2 x 1,75	2 x 2,00
Al-Alloy, $R_m \geq 165$ N/mm²	$V_{R,k}$ [kN]	0,50	0,84	0,84	0,84	0,67	0,67	0,67	0,67	0,67	0,67	0,67	0,67
		0,60	1,10	1,10	1,10	0,82	0,82	0,82	0,82	0,82	0,82	0,82	0,82
		0,70	1,37	1,37	1,37	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96
		0,80	1,63	1,63	1,63	1,11	1,11	1,11	1,11	1,11	1,11	1,11	1,11
		0,90	1,82	1,82	1,82	1,17	1,17	1,17	1,17	1,17	1,17	1,17	1,17
		1,00	2,01	2,01	2,01	1,22	1,22	1,22	1,22	1,22	1,22	1,22	1,22
		1,20	2,63	2,63	2,63	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32
		1,50	3,56	3,56	3,56	1,46	1,91	1,91	1,91	1,91	1,91	1,91	1,91
		2,00	4,62	4,62	4,62	1,46	2,31	2,31	2,31	2,31	2,31	2,31	2,31
	$N_{R,k}$ [kN]	0,50	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54
		0,60	0,62	0,62	0,62	0,62	0,62	0,62	0,62	0,62	0,62	0,62	0,62
		0,70	0,74	0,74	0,74	0,74	0,74	0,74	0,74	0,74	0,74	0,74	0,74
		0,80	0,88	0,88	0,88	0,81	0,88	0,88	0,88	0,88	0,88	0,88	0,88
		0,90	1,06	1,06	1,06	0,81	1,06	1,06	1,06	1,06	1,06	1,06	1,06
		1,00	1,27	1,27	1,27	0,81	1,27	1,27	1,27	1,27	1,27	1,27	1,27
		1,20	1,80	1,80	1,80	0,81	1,80	1,80	1,80	1,80	1,80	1,80	1,80
		1,50	1,80	1,80	1,80	0,81	1,80	1,80	1,80	1,80	1,80	1,80	1,80
		2,00	1,80	1,80	1,80	0,81	1,80	1,80	1,80	1,80	1,80	1,80	1,80
Al-Alloy, $R_m \geq 215$ N/mm²	$V_{R,k}$ [kN]	0,50	1,10	1,10	1,10	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88
		0,60	1,44	1,44	1,44	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07
		0,70	1,79	1,79	1,79	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26
		0,80	2,13	2,13	2,13	1,45	1,45	1,45	1,45	1,45	1,45	1,45	1,45
		0,90	2,38	2,38	2,38	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52
		1,00	2,62	2,62	2,62	1,59	1,59	1,59	1,59	1,59	1,59	1,59	1,59
		1,20	3,43	3,43	3,43	1,71	1,71	1,71	1,71	1,71	1,71	1,71	1,71
		1,50	4,64	4,64	4,64	1,90	2,48	2,48	2,48	2,48	2,48	2,48	2,48
		2,00	6,02	6,02	6,02	1,90	3,01	3,01	3,01	3,01	3,01	3,01	3,01
	$N_{R,k}$ [kN]	0,50	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71
		0,60	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81
		0,70	0,96	0,96	0,96	0,81	0,96	0,96	0,96	0,96	0,96	0,96	0,96
		0,80	1,15	1,15	1,15	0,81	1,15	1,15	1,15	1,15	1,15	1,15	1,15
		0,90	1,38	1,38	1,38	0,81	1,38	1,38	1,38	1,38	1,38	1,38	1,38
		1,00	1,65	1,65	1,65	0,81	1,65	1,65	1,65	1,65	1,65	1,65	1,65
		1,20	2,35	2,35	2,35	0,81	2,35	2,35	2,35	2,35	2,35	2,35	2,35
		1,50	2,35	2,35	2,35	0,81	2,35	2,35	2,35	2,35	2,35	2,35	2,35
		2,00	2,35	2,35	2,35	0,81	2,35	2,35	2,35	2,35	2,35	2,35	2,35
$N_{R,II,k}$ [kN]			6,46[2]	8,73	11,0	0,81	1,11[1]	1,38[1]	1,77[2]	2,81	3,53[1]	4,52[2]	5,50[2]

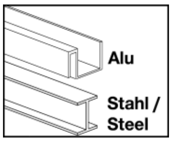
1) For component II made of S320GD, the value may be increased by 8%.
2) For component II made of S320GD, the value may be increased by 8%.
   For component II made of S350GD, the value may be increased by 16%.

Self drilling screw

Hilti S-MD 35 PS 5,5 x L / Hilti S-MD 35 PSS 5,5 x L
with round head and sealing washer Ø12 mm

Annex 81

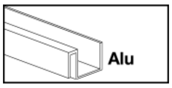
Application range:



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²
Steel S280GD to S450GD

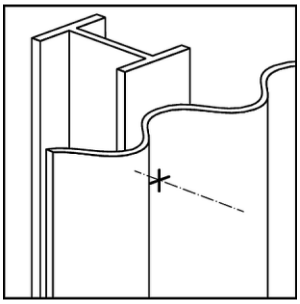
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 4,00 to 12,00 mm



Aluminium alloy with $R_m \geq 165$ N/mm²
Aluminium alloy with $R_m \geq 215$ N/mm²

Typical application:



Fastener:

S-MD 35 PS(S) 5,5 x L

Washer: Ø12

Drilling capacity in metal: $\Sigma t_i \leq 15{,}00$ mm

Performance for timber substructures not determined

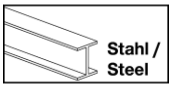
		t_I [mm]	t_{II} [mm]											
			Al-Alloy, $R_m \geq 165$ N/mm²						Al-Alloy, $R_m \geq 215$ N/mm²					
			4,00	**5,00**	**6,00**	**8,00**	**10,0**	**12,0**	**4,00**	**5,00**	**6,00**	**8,00**	**10,0**	**12,0**
Al-Alloy, $R_m \geq 165$ N/mm²	**$V_{R,k}$ [kN]**	**0,50**	0,95	0,95	0,95	0,95	0,95	0,95	0,95	0,95	0,95	0,95	0,95	0,95
		0,60	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14
		0,70	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32	1,32
		0,80	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51
		0,90	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76
		1,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00
		1,20	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,22
		1,50	2,56	2,56	2,56	2,56	2,56	2,56	2,56	2,56	2,56	2,56	2,56	2,56
		2,00	3,85	3,85	3,85	3,85	3,85	3,85	3,85	3,85	3,85	3,85	3,85	3,85
	$N_{R,k}$ [kN]	**0,50**	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54
		0,60	0,62	0,62	0,62	0,62	0,62	0,62	0,62	0,62	0,62	0,62	0,62	0,62
		0,70	0,74	0,74	0,74	0,74	0,74	0,74	0,74	0,74	0,74	0,74	0,74	0,74
		0,80	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88
		0,90	1,06	1,06	1,06	1,06	1,06	1,06	1,06	1,06	1,06	1,06	1,06	1,06
		1,00	1,27	1,27	1,27	1,27	1,27	1,27	1,27	1,27	1,27	1,27	1,27	1,27
		1,20	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80
		1,50	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80
		2,00	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80
Al-Alloy, $R_m \geq 215$ N/mm² Stahl S280GD bis S450GD	**$V_{R,k}$ [kN]**	**0,50**	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24
		0,60	1,48	1,48	1,48	1,48	1,48	1,48	1,48	1,48	1,48	1,48	1,48	1,48
		0,70	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73	1,73
		0,80	1,97	1,97	1,97	1,97	1,97	1,97	1,97	1,97	1,97	1,97	1,97	1,97
		0,90	2,29	2,29	2,29	2,29	2,29	2,29	2,29	2,29	2,29	2,29	2,29	2,29
		1,00	2,61	2,61	2,61	2,61	2,61	2,61	2,61	2,61	2,61	2,61	2,61	2,61
		1,20	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90
		1,50	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33
		2,00	5,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02
	$N_{R,k}$ [kN]	**0,50**	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71
		0,60	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81
		0,70	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96
		0,80	1,15	1,15	1,15	1,15	1,15	1,15	1,15	1,15	1,15	1,15	1,15	1,15
		0,90	1,38	1,38	1,38	1,38	1,38	1,38	1,38	1,38	1,38	1,38	1,38	1,38
		1,00	1,65	1,65	1,65	1,65	1,65	1,65	1,65	1,65	1,65	1,65	1,65	1,65
		1,20	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35
		1,50	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35
		2,00	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35	2,35
$N_{R,II,k}$ [kN]			2,87	4,41	5,94	8,07	8,74	9,41	3,74	5,74	7,74	10,52	10,76	11,00

Self drilling screw

Hilti S-MD 35 PS 5,5 x L / Hilti S-MD 35 PSS 5,5 x L
with round head and sealing washer Ø12 mm

Annex 82

Application range:



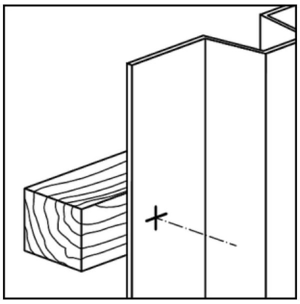
Steel S280GD to S450GD

Component I: t_I = 0,40 to 1,50 mm

Component II:

Structural timber

Typical application:



Fastener:

S-MDW 01 S(S) 6,5 x L
S-MDW 01 PS(S) 6,5 x L

Washer: none

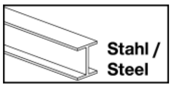
Drilling capacity in metal: $\Sigma t_i \leq 2{,}00$ mm

Performance for timber substructures determined with:
$M_{y,Rk}$ = 11,546 Nm
$f_{ax,k}$ = 10,693 N/mm² for C24 and $l_{ef} \geq 30{,}0$ mm
$f_{ax,k}$ = 11,937 N/mm² for C40 and $l_{ef} \geq 30{,}0$ mm

	t_I [mm]	l_{ef} [mm] 30	35	40	45	55	65	75	
$V_{R,k}$ [kN]	**0,40**	1,63	1,63	1,63	1,63	1,63	1,63	1,63	1,63
	0,50	1,88	2,20	2,33	2,33	2,33	2,33	2,33	2,33
	0,55	1,88	2,20	2,51	2,62	2,62	2,62	2,62	2,62
	0,63	1,88	2,20	2,51	2,78	2,94	2,99	2,99	2,99
	0,75	1,88	2,20	2,51	2,78	2,94	3,09	3,25	3,50
	0,88	1,88	2,20	2,51	2,78	2,94	3,09	3,25	3,70
	1,00	1,88	2,20	2,51	2,78	2,94	3,09	3,25	3,90
	1,25	1,88	2,20	2,51	2,78	2,94	3,09	3,25	4,10
	1,50	1,88	2,20	2,51	2,78	2,94	3,09	3,25	4,30 $V_{R,I,k}$ [kN]
$V_{R,II,k}$ [kN]		1,88	2,20	2,51	2,78	2,94	3,09	3,25	
$N_{R,k}$ [kN]	**0,40**	0,92	0,92	0,92	0,92	0,92	0,92	0,92	0,92
	0,50	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35
	0,55	1,57	1,57	1,57	1,57	1,57	1,57	1,57	1,57
	0,63	1,88	1,91	1,91	1,91	1,91	1,91	1,91	1,91
	0,75	1,88	2,19	2,48	2,48	2,48	2,48	2,48	2,48
	0,88	1,88	2,19	2,50	2,81	3,09	3,09	3,09	3,09
	1,00	1,88	2,19	2,50	2,81	3,44	3,70	3,70	3,70
	1,25	1,88	2,19	2,50	2,81	3,44	4,07	4,69	4,91
	1,50	1,88	2,19	2,50	2,81	3,44	4,07	4,69	6,34 $N_{R,I,k}$ [kN]
$N_{R,II,k}$ [kN]		1,88	2,19	2,50	2,81	3,44	4,07	4,69	

The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see Annex 3.

Application range:



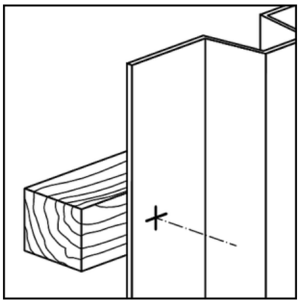
Steel S280GD to S450GD

Component I: t_I = 0,40 to 1,50 mm

Component II:

Structural timber

Typical application:



Fastener:

S-MDW 51 S(S) 6,5 x L
S-MDW 51 PS(S) 6,5 x L

Washer: Ø16

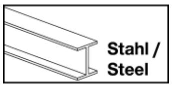
Drilling capacity in metal: $\Sigma t_i \leq 2{,}00$ mm

Performance for timber substructures determined with:
$M_{y,Rk}$ = 11,546 Nm
$f_{ax,k}$ = 10,693 N/mm² for C24 and $l_{ef} \geq 30{,}0$ mm
$f_{ax,k}$ = 11,937 N/mm² for C40 and $l_{ef} \geq 30{,}0$ mm

	t_I [mm]	l_{ef} [mm] 30	35	40	45	55	65	75	
$V_{R,k}$ [kN]	**0,40**	1,63	1,63	1,63	1,63	1,63	1,63	1,63	1,63 ($V_{R,I,k}$ [kN])
	0,50	1,88	2,20	2,33	2,33	2,33	2,33	2,33	2,33
	0,55	1,88	2,20	2,51	2,62	2,62	2,62	2,62	2,62
	0,63	1,88	2,20	2,51	2,78	2,94	2,99	2,99	2,99
	0,75	1,88	2,20	2,51	2,78	2,94	3,09	3,25	3,50
	0,88	1,88	2,20	2,51	2,78	2,94	3,09	3,25	3,70
	1,00	1,88	2,20	2,51	2,78	2,94	3,09	3,25	3,90
	1,25	1,88	2,20	2,51	2,78	2,94	3,09	3,25	4,10
	1,50	1,88	2,20	2,51	2,78	2,94	3,09	3,25	4,30
$V_{R,II,k}$ [kN]		1,88	2,20	2,51	2,78	2,94	3,09	3,25	
$N_{R,k}$ [kN]	**0,40**	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00 ($N_{R,I,k}$ [kN])
	0,50	1,46	1,46	1,46	1,46	1,46	1,46	1,46	1,46
	0,55	1,70	1,70	1,70	1,70	1,70	1,70	1,70	1,70
	0,63	1,88	2,07	2,07	2,07	2,07	2,07	2,07	2,07
	0,75	1,88	2,19	2,50	2,68	2,68	2,68	2,68	2,68
	0,88	1,88	2,19	2,50	2,81	3,35	3,35	3,35	3,35
	1,00	1,88	2,19	2,50	2,81	3,44	4,01	4,01	4,01
	1,25	1,88	2,19	2,50	2,81	3,44	4,07	4,69	5,32
	1,50	1,88	2,19	2,50	2,81	3,44	4,07	4,69	6,87
$N_{R,II,k}$ [kN]		1,88	2,19	2,50	2,81	3,44	4,07	4,69	

The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see Annex 3.

Application range:



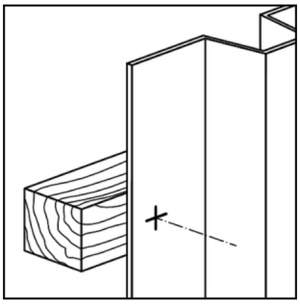
Steel S280GD to S450GD

Component I: t_I = 0,40 to 1,50 mm

Component II:

Structural timber

Typical application:



Fastener:

S-MDW 61 S(S) 6,5 x L
S-MDW 61 PS(S) 6,5 x L
S-MDW 71 S(S) 6,5 x L
S-MDW 71 PS(S) 6,5 x L

Washer: Ø19 / Ø22

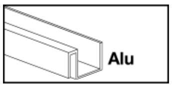
Drilling capacity in metal: $\Sigma t_i \leq 2,00$ mm

Performance for timber substructures determined with:
$M_{y,Rk}$ = 11,546 Nm
$f_{ax,k}$ = 10,693 N/mm² for C24 and $l_{ef} \geq 30,0$ mm
$f_{ax,k}$ = 11,937 N/mm² for C40 and $l_{ef} \geq 30,0$ mm

	t_I [mm]	l_{ef} [mm] 30	35	40	45	55	65	75		
$V_{R,k}$ [kN]	**0,40**	1,63	1,63	1,63	1,63	1,63	1,63	1,63	1,63	$V_{R,I,k}$ [kN]
	0,50	1,88	2,20	2,33	2,33	2,33	2,33	2,33	2,33	
	0,55	1,88	2,20	2,51	2,62	2,62	2,62	2,62	2,62	
	0,63	1,88	2,20	2,51	2,78	2,94	2,99	2,99	2,99	
	0,75	1,88	2,20	2,51	2,78	2,94	3,09	3,25	3,50	
	0,88	1,88	2,20	2,51	2,78	2,94	3,09	3,25	3,70	
	1,00	1,88	2,20	2,51	2,78	2,94	3,09	3,25	3,90	
	1,25	1,88	2,20	2,51	2,78	2,94	3,09	3,25	4,10	
	1,50	1,88	2,20	2,51	2,78	2,94	3,09	3,25	4,30	
$V_{R,II,k}$ [kN]		1,88	2,20	2,51	2,78	2,94	3,09	3,25		
$N_{R,k}$ [kN]	**0,40**	1,04	1,04	1,04	1,04	1,04	1,04	1,04	1,04	$N_{R,I,k}$ [kN]
	0,50	1,55	1,55	1,55	1,55	1,55	1,55	1,55	1,55	
	0,55	1,82	1,82	1,82	1,82	1,82	1,82	1,82	1,82	
	0,63	1,88	2,19	2,22	2,22	2,22	2,22	2,22	2,22	
	0,75	1,88	2,19	2,50	2,81	2,88	2,88	2,88	2,88	
	0,88	1,88	2,19	2,50	2,81	3,44	3,60	3,60	3,60	
	1,00	1,88	2,19	2,50	2,81	3,44	4,07	4,31	4,31	
	1,25	1,88	2,19	2,50	2,81	3,44	4,07	4,69	5,73	
	1,50	1,88	2,19	2,50	2,81	3,44	4,07	4,69	7,40	
$N_{R,II,k}$ [kN]		1,88	2,19	2,50	2,81	3,44	4,07	4,69		

The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see Annex 3.

Application range:



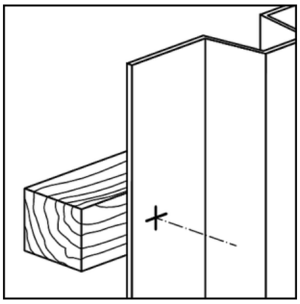
Aluminium alloy with $R_m \geq 185$ N/mm²

Component I: t_I = 0,40 to 1,50 mm

Component II:

Structural timber

Typical application:



Fastener:

S-MDW 01 S(S) 6,5 x L
S-MDW 51 S(S) 6,5 x L
S-MDW 61 S(S) 6,5 x L
S-MDW 71 S(S) 6,5 x L
S-MDW 01 PS(S) 6,5 x L
S-MDW 51 PS(S) 6,5 x L
S-MDW 61 PS(S) 6,5 x L
S-MDW 71 PS(S) 6,5 x L

Washer: none/Ø16/Ø19/Ø22

Drilling capacity in metal: $\Sigma t_i \leq 2,00$ mm

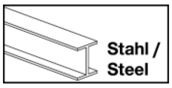
Performance for timber substructures determined with:
$M_{y,Rk}$ = 11,546 Nm
$f_{ax,k}$ = 10,693 N/mm² for C24 and $l_{ef} \geq 30,0$ mm
$f_{ax,k}$ = 11,937 N/mm² for C40 and $l_{ef} \geq 30,0$ mm

t_I [mm]	l_{ef} [mm] 30	35	40	45	55	65	75
$V_{R,k}$ [kN] **0,40**	0,65	0,65	0,65	0,65	0,65	0,65	0,65
0,50	1,23	1,23	1,23	1,23	1,23	1,23	1,23
0,60	1,30	1,30	1,30	1,30	1,30	1,30	1,30
0,70	1,38	1,38	1,38	1,38	1,38	1,38	1,38
0,80	1,48	1,48	1,48	1,48	1,48	1,48	1,48
0,90	1,59	1,59	1,59	1,59	1,59	1,59	1,59
1,00	1,88	1,94	1,94	1,94	1,94	1,94	1,94
1,10	1,88	1,94	1,94	1,94	1,94	1,94	1,94
1,20	1,88	2,02	2,02	2,02	2,02	2,02	2,02
1,30	1,88	2,02	2,02	2,02	2,02	2,02	2,02
1,40	1,88	2,02	2,02	2,02	2,02	2,02	2,02
1,50	1,88	2,02	2,02	2,02	2,02	2,02	2,02
$N_{R,II,k}$ [kN]	1,88	2,19	2,50	2,81	3,44	4,07	4,69

$V_{R,I,k}$ [kN]
0,65
1,23
1,30
1,38
1,48
1,59
1,94
1,94
2,02
2,02
2,02
2,02

Pull-through of component I according to the recommendations of the aluminum profile producers.
The characteristic value $N_{R,k}$ can be determined according to Annex 3.The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see Annex 3.

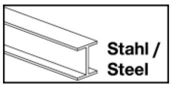
Application range:



Steel S280GD to S320GD

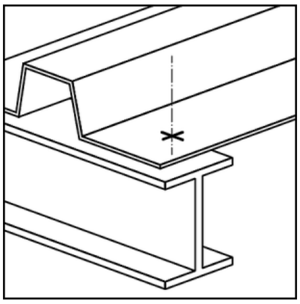
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,25 to 30,00 mm



Steel S235
Steel S280GD to S320GD

Typical application:



Fastener:

S-MP 52 S(S) 6,3 x L
S-MP 62 S(S) 6,3 x L
S-MP 72 S(S) 6,3 x L

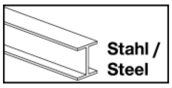
Washer: Ø16 / Ø19 / Ø22

Predrill diameters d_{pd} see table below

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 1,25		1,50		2,00		3,00		4,00		6,00		≥ 7,00		—	
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	2,50	ac	2,70	ac	2,90	abcd	3,00	abcd	3,10	abcd	3,10	abcd	3,10	abcd	—	—
	0,75	2,60	ac	3,10	ac	3,30	ac	3,60	ac	3,70	abcd	3,70	abcd	3,70	abcd	—	—
	0,88	2,80	ac	3,20	ac	3,80	ac	4,10	ac	4,30	ac	4,40	ac	4,40	ac	—	—
	1,00	3,20	—	3,60	ac	4,10	ac	4,80	ac	4,90	ac	5,10	ac	5,10	ac	—	—
	1,13	3,40	—	4,00	—	4,60	ac	5,40	ac	5,60	ac	5,80	ac	5,80	ac	—	—
	1,25	3,60	—	4,20	—	5,00	ac	6,10	ac	6,30	ac	6,50	ac	6,50	ac	—	—
	1,50	3,70	—	4,40	—	5,70	—	6,80	—	7,10	—	7,30	—	7,30	—	—	—
	1,75	3,70	—	4,70	—	6,20	—	7,60	—	7,70	—	8,10	—	8,10	—	—	—
	2,00	5,00	—	6,30	—	7,90	—	8,30	—	8,40	—	9,40	—	9,40	—	—	—
$N_{R,k}$ [kN]	0,50	0,97	ac	1,35	ac	1,51	abcd	1,51	abcd	1,51	abcd	1,51	abcd	1,51	abcd	—	—
	0,55	1,23	ac	1,71	ac	1,91	abcd	1,91	abcd	1,91	abcd	1,91	abcd	1,91	abcd	—	—
	0,63	1,80	ac	2,50	ac	2,80	abcd	2,80	abcd	2,80	abcd	2,80	abcd	2,80	abcd	—	—
	0,75	2,00	ac	2,60	ac	3,10	ac	3,60	ac	3,60	abcd	3,60	abcd	3,60	abcd	—	—
	0,88	2,00	ac	2,70	ac	3,30	ac	3,80	ac	3,80	ac	3,80	ac	3,80	ac	—	—
	1,00	2,00	—	2,70	ac	3,40	ac	4,00	ac	4,00	ac	4,00	ac	4,00	ac	—	—
	1,13	2,00	—	2,70	—	3,60	ac	4,40	ac	4,40	ac	4,40	ac	4,40	ac	—	—
	1,25	2,00	—	2,70	—	3,60	ac	4,80	ac	4,90	ac	4,90	ac	4,90	ac	—	—
	1,50	2,00	—	2,70	—	3,60	—	5,60	—	5,90	—	5,90	—	5,90	—	—	—
	1,75	2,00	—	2,70	—	3,60	—	5,80	—	6,90	—	7,10	—	7,10	—	—	—
	2,00	2,00	—	2,70	—	3,60	—	6,00	—	7,30	—	7,60	—	7,60	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															
d_{pd} [mm]		t_{II} ≤ 1,50 mm d_{pd} = Ø5,0 mm				1,50 mm < t_{II} ≤ 4,0 mm d_{pd} = Ø5,3 mm				4,0 mm < t_{II} < 7,0 mm d_{pd} = Ø5,5 mm				t_{II} ≥ 7,0 mm d_{pd} = Ø5,7 mm			

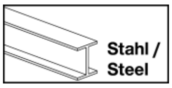
Application range:



Steel S280GD to S420GD

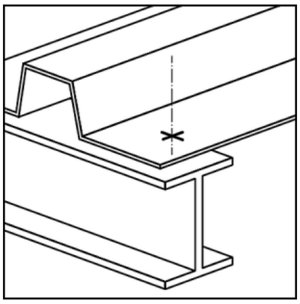
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 1,25 to 30,00 mm



Steel S235 to S355
Steel S280GD to S420GD

Typical application:



Fastener:

S-MP 54 S(S) 6,3 x L
S-MP 64 S(S) 6,3 x L
S-MP 74 S(S) 6,3 x L

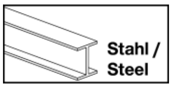
Washer: Ø16 / Ø19 / Ø22

Predrill diameters d_{pd} see table below

Performance for timber substructures not determined

	t_I [mm]	t_{II} [mm] 1,25		1,50		2,00		3,00		4,00		6,00		≥ 7,00		—	
$V_{R,k}$ [kN]	**0,50**	1,65	ac	1,72	ac	1,78	abcd	1,78	abcd	1,78	abcd	1,78	abcd	1,78	abcd	—	—
	0,55	2,08	ac	2,21	ac	2,34	abcd	2,34	abcd	2,34	abcd	2,34	abcd	2,34	abcd	—	—
	0,63	2,50	ac	2,70	ac	2,90	abcd	3,00	abcd	3,10	abcd	3,10	abcd	3,10	abcd	—	—
	0,75	2,60	ac	3,10	ac	3,30	ac	3,60	ac	3,70	abcd	3,70	abcd	3,70	abcd	—	—
	0,88	2,80	ac	3,20	ac	3,80	ac	4,10	ac	4,30	ac	4,40	ac	4,40	ac	—	—
	1,00	3,20	—	3,60	ac	4,10	ac	4,80	ac	4,90	ac	5,10	ac	5,10	ac	—	—
	1,13	3,40	—	4,00	—	4,60	ac	5,40	ac	5,60	ac	5,80	ac	5,80	ac	—	—
	1,25	3,60	—	4,20	—	5,00	ac	6,10	ac	6,30	ac	6,50	ac	6,50	ac	—	—
	1,50	3,70	—	4,40	—	5,70	—	6,80	—	7,10	—	7,30	—	7,30	—	—	—
	1,75	3,70	—	4,70	—	6,20	—	7,60	—	7,70	—	8,10	—	8,10	—	—	—
	2,00	5,00	—	6,30	—	7,90	—	8,30	—	8,40	—	9,40	—	9,40	—	—	—
$N_{R,k}$ [kN]	**0,50**	0,97	ac	1,35	ac	1,51	abcd	1,51	abcd	1,51	abcd	1,51	abcd	1,51	abcd	—	—
	0,55	1,23	ac	1,71	ac	1,91	abcd	1,91	abcd	1,91	abcd	1,91	abcd	1,91	abcd	—	—
	0,63	1,80	ac	2,50	ac	2,80	abcd	2,80	abcd	2,80	abcd	2,80	abcd	2,80	abcd	—	—
	0,75	2,00	ac	2,60	ac	3,10	ac	3,60	ac	3,60	abcd	3,60	abcd	3,60	abcd	—	—
	0,88	2,00	ac	2,70	ac	3,30	ac	3,80	ac	3,80	ac	3,80	ac	3,80	ac	—	—
	1,00	2,00	—	2,70	ac	3,40	ac	4,00	ac	4,00	ac	4,00	ac	4,00	ac	—	—
	1,13	2,00	—	2,70	—	3,60	ac	4,40	ac	4,40	ac	4,40	ac	4,40	ac	—	—
	1,25	2,00	—	2,70	—	3,60	ac	4,80	ac	4,90	ac	4,90	ac	4,90	ac	—	—
	1,50	2,00	—	2,70	—	3,60	—	5,60	—	5,90	—	5,90	—	5,90	—	—	—
	1,75	2,00	—	2,70	—	3,60	—	5,80	—	6,90	—	7,10	—	7,10	—	—	—
	2,00	2,00	—	2,70	—	3,60	—	6,00	—	7,30	—	7,60	—	7,60	—	—	—
$M_{t,nom}$ [Nm]		5 Nm															
d_{pd} [mm]		t_{II} ≤ 1,50 mm, d_{pd} = Ø5,0 mm				1,50 mm < t_{II} ≤ 4,0 mm, d_{pd} = Ø5,3 mm				4,0 mm < t_{II} < 7,0 mm, d_{pd} = Ø5,5 mm				t_{II} ≥ 7,0 mm, d_{pd} = Ø5,7 mm			

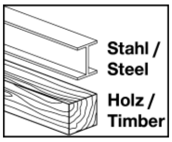
Application range:



Steel S280GD to S320GD

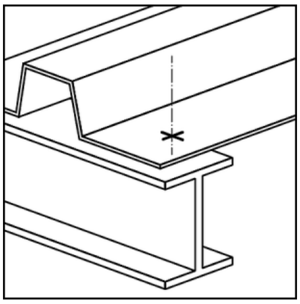
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,63 to 3,00 mm



Steel S235
Steel S280GD to S320GD
Structural timber

Typical application:



Fastener:

S-MP 53 S(S) 6,5 x L
S-MP 63 S(S) 6,5 x L
S-MP 73 S(S) 6,5 x L

Washer: Ø16 / Ø19 / Ø22

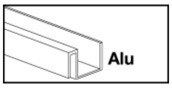
Predrill diameters d_{pd} see table below

Performance for timber substructures determined with:
$M_{y,Rk}$ = 9,742 Nm
$f_{ax,k}$ = 8,575 N/mm² for C24 and l_{ef} ≥ 26,0 mm

	t_I [mm]	t_{II} [mm]													$V_{R,I,k}$
		0,63	0,75	0,88	1,00		1,13		1,25		1,50		≥ 2,00		$N_{R,I,k}$
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	1,30	1,50	1,80	2,00	ac	2,30	ac	2,50	ac	2,90	ac	2,90	ac	2,90
	0,75	1,40	1,60	1,90	2,20	ac	2,50	ac	2,60	ac	3,10	ac	3,50	ac	3,50
	0,88	1,50	1,70	2,00	2,30	ac	2,60	ac	2,80	ac	3,20	ac	3,70	ac	3,70
	1,00	1,50	1,80	2,10	2,50	—	2,80	—	3,10	—	3,60	—	3,90	ac	3,90
	1,13	1,60	1,80	2,20	2,60	—	2,90	—	3,20	—	3,80	—	4,00	ac	4,00
	1,25	1,60	1,90	2,30	2,70	—	3,00	—	3,30	—	4,00	—	4,10	ac	4,10
	1,50	1,60	1,90	2,40	2,80	—	3,20	—	3,50	—	4,00	—	4,30	—	4,30
	1,75	1,60	1,90	2,40	2,80	—	3,20	—	3,50	—	4,00	—	4,30	—	4,30
	2,00	1,60	1,90	2,40	2,80	—	3,20	—	3,50	—	4,00	—	4,30	—	4,30
$N_{R,k}$ [kN]	0,50	0,49	0,59	0,70	0,76	ac	0,86	ac	0,97	ac	1,13	ac	1,19	ac	1,19
	0,55	0,61	0,75	0,89	0,95	ac	1,09	ac	1,23	ac	1,43	ac	1,50	ac	1,50
	0,63	0,90	1,10	1,30	1,40	ac	1,60	ac	1,80	ac	2,10	ac	2,20	ac	2,20
	0,75	0,90	1,10	1,30	1,40	ac	1,60	ac	1,80	ac	2,10	ac	2,80	ac	2,80
	0,88	0,90	1,10	1,30	1,40	ac	1,60	ac	1,80	ac	2,10	ac	3,50	ac	3,50
	1,00	0,90	1,10	1,30	1,40	—	1,60	—	1,80	—	2,20	—	3,60	ac	3,60
	1,13	1,00	1,20	1,40	1,50	—	1,70	—	1,90	—	2,30	—	3,60	ac	3,60
	1,25	1,00	1,20	1,40	1,50	—	1,70	—	1,90	—	2,30	—	3,60	ac	3,60
	1,50	1,00	1,20	1,40	1,50	—	1,70	—	1,90	—	2,30	—	3,60	—	3,60
	1,75	1,00	1,20	1,40	1,50	—	1,70	—	1,90	—	2,30	—	3,60	—	3,60
	2,00	1,00	1,20	1,40	1,50	—	1,70	—	1,90	—	2,30	—	3,60	—	3,60
$M_{t,nom}$ [Nm]		3 Nm							5 Nm						
d_{pd} [mm]		t_{II} ≤ 0,75 mm d_{pd} = Ø4,0 mm			0,75 mm < t_{II} ≤ 1,50 mm d_{pd} = Ø4,5 mm						t_{II} ≥ 1,50 mm d_{pd} = Ø5,0 mm				

The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see Annex 3.

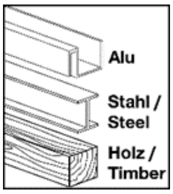
Application range:



Aluminium alloy with R_m ≥ 185 N/mm²

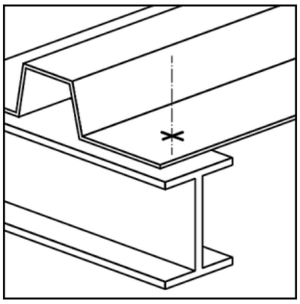
Component I: t_I = 0,50 to 2,00 mm

Component II: t_{II} = 0,50 to 3,00 mm



Aluminium alloy with R_m ≥ 185 N/mm²
Steel S280GD to S350GD
Structural timber

Typical application:



Fastener:

S-MP 53 S(S) 6,5 x L
S-MP 63 S(S) 6,5 x L
S-MP 73 S(S) 6,5 x L

Washer: Ø16 / Ø19 / Ø22

Predrill diameters d_{pd} see table below

Performance for timber substructures determined with:
$M_{y,Rk}$ = 9,742 Nm
$f_{ax,k}$ = 8,575 N/mm² for C24 and l_{ef} ≥ 26,0 mm

	t_I [mm]	Stahl S280GD bis S350GD t_{II} [mm]						Al-Alloy, R_m ≥ 185 N/mm² t_{II} [mm]						$V_{R,I,k}$ $N_{R,I,k}$
		0,63	0,75	0,88	1,00	1,50	≥ 2,00	0,50	0,60	0,80	1,00	1,50	≥ 2,00	
$V_{R,k}$ [kN]	0,50	1,23	1,23	1,23	1,23	1,23	1,23	—	—	—	—	—	—	1,23
	0,60	1,30	1,30	1,30	1,30	1,30	1,30	—	—	—	—	—	—	1,30
	0,70	1,38	1,38	1,38	1,38	1,38	1,38	—	—	—	—	—	—	1,38
	0,80	1,48	1,48	1,48	1,48	1,48	1,48	0,50	0,50	0,50	0,50	0,50	0,50	1,48
	0,90	1,59	1,59	1,59	1,59	1,59	1,59	0,50	0,50	0,50	0,50	0,50	0,50	1,59
	1,00	1,72	1,79	1,87	1,94	1,94	1,94	0,50	0,71	1,15	1,59	1,59	1,59	1,94
	1,10	1,86	1,86	1,87	1,94	1,94	1,94	0,50	0,71	1,15	1,59	1,59	1,59	1,94
	1,20	2,02	2,02	2,02	2,02	2,02	2,02	0,50	0,71	1,15	1,59	1,59	1,59	2,02
	1,30	2,02	2,02	2,02	2,02	2,02	2,02	0,50	0,71	1,15	1,59	1,59	1,59	2,02
	1,90	2,02	2,02	2,02	2,02	2,02	2,02	0,50	0,71	1,15	1,59	1,59	1,59	2,02
	2,00	2,02	2,02	2,02	2,02	2,02	4,04	0,50	0,71	1,15	1,59	1,59	3,26	4,04
$N_{R,k}$ [kN]	0,50	0,48	0,48	0,48	0,48	0,48	0,48	0,16	0,21	0,32	0,45	0,48	0,48	0,48
	0,60	0,58	0,58	0,58	0,58	0,58	0,58	0,16	0,21	0,32	0,45	0,58	0,58	0,58
	0,70	0,67	0,67	0,67	0,67	0,67	0,67	0,16	0,21	0,32	0,45	0,67	0,67	0,67
	0,80	0,77	0,77	0,77	0,77	0,77	0,77	0,16	0,21	0,32	0,45	0,77	0,77	0,77
	0,90	0,87	0,87	0,87	0,87	0,87	0,87	0,16	0,21	0,32	0,45	0,82	0,87	0,87
	1,00	0,96	0,96	0,96	0,96	0,96	0,96	0,16	0,21	0,32	0,45	0,82	0,96	0,96
	1,10	1,00	1,06	1,06	1,06	1,06	1,06	0,16	0,21	0,32	0,45	0,82	1,06	1,06
	1,20	1,00	1,15	1,15	1,15	1,15	1,15	0,16	0,21	0,32	0,45	0,82	1,15	1,15
	1,30	1,00	1,20	1,25	1,25	1,25	1,25	0,16	0,21	0,32	0,45	0,82	1,25	1,25
	1,90	1,00	1,20	1,40	1,44	1,44	1,44	0,16	0,21	0,32	0,45	0,82	1,27	1,44
	2,00	1,00	1,20	1,40	1,44	1,44	1,44	0,16	0,21	0,32	0,45	0,82	1,27	1,44
$M_{t,nom}$ [Nm]		3 Nm				5 Nm								
d_{pd} [mm]		$t_{N,II}$ ≤ 0,75 mm d_p = ø4,0 mm			0,75 mm < $t_{N,II}$ ≤ 1,50 mm d_p = ø4,5 mm				$t_{N,II}$ ≥ 1,50 mm d_p = ø5,0 mm					

The grey highlighted values $N_{R,k}$ may be increased by 9.0% when using the types "S-MP 6x" and by 17.3% when using the types "S-MP 7x".The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see Annex 3.