

# HILTI

**Technical  
Manual**

**Metal Construction  
Screws  
Siding/Decking/  
Roofing**



Edition 08/2015



**HILTI**

Chipless fastening S-MS 41 / 51

**CLEAN.  
SECURE. FAST.**

**Hilti. Outperform. Outlast.**

### **Hilti screw tip technology**

- High application security and perfect sealing
- No rust stains through chipless technology
- Fast setting time

# Table of contents

<b>1.1</b>	Uninsulated roof with steel or aluminium sheet	2	<b>5.4</b>		
<b>1.2</b>	Insulated roof with steel or aluminium sheet	2	5.4.1	Carbon steel overlapping screw, chipless (Ø 14, 16) S-MS 41 Z/51 Z	39
<b>1.3</b>	Insulated flatroof	3	5.4.2	Carbon steel self-drilling Screw (Ø 16) S-MD 51 Z	40
<b>1.4</b>	Sandwich roof	3	5.4.3	Carbon steel self-drilling Screw (Ø 16) S-MD 51 LZ	41
<b>1.5</b>	Eaves	4	5.4.4	Carbon steel self-drilling Screw (Ø 16) S-MD 53 Z	42
<b>1.6</b>	Finishing at corners and edges	4	5.4.5	Carbon steel self-drilling Screw (Ø 16) S-MD 55 GZ	43
<b>1.7</b>	Uninsulated siding with steel or aluminium sheet	5	5.4.6	Carbon steel self-drilling Screw (Ø 19) S-MD 65 GZ	44
<b>1.8</b>	Sandwich panel siding	5	5.4.7	Colored carbon steel overlapping screw, chipless (Ø 14, 16) S-MS 41 Z/51 Z RAL	45
<b>1.9</b>	Insulated siding with steel or aluminium sheet, vertical	6	5.4.8	Colored carbon self-drilling Screw (Ø 16) S-MD 51 Z RAL	46
<b>1.10</b>	Insulated siding with steel or aluminium sheet, horizontal	6	5.4.9	Colored carbon self-drilling Screw (Ø 16) S-MD 51 LZ RAL	47
<b>1.11</b>	Light ventilated facade, 1 Layer	7	5.4.10	Colored carbon self-drilling Screw (Ø 16) S-MD 53 Z RAL	48
<b>1.12</b>	Light ventilated facade, 2 Layer	7	5.4.11	Colored carbon self-drilling Screw (Ø 16) S-MD 55 GZ RAL	49
<b>2.1</b>	Leak-proof connections without swarf on the roof and wall	8	<b>5.5</b>	Carbon steel self-drilling screw S-MD 01 ZW, S-MD 03 ZW, S-MD 05 ZW	50
<b>2.2</b>	Make reliable, high-speed screw fastenings without tip failure, even in high-strength steel	10	<b>6.1</b>		
<b>2.3</b>	Screwdriving at high speed	11	6.1.1	Stainless steel overlapping Screw, chipless S-MS 01 S	53
<b>2.4</b>	Mobile power for decking and siding	12	6.1.2	Stainless steel self-drilling screw S-MD 01 S	54
<b>3.1</b>	Selection of the right screw	15-16	6.1.3	Stainless steel self-drilling screw S-MD 03 S	55
<b>3.2</b>	Screw type	17	6.1.4	Stainless steel self-drilling screw S-MD 05 S	56
<b>3.3</b>	Screw head & recess	17	<b>6.2</b>		
<b>3.4</b>	Definition of the screw length (L)	18	6.2.1	Stainless steel overlapping screw S-MS 41 S/51 S	57
3.4.1	Definition of the drilling performance (DC)	18	6.2.2	Stainless steel self-drilling screw (Ø 16) S-MD 51 S	58
3.4.2	Calculating the fastening height (MF)	18	6.2.3	Stainless steel self-drilling screw (Ø 19) S-MD 61 S	59
<b>3.5</b>	Services offered	19	6.2.4	Stainless steel self-drilling screw (Ø 16, 19, 22) S-MD LS	60
<b>3.6</b>	Hilti Screw Nomenclature	19	6.2.5	Stainless steel self-drilling screw (Ø 14) S-MD 43 S	61
<b>4.1</b>	Corrosion protection	23	6.2.6	Stainless steel self-drilling screw (Ø 16) S-MD 53 S	62
<b>4.2</b>	Test procedures and evaluation of corrosion protection systems	24	6.2.7	Stainless steel self-drilling screw (Ø 19) S-MD 63 S	63
<b>4.3</b>	Selecting the right corrosion protection for anchors, powder-actuated fasteners and screws	25	6.2.8	Stainless steel self-drilling screw (Ø 22) S-MD 73 S	64
<b>4.4</b>	Environment categories	26	6.2.9	Stainless steel self-drilling screw (Ø 16) S-MD 55 S	65
<b>4.5</b>	Material and Corrosion resistance data for steel/metal screws	27	6.2.10	Stainless steel self-drilling screw (Ø 19) S-MD 65 S	66
<b>5.1</b>	Carbon steel overlapping screw, chipless S-MS 01 Z	31	6.2.11	Stainless steel self-drilling screw (Ø 22) S-MD 75 S	67
5.1.1	Carbon steel self-drilling screw S-MD 01 Z	32	<b>6.3</b>		
5.1.2	Carbon steel self-drilling screw S-MD 03 Z	33	6.3.1	Stainless steel self-drilling pan head screw S-MD 01 PS	68
5.1.3	Carbon steel self-drilling screw S-MD 05 GZ	34	6.3.2	Stainless steel self-drilling pan head screw S-MD 03 PS	69
<b>5.2</b>	Carbon steel self-drilling with pressed-on flange S-MD/MDU 21 Z	35	6.3.3	Stainless steel self-drilling pan head screw S-MD 05 PS	70
5.2.1	Carbon steel self-drilling with pressed-on flange S-MD 23 Z	36	<b>6.4</b>		
5.2.2	Carbon steel self-drilling with pressed-on flange S-MD 25 GZ	37	6.4.1	Stainless self-drill pan head screw (Ø 12) S-MD 31 PS	71
<b>5.3</b>	Collated carbon steel self-drilling screw S-MS/MD/MDU	38	6.4.2	Stainless self-drill pan head screw (Ø 12) S-MD 33 PS	72
			6.4.3	Stainless self-drill pan head screw (Ø 12) S-MD 35 PS	73
			<b>6.5</b>	Stainless steel self-drilling screw S-AD 01 S/SS	74
			<b>7.1</b>	Carbon steel sandwich panel screw (Ø 19) S-CDW 61 C	77
			<b>7.2</b>	Carbon steel sandwich panel screw (Ø 16) S-CD 53 C	78
			<b>7.3</b>	Carbon steel sandwich panel screw (Ø 19) S-CD 63 C	79
			<b>7.4</b>	Carbon steel sandwich panel screw (Ø 16) S-CD 55 C	80
			<b>7.5</b>	Carbon steel sandwich panel screw (Ø 19) S-CD 65 C	81
			<b>8.1</b>	Stainless steel sandwich panel screw (Ø 16) S-CDW 51 S	83
			<b>8.2</b>	Stainless steel sandwich panel screw (Ø 19) S-CDW 61 S	84
			<b>8.3</b>	Stainless steel sandwich panel screw (Ø 22) S-CDW 71 S	85
			<b>8.4</b>	Stainless steel sandwich panel screw (Ø 16) S-CD 53 S	86
			<b>8.5</b>	Stainless steel sandwich panel screw (Ø 19) S-CD 63 S	87
			<b>8.6</b>	Stainless steel sandwich panel screw (Ø 22) S-CD 73 S	88
			<b>8.7</b>	Stainless steel sandwich panel screw (Ø 16) S-CD 55 S	89
			<b>8.8</b>	Stainless steel sandwich panel screw (Ø 19) S-CD 65 S	90
			<b>8.9</b>	Stainless steel sandwich panel screw (Ø 22) S-CD 75 S	91

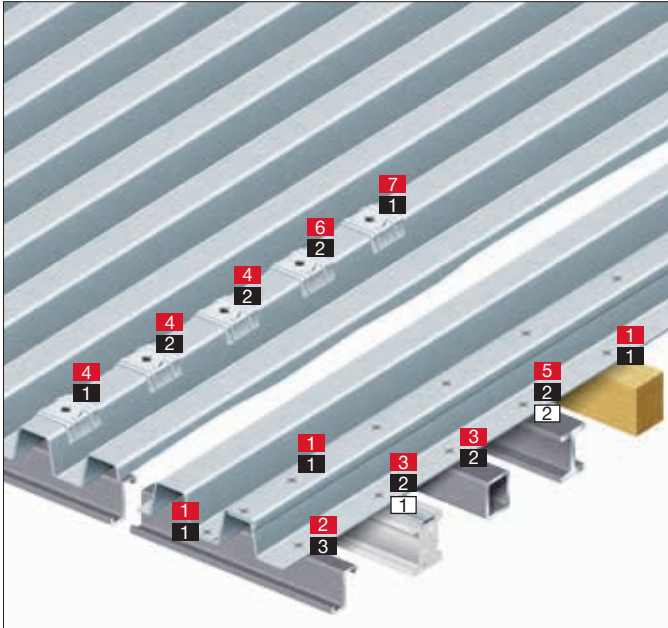
<b>9.1</b>	Galvanized self-tapping screws (Ø16 mm) S-MP 53 Z	93	<b>15.1</b>	Battery metal construction screwdriver (Li-Ion) ST 1800-A22	137
<b>9.2</b>	Galvanized self-tapping screws (Ø16 mm) S-MP 52 Z	94	<b>15.2</b>	Metal construction screwdriver ST 1800	137
<b>10.1</b>	Stainless steel self-tapping screws (Ø16 mm) S-MP 53 S	97	<b>15.3</b>	Accessories	138
<b>10.2</b>	Stainless steel self-tapping screws (Ø19 mm) S-MP 63 S	98	<b>15.4</b>	Nut setter S-NS (C)	138
<b>10.3</b>	Stainless steel self-tapping screws (Ø22 mm) S-MP 73 S	99	<b>15.5</b>	Magnetic nut setter S-NS (M)	139
<b>10.4</b>	Stainless steel self-tapping screws (Ø16 mm) S-MP 52 S	100	<b>15.6</b>	System nut setter S-SY	139
<b>10.5</b>	Stainless steel self-tapping screws (Ø19 mm) S-MP 62 S	101	<b>15.7</b>	Bit and bit holder	139
<b>10.6</b>	Stainless steel self-tapping screws (Ø22 mm) S-MP 72 S	102	<b>15.8</b>	Bit and bit holder	140
<b>10.7</b>	Stainless steel self-tapping screws (Ø16 mm) S-MP 54 S	103	<b>15.9</b>	Special cartridges für DX 76	140
<b>10.8</b>	Stainless steel self-tapping screws (Ø19 mm) S-MP 64 S	104	<b>15.10</b>	Special cartridges for the DX 860	140
<b>10.9</b>	Stainless steel self-tapping screws (Ø22 mm) S-MP 74 S	105	<b>16.1</b>	FAQs (frequently asked questions) about the approvals	143
<b>11.1</b>	Galvanized carbon steel self-drilling wing tip screw S-WD 11 Z M 107	107	<b>16.2 Overview approval</b>		
<b>11.2</b>	Galvanized steel self-drilling wing tip screw S-WD 11 Z	108	16.2.1	ETA-10/0182 – Fastening screws for metal members and sheeting	144
<b>11.3</b>	Coated steel self-drilling wing tip screw S-WD 11C	109	16.2.2	ETA-13/0179 – Fastening screws for sandwich panels	145
<b>11.4</b>	Coated steel self-drilling wing tip screw S-WD 13 C	110	16.2.3	ETA-12/0057 – Fasteness for systems of mech. fastened flexible roof waterproofing membranes	145
<b>11.5</b>	Coated steel self-drilling wing tip screw S-WD 15 C	111	16.2.4	Z-14.1-4 – German approval for fastening screws for steel members and sheeting	146
<b>12.1</b>	Carbon steel flat roof screw S-IT 01 C 4.8	113	16.2.5	Z-14.1-537 – German approval for fastening screws for steel members and sheeting	146
<b>12.2</b>	Carbon steel flat roof screw S-IT 01 C 6.3	114	16.2.6	Certification report P-BWU02-148009 – Fastening screws for external ventilated facade cladding according to DIN 18516-1	146
<b>12.3</b>	Load distribution plates S-IW	115	<b>16.3</b>	ETA-10/0182 – Fastening screws for metal members and sheeting	147
<b>12.4</b>	Flat roof fastener (Ø 40 mm) S-IDP 4.8C/40	116	<b>16.4</b>	ETA-13/0179 – Fastening screws for sandwich panels	185
<b>12.5</b>	Flat roof fastener (80 mm x 40 mm) S-IDP 4.8C/8040	117	<b>16.5</b>	ETA-12/0057 – Fasteness for systems of mechanically fastened flexible roof waterproofing membranes	195
<b>12.6</b>	Flat roof fastener (Ø 40 mm) S-IDP 6.7C/40	118	<b>16.6</b>	Z-14.1-4 – German approval for fastening screws for steel members and sheeting	209
<b>12.7</b>	Flat roof fastener (80 mm x 40 mm) S-IDP 6.7C/8040	119	<b>16.7</b>	Z-14.1-537 – German approval for fastening screws for steel members and sheeting	215
<b>12.8</b>	Flat roof fastener (Ø 40 mm) S-IDP 4.8S/40	120	<b>16.8</b>	Certification report P-BWU02-148009 – Fastening screws for external ventilated facade cladding according to DIN 18516-1	228
<b>12.9</b>	Flat roof fastener (80 mm x 40 mm) S-IDP 4.8S/8040	121	<b>16.9 Technical data for screws without approval</b>		
<b>13.1</b>	Saddle washer for trapezoidal profile S-SWTR	123	S-MD 25Z 5.5xL	carbon steel self-drilling screw	235
<b>13.2</b>	Saddle washer for trapezoidal profile S-SWTR RAL	124	S-MD 21Z 5.5xL	carbon steel self-drilling screw	235
<b>13.3</b>	Saddle washer for wave profile S-SWWA	125	S-MD 51LZ 4.8xL	carbon steel self-drilling screw	236
<b>13.4</b>	Which saddle washer is suitable for which profile?	126	S-MD 01ZW 5.5xL	carbon steel self-drilling screw	236
<b>13.5</b>			S-MD 05ZW 5.5xL	carbon steel self-drilling screw	237
13.5.1	S-AW Sealing washer application example	129	S-MD 03ZW 5.5xL	carbon steel self-drilling screw	237
13.5.2	Product Data	129	S-MD 01S 4.8xL	stainless steel self-drilling screw	238
13.5.3	Dimensions	130	S-MD 01LS 5.5xL	stainless steel self-drilling screw	238
13.5.4	Sealing washers for screws with „PS“ (S-MD)	130	S-MD 03S 6.3xL	stainless steel self-drilling screw	239
13.5.5	Sealing washer for screws without „PS“ (S-MD, S-MP)	130	S-MD 03S 5.5xL	stainless steel self-drilling screw	239
13.5.6	Sealing washer for screws S-MS	131	S-MD 05SxL	stainless steel self-drilling screw	240
13.5.7	Sealing washer for screws panel (S-CD/S-CDW)	131	S-CDW 61C 6.5xL	carbon steel self-drilling screw	240
<b>14.1</b>			S-CD 65C 5.5xL	carbon steel self-drilling screw	241
	Siding and decking nail X-ENP X-ENP Nail	133	S-CD 63C 5.5xL	carbon steel self-drilling screw	241
	X-ENP Nail, collated for DX 76 MX/DX 76 PTR	133	S-CD 63S 5.5xL/		
	X-ENP Nail, collated for DX 860-ENP	133	S-CD 73S 5.5xL	stainless steel self-drilling screw	242
<b>14.2</b>			S-CD 65S 5.5xL/		
	Sealing cap for ENP SDK2/PDK2	134	S-CD 75S 5.5xL	stainless steel self-drilling screw	242
<b>14.3</b>			S-CDW 61S 6.5xL/		
	Setting tool for sealing caps SDK2/PDK2	134	S-CDW 71S 6.5xL	stainless steel self-drilling screw	243
<b>14.4</b>			S-MP 53Z 6.5xL	carbon steel self-tapping screw	244
	Sheet metal nail X-ENP2K	135	S-MP 52Z 6.3xL	carbon steel self-tapping screw	244
	X-ENP2K Nail	135	S-WD 13C 4.8xL; 5.5xL	carbon steel self-drilling wing screw	245
	X-ENP2K Nagel, collated	135	S-WD 11C 3.8xL; 4.2xL	carbon steel self-drilling wing screw	245
			S-WD 13C 6.3xL	carbon steel self-drilling wing screw	246
			S-WD 15C 5.5xL	carbon steel self-drilling wing screw	246
			<b>16.10</b>		
				ETA-04-0101 X-ENP-19L15 vom 01.03.2013	247



## Content

	Page
<b>1.1</b>	
Uninsulated roof with steel or aluminium sheet	2
<b>1.2</b>	
Insulated roof with steel or aluminium sheet	2
<b>1.3</b>	
Insulated flatroof	3
<b>1.4</b>	
Sandwich roof	3
<b>1.5</b>	
Eaves	4
<b>1.6</b>	
Finishing at corners and edges	4
<b>1.7</b>	
Uninsulated siding with steel or aluminium sheet	5
<b>1.8</b>	
Sandwich panel siding	5
<b>1.9</b>	
Insulated siding with steel or aluminium sheet, vertical	6
<b>1.10</b>	
Insulated siding with steel or aluminium sheet, horizontal	6
<b>1.11</b>	
Light ventilated facade, 1 Layer	7
<b>1.12</b>	
Light ventilated facade, 2 Layer	7

## 1.1 Uninsulated roof with steel or aluminium sheet



### Self-drilling screws

<b>1</b>	S-MS 51Z	p. 39
	S-MD 51Z	p. 40
	S-MS 51S	p. 57
	S-MD 51S	p. 58
	S-MD 61S	p. 59
<b>2</b>	S-MD 51LZ	p. 41
	S-MD 53Z	p. 42
	S-MD 51LS	p. 60
<b>3</b>	S-MD 53Z	p. 42
	S-MD 53S	p. 62
	S-MD 63S	p. 63
	S-MD 73S	p. 64
<b>4</b>	S-CD 53C	p. 78
	S-CD 63C	p. 79
	S-CD 53S	p. 86
	S-CD 63S	p. 87
	Saddle washer	p. 123
	S-CD 73S	p. 88
<b>5</b>	S-MD 55GZ	p. 43
	S-MD 65GZ	p. 44
	S-MD 55S	p. 65
	S-MD 65S	p. 66
	S-MD 75S	p. 67
<b>6</b>	S-CD 55C	p. 80
	S-CD 65C	p. 81
	S-CD 55S	p. 89
	S-CD 65S	p. 90
	Saddle washer	p. 123
	S-CD 75S	p. 91

<b>7</b>	S-CDW 61C	p. 77
	S-CDW 51S	p. 83
	S-CDW 61S	p. 84
	Saddle washer	p. 123
	S-CDW 71S	p. 85

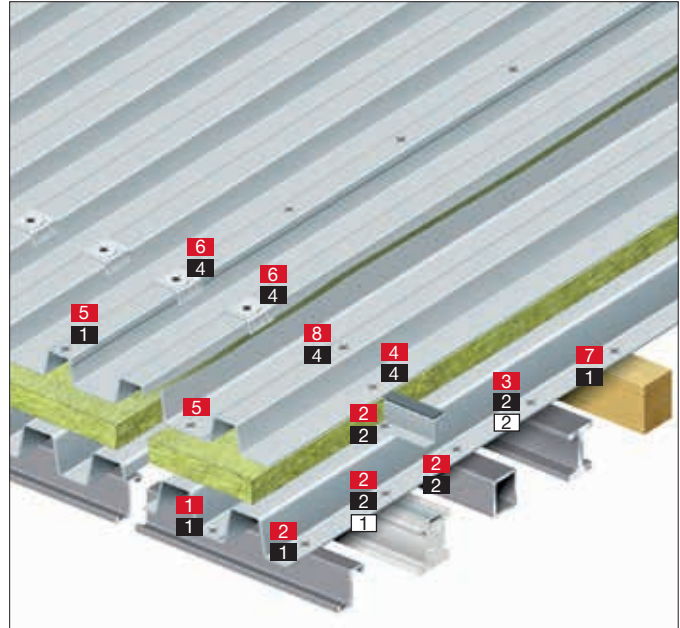
### Self-tapping screws

<b>1</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97
	S-MP 63S	p. 98
	S-MP 73S	p. 99
	Saddle washer	p. 123
<b>2</b>	S-MP 52Z	p. 94
	S-MP 52S	p. 100
	S-MP 62S	p. 101
	S-MP 54S	p. 103
	S-MP 64S	p. 104
	Saddle washer	p. 123
	S-MP 72S	p. 102
	S-MP 74S	p. 105

### DX-application

<b>1</b>	X-ENP2K	p. 135
	SDK2/PDK2	p. 134
<b>2</b>	X-ENP	p. 133
	SDK2/PDK2	p. 134

## 1.2 Insulated roof with steel or aluminium sheet



### Self-drilling screws

<b>1</b>	S-MS 01Z	p. 31
	S-MD 01Z	p. 32
	S-MDU 21Z	p. 35
	S-MD/MS M	p. 38
<b>2</b>	S-MD 21Z	p. 35
	S-MD 23Z	p. 36
<b>3</b>	S-MD 25GZ	p. 37
	S-MD 05GZ	p. 34
<b>4</b>	S-MD 51LZ	p. 41
	S-MD 53Z	p. 42
	S-MD 51LS	p. 60
	S-MD 61LS	p. 60
	S-MD 71LS	p. 60
<b>5</b>	S-MS 51Z	p. 39
	S-MD 51Z	p. 40
	S-MS 51S	p. 57
	S-MD 51S	p. 58
	S-MD 61S	p. 59
<b>6</b>	S-CD 53C	p. 78
	S-CD 63C	p. 79
	S-CD 53S	p. 86
	S-CD 63S	p. 87
	Saddle washer	p. 123
<b>7</b>	S-MD 01S	p. 54
	S-MD 51S	p. 58
<b>8</b>	S-CD 73S	p. 88

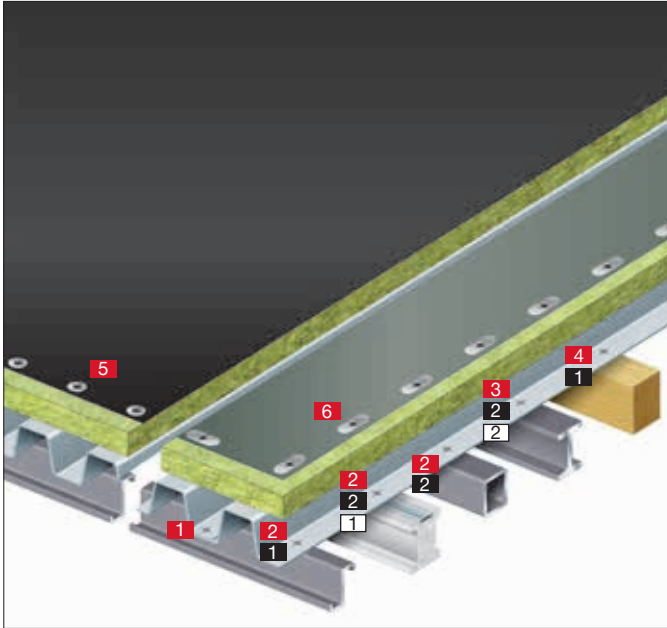
### Self-tapping screws

<b>1</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97
<b>2</b>	S-MP 52Z	p. 94
	S-MP 52S	p. 100
	S-MP 54S	p. 103
	S-MP 53Z	p. 93
	S-MP 52Z	p. 94
<b>4</b>	S-MP 52S	p. 100
	S-MP 62S	p. 101
	S-MP 72S	p. 102
	S-MP 54S	p. 103
	S-MP 64S	p. 104
	S-MP 74S	p. 105
	Saddle washer	p. 123

### DX-application

<b>1</b>	X-ENP2K	p. 135
<b>2</b>	X-ENP	p. 133

### 1.3 Insulated flatroof



**Self-drilling screws**

<b>1</b>	S-MS 01Z	p. 31
	S-MD 01Z	p. 32
	S-MDU 21Z	p. 35
	S-MD/MS M	p. 38
<b>2</b>	S-MD 21Z	p. 35
	S-MD 23Z	p. 36
<b>3</b>	S-MD 25GZ	p. 37
	S-MD 05GZ	p. 34
<b>4</b>	S-MD 01S	p. 54
	S-MD 51S	p. 58
<b>5</b>	S-IDP 4.8C/40	p. 116
	S-IDP 6.7C/40	p. 118
	S-IDP 4.8S/40	p. 120
<b>6</b>	S-IDP 4.8C/8040	p. 117
	S-IDP 6.7C/8040	p. 119
	S-IDP 4.8S/8040	p. 121

**Self-tapping screws**

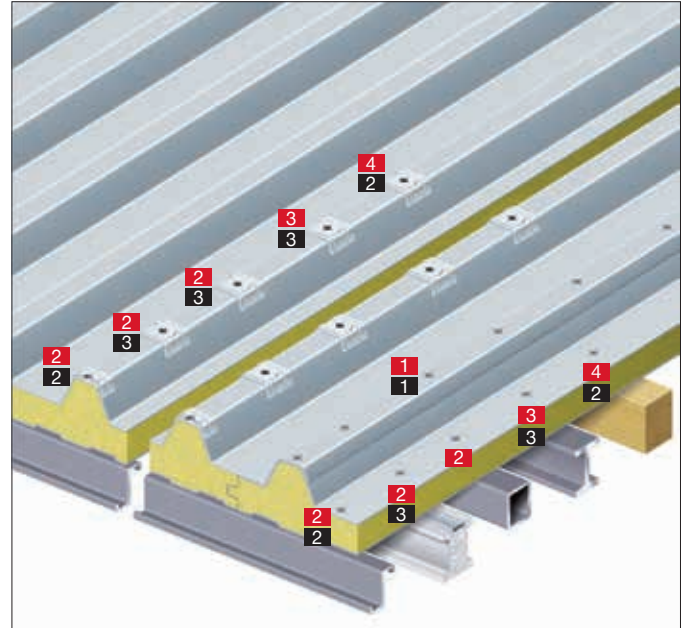
<b>1</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97
<b>2</b>	S-MP 52Z	p. 94
	S-MP 52S	p. 100
	S-MP 54S	p. 103

**DX-application**

<b>1</b>	X-ENP2K	p. 135
<b>2</b>	X-ENP	p. 133

### 1.4 Sandwich panel roof

1



**Self-drilling screws**

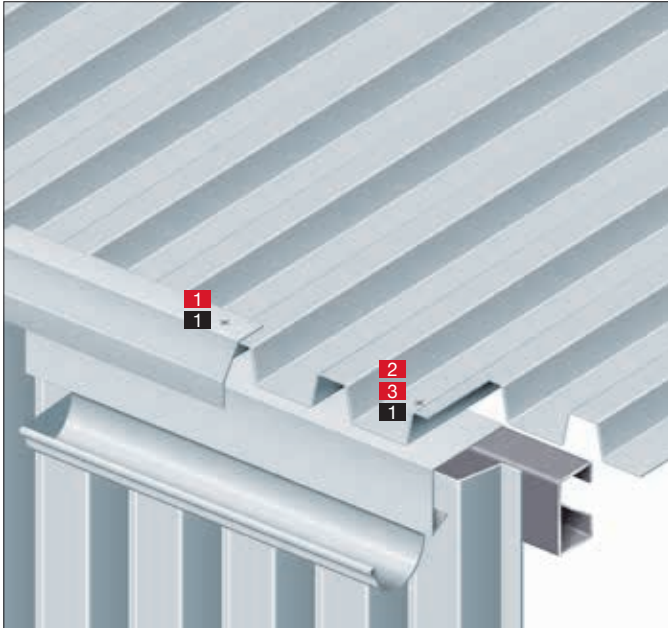
<b>1</b>	S-MS 51Z	p. 39
	S-MD 51Z	p. 40
	S-MS 51S	p. 57
	S-MD 51S	p. 58
	S-MD 61S	p. 59
<b>2</b>	S-CD 53C	p. 78
	S-CD 63C	p. 79
	S-CD 53S	p. 86
	S-CD 63S	p. 87
	Saddle washer	p. 123
	S-CD 73S	p. 88
<b>3</b>	S-CD 55C	p. 80
	S-CD 65C	p. 81
	S-CD 55S	p. 89
	S-CD 65S	p. 90
	Saddle washer	p. 123
	S-CD 75S	p. 91
<b>4</b>	S-CDW 61C	p. 77
	S-CDW 51S	p. 83
	S-CDW 61S	p. 84
	Saddle washer	p. 123
	S-CDW 71S	p. 85

**Self-tapping screws**

<b>1</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97
<b>2</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97
	S-MP 63S	p. 98
	Saddle washer	p. 123
	S-MP 73S	p. 99
<b>3</b>	S-MP 52Z	p. 94
	S-MP 52S	p. 100
	S-MP 62S	p. 101
	S-MP 54S	p. 103
	S-MP 64S	p. 104
	Saddle washer	p. 123
	S-MP 72S	p. 102
	S-MP 74S	p. 105

**1**

**1.5  
Eaves**



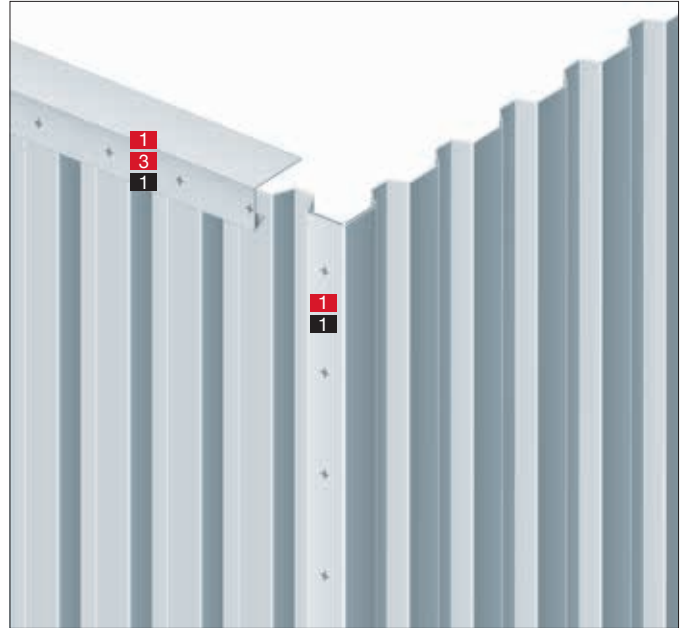
**Self-drilling screws**

<b>1</b>	S-MS 41Z	p. 39
	S-MS 51Z	p. 39
	S-MD 51Z	p. 40
	S-MS 41S	p. 57
	S-MS 51S	p. 57
	S-MD 51S	p. 58
<b>2</b>	S-MD 51LZ	p. 41
	S-MD 53Z	p. 42
	S-MD 51LS	p. 60
<b>3</b>	S-MD 53Z	p. 42
	S-MD 43S	p. 61
	S-MD 53S	p. 62

**Self-tapping screws**

<b>1</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97

**1.6  
Finishing at corners and edges**



**Self-drilling screws**

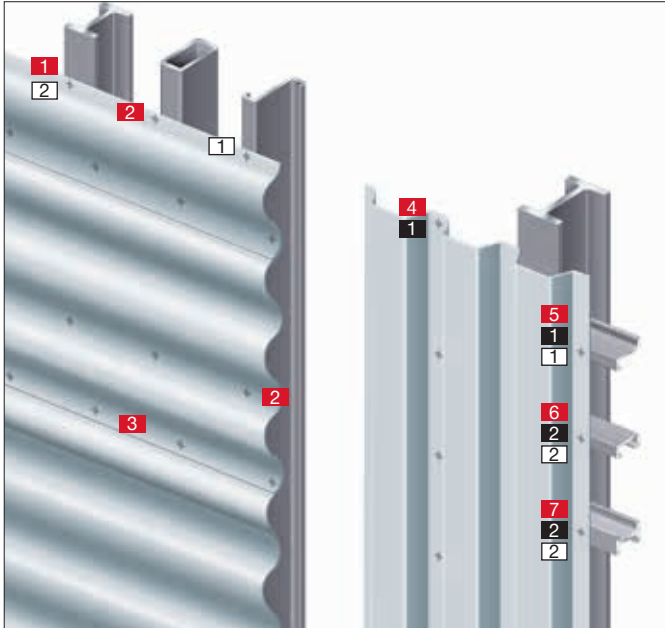
<b>1</b>	S-MS 41Z	p. 39
	S-MS 51Z	p. 39
	S-MD 51Z	p. 40
	S-MS 41S	p. 57
	S-MS 51S	p. 57
	S-MD 51S	p. 58
<b>2</b>	S-MD 51LZ	p. 41
	S-MD 53Z	p. 42
	S-MD 51LS	p. 60
<b>3</b>	S-MD 53Z	p. 42
	S-MD 43S	p. 61
	S-MD 53S	p. 62

**Self-tapping screws**

<b>1</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97



## 1.7 Uninsulated siding with steel or aluminium sheet



### Self-drilling screws

<b>1</b>	S-MD 35PS	p. 73
<b>2</b>	S-MD 33PS	p. 72
	S-MD 43S	p. 61
<b>3</b>	S-MD 31PS	p. 71
	S-MS 41Z	p. 39
<b>4</b>	S-MS 41Z	p. 39
	S-MS 51Z	p. 39
	S-MD 51Z	p. 40
	S-MS 41S	p. 57
	S-MS 51S	p. 57
<b>5</b>	S-MD 51LZ	p. 41
	S-MD 53Z	p. 42
	S-MD 51LS	p. 60
<b>6</b>	S-MD 53Z	p. 42
	S-MD 53S	p. 62
	S-MD 63S	p. 63
	S-MD 73S	p. 64
<b>7</b>	S-MD 55GZ	p. 43
	S-MD 65GZ	p. 44
	S-MD 55S	p. 65

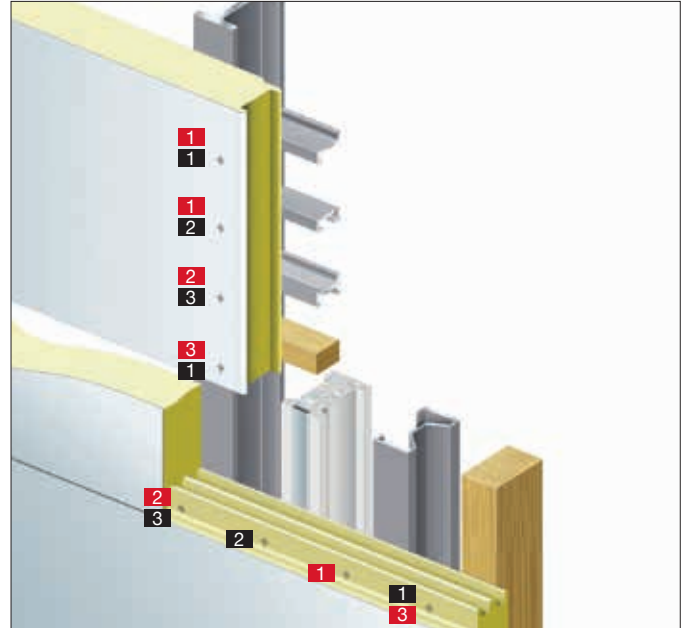
### Self-tapping screws

<b>1</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97
<b>2</b>	S-MP 52Z	p. 94
	S-MP 52S	p. 100
	S-MP 54S	p. 103

### DX-application

<b>1</b>	X-ENP2K	p. 135
	SDK2/PDK2	p. 134
<b>2</b>	X-ENP	p. 133
	SDK2/PDK2	p. 134

## 1.8 Sandwich panel siding



### Self-drilling screws

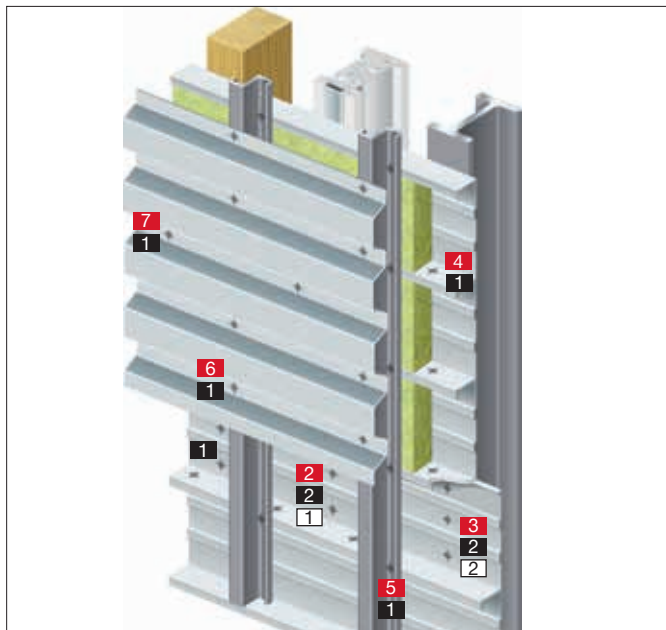
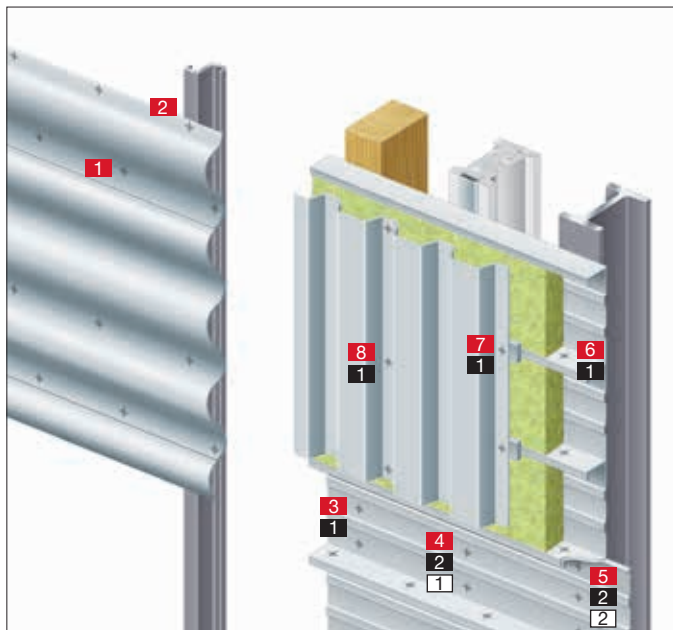
<b>1</b>	S-CD 53C	p. 78
	S-CD 63C	p. 79
	S-CD 53S	p. 86
	S-CD 63S	p. 87
<b>2</b>	S-CD 55C	p. 80
	S-CD 65C	p. 81
	S-CD 55S	p. 89
	S-CD 65S	p. 90
<b>3</b>	S-CDW 61C	p. 77
	S-CDW 51S	p. 83
	S-CDW 61S	p. 84

### Self-tapping screws

<b>1</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97
	S-MP 63S	p. 98
<b>2</b>	S-MP 52Z	p. 94
	S-MP 52S	p. 100
	S-MP 62S	p. 101
<b>3</b>	S-MP 52Z	p. 94
	S-MP 54S	p. 103
	S-MP 64S	p. 104

**1** **1.9 Insulated siding with steel or aluminium sheet, vertical**

**1.10 Insulated siding with steel or aluminium sheet, horizontal**



**Self-drilling screws**

<b>1</b>	S-MS 41Z	p. 39
	S-MD 31PS	p. 71
<b>2</b>	S-MD 31PS	p. 71
	S-MD 33PS	p. 72
	S-MD 43S	p. 61
<b>3</b>	S-MD 01PS	p. 68
	S-MD 31PS	p. 71
	S-MD 01S	p. 54
	S-MD 51S	p. 58
<b>4</b>	S-MD 21Z	p. 35
	S-MD 23Z	p. 36
<b>5</b>	S-MD 25GZ	p. 37
	S-MD 05GZ	p. 34
<b>6</b>	S-MS 01Z	p. 31
	S-MD 01Z	p. 32
	S-MDU 21Z	p. 35
<b>7</b>	S-MD 51LZ	p. 41
	S-MD 53Z	p. 42
	S-MD 51LS	p. 60
	S-MD 53S	p. 62

<b>8</b>	S-MS 41Z	p. 39
	S-MS 51Z	p. 39
	S-MD 51Z	p. 40
	S-MS 41S	p. 57
	S-MS 51S	p. 57
	S-MD 51S	p. 58
	S-MD 51LS	p. 60

**Self-tapping screws**

<b>1</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97
<b>2</b>	S-MP 52Z	p. 94
	S-MP 52S	p. 100
	S-MP 54S	p. 103

**DX-application**

<b>1</b>	X-ENP2K	p. 135
<b>2</b>	X-ENP	p. 135

**Self-drilling screws**

<b>1</b>	S-MD 01PS	p. 68
	S-MD 31PS	p. 71
	S-MD 01S	p. 54
	S-MD 51S	p. 58
<b>2</b>	S-MD 21Z	p. 35
	S-MD 23Z	p. 36
<b>3</b>	S-MD 25GZ	p. 37
	S-MD 05GZ	p. 34
<b>4</b>	S-MS 01Z	p. 31
	S-MD 01Z	p. 32
	S-MDU 21Z	p. 35
<b>5</b>	S-MD 01Z	p. 32
	S-MD 03Z	p. 33
	S-MD 51Z	p. 40
	S-MD 51LZ	p. 41
	S-MD 53Z	p. 42
<b>6</b>	S-MD 51LZ	p. 41
	S-MD 53Z	p. 42
	S-MD 51LS	p. 60
	S-MD 53S	p. 62
<b>7</b>	S-MS 41Z	p. 39
	S-MS 51Z	p. 39
	S-MD 51Z	p. 40
	S-MS 41S	p. 57
	S-MS 51S	p. 57
	S-MD 51S	p. 58
	S-MD 51LS	p. 60

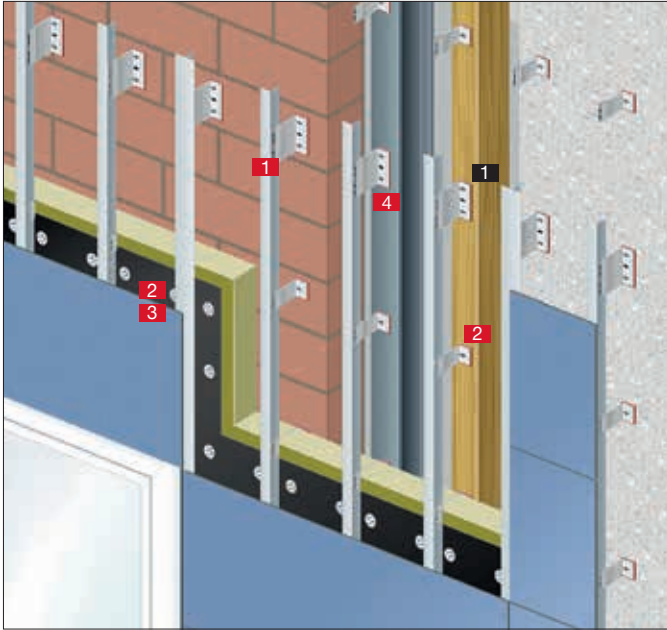
**Self-tapping screws**

<b>1</b>	S-MP 53Z	p. 93
	S-MP 53S	p. 97
<b>2</b>	S-MP 52Z	p. 94
	S-MP 52S	p. 100
	S-MP 54S	p. 103

**DX-application**

<b>1</b>	X-ENP2K	p. 135
<b>2</b>	X-ENP	p. 133

**1.11  
Light ventilated facade  
1 Layer**



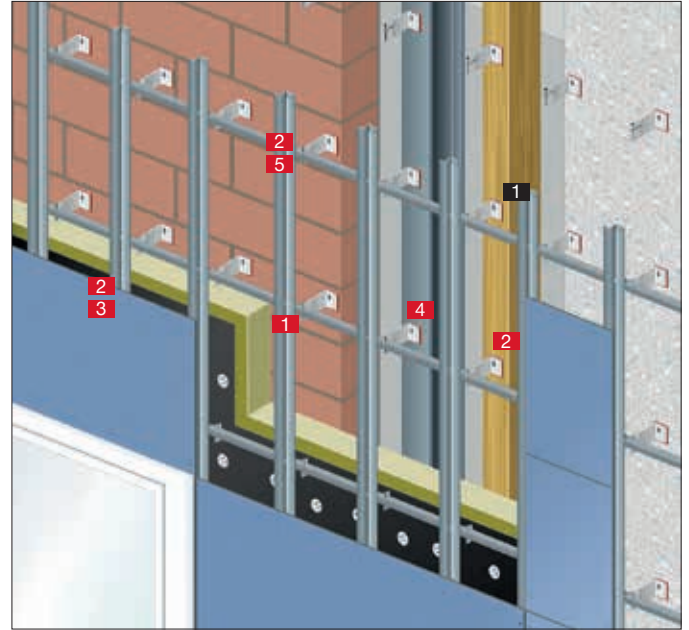
**Self-drilling screws**

<b>1</b>	S-AD 01S	p. 74
	S-AD 01SS	p. 74
<b>2</b>	S-MD 31PS	p. 71
<b>3</b>	S-MD 33PS	p. 72
<b>4</b>	S-MD 55S	p. 65

**Self-tapping screws**

<b>1</b>	S-MP 53S	p. 97
----------	----------	-------

**1.12  
Light ventilated facade  
2 Layer**



**Self-drilling screws**

<b>1</b>	S-AD 01S	p. 74
	S-AD 01SS	p. 74
<b>2</b>	S-MD 31PS	p. 71
<b>3</b>	S-MD 33PS	p. 72
<b>4</b>	S-MD 55S	p. 65
<b>5</b>	S-MD 51LS	p. 60

**Self-tapping screws**

<b>1</b>	S-MP 53S	p. 97
----------	----------	-------

## Content

**2**

<b>2.1</b>		Page
	Leak-proof connections without swarf on the roof and wall	9
<b>2.2</b>		
	Make reliable, high-speed screw fastenings without tip failure, even in high-strength steel	10
<b>2.3</b>		
	Screwdriving at high speed	11
<b>2.4</b>		
	Mobile power for decking and siding	12



## 2.1 Leak-proof connections without swarf on the roof and wall

The new overlap screw with sealing washer S-MS combines a new „PS“ function for thin clamping thicknesses too, thanks to technology for non-cutting screwdriving.

In 2008, Hilti revolutionized the market with the first non-cutting screw. This technology is now also available as a stainless version and with a sealing washer. The new S-MS is perfectly designed for the assembly of steel or aluminum packages measuring up to 2x 1.0 mm.

Hilti's many years of experience with this cutting-edge technology allows users to work with very little contact pressure, especially in wall applications.

The high hexagon head improves the user's guide and power transmission, thus preventing any damage to the surface as a result of slipping.



„PS“ function for thin material thicknesses due to optimized undercut geometry.

Once Hilti had launched the „PS“ function for self-drilling screws with a drilling capacity of more than 3 mm on the market, there was high demand for this function in thinner sheet thicknesses too. With a special undercut, Hilti is now filling this gap too by offering packages from 2x 0.4 mm to 2x 1.0 mm. This solution combines a high degree of application safety, screw connection impermeability, simple and fast handling as well as high positioning comfort.

It does not matter if the screw is overtorqued or fastened in a torque-oriented manner. The sealing washer is perfectly pressed and leak-proof at all times.



2



## 2.2 Make reliable, high-speed screw fastenings without tip failure, even in high-strength steel

2

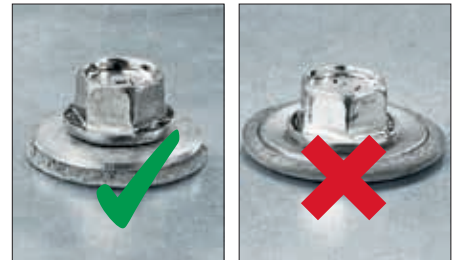
Hilti screw fastening technology sets new standards because, on the one hand, virtually no drill point failure occurs even in high-strength steel with a thickness of up to 15 mm and, on the other, because sealing washers are always perfectly and reliably compressed even when the screws are driven at high speed.

We offer an immediate solution for all of your screw fastening applications where a drilling capacity of greater than 3 mm is required.



### „PS” sealing through customized below-head geometry

The sealing washers at screws on decking, siding and facades are often over compressed. Excessive pressure between the screw head and the sheets fastened causes fine cracks to occur in the EPDM sealing washer. This leads to leakage through the outer skin of the building at the fastening point and thus to an increase in the amount of subsequent remedial work required. The innovative and patented “PS” feature incorporated in all Hilti self-drilling screws with a drilling capacity of more than 3 mm provides a simple solution to the problem of over compression. Hilti screws with this new feature can be identified by the “PS” logo on the package.



### The Hilti „RT“-drill point for fast, reliable screwdriving characteristics

Burned out or broken drill points are not only a thorn in the side of the user. The remedial work required is costly and time-consuming. Thanks to the new, patented, RT wave-form cutting edge, burned out drill points become a thing of the past, even in high-strength S355 steel. Rapid removal of the drilling chips allows the screw to penetrate the base material more quickly and prevents point burn-out in materials with a thickness of up to 15 mm. All screws featuring the new technology carry the “RT” logo on the package.



## 2.3 Screwdriving at high speed

The S-MS is clearly much more than “just a screw”. It displaces the metal around it as it penetrates and therefore creates no troublesome metal chips. In its role as a part of the system comprising the SDT 5 stand-up tool and the new ST 1800-A22 cordless metal construction screwdriver, the S-MS cuts screw fastening time by up to 60 percent.

The Hilti S-MS is available in single or collated form and is perfectly matched to the other components of the system. High-speed fastening is possible because the screws, the screwdriver and the stand-up tool all work together in perfect harmony, achieving a considerable productivity increase over conventional screw fastening systems. Screwdriving becomes a new, high-speed experience!

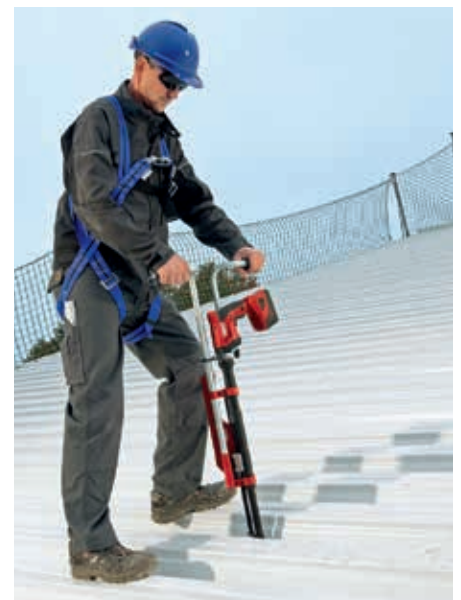
The innovative screw-fastening technology incorporated in this self-piercing overlap screw brings many advantages. The metal around the screw, for instance, is simply displaced as it penetrates. As no metal chips are formed there’s no need for subsequent cleaning up and the risk of discoloration due to corrosion of metal chips can be ruled out.

Because metal is simply displaced as the screw penetrates, the screw hole remains surrounded by a greater volume of metal, resulting in a higher permissible loading capacity compared to conventional screw fastenings. As a result, the S-MS screw achieves best-in-class load values.

The special “ballistic” shape of the screw tip prevents slipping when starting. Maximum reliability is thus guaranteed, even when driving screws at an angle or when the working surface is wet.

The ergonomically designed SDT 5 stand-up tool for use with collated screws lets the operator work in a relaxed, upright and thus less-tiring standing position, even for long periods. Thanks to its pivoting nose section, the tool can be used comfortably on trapezoidal profile sheets with deep, narrow corrugations.

The third member of this screw fastening system, and ideal for the job, is the new ST 1800-A22 cordless metal construction screwdriver.



## 2.4 Mobile power for decking and siding

2

With the power of a corded tool, the new Hilti ST 1800-A22 cordless metal construction screwdriver makes light work of the toughest jobs, even on thick, solid steel beams. With Hilti's comprehensive range of screws and matching accessories it forms an unrivalled cordless system that's unique in this field. Go mobile and raise your productivity – with the Hilti Screw Fastening System and this outstanding cordless tool from the Hilti 22 volt range.



### With the power of a corded tool, the ST 1800-A22 makes light work of the toughest jobs

Ideal for driving screws in sheet metal or aluminium structures and for fastening profile metal sheets to steel or timber supports, the red dot design award-winning ST 1800-A22 brings mobile power to decking and siding work. Thanks also to the Hilti ST-SG screw guide, sandwich panel screws can now be driven more efficiently and reliably than ever before. Developed specially for this application and single-hand use, the ST-SG screw guide enables you to drive long sandwich panel screws with ease, accuracy and without scratching or denting the sensitive panel surface.



### Compact and perfectly balanced

The tool's comfortable in-line grip allows optimum power transmission and a relaxed hand position.



### Extremely cost-efficient

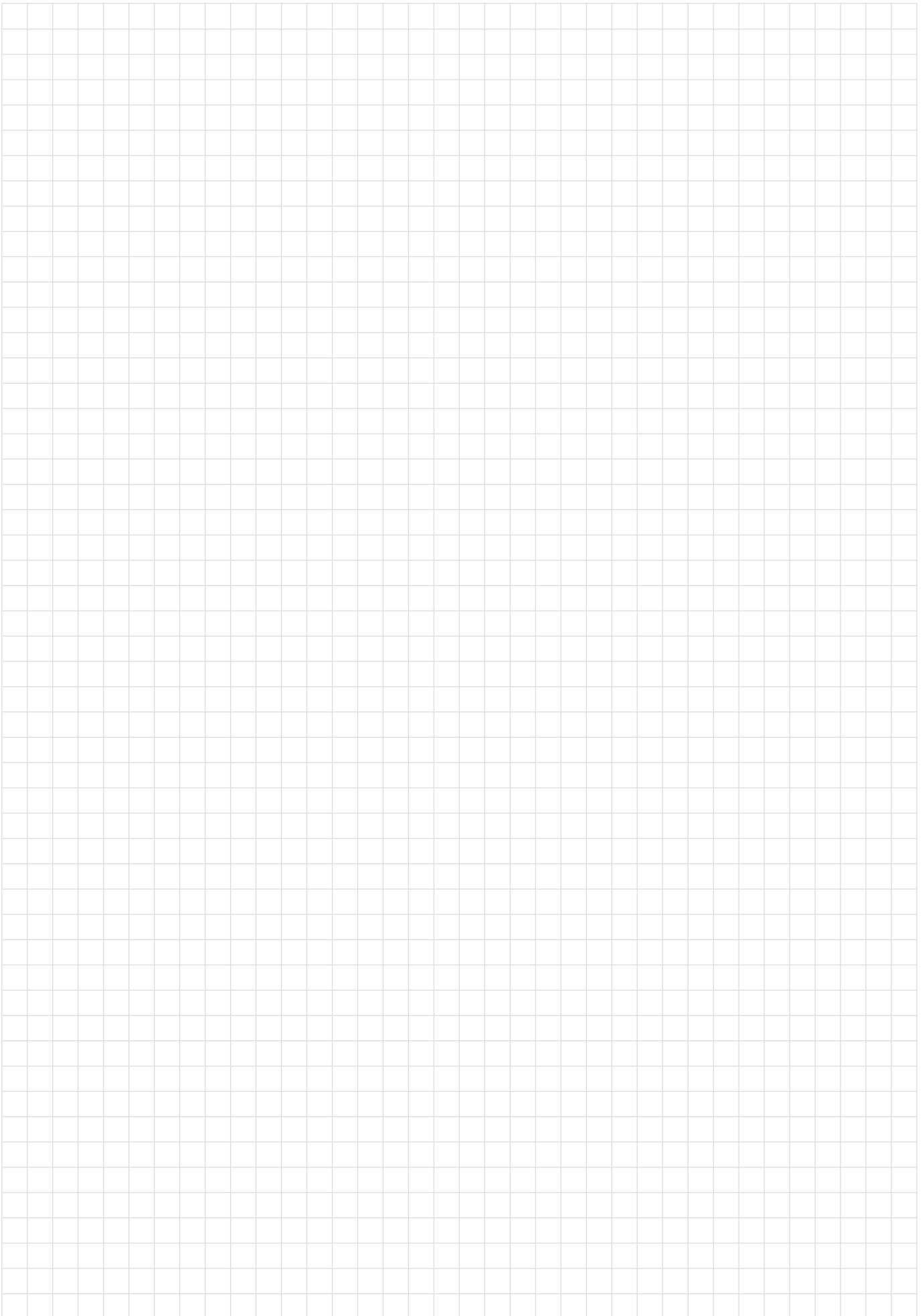
The SDT 5 helps you increase your output by up to 300%. It lets you work cordlessly while maintaining a comfortable, upright stance.



### Optimum screw guidance

The practical ST-SG screw guide lets you drive sandwich panel screws accurately with one hand and without denting the panels.





## Content

	Page
<b>3.1</b>	
Selection of the right screw	15-16
<b>3.2</b>	
Screw type	17
<b>3.3</b>	
Screw head & recess	17
<b>3.4</b>	
3.4.1 Definition of the screw length (L)	18
3.4.2 Definition of the drilling performance (DC)	18
3.4.3 Calculating the fastening height (MF)	18
<b>3.5</b>	
Services offered	19
<b>3.6</b>	
Hilti Screw Nomenclature	19

### 3.1 Selection of the right screw

Selection of the right screw depends on a number of factors determined by the application and the circumstances or conditions under which the screw is to be used. If the application is known, the Hilti screw designation system provides a quick and reliable screw selection aid.



To quickly find the most suitable product for the specific application on hand, simply ask yourself the following questions.

#### 1. Which type of Hilti fastener do you wish to use?

**S:** Screw

Example: Example
<b>S-</b> always stands for Hilti screw fastening

#### 2. Which material is to be fastened?

- M:** Metal
- C:** Sandwich panel
- W:** Wood
- I:** Insulation
- A:** Aluminium

Example: Fastening metal profile sheet
<b>S-M</b>

#### 3. Do you wish to use a self-tapping, self-drilling or pointed self-piercing (chipless) screw?

- S:** Pointed, self-piercing (Speedy function)
- D:** Self-drilling
- DU:** Self-drilling undercut
- DW:** Self-drilling wood
- P:** Pre-drilling (self-tapping)
- T:** Treadfast
- DP:** Plastic plug pre-mounted screw

Example: Self-drilling
<b>S-MD</b>

#### 4. Is a sealing washer or a pressed-on washer required?

- 0:** No sealing washer
- 1:** Countersunk head
- 2:** Pressed-on flange
- 3:** 12 mm sealing washer
- 4:** 14 mm sealing washer
- 5:** 16 mm sealing washer
- 6:** 19 mm sealing washer
- 7:** 22 mm sealing washer
- 8:** 29 mm sealing washer

Example: 19 mm sealing washer
<b>S-MD 6</b>

## 5. How thick is the material to be drilled through by the screw?

### S-MS stitching screw

1: Drilling capacity 2 x 0.4 mm up to 2 x 1.25 mm

### Self-drilling screw

1: Drilling capacity 1.0 up to 4.0 mm

3: Drilling capacity 2.1 up to 6.0 mm

5: Drilling capacity 4.6 up to 15.0 mm

Example: Drilling capacity 5 mm

S-MD 63

### Self-tapping screw

2: Blunt thread run-out >1.25 mm steel substructure

3: Pointed thread run-out <3 mm steel substructure

Timber substructure

4: Blunt, hardened thread run-out, suitable for S355/ST52  
high strength steel >1.25 mm steel substructure

## 6. Which type of corrosion protection and head geometry are required.

### Material:

Z: Galvanized carbon steel

C: Duplex coated carbon steel

S: A2 grade stainless steel

SS: A4 grade stainless steel

S-A: A2 with alu washer

SS-A: A4 with alu washer

Example: Stainless steel

S-MD 63 S

### Head geometry:

PS: Pan head, stainless steel

PS-A: Pan head with alu washer

LS: Long drill point / A2 Drilling capacity 1.0 to approx. 4.0 mm

LZ: Long drill point / galvanized carbon steel

Drilling capacity 1.0 to approx. 4.0 mm

ZW: Wafer head, galvanized

GZ: Coarse thread galvanized

GS: Coarse thread stainless

Example: 5.5 mm diameter  
length 55 mm

S-MD 63 S 5.5x40

## 7. Dimensions and screw diameter

### Screw diameter:

3.8 / 4.2 mm / 4.8 mm / 5.5 mm / 6.3 mm / 6.5 mm

### Screw length:

13 mm – 102 mm S-MD screws

75 mm – 300 mm S-CD screws

19 mm – 275 mm S-MP screws



### 3.2 Screw type

S-MD_1/3/5 S-CDW_1 S-CD_3/5 S-AD 01 S-IDP_4.8/6.7	S-MS_1	S-MP_2 S-MP_4	S-MP_3 S-IT_1

**3**

### 3.3 Screw head & recess

Hexagon head	Hexagon head with pressed-on flange	Hexagon head with sealing washer	Hexagon head with sealing washer and supporting thread
Pan head	Pan head with sealing washer	Wafer head	Countersunk head

## 3.4 Determining the screw length

All values from this manual need to be verified with actual jobsite situation and adapted if additional distances e.g. gaps occur on site.

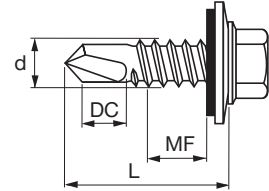
### 3.4.1 Definition of the screw length (L)

The screw length is measured from the start of the screw (drill point) to below the screw head. However, the screw length alone says nothing about the screw's clamping area.

The screw length is selected depending on

- the thickness of the base material,
- the thickness of the building component to be fastened,
- the thickness of possible intermediate layers such as thermal separation, and
- additional building components such as calottes.

It must also be noted that when determining the screw length, the drill point, thread cut and (if necessary, in the case of bi-metal screws) the welding zone must be taken into account.



### 3.4.2 Definition of the drilling performance (DC)

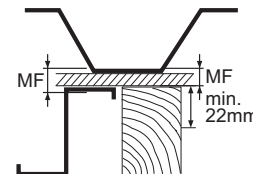
The drilling performance is the sum of the building component thicknesses, consisting of building component I and building component II, which can be drilled through by the drill point. The length of the drill point must always be selected such that the total material thickness is completely drilled through before the thread starts to mold.

### 3.4.3 Calculating the fastening height (MF)

The fastening height MF (clamping area) is understood to mean the total height, consisting of:

- + the thickness of building component I
- + the thickness of possible intermediate layers, such as thermal separation
- + the thickness of additional building components, such as calottes
- + the embedment depth in building component II (steel)

Note: in wood embedment is not part of MF



Fastening height in sheet metal with and without an intermediate layer      Fastening height in wood

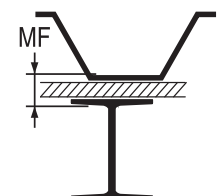
The embedment depth in building component II depends on the base material thickness and the base material itself. It is calculated as follows:

- Sheet metal or steel < 6 mm ➔ embedment depth = existing material thickness
- Steel ≥ 6 mm ➔ Self-tapping screws: embedment depth = 6 mm  
➔ Self-drilling screws: embedment depth = existing material thickness
- Wood ➔ embedment depth ≥ 22 mm

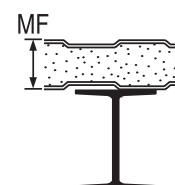
#### Special features:

- Sandwich elements fastened with S-CD screws: The fastening height (MF) or clamping length is only specified with the maximum sandwich element thickness that is relevant to the fastening.
- Calottes: If using calottes, 3 mm must be taken into account when calculating the fastening height (MF).

The fastening height (MF) is not included in the screw approvals. For this, please refer to the Hilti technical manual for metal construction screws for use in roofs/walls.



Fastening height in profile metal sheet on steel



Fastening height in sandwich panel

### 3.5 Services offered

#### Screws with colored heads and washers

All screws can be supplied with powder-coated heads and washers.

**Delivery period:**

Standard RAL: 1 to 2 weeks

Other RAL: 3 to 4 weeks



#### Saddle washers for trapezoidal and wave profiles

All saddle washers can be supplied with powder coating.

**Delivery period:**

Standard RAL: 2 weeks

Other RAL: 3 to 4 weeks

The following RAL colors fall under the „Standard“ category:								
1015	Light ivory		6011	Reseda green		8004	Copper brown	
3000	Flame red		6020	Chrome green		8011	Nut brown	
3005	Wine red		6021	Pale green		8012	Red brown	
3009	Oxide red		7005	Mouse grey		8014	Sepia brown	
3011	Brown red		7012	Basalt grey		8016	Mahogany brown	
5008	Grey blue		7015	Slate grey		8017	Chocolate brown	
5009	Azure blue		7016	Anthracite grey		8019	Grey brown	
5010	Gentian blue		7022	Umbra grey		9001	Cream	
5014	Sky blue		7024	Graphite grey		9002	Grey white	
5017	Traffic blue		7031	Blue grey		9005	Jet black	
6003	Olive green		7032	Pebble grey		9006	White aluminium	
6005	Moos green		7035	Light grey		9007	Gray aluminium	
6006	Gray olive		7038	Agate grey		9010	Pure white	
6007	Battle green		7042	Traffic grey A		9011	Graphite black	

### 3.6 Hilti Screw Nomenclature

The easy way to find the right screw

<b>S</b>	-	<b>M</b>	<b>D</b>	<b>5</b>	<b>3</b>	<b>Z</b>	<b>5,5x25</b>	<b>M</b>
----------	---	----------	----------	----------	----------	----------	---------------	----------

**Screw Fastening**

**Application**  
M: Metall  
C: Composite/Sandwich  
W: Wood  
I: Insulation  
A: Aluminium

**Function**  
S: Speedy function  
D: Self-drilling  
DU: Self-drilling undercut  
DW: Self-drilling wood  
P: Pre-drilling  
T: Treadfast  
DP: Plastic plug pre-mounted screw

**Information about washers**  
0: No washer  
1: Countersunk head  
2: Pressed on flange  
3: Washer 12 mm  
4: Washer 14 mm  
5: Washer 16 mm  
6: Washer 19 mm  
7: Washer 22 mm  
8: Washer 29 mm

**Dimensions**  
Thread Diameter x Length

**Material**  
Z: Galvanized  
C: Duplex coated  
S: Stainless (A2)  
SS: Stainless (A4)  
S-A: A2 with alu  
SS-A: A4 with alu

**Add on**  
PS: Pan head / Stainless  
PS-A: Pan head / Alu  
LS: Long point / Stainless  
LZ: Long point / galvanized  
ZW: Wafer head / galvanized  
GZ: Coarse thread galvanized  
GS: Coarse thread stainless

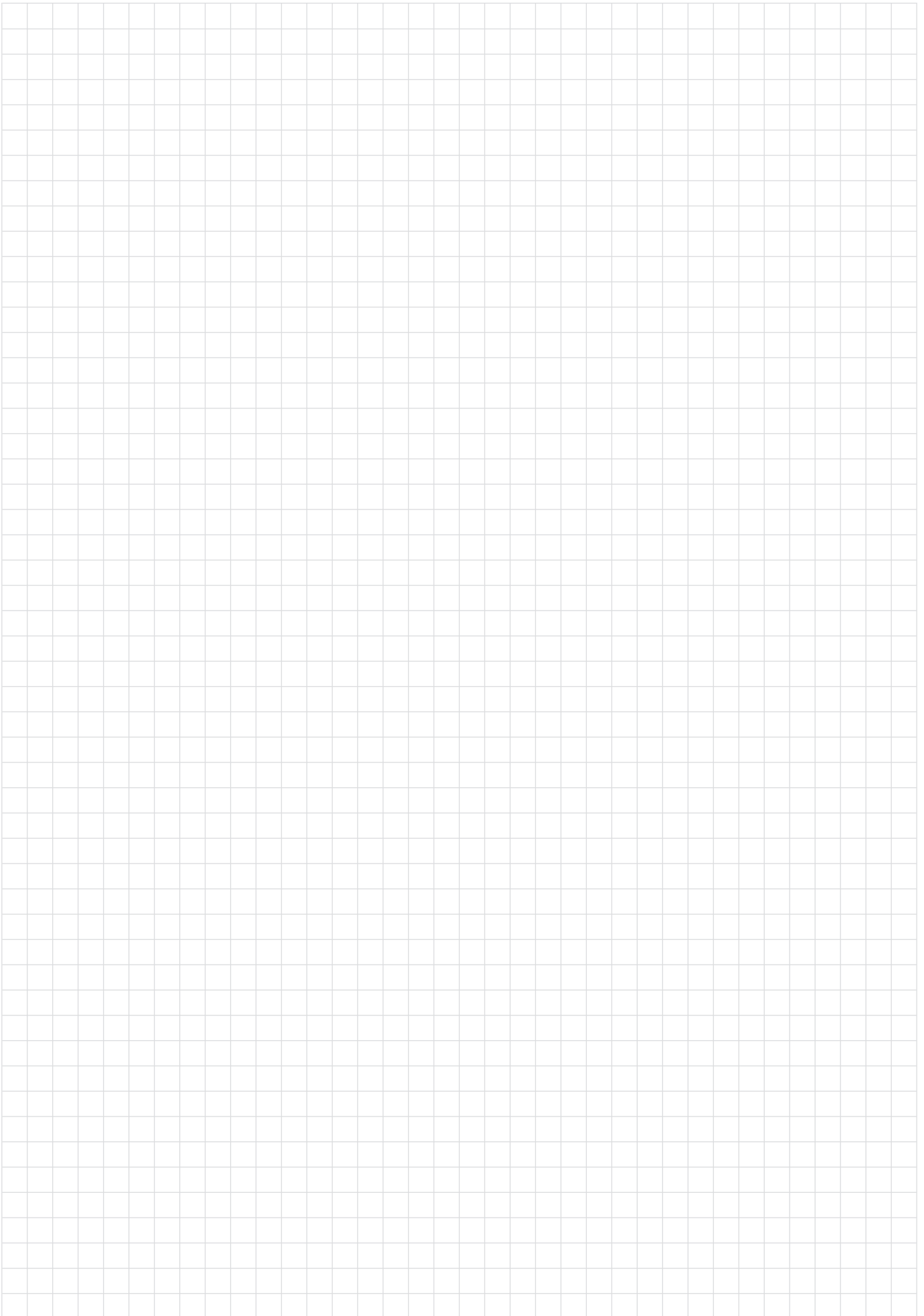
**Information about the screw point**  
**Self-piercing (S-MS)**  
1: Drilling capacity 2 x 0.4mm – 2 x 1.25 mm

**Self-drilling screw (S-MD / S-CD)**  
1: Drilling capacity 1.0 – 4.0 mm  
3: Drilling capacity 2.1 – 6.0 mm  
5: Drilling capacity 4.6 – 15.0 mm

**Self-tapping screw (S-MP)**  
2: >1.25 mm steel base material  
3: <3.00 mm steel base material and wood base material  
4: >1.25 mm steel base material, in high strength

**Further Information**  
M: Collated  
RAL: Color Code

3



## Content

	Page
<b>4.1</b>	
Corrosion protection	23
<b>4.2</b>	
Test procedures and evaluation of corrosion protection systems	24
<b>4</b> <b>4.3</b>	
Selecting the right corrosion protection for anchors, powder-actuated fasteners and screws	25
<b>4.4</b>	
Environment categories	26
<b>4.5</b>	
Material and Corrosion resistance data for steel/metal screws	27



## 4.1 Corrosion protection

With a view to supplying reliable and durable products, Hilti is constantly active in the development of methods of corrosion protection suitable for use with screws and fastening systems.

### Ambient conditions, categories of corrosion

Corrosion occurs under a variety of conditions. It may be caused or increased by the following

- microclimatic conditions
- the installation process and working with the items concerned
- contact with various materials

In order to select the most suitable type of corrosion protection for screws, the ambient conditions and the situation in which screws are to be used as well as the materials to be fastened must be taken into account.

In accordance with DIN EN ISO 12944-2, the ambient conditions can be divided into six categories:

	<b>Examples:</b>
C1 = insignificant	heated buildings (schools, offices, etc.)
C2 = low	rural areas, unheated buildings (warehouses)
C3 = moderate	urban and industrial areas with moderate pollution
C4 = heavy	industrial and coastal areas with moderate salt pollution
C5i = very heavy (industry)	industrial areas with high rel. humidity and heavy pollution
C5m = very heavy (coastal)	coastal and offshore areas with high salt pollution

While it is usually easy to differentiate between dry interiors (C1) and extreme conditions (C5), it is often difficult to differentiate between C2, C3 and C4.

For this reason, the screw selection aid provided in Section 3.5 is based on examples. These examples also take contact with the material to be fastened into account.

### Standards, approvals

When choosing the right material or corrosion protection for a fastener, the conditions under which it will be used, the applicable loads and the expected duration of use must be taken into account.

It is essential that the requirements laid out in the applicable regulations or codes, standards and approvals for the corresponding countries (e.g. ETA, DTU, etc.) are observed.

Below, as an example, is an extract from the ETA-10/0182 approval for the S-MD, S-MP and S-MS:

“The provisions made in this European technical approval are based on an assumed working life of the fastening screws of 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.”

### Duration of use and warranty

- Service life (or effective useful life) provides an indication of the duration for which the fastener can be expected to provide an intact connection between the components without impairment of its loadbearing characteristics or reduction of its loadbearing capacity. It is possible that signs of corrosion such as white rust or red rust may occur during the service life of the fastening but these only affect its appearance.
- Warranty period is a legal term that regulates the subject of liability for defective products.
- The service life possible without functional impairment and without increased risk of failure is usually significantly longer than the duration of the warranty period. Both, however, depend on whether the recommendations concerning the choice of material in relation to the conditions of use, including the surrounding atmosphere, have been observed.

## 4.2 Test procedures and evaluation of corrosion protection systems

Hilti operates a corrosion laboratory and several test stands where items are subjected to weathering under various climatic conditions. Regular laboratory tests ensure the consistently high quality of well-proven corrosion protection solutions. Descriptions of products often contain references to the laboratory tests carried out. The most important of these are described below.

### The salt spray test

A standardized test for the evaluation of the corrosion protection offered by various coatings. The procedure followed by the tests is laid down in the ASTM B117 and DIN EN ISO 9227 standards. The items to be evaluated are placed in a test chamber in which they are sprayed constantly with a salt solution (usually sodium chloride). The duration of the test depends on the type and thickness of the coating on the item and the coating's corrosion resistance, and may vary between 6 hours and more than 1000 hours. Coatings with a high corrosion resistance require a longer test duration.

### Kesternich test and alternating humidity test

„Kesternich test” is the name given to a corrosion resistance test in which specimens are exposed to sulfur dioxide in an atmosphere of condensing humidity. This test was developed in 1951 by Wilhelm Kesternich in order to simulate the damaging effect of acid rain and can be used for coatings as well as base materials. The test method is laid down in various standards (DIN EN ISO 6988, DIN 50018). The test specimens are placed in a test chamber where they are exposed to warm, humid air in conjunction with a defined quantity of sulfur dioxide. The test is conducted in 24-hour cycles. The alternating humidity test (ISO 6270) is carried out in a similar manner but without the addition of sulfur dioxide.

## Corrosion protection systems used by Hilti for screws.

Hilti currently offers three different corrosion protection solutions which are adapted according to how the products are to be used and the applicable ambient conditions:

### Galvanic zinc plated (electrogalvanized) carbon steel

The thickness of the zinc layer is between 4 and 15  $\mu\text{m}$ , depending on the type of screw. The steel is protected from corrosion by sacrificial corrosion of the zinc, which is a base metal (i.e. not a noble metal). The zinc layer dissolves during the course of this protective procedure. The period of time until the steel begins to rust is thus defined by the rate at which the zinc corrodes.

### Duplex-coated carbon steel

A duplex coating system is a corrosion protection system consisting of galvanizing (see above) in combination with other coatings. The galvanizing and the additional coating work together as a protective system. The coating protects the zinc layer from the effects of the atmosphere and chemical influences, thereby reducing the rate of corrosion. This increases the life of the screw, making its use possible in corrosive atmospheres.









### A2 stainless steel

A2 stainless steel is an austenitic, acid-resistant Cr-Ni steel with a low carbon content. Its high chromium content leads to formation of an oxide layer which provides a high level of corrosion protection. In situations where the oxide layer is destroyed it usually reforms if oxygen and moisture are present.

### 4.3 Selecting the right corrosion protection for anchors, powder-actuated fasteners and screws

If a fastening is to be perfectly satisfactory and reliable for its entire service life, all surrounding conditions must be ascertained before a suitable fastener can be selected.

The following table provides a general guideline for commonly accepted applications for fastening elements with various corrosion protection in typical atmospheric environments and depending on the fastened material (see notes).

Screws		Screws	S-MS Z S-MD Z S-MP Z	S-CD C S-IT C	S-AD S S-MS S S-MD S S-CD S	S-AD SS S-MD SS S-CD SS
		Coating/material	C-Steel galvanic zinc plated	C-Steel duplex coated	Stainless steel A2	Stainless steel A4
Environmental conditions	Fastened part					
 Dry indoor	Steel (zinc-coated, painted), aluminium, stainless steel	■	■	■	■	■
 Indoor with temporary condensation	Steel (zinc-coated, painted), aluminium	-	■	■	■	■
	Stainless steel	-	-	-	-	-
 Outdoor with low pollution	Steel (zinc-coated, painted), aluminium	-	□	■	■	■
	Stainless steel	-	-	-	-	-
 Outdoor with moderate concentration of pollutants 1-10km	Steel (zinc-coated, painted), aluminium	-	□	■	■	■
	Stainless steel	-	-	-	-	-
 Coastal areas 0-1km	Steel (zinc-coated, painted), aluminium, stainless steel	-	-	-	-	■
 Outdoor, areas with heavy industrial pollution	Steel (zinc-coated, painted), aluminium, stainless steel	-	-	-	-	■
 Close proximity to roads	Steel (zinc-coated, painted), aluminium, stainless steel	-	-	-	-	■
 Special applications	Steel (zinc-coated, painted), aluminium, stainless steel	-	-	-	-	-










■ = expected lifetime of fasteners made from this material is typically satisfactory in the specified environment based on the typically expected lifetime of a building. The assumed service life in ETA approvals for screw fasteners is 25 years.

□ = a decrease in the expected lifetime of non-stainless fasteners in these atmospheres must be taken into account (≤ 25 years). Higher expected lifetime needs a specific assessment.

- = fasteners made from this material are not suitable in the specified environment. Exceptions need a specific assessment.

## 4.4 Environment categories

Applications can be classified into various environmental categories, by taking the following main factors into account:

Indoor applications	
	<b>Dry indoor environments</b> (heated or air-conditioned areas) without condensation, e.g. office buildings, schools
	<b>Indoor environments with temporary condensation</b> (unheated areas without pollutants), e.g. storage sheds
Outdoor applications	
	<b>Outdoor, rural or urban environment with low pollution</b> Large distance (> 10 km) from the sea
	<b>Outdoor, rural or urban environment with moderate concentration of pollutants</b> and/or salt from sea water Distance from the sea 1-10 km
	<b>Coastal areas</b> Distance from the sea < 1 km
	<b>Outdoor, areas with heavy industrial pollution</b> Close to plants < 1km (e.g. petrochemical, coal industry)
	<b>Close proximity to roadways</b> treated with de-icing salts, Distance from roadways < 10 m
Special applications	
	<b>Special applications</b> Areas with special corrosive conditions, e.g. road tunnels with de-icing salt, indoor swimming pools, special applications in the chemical industry (exceptions possible)
	

### Important notes:

The ultimate decision on the required corrosion protection must be made by the customer. Hilti accepts no responsibility regarding the suitability of a product for a specific application, even if informed of the application conditions.

The tables are based on an average service life for typical applications.

For metallic coatings, e.g. zinc layer systems, the end of lifetime is the point at which red rust is visible over a large fraction of the product and widespread structural deterioration can occur – the initial onset of rust may occur sooner.

National or international codes, standards or regulations, customer and/or industry specific guidelines must be independently considered and evaluated.

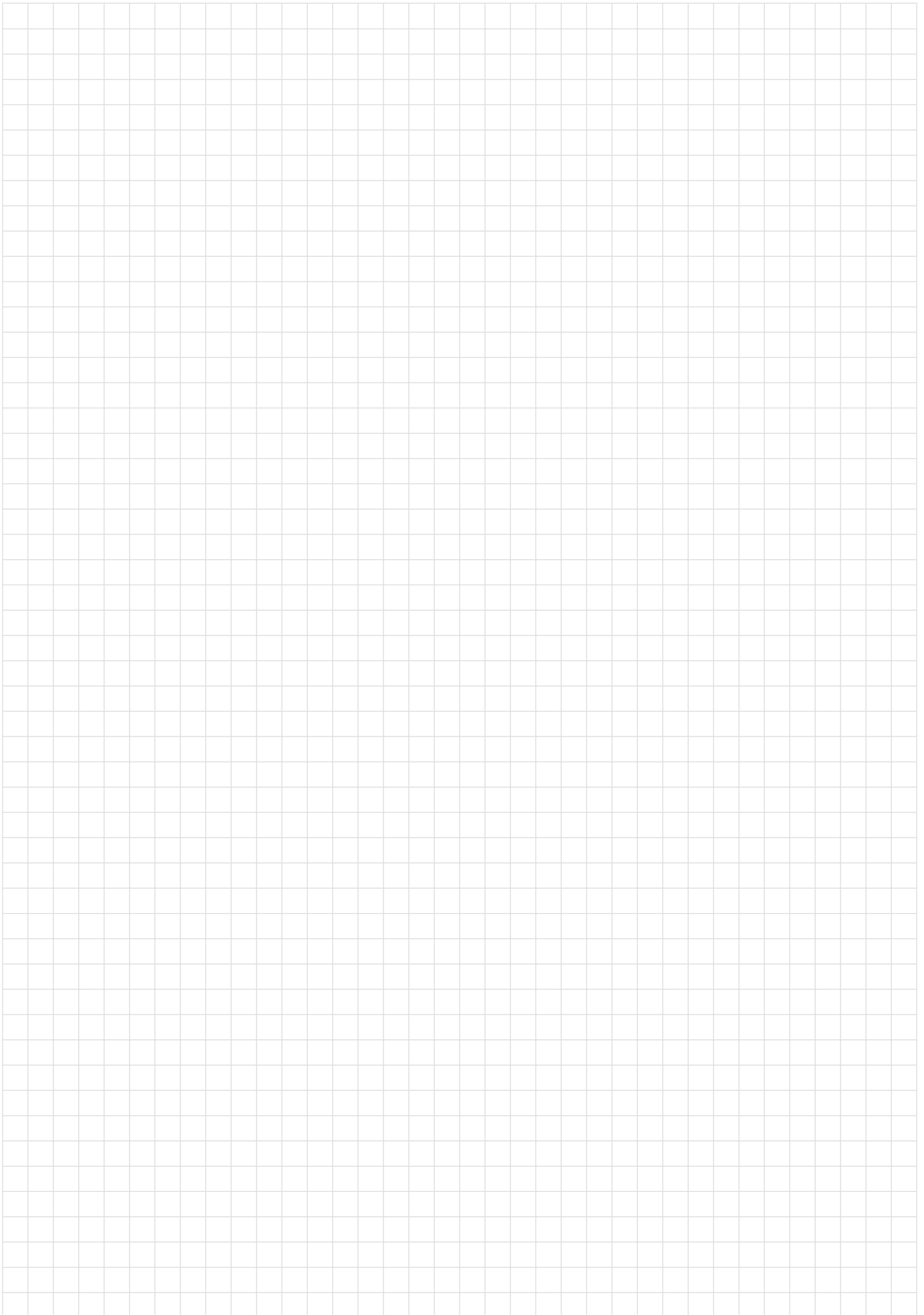
These guidelines apply to atmospheric corrosion only. Special types of corrosion, such as crevice corrosion or hydrogen assisted cracking must be independently evaluated.

### 4.5 Material and Corrosion resistance data for steel/metal screws

Screw	Materials and coatings	Corrosion resistance
S-MS 01 Z 4,8 x 20	Case hardened carbon steel according to DIN EN 10084 and ASTM A510-03 Grade 1022	≥ 48 Std. Salt spray test w/o red rust on the screw head according to EN ISO 9227
S-MD 01 Z 4,2 x L		
S-MD 01 Z/LZ 4,8 x L		
S-MD 01 Z 5,5 x L		
S-MD 01 Z 6,3 x L		
S-MD 03 Z 4,8 x L		
S-MD 03 Z 5,5 x L		
S-MD 03 Z 6,3 x L		
S-MD 05 GZ 5,5 x L		
S-MDU 21 Z 6,3 x 22		
S-MD 21 Z 5,5 x 25		
S-MD 23 Z 5,5 x 22		
S-MD 23 Z 6,3 x L		
S-MD 25 GZ 5,5 x 40		
S-MS 41 Z 4,8 x 20		
S-MS 51 Z 4,8 x 20		
S-MD 51 Z 4,2 x L		
S-MD 51 Z 4,8 x L		
S-MD 51 Z 5,5 x L		
S-MD 51 Z 6,3 x L		
S-MD 53 Z 4,8 x L		
S-MD 53 Z 5,5 x L		
S-MD 53 Z 6,3 x L		
S-MD 55 GZ 5,5 x L		
S-MS 01 S 4,8 x 20	Stainless steel (1.4301 / A2) – EN 10088	≥ 20 cycles Kesternich test according to EN ISO 6988
S-MD 01 S 4,8 x L		
S-MD 01 LS 5,5 x L		
S-MD 03 S 5,5 x L		
S-MD 05 S 5,5 x L		
S-MS 41 S 4,8 x L		
S-MS 51 S 4,8 x L		
S-MD 51 S 4,8 x L		
S-MD 51 S 5,5 x L		
S-MD 61 S 5,5 x L		
S-MD 51 LS 5,5 x L		
S-MD 61 LS 5,5 x L		
S-MD 71 LS 5,5 x L		
S-MD 43 S 5,5 x L		
S-MD 53 S 5,5 x L		
S-MD 63 S 5,5 x L		
S-MD 73 S 5,5 x L		
S-MD 53 S 6,3 x L		
S-MD 63 S 6,3 x L		
S-MD 73 S 6,3 x L		
S-MD 55 S 5,5 x L		
S-MD 65 S 5,5 x L		
S-MD 75 S 5,5 x L		

Screw	Materials and coatings	Corrosion resistance
S-MD 01 PS 4,8 x L	Stainless steel (1.4567 / A2L) – EN 10088  Tensile strength $f_{u,k} = 650 \text{ N/mm}^2$ Shear strength $\tau_{u,k} = 400 \text{ N/mm}^2$	$\geq 20$ cycles Kesternich test according to EN ISO 6988
S-MD 01 PS 5,5 x L		
S-MD 03 PS 5,5 x L		
S-MD 05 PS 5,5 x L		
S-MD 31 PS 4,8 x L		
S-MD 31 PS 5,5 x L		
S-MD 33 PS 5,5 x L		
S-MD 35 PS 5,5 x L		
S-CDW 51 C 6,5 x L	Carbonitride hardened Duplex Coated  Tensile strength $f_{u,k} = 1000 \text{ N/mm}^2$ Shear strength $\tau_{u,k} = 600 \text{ N/mm}^2$	$\geq 1000$ h Salt spray test w/o red rust on the screw head according to EN ISO 9227  $\geq 15$ cycles Kesternich test according to EN ISO 6988
S-CDW 61 C 6,5 x L		
S-CD 53 C 5,5 x L		
S-CD 63 C 5,5 x L		
S-CD 73 C 5,5 x L		
S-CD 55 C 5,5 x L		
S-CD 65 C 5,5 x L		
S-CD 75 C 5,5 x L		
S-CDW 51 S 6,5 x L	Stainless steel (1.4301 / A2) – EN 10088  Tensile strength $f_{u,k} = 800 \text{ N/mm}^2$ Shear strength $\tau_{u,k} = 450 \text{ N/mm}^2$	$\geq 20$ cycles Kesternich test according to EN ISO 6988
S-CDW 61 S 6,5 x L		
S-CDW 71 S 6,5 x L		
S-CD 53 S 5,5 x L		
S-CD 63 S 5,5 x L		
S-CD 73 S 5,5 x L		
S-CD 55 S 5,5 x L		
S-CD 65 S 5,5 x L		
S-CD 75 S 5,5 x L		
S-MP 53 Z 6,5 x L	Case hardened carbon steel according to DIN EN 10084 and ASTM A510-03 Grade 1022  Tensile strength $f_{u,k} = 1000 \text{ N/mm}^2$ Shear strength $\tau_{u,k} = 600 \text{ N/mm}^2$	$\geq 48$ h Salt spray test w/o red rust on the screw head according to EN ISO 9227
S-MP 52 Z 6,3 x L		
S-MP 63 S 6,5 x L	Stainless Steel (1.4301) – EN 10269  Tensile strength $f_{u,k} = 800 \text{ N/mm}^2$ Shear strength $\tau_{u,k} = 450 \text{ N/mm}^2$	$\geq 20$ cycles Kesternich test according to EN ISO 6988
S-MP 63 S 6,5 x L		
S-MP 63 S 6,5 x L		
S-MP 52 S 6,3 x L		
S-MP 62 S 6,3 x L		
S-MP 72 S 6,3 x L		
S-MP 54 S 6,3 x L		
S-MP 64 S 6,3 x L		
S-MP 74 S 6,3 x L		
S-WD 11 C 3,8 x L	Case hardened carbon steel according to DIN EN 10084 and ASTM A510-03  Tensile strength $f_{u,k} = 1000 \text{ N/mm}^2$ Shear strength $\tau_{u,k} = 600 \text{ N/mm}^2$ Duplex Coated	$\geq 48$ h Salt spray test w/o red rust on the screw head according to EN ISO 9227
S-WD 11 C 4,2 x L		
S-WD 13 C 4,8 x L		
S-WD 13 C 5,5 x L		
S-WD 13 C 6,3x L		
S-WD 15 C 5.5 x L		
S-IT 01C 4,8 x L	C-Stahl, case hardend, Duplex Coated	$\geq 15$ cycles Kesternich test according to EN ISO 6988
S-IT 01C 6,3 x L		
S-IDP 4,8 C / 40 x L		
S-IDP 4,8 C / 8040 x L		
S-IDP 4,8 C / 50 x L		
S-IDP 6,7 C / 40 x L		
S-IDP 6,7 C / 8040 x L		





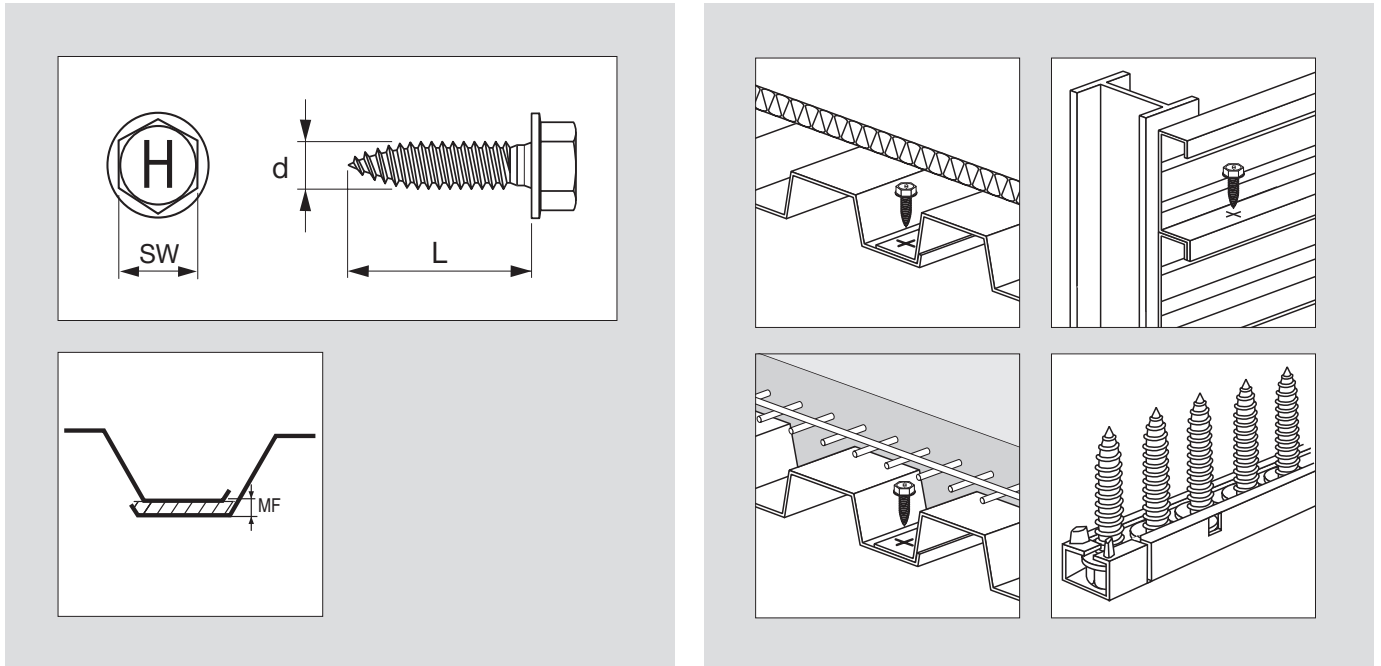
## Content

<b>5.1</b>			Page
5.1.1	Carbon steel overlapping screw, chipless	S-MS 01 Z	31
5.1.2	Carbon steel self-drilling screw	S-MD 01 Z	32
5.1.3	Carbon steel self-drilling screw	S-MD 03 Z	33
5.1.4	Carbon steel self-drilling screw	S-MD 05 GZ	34
<b>5.2</b>			
5.2.1	Carbon steel self-drilling with pressed-on flange	S-MD/MDU 21 Z	35
5.2.2	Carbon steel self-drilling with pressed-on flange	S-MD 23 Z	36
5.2.3	Carbon steel self-drilling with pressed-on flange	S-MD 25 GZ	37
<b>5.3</b>			
	Collated carbon steel self-drilling screw	S-MS/MD/MDU	38
<b>5.4</b>			
5.4.1	Carbon steel overlapping screw, chipless (Ø 14, 16)	S-MS 41 Z/51 Z	39
5.4.2	Carbon steel self-drilling Screw (Ø 16)	S-MD 51 Z	40
5.4.3	Carbon steel self-drilling Screw (Ø 16)	S-MD 51 LZ	41
5.4.4	Carbon steel self-drilling Screw (Ø 16)	S-MD 53 Z	42
5.4.5	Carbon steel self-drilling Screw (Ø 16)	S-MD 55 GZ	43
5.4.6	Carbon steel self-drilling Screw (Ø 19)	S-MD 65 GZ	44
5.4.7	Colored carbon steel overlapping screw, chipless (Ø 14, 16)	S-MS 41 Z/51 Z RAL	45
5.4.8	Colored carbon self-drilling Screw (Ø 16)	S-MD 51 Z RAL	46
5.4.9	Colored carbon self-drilling Screw (Ø 16)	S-MD 51 LZ RAL	47
5.4.10	Colored carbon self-drilling Screw (Ø 16)	S-MD 53 Z RAL	48
5.4.11	Colored carbon self-drilling Screw (Ø 16)	S-MD 55 GZ RAL	49
<b>5.5</b>			
	Carbon steel self-drilling screw	S-MD 01 ZW S-MD 03 ZW S-MD 05 ZW	50



### 5.1.1 Carbon steel overlapping screw, chipless S-MS 01 Z

The fastest chipless overlapping screw



5

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MS01Z 4,8x20	2x 0.5 mm - 2x 1.25 mm	1.0 - 2.5 mm	4.8 mm	20 mm	Hexagon 8	1000 pc	385448
Self-drill screw S-MS01Z 4,8x20 M	2x 0.5 mm - 2x 1.25 mm	1.0 - 2.5 mm	4.8 mm	20 mm	Hexagon 8	250 pc	385450

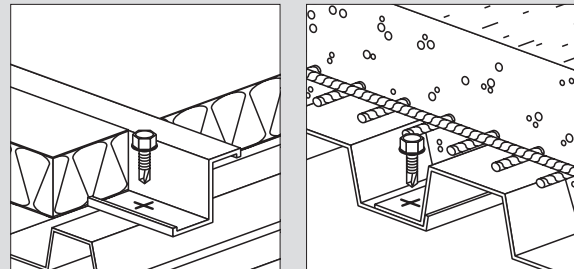
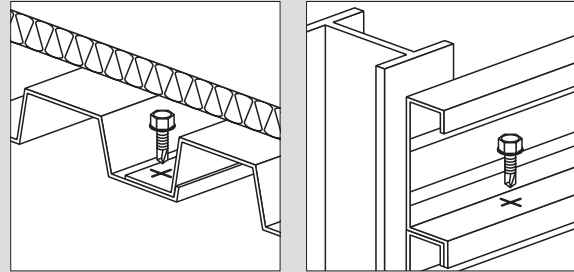
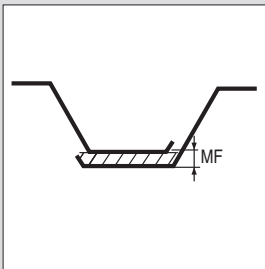
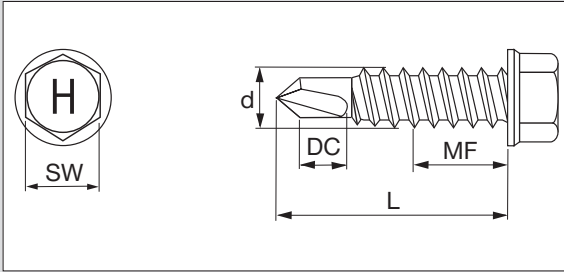
**Reference:**

- More Information see approval ETA-10/0182 (Chapter 16)

## 5.1.2 Carbon steel self-drilling screw S-MD 01 Z



Universal carbon self-drilling screw for a wide range of light inside applications



Ordering description	Reference	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD01Z 4,2X13		1.2 - 2.5 mm	1.2 - 4.5 mm	4.2 mm	13 mm	Hexagon 7	1000 pc	224500
Self-drill screw S-MD01Z 4,2X16		1.2 - 2.5 mm	1.2 - 7.5 mm	4.2 mm	16 mm	Hexagon 7	1000 pc	10405
Self-drill screw S-MD01Y 4,8X16	no approval	1.2 - 2.75 mm	1.2 - 7 mm	4.8 mm	16 mm	Hexagon 8	1000 pc	257732
Self-drill screw S-MD01Z 4,8X13		1.2 - 2.75 mm	1.2 - 4 mm	4.8 mm	13 mm	Hexagon 8	1000 pc	224501
Self-drill screw S-MD01Z 4,8X19		1.2 - 2.75 mm	1.2 - 10 mm	4.8 mm	19 mm	Hexagon 8	500 pc	219557
Self-drill screw S-MD01Z 5,5X19		1.2 - 3 mm	1.2 - 9 mm	5.5 mm	19 mm	Hexagon 8	500 pc	219558
Self-drill screw S-MD01Z 6,3X19		1.2 - 3 mm	1.2 - 8 mm	6.3 mm	19 mm	Hexagon 3/8	500 pc	219559

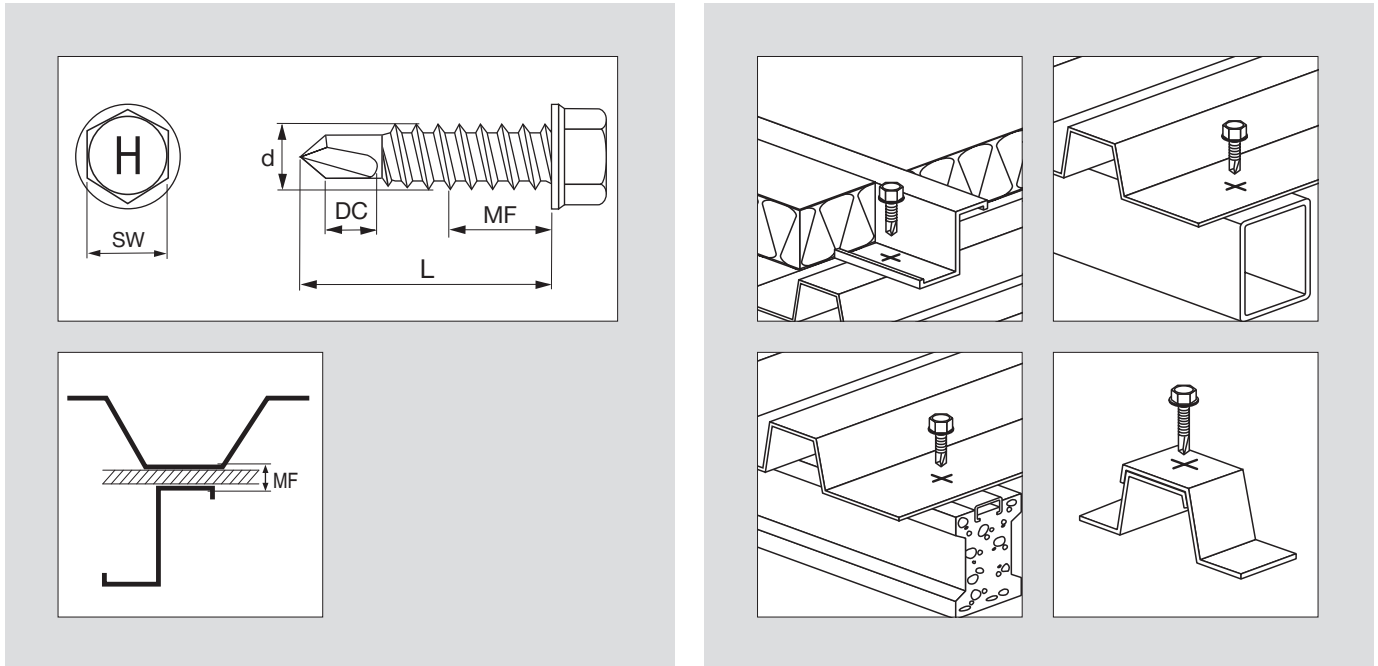
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

### 5.1.3 Carbon steel self-drilling screw S-MD 03 Z



The universal and robust self-drilling screws for a wide range of fastenings on steel framing



5

Ordering description	Reference	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD03Z 4,2X16	Without RT, no approval	2.1 - 3.5 mm	2.1 - 6 mm	4.2 mm	16 mm	Hexagon 7	1000 pc	219013
Self-drill screw S-MD03Z 4,8X16	Without RT	2.1 - 4.5 mm	2.1 - 5 mm	4.8 mm	16 mm	Hexagon 8	500 pc	219015
Self-drill screw S-MD03Z 4,8X19	Without RT	2.1 - 4.5 mm	2.1 - 8 mm	4.8 mm	19 mm	Hexagon 8	500 pc	219016
Self-drill screw S-MD03Z 5,5x19		2.6 - 6 mm	2.6 - 7 mm	5.5 mm	19 mm	Hexagon 8	500 pc	413415
Self-drill screw S-MD03Z 5,5x22		2.6 - 6 mm	2.6 - 10 mm	5.5 mm	22 mm	Hexagon 8	500 pc	413416
Self-drill screw S-MD03Z 5,5x25		2.6 - 6 mm	2.6 - 13 mm	5.5 mm	25 mm	Hexagon 8	500 pc	413417
Self-drill screw S-MD03Z 5,5x32		2.6 - 6 mm	2.6 - 20 mm	5.5 mm	32 mm	Hexagon 8	500 pc	413419
Self-drill screw S-MD03Z 5,5x38		2.6 - 6 mm	2.6 - 26 mm	5.5 mm	38 mm	Hexagon 8	500 pc	413420
Self-drill screw S-MD03Z 5,5x50		2.6 - 6 mm	2.6 - 38 mm	5.5 mm	50 mm	Hexagon 8	500 pc	414293
Self-drill screw S-MD03Z 6,3x19		2.6 - 6 mm	2.6 - 7 mm	6.3 mm	19 mm	Hexagon 8	500 pc	413421
Self-drill screw S-MD03Z 6,3x22		2.6 - 6 mm	2.6 - 10 mm	6.3 mm	22 mm	Hexagon 8	500 pc	413422
Self-drill screw S-MD03Z 6,3x25		2.6 - 6 mm	2.6 - 13 mm	6.3 mm	25 mm	Hexagon 8	500 pc	413423
Self-drill screw S-MD03Z 6,3x32		2.6 - 6 mm	2.6 - 20 mm	6.3 mm	32 mm	Hexagon 8	500 pc	413424
Self-drill screw S-MD03Z 6,3x38		2.6 - 6 mm	2.6 - 26 mm	6.3 mm	38 mm	Hexagon 8	500 pc	414295
Self-drill screw S-MD03Z 6,3x50		2.6 - 6 mm	2.6 - 38 mm	6.3 mm	50 mm	Hexagon 8	250 pc	413425
Self-drill screw S-MD03Z 6,3x70		2.6 - 6 mm	2.6 - 58 mm	6.3 mm	70 mm	Hexagon 8	250 pc	413426

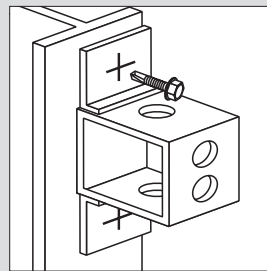
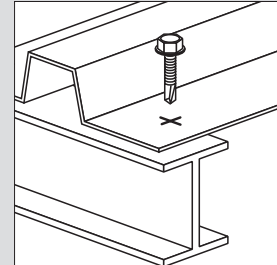
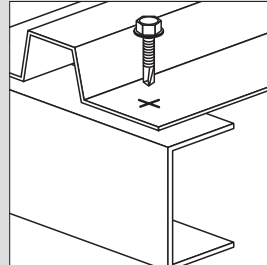
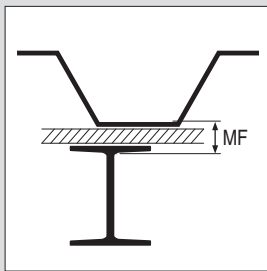
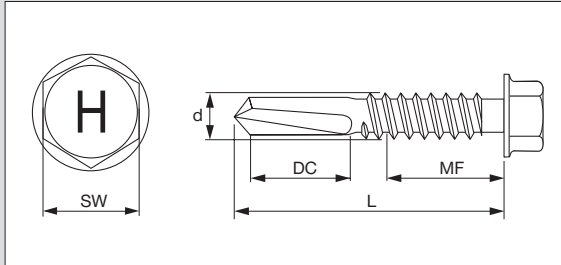
**Reference:**

- More Information see approval ETA-10/0182 (Chapter 16)

## 5.1.4 Carbon steel self-drilling screw S-MD 05 GZ



Universal carbon steel self-drilling screw for a wide range of medium and heavy inside applications



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD05GZ 5,5x40	4.6 - 15 mm	4.6 - 18 mm	5.5 mm	40 mm	Hexagon 8	250 pc	2054483
Self-drill screw S-MD05GZ 5,5x52	4.6 - 15 mm	4.6 - 30 mm	5.5 mm	52 mm	Hexagon 8	250 pc	2054484
Self-drill screw S-MD05GZ 5,5x65	4.6 - 15 mm	4.6 - 43 mm	5.5 mm	65 mm	Hexagon 8	100 pc	2054485
Self-drill screw S-MD05GZ 5,5x82	4.6 - 15 mm	4.6 - 60 mm	5.5 mm	82 mm	Hexagon 8	100 pc	2054486
Self-drill screw S-MD05GZ 5,5x102	4.6 - 15 mm	4.6 - 80 mm	5.5 mm	102 mm	Hexagon 8	100 pc	2054487

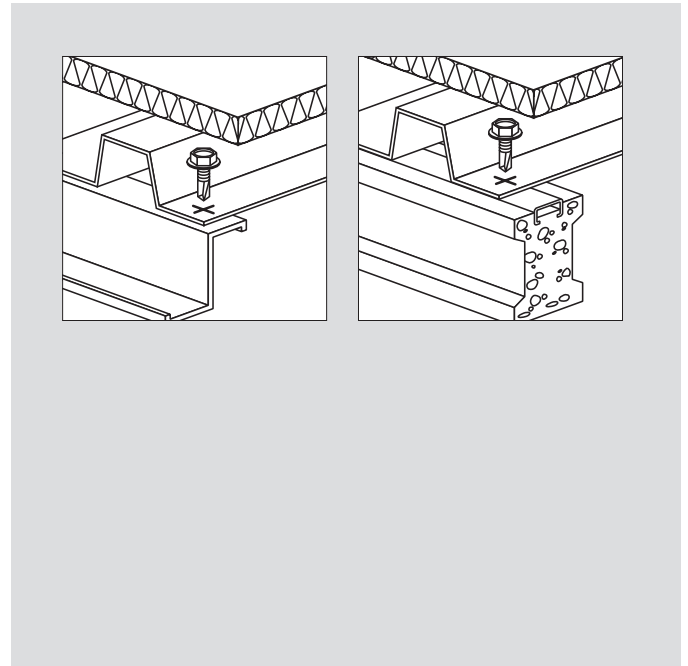
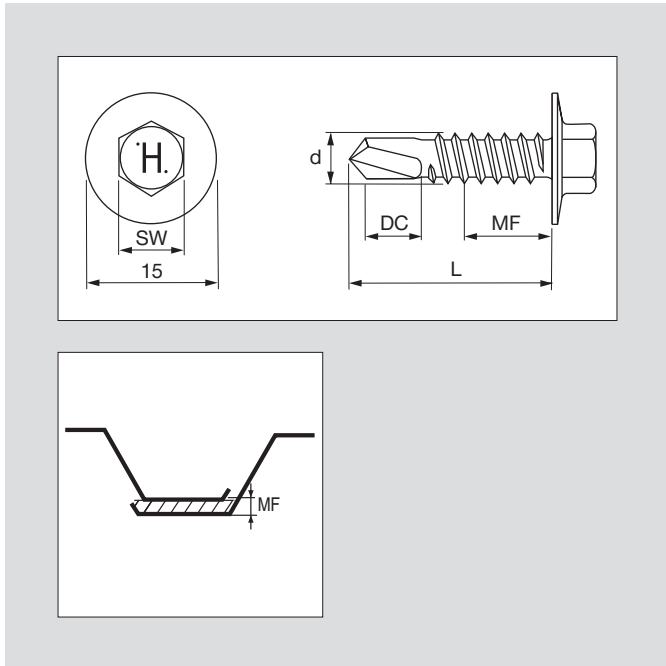
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)



### 5.2.1 Carbon steel self-drilling with pressed-on flange S-MD/MDU 21Z

The universal and robust self-drilling screws for a wide range of fastenings on steel framing



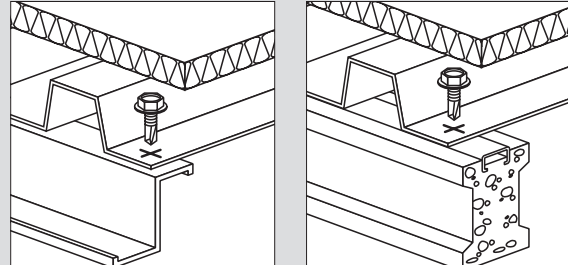
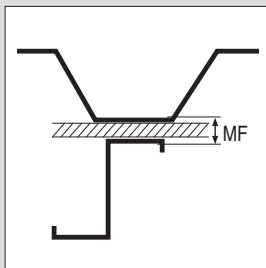
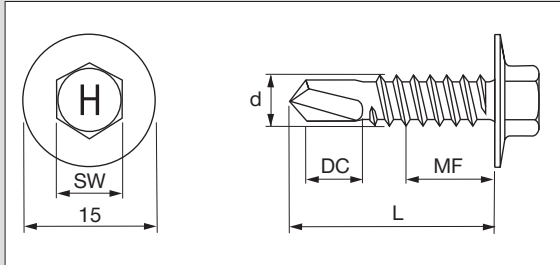
5

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD21Z 5,5X25	1.2 - 3 mm	1.2 - 15 mm	5.5 mm	25 mm	15 mm pressed-on	Hexagon 8	500 pc	234588
Self-drill screw S-MDU21 Z 6,3x22	1.2 - 3 mm	1.2 - 9 mm	6.3 mm	22 mm	15 mm pressed-on	Hexagon 3/8	500 pc	201990

## 5.2.2 Carbon steel self-drilling with pressed-on flange S-MD 23 Z



The universal and robust self-drilling screws for a wide range of fastenings on steel framing



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD23Z 5,5x22	2.6 - 6 mm	2.6 - 10 mm	5.5 mm	22 mm	15 mm pressed-on	Hexagon 8	500 pc	413427
Self-drill screw S-MD23Z 6,3x19	2.6 - 6 mm	2.6 - 7 mm	6.3 mm	19 mm	15 mm pressed-on	Hexagon 8	500 pc	413429
Self-drill screw S-MD23Z 6,3x22	2.6 - 6 mm	2.6 - 10 mm	6.3 mm	22 mm	15 mm pressed-on	Hexagon 8	500 pc	413430
Self-drill screw S-MD23Z 6,3x25	2.6 - 6 mm	2.6 - 13 mm	6.3 mm	25 mm	15 mm pressed-on	Hexagon 8	500 pc	413432
Self-drill screw S-MD23Z 6,3x50	2.6 - 6 mm	2.6 - 38 mm	6.3 mm	50 mm	15 mm pressed-on	Hexagon 8	250 pc	413433

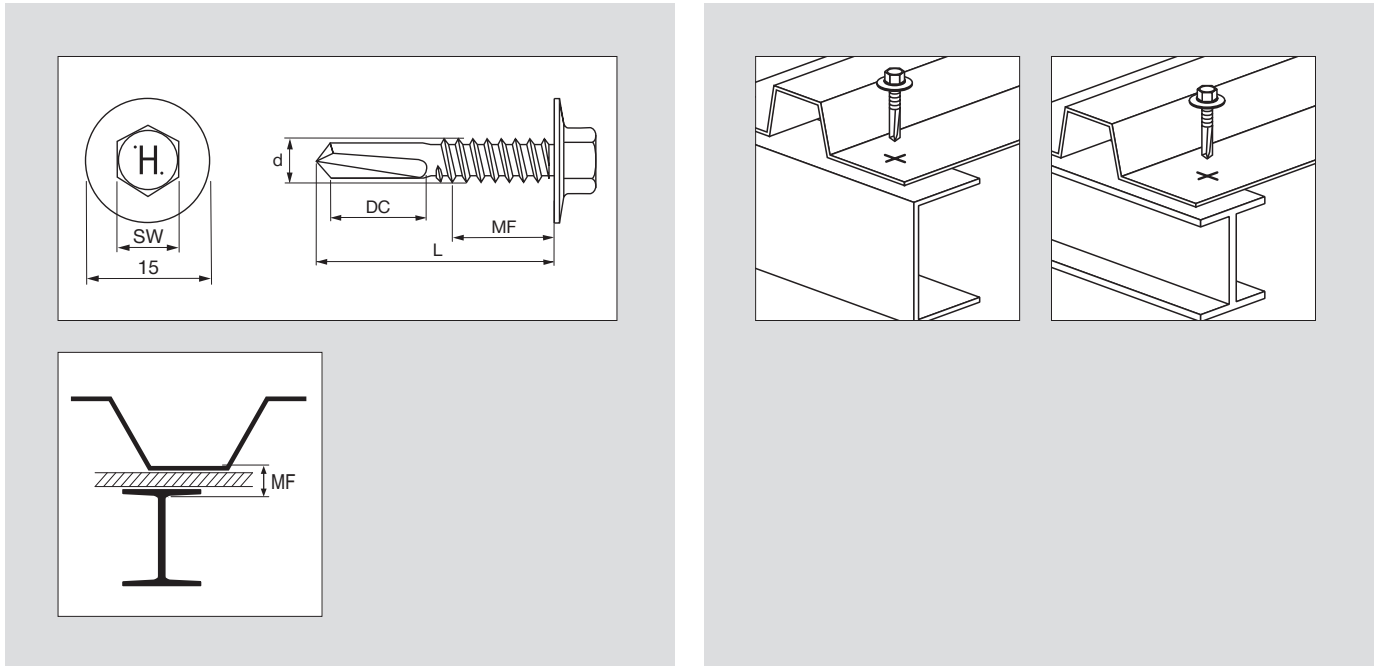
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)



### 5.2.3 Carbon steel self-drilling with pressed-on flange S-MD 25 GZ

Universal carbon steel self-drilling screw for a wide range of medium and heavy inside applications



5

Ordering description	Drilling capacity range (DC)	Befestigungshöhe (MF)	Screw diameter (d)	Screw length (L)	Washer	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD25GZ 5,5x40	4.6 - 15 mm	4.6 - 18 mm	5.5 mm	40 mm	15 mm pressed-on	Hexagon 8	250 pc	2054488

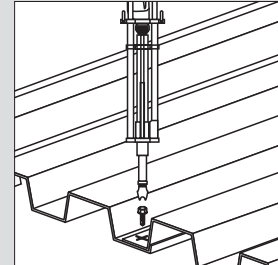
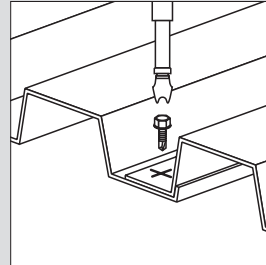
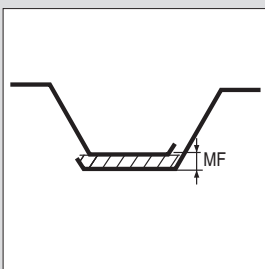
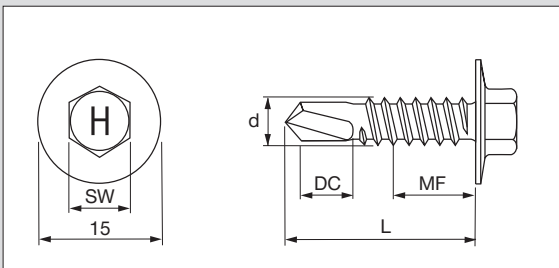
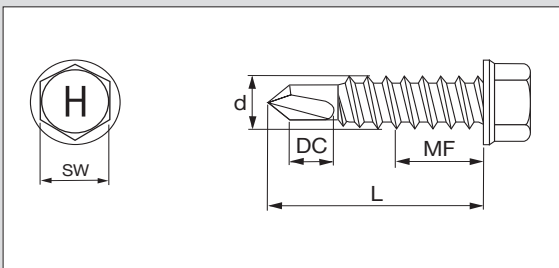
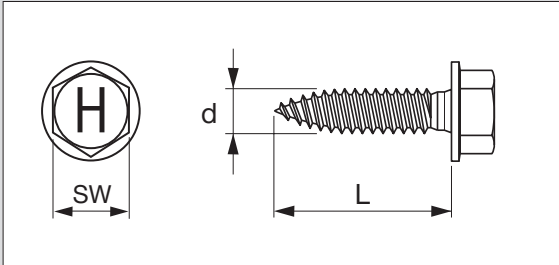
**Reference:**

- Technical data see chapter 16.9

## 5.3 Collated carbon steel self-drilling screw S-MD/MDU/MS M



Collated carbon steel self-drilling screws for higher productivity



Ordering description	Reference	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer	Standgerät	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MS01Z 4,8x20 M	without RT	2x 0.5 mm - 2x 1.25 mm	1.0 - 2.5 mm	4.8 mm	20 mm		SDT 5 SDT 30	Hexagon 8	250 pc	385450
Self-drill screw S-MD01Z 4,8x19 M	without RT	1.2 - 2.75 mm	1.2 - 10 mm	4.8 mm	19 mm		SDT 5 SDT 30	Hexagon 8	250 pc	378978
Self-drill screw S-MD01LZ 4,8x22 M	without RT without ETA	1.6 - 2.75 mm	1.6 - 10 mm	4.8 mm	22 mm		SDT 5 SDT 30	Hexagon 8	250 pc	284488
Self-drill screw S-MDU21Z 6,3x22 M	without RT without ETA	1.2 - 3 mm	1.2 - 9 mm	6.3 mm	22 mm	15 mm pressed-on	SDT 25-15	Hexagon 3/8	200 pc	228237
Self-drill screw S-MD03Z 5,5x25 M		2.6 - 6 mm	2.6 - 13 mm	5.5 mm	25 mm		SDT 5 SDT 30	Hexagon 8	250 pc	413418
Self-drill screw S-MD23Z 5,5x22 M		2.6 - 6 mm	2.6 - 10 mm	5.5 mm	22 mm	15 mm pressed-on	SDT 25-15	Hexagon 10	200 pc	413428
Self-drill screw S-MD23Z 6,3x22 M		2.6 - 6 mm	2.6 - 10 mm	6.3 mm	22 mm	15 mm pressed-on	SDT 25-15	Hexagon 10	200 pc	413431
Self-drill screw S-MD05Z 5,5x40 M		4.6 - 15 mm	4.6 - 18 mm	5.5 mm	40 mm		SDT 5	Hexagon 8	250 pc	2058923

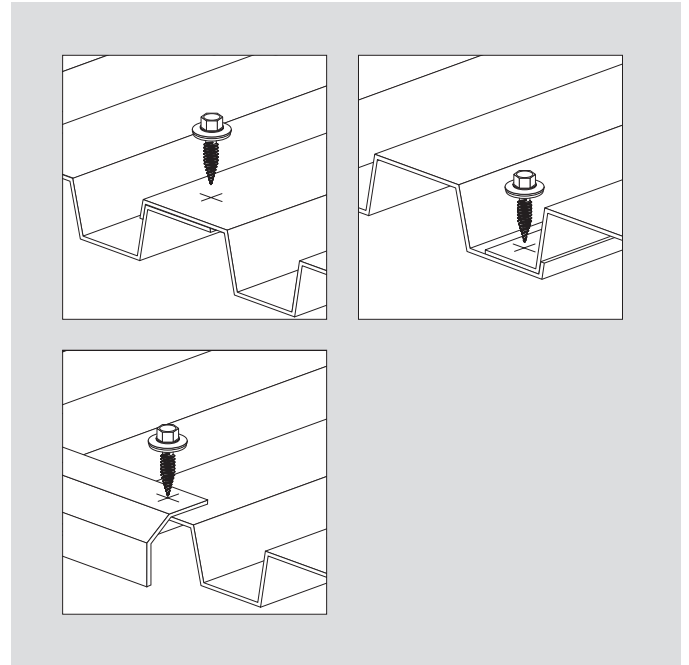
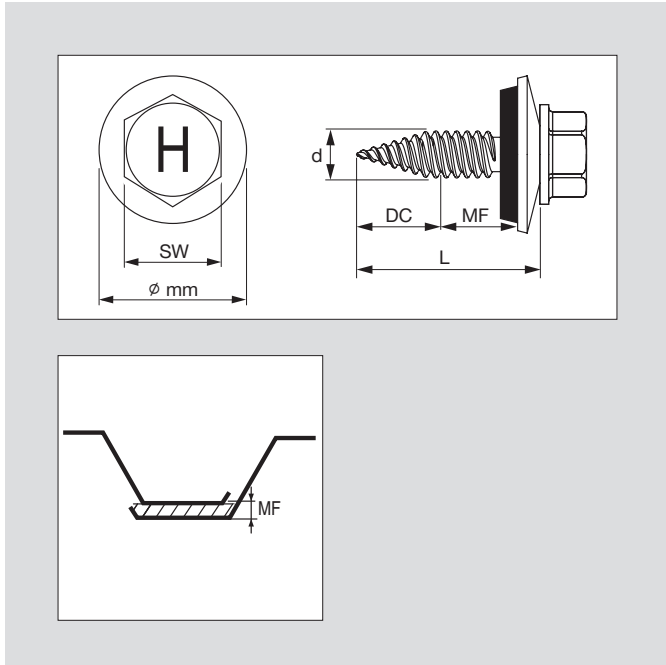
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

**5.4.1**  
**Carbon steel overlapping screw,**  
**chipless (Ø 14, 16)**  
**S-MS 41 Z/51 Z**



The fastest chipless overlapping screw with 14 and 16 mm sealing washer



5

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MS 41Z 4.8x20	2 x 0.4 mm - 2 x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	14 mm	2 mm	Hexagon 8	500 pc	2083694
Self-drill screw S-MS 51Z 4.8x20	2 x 0.4 mm - 2 x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	16 mm	2 mm	Hexagon 8	500 pc	2083695

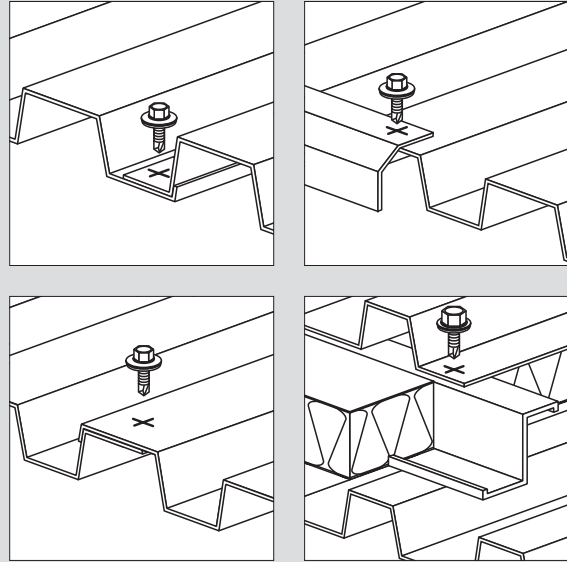
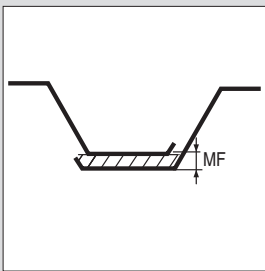
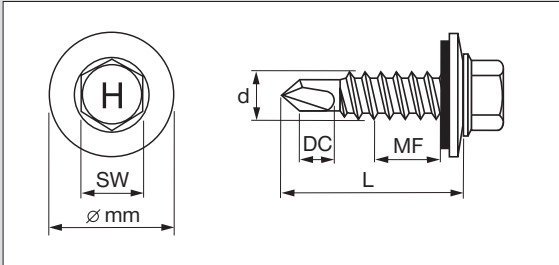
**Reference:**

- The screws can be processed without a depth gauge and without torque limitation. They are deliberately and systematically overtorqued
- More Information see approval Z-14.1 and Z-14.1-537 (Chapter 16)

## 5.4.2 Carbon steel self-drilling Screw (Ø19) S-MD 51 Z



Carbon steel self-drilling screw with 16 mm sealing washer for light applications



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD51Z 4,8X19	1.2 - 2.75 mm	1.2 - 8 mm	4.8 mm	19 mm	16 mm	2 mm	Hexagon 8	500 pc	219032
Self-drill screw S-MD51Z 6,3X19	1.2 - 3 mm	1.2 - 6 mm	6.3 mm	19 mm	16 mm	2 mm	Hexagon 3/8	500 pc	219034

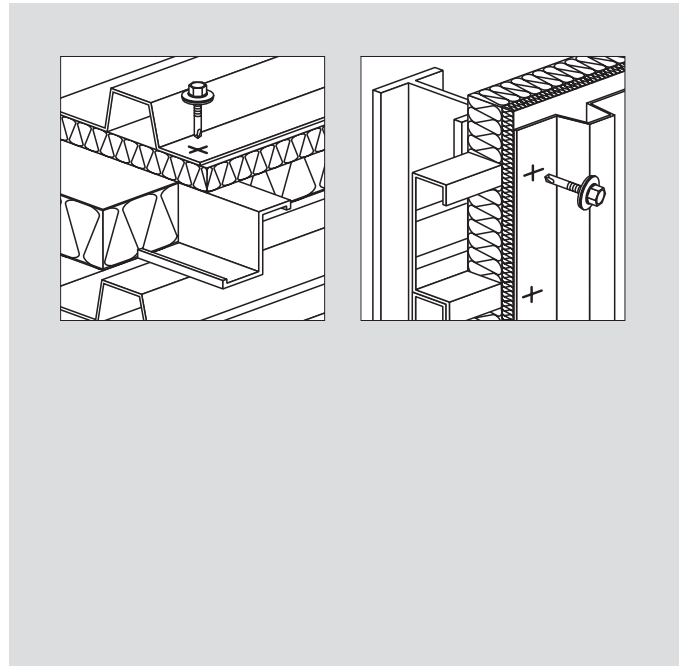
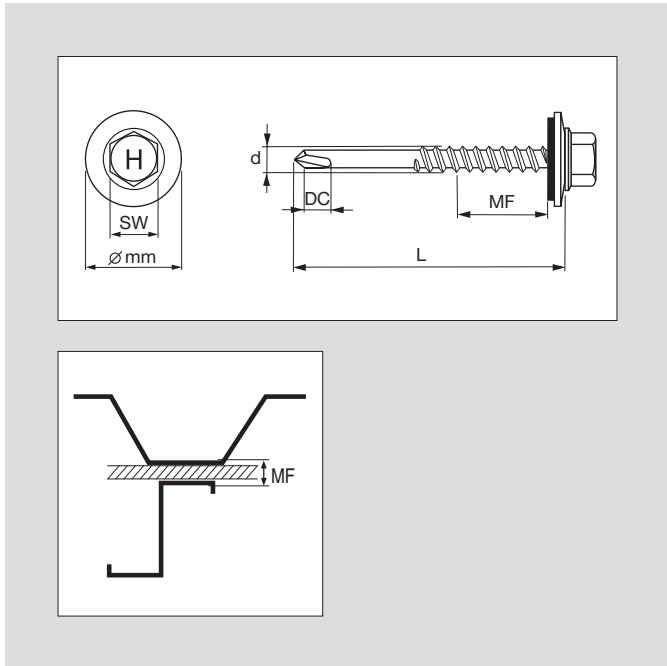
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)



### 5.4.3 Carbon steel self-drilling Screw (Ø16) S-MD 51 LZ

Carbon Steel Self-Drilling Screw with 16 mm sealing washer for light applications



5

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD51LZ 4,8X38	1.2 - 2.75 mm	1.2 - 13 mm	4.8 mm	38 mm	16 mm	2 mm	Hexagon 8	250 pc	252801

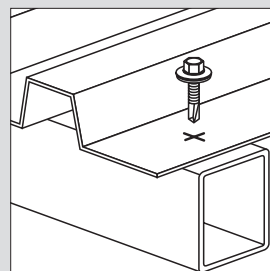
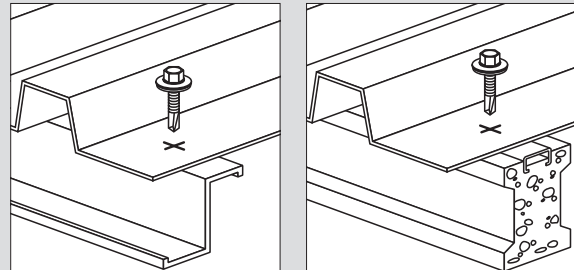
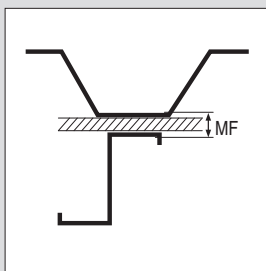
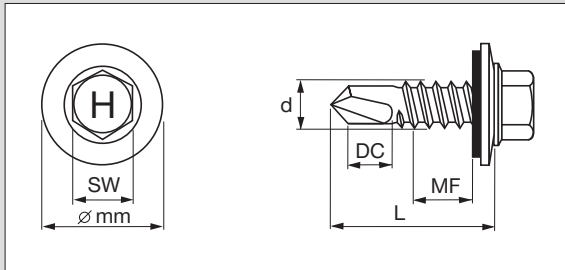
**Reference:**

- Technical data see chapter 16.9

## 5.4.4 Carbon steel self-drilling Screw (Ø16) S-MD 53 Z



Carbon Steel Self-Drilling Screw with 16 mm sealing washer for light and medium applications



Ordering description	Reference	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD53Z 4,8X19	Without RT and PS	2.1 - 4.5 mm	2.1 - 6 mm	4.8 mm	19 mm	16 mm	2 mm	Hexagon 8	500 pc	219035
Self-drill screw S-MD53Z 4,8X32	Without RT and PS	2.1 - 4.5 mm	2.1 - 20 mm	4.8 mm	32 mm	16 mm	2 mm	Hexagon 8	1500 pc	224612
Self-drill screw S-MD53Z 5,5x19		2.6 - 6 mm	2.6 - 4 mm	5.5 mm	19 mm	16 mm	2 mm	Hexagon 8	500 pc	413440
Self-drill screw S-MD53Z 5,5x25		2.6 - 6 mm	2.6 - 10 mm	5.5 mm	25 mm	16 mm	2 mm	Hexagon 8	500 pc	413441
Self-drill screw S-MD53Z 5,5x32		2.6 - 6 mm	2.6 - 17 mm	5.5 mm	32 mm	16 mm	2 mm	Hexagon 8	500 pc	413442
Self-drill screw S-MD53Z 5,5x38		2.6 - 6 mm	2.6 - 23 mm	5.5 mm	38 mm	16 mm	2 mm	Hexagon 8	250 pc	413443
Self-drill screw S-MD53Z 5,5x50		2.6 - 6 mm	2.6 - 35 mm	5.5 mm	50 mm	16 mm	2 mm	Hexagon 8	250 pc	413444
Self-drill screw S-MD53Z 6,3x19		2.6 - 6 mm	2.6 - 4 mm	6.3 mm	19 mm	16 mm	2 mm	Hexagon 8	500 pc	413445
Self-drill screw S-MD53Z 6,3x25		2.6 - 6 mm	2.6 - 10 mm	6.3 mm	25 mm	16 mm	2 mm	Hexagon 8	500 pc	413446
Self-drill screw S-MD53Z 6,3x32		2.6 - 6 mm	2.6 - 17 mm	6.3 mm	32 mm	16 mm	2 mm	Hexagon 8	500 pc	413447
Self-drill screw S-MD53Z 6,3x38		2.6 - 6 mm	2.6 - 23 mm	6.3 mm	38 mm	16 mm	2 mm	Hexagon 8	250 pc	413448
Self-drill screw S-MD53Z 6,3x50		2.6 - 6 mm	2.6 - 35 mm	6.3 mm	50 mm	16 mm	2 mm	Hexagon 8	250 pc	413449

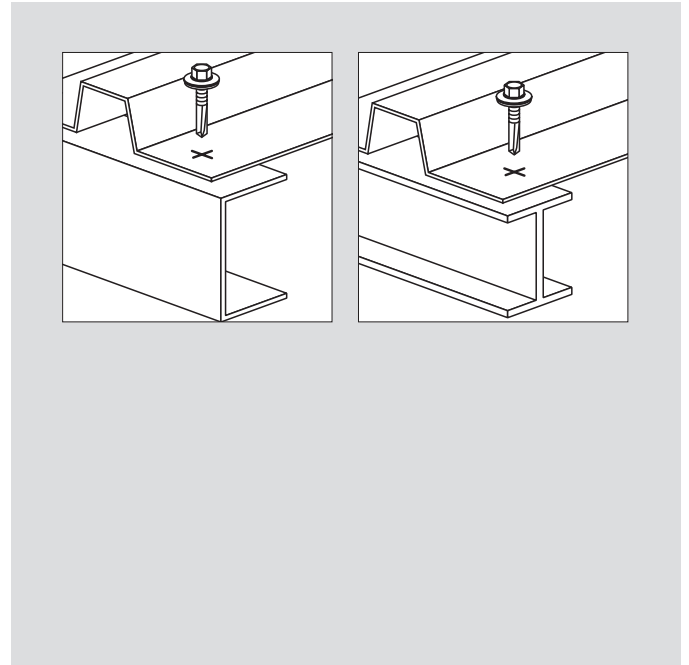
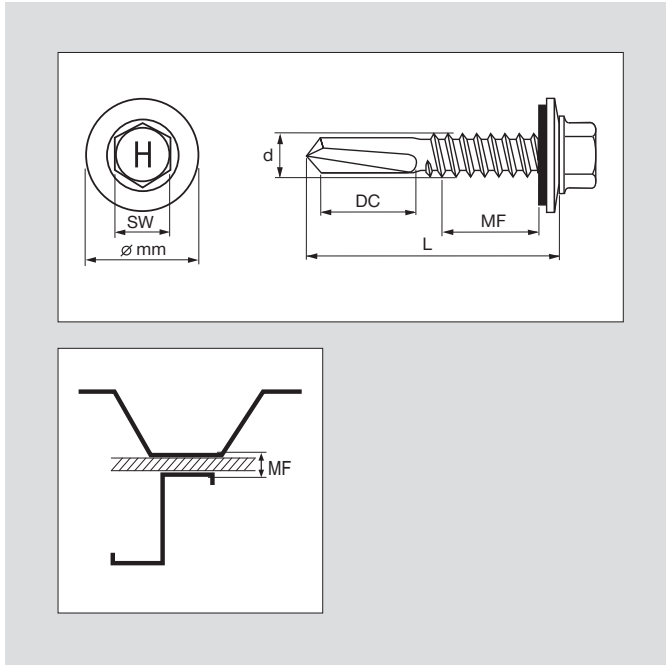
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

### 5.4.5 Carbon steel self-drilling Screw (Ø16) S-MD 55 GZ



Carbon steel self-drilling screw with 16 mm sealing washer for medium and heavy applications



5

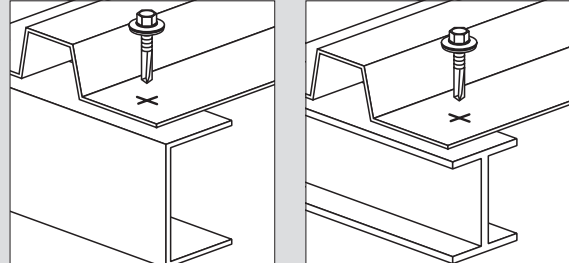
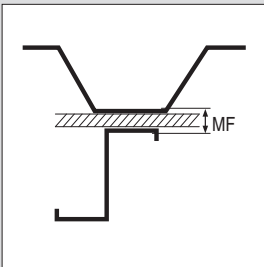
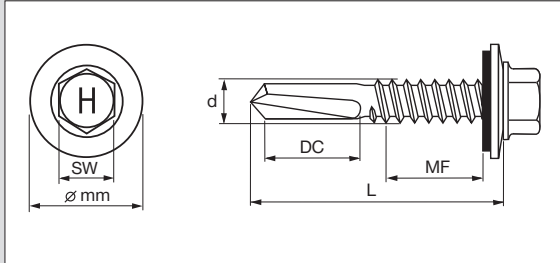
Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD55GZ 5,5x40	4.6 - 15 mm	4.6 - 15 mm	5.5 mm	40 mm	16 mm	2 mm	Hexagon 8	250 pc	2054489
Self-drill screw S-MD55GZ 5,5x52	4.6 - 15 mm	4.6 - 27 mm	5.5 mm	52 mm	16 mm	2 mm	Hexagon 8	250 pc	2054830
Self-drill screw S-MD55GZ 5,5x65	4.6 - 15 mm	4.6 - 40 mm	5.5 mm	65 mm	16 mm	2 mm	Hexagon 8	100 pc	2054831
Self-drill screw S-MD55GZ 5,5x82	4.6 - 15 mm	4.6 - 57 mm	5.5 mm	82 mm	16 mm	2 mm	Hexagon 8	100 pc	2054832
Self-drill screw S-MD55GZ 5,5x102	4.6 - 15 mm	4.6 - 77 mm	5.5 mm	102 mm	16 mm	2 mm	Hexagon 8	100 pc	2054833

**Reference:**

- More Information see approval ETA-10/0182 (Chapter 16)

## 5.4.6 Carbon steel self-drilling Screw (Ø19) S-MD 65 GZ

Carbon steel self-drilling screw with 19 mm sealing washer for medium and heavy applications



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD65GZ 5,5x40	4.6 - 15 mm	4.6 - 15 mm	5.5 mm	40 mm	19 mm	2 mm	Hexagon 8	250 pc	2090661

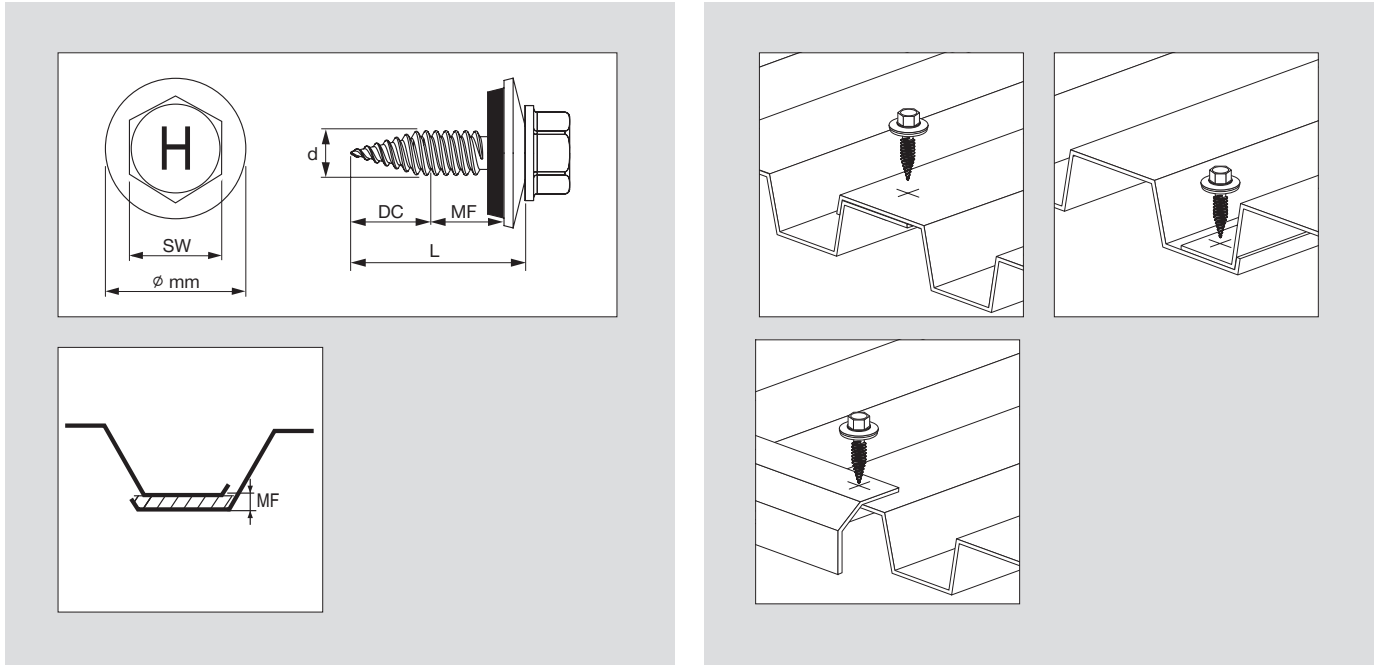
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

**5.4.7**  
**Colored carbon steel overlapping screw,**  
**chipless (Ø14, 16)**  
**S-MS 41 Z/51 Z RAL**



The fastest chipless overlapping screw with 14 and 16 mm sealing washer



5

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MS41Z 4,8x20 RAL 9006	2 x 0.4 mm - 2 x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	14 mm	2 mm	Hexagon 8	500 pc	2089264
Self-drill screw S-MS51Z 4,8x20 RAL 9010	2 x 0.4 mm - 2 x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	16 mm	2 mm	Hexagon 8	500 pc	2089267
Self-drill screw S-MS41Z 4,8x20 RAL 9010	2 x 0.4 mm - 2 x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	14 mm	2 mm	Hexagon 8	500 pc	2089265
Self-drill screw S-MS51Z 4,8x20 RAL 9006	2 x 0.4 mm - 2 x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	16 mm	2 mm	Hexagon 8	500 pc	2089266

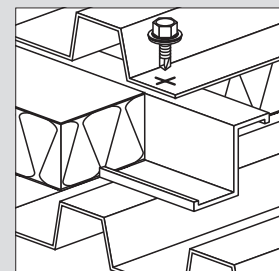
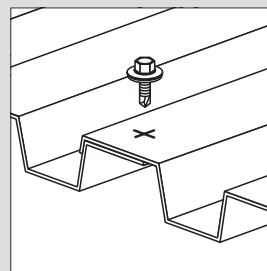
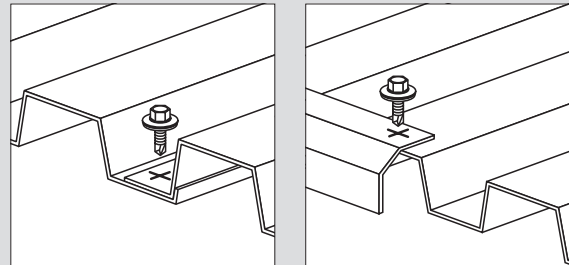
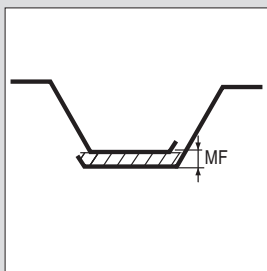
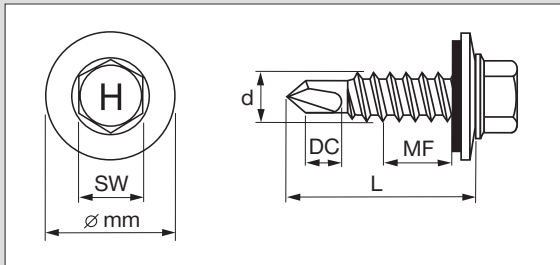
**Reference:**

- The screws can be processed without a depth gauge and without torque limitation. They are deliberately and systematically overtorqued
- More Information see approval Z-14.1-4 and Z-14.1-537 (Chapter 16)

## 5.4.8 Colored carbon self-drilling Screw (Ø16) S-MD 51 Z RAL



Carbon steel self-drilling screw with 16 mm sealing washer for light applications



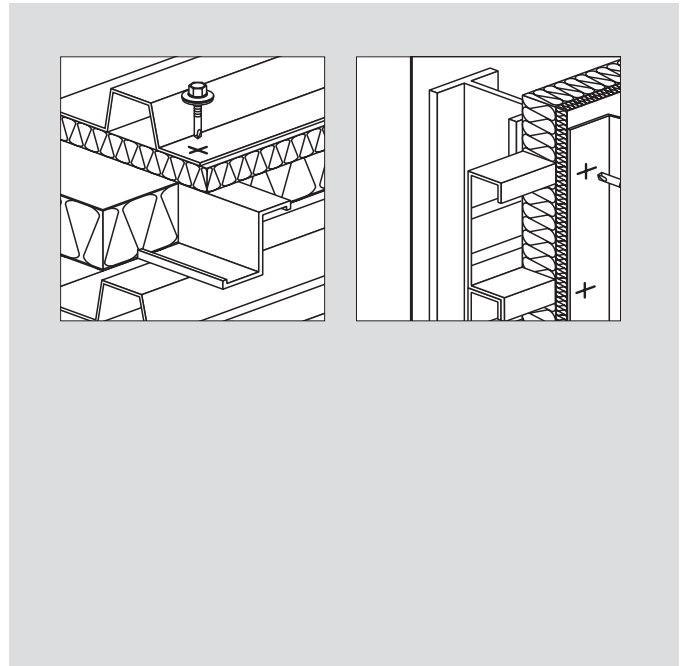
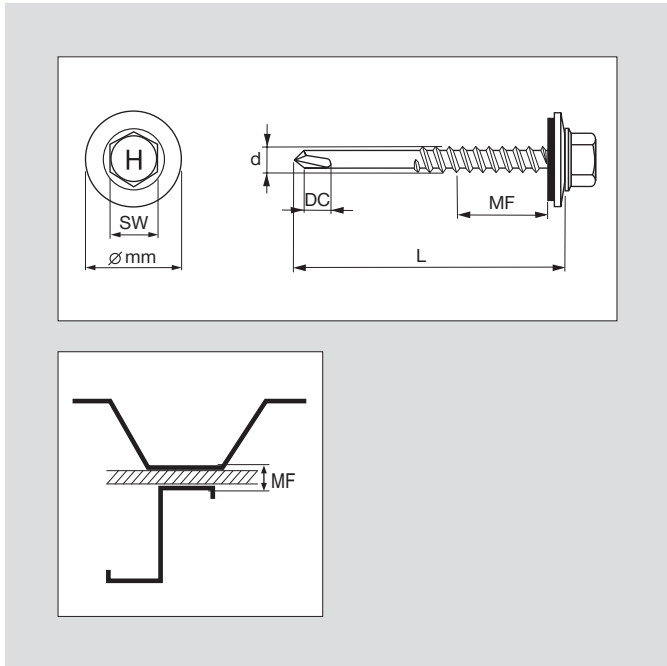
Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD 51 Z 4,8x19 RAL9006	1.2 - 2.75 mm	1.2 - 8 mm	4.8 mm	19 mm	16 mm	2 mm	Hexagon 8	500 pc	224614
Self-drill screw S-MD 51 Z 4,8x19 RAL9010	1.2 - 2.75 mm	1.2 - 8 mm	4.8 mm	19 mm	16 mm	2 mm	Hexagon 8	500 pc	224613

### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

### 5.4.9 Colored carbon self-drilling Screw (Ø16) S-MD 51 LZ RAL

Carbon steel self-drilling screw with 16mm sealing washer for light applications



5

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD 51 LZ 4,8x38 RAL9006	1.2 - 2.75 mm	1.2 - 13 mm	4.8 mm	38 mm	16 mm	2 mm	Hexagon 8	250 pc	258791
Self-drill screw S-MD 51 LZ 4,8x38 RAL9010	1.2 - 2.75 mm	1.2 - 13 mm	4.8 mm	38 mm	16 mm	2 mm	Hexagon 8	250 pc	258790

**Reference:**

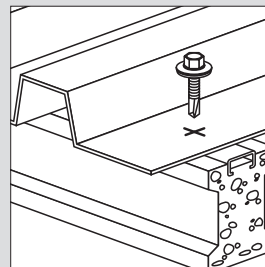
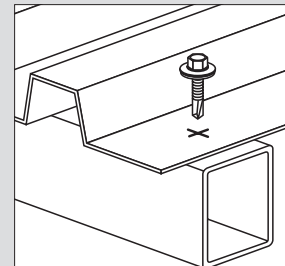
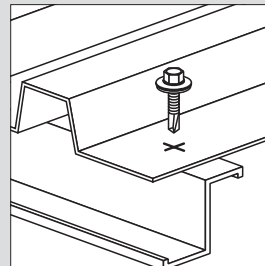
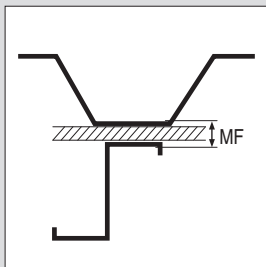
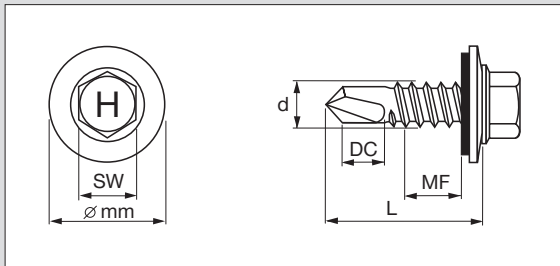
- Technical data see chapter 16.9



## 5.4.10 Colored carbon self-drilling Screw (Ø16) S-MD 53 Z RAL



Carbon Steel Self-Drilling Screw with 16 mm sealing washer for light and medium applications



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD53Z 5,5x25 RAL9006	2.6 - 6 mm	2.6 - 10 mm	6 mm	25 mm	16 mm	2 mm	Hexagon 8	500 pc	413320
Self-drill screw S-MD53Z 5,5x25 RAL9010	2.6 - 6 mm	2.6 - 10 mm	6 mm	25 mm	16 mm	2 mm	Hexagon 8	500 pc	413319

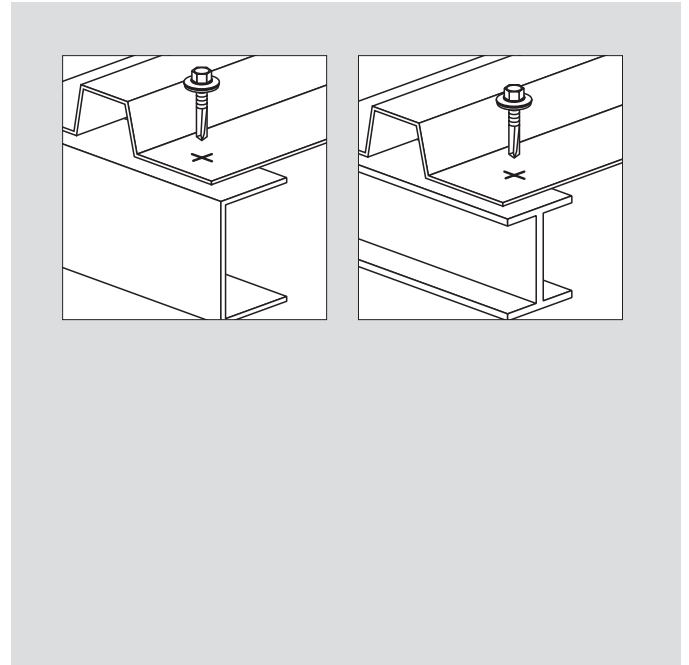
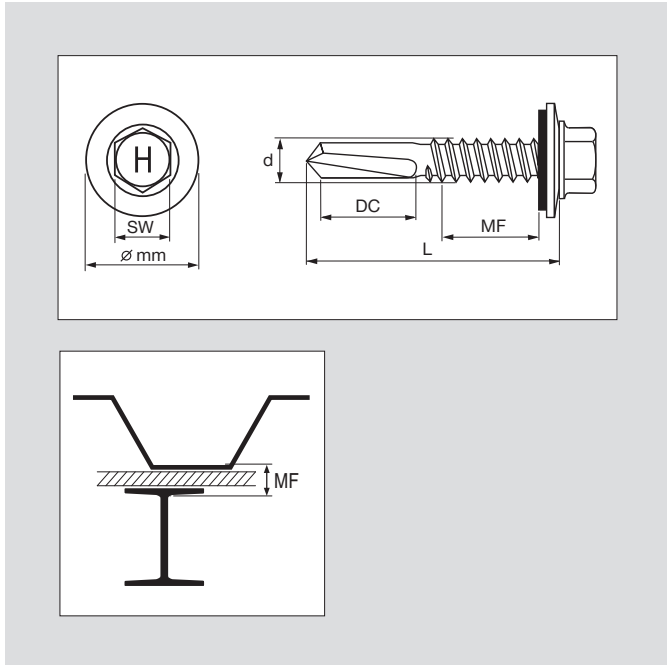
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

**5.4.11**  
**Colored carbon self-drilling Screw (Ø16)**  
**S-MD 55 GZ RAL**



Carbon steel self-drilling screw with 16 mm sealing washer for medium and heavy applications



5

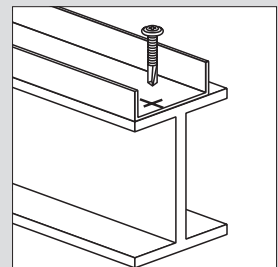
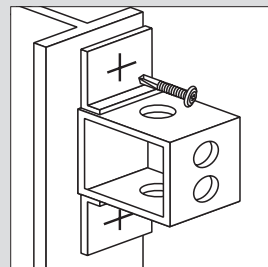
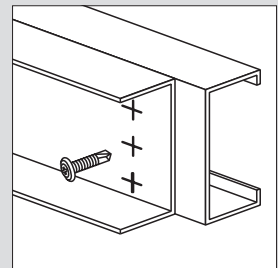
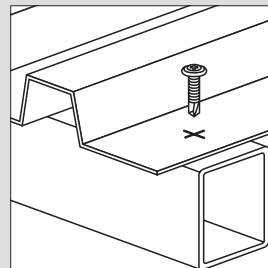
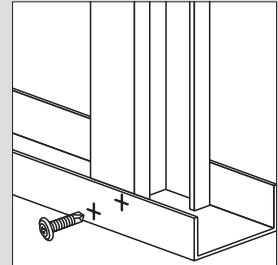
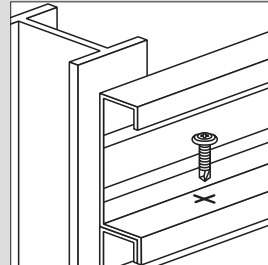
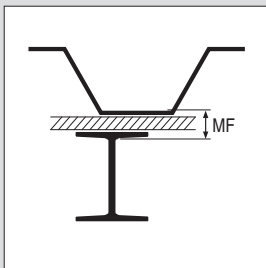
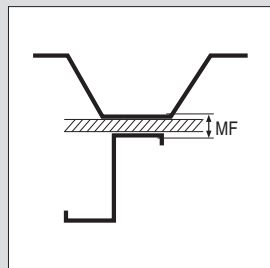
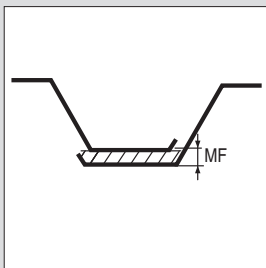
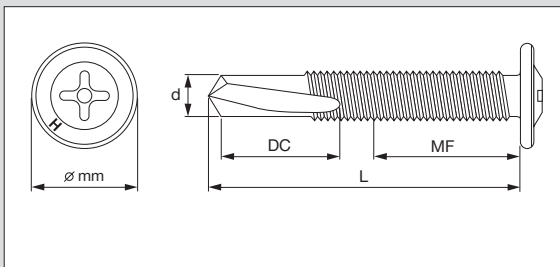
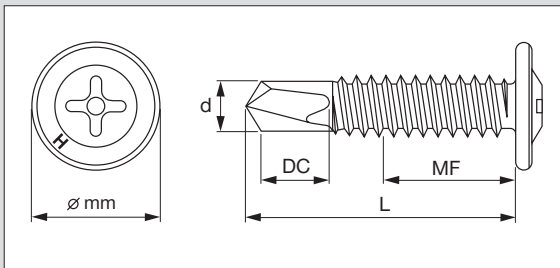
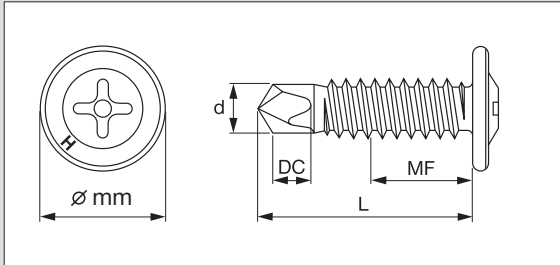
Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD55GZ 5,5x40 RAL9010	4.6 - 15 mm	4.6 - 15 mm	5.5 mm	40 mm	16 mm	2 mm	Hexagon 8	250 pc	2054834
Self-drill screw S-MD55GZ 5,5x40 RAL9006	4.6 - 15 mm	4.6 - 15 mm	5.5 mm	40 mm	16 mm	2 mm	Hexagon 8	250 pc	2054835

**Reference:**

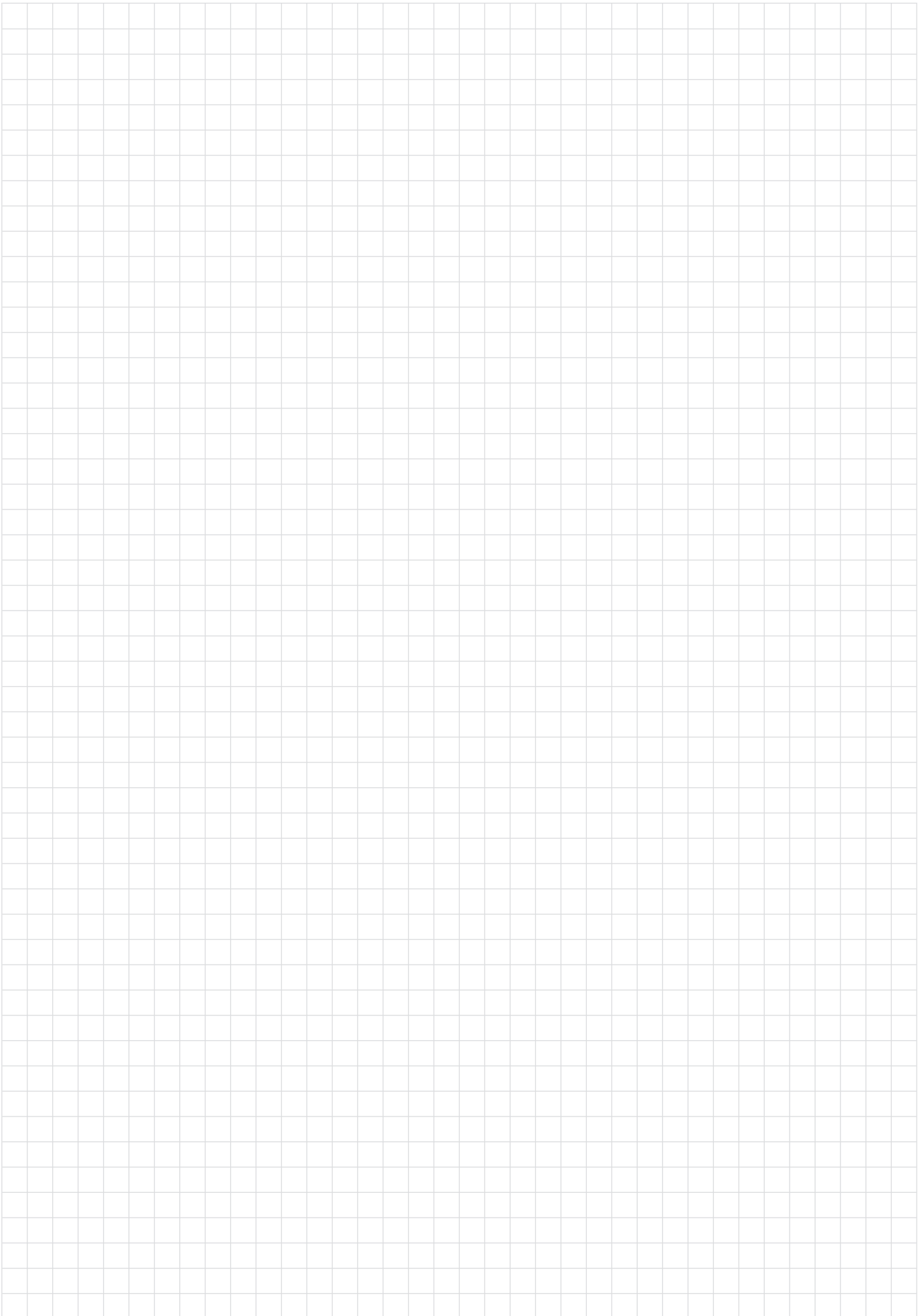
- More Information see approval ETA-10/0182 (Chapter 16)

## 5.5 Carbon steel self-drilling screw S-MD 01/S-MD 03/S-MD 05 ZW

The carbon steel waferhead screw for fastening metal sheets to steel structures



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Schraubenkopf- $\varnothing$	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD01ZW 5,5x19	1.2 - 3 mm	1.2 - 7.5 mm	5.5 mm	19 mm	11 mm	PH #2	1000 pc	408761
Self-drill screw S-MD03ZW 5,5x25	2.6 - 6 mm	2.6 - 12 mm	5.5 mm	25 mm	11 mm	PH #2	1000 pc	408762
Self-drill screw S-MD05ZW 5,5x40	4.6 - 12 mm	4.6 - 18 mm	5.5 mm	40 mm	12.5 mm	PH #3	500 pc	408763

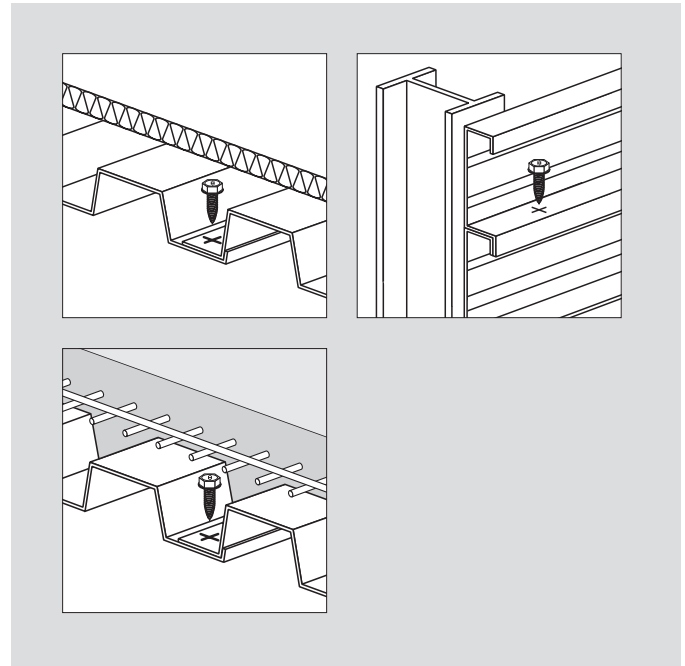
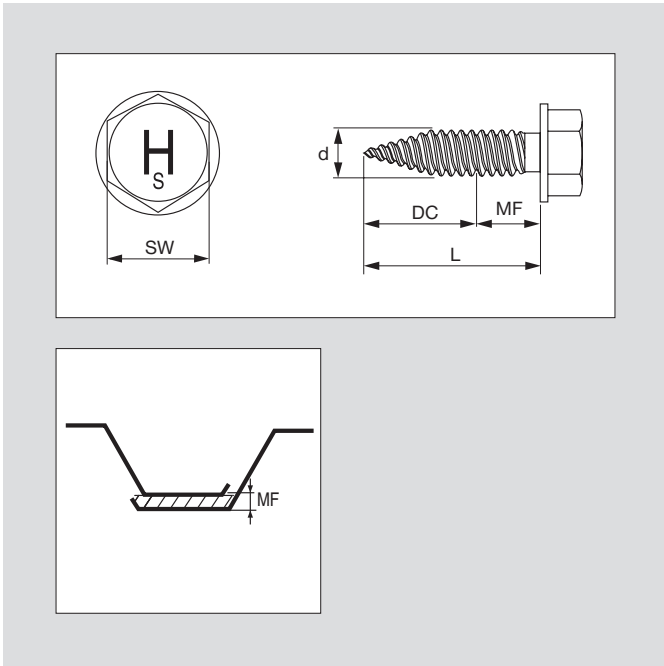


## Content

<b>6.1</b>			Page
6.1.1	Stainless steel overlapping Screw, chipless	S-MS 01 S	53
6.1.2	Stainless steel self-drilling screw	S-MD 01 S	54
6.1.3	Stainless steel self-drilling screw	S-MD 03 S	55
6.1.4	Stainless steel self-drilling screw	S-MD 05 S	56
<b>6.2</b>			
6.2.1	Stainless steel overlapping screw,	S-MS 41 S/51 S	57
6.2.2	Stainless steel self-drilling screw (Ø 16)	S-MD 51 S	58
6.2.3	Stainless steel self-drilling screw (Ø 19)	S-MD 61 S	59
6.2.4	Stainless steel self-drilling screw (Ø 16, 19, 22)	S-MD LS	60
6.2.5	Stainless steel self-drilling screw (Ø 14)	S-MD 43 S	61
6.2.6	Stainless steel self-drilling screw (Ø 16)	S-MD 53 S	62
6.2.7	Stainless steel self-drilling screw (Ø 19)	S-MD 63 S	63
6.2.8	Stainless steel self-drilling screw (Ø 22)	S-MD 73 S	64
6.2.9	Stainless steel self-drilling screw (Ø 16)	S-MD 55 S	65
6.2.10	Stainless steel self-drilling screw (Ø 19)	S-MD 65 S	66
6.2.11	Stainless steel self-drilling screw (Ø 22)	S-MD 75 S	67
<b>6.3</b>			
6.3.1	Stainless steel self-drilling pan head screw	S-MD 01 PS	68
6.3.2	Stainless steel self-drilling pan head screw	S-MD 03 PS	69
6.3.3	Stainless steel self-drilling pan head screw	S-MD 05 PS	70
<b>6.4</b>			
6.4.1	Stainless self-drill pan head screw (Ø 12)	S-MD 31 PS	71
6.4.2	Stainless self-drill pan head screw (Ø 12)	S-MD 33 PS	72
6.4.3	Stainless self-drill pan head screw (Ø 12)	S-MD 35 PS	73
<b>6.5</b>			
	Stainless steel self-drilling screw	S-AD 01 S/SS	74

### 6.1.1 Stainless steel overlapping Screw, chipless S-MS 01 S

The fastest stainless steel chipless overlapping screw



6

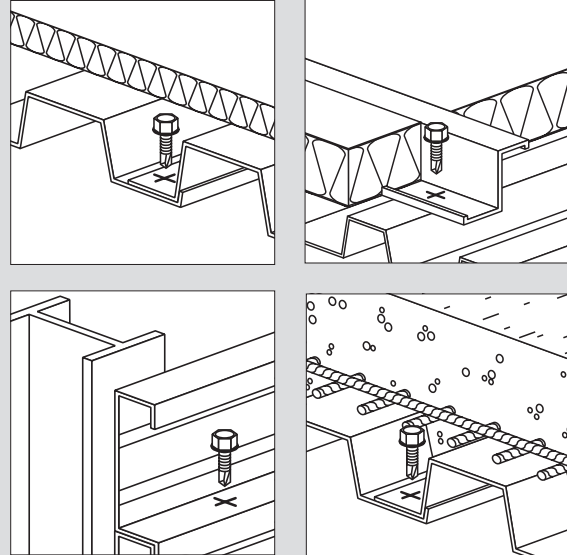
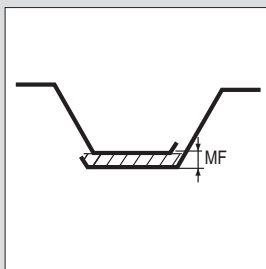
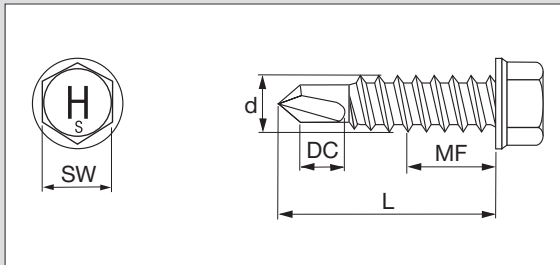
Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MS 01S 4.8x20	2x 0.4 mm - 2x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	Hexagon 8	1000 pc	2083693

**Reference:**

- More Information see approval Z-14.1-4 and Z-14.1-537 (Chapter 16)

## 6.1.2 Stainless steel self-drilling screw S-MD 01 S

Universal stainless steel self-drilling screw for a wide range of light inside applications



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD01S 4,8x22	1.2 - 2 mm	1.2 - 8 mm	4.8 mm	22 mm	Hexagon 8	500 pc	285608
Self-drill screw S-MD01LS 5,5x25	1.2 - 4 mm	1.2 - 8 mm	5.5 mm	25 mm	Hexagon 8	500 pc	285609

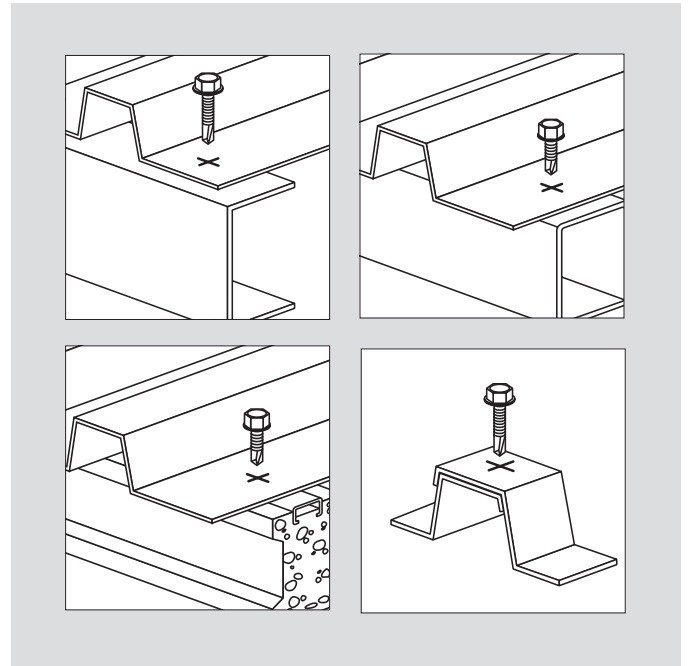
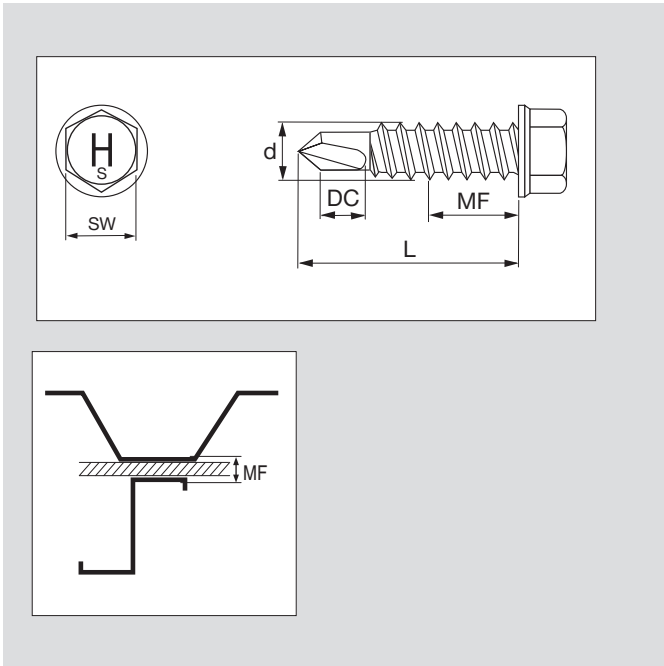
### Reference:

- Technical data see chapter 16.9



### 6.1.3 Stainless steel self-drilling screw S-MD 03 S

Universal stainless self-drilling screw for a wide range of light and medium inside applications



6

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD03S 5,5x25	2.1 - 6 mm	2.1 - 10 mm	5.5 mm	25 mm	Hexagon 8	500 pc	413408
Self-drill screw S-MD03S 5,5x32	2.1 - 6 mm	2.1 - 17 mm	5.5 mm	32 mm	Hexagon 8	250 pc	413409
Self-drill screw S-MD03S 5,5x38	2.1 - 6 mm	2.1 - 23 mm	5.5 mm	38 mm	Hexagon 8	250 pc	413410
Self-drill screw S-MD03S 5,5x50	2.1 - 6 mm	2.1 - 35 mm	5.5 mm	50 mm	Hexagon 8	250 pc	413411
Self-drill screw S-MD03S 5,5x63	2.1 - 6 mm	2.1 - 48 mm	5.5 mm	63 mm	Hexagon 8	100 pc	413412
Self-drill screw S-MD03S 6,3x25	2.1 - 6 mm	2.1 - 10 mm	6.3 mm	25 mm	Hexagon 8	500 pc	413413
Self-drill screw S-MD03S 6,3x32	2.1 - 6 mm	2.1 - 17 mm	6.3 mm	32 mm	Hexagon 8	500 pc	413414

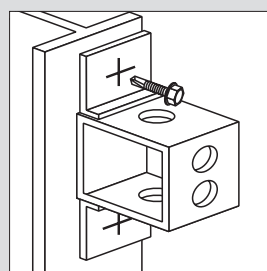
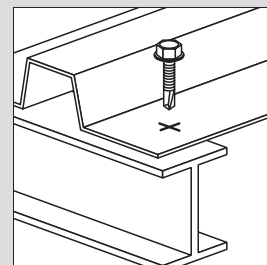
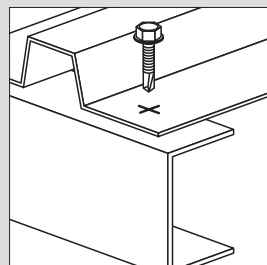
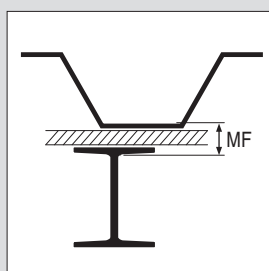
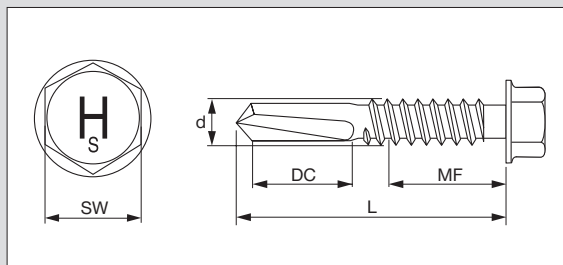
**Reference:**

- Technical data see chapter 16.9



## 6.1.4 Stainless steel self-drilling screw S-MD 05 S

Universal stainless self-drilling screw for a wide range of medium and heavy inside applications



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD05S 5,5x40	4.6 - 12 mm	4.6 - 14 mm	5.5 mm	40 mm	Hexagon 8	250 pc	290368
Self-drill screw S-MD05S 5,5x52	4.6 - 12 mm	4.6 - 26 mm	5.5 mm	52 mm	Hexagon 8	250 pc	290369
Self-drill screw S-MD05S 5,5x65	4.6 - 12 mm	4.6 - 39 mm	5.5 mm	65 mm	Hexagon 8	100 pc	290370
Self-drill screw S-MD05S 5,5x82	4.6 - 12 mm	4.6 - 56 mm	5.5 mm	82 mm	Hexagon 8	100 pc	290371
Self-drill screw S-MD05S 5,5x102	4.6 - 12 mm	4.6 - 76 mm	5.5 mm	102 mm	Hexagon 8	100 pc	290385

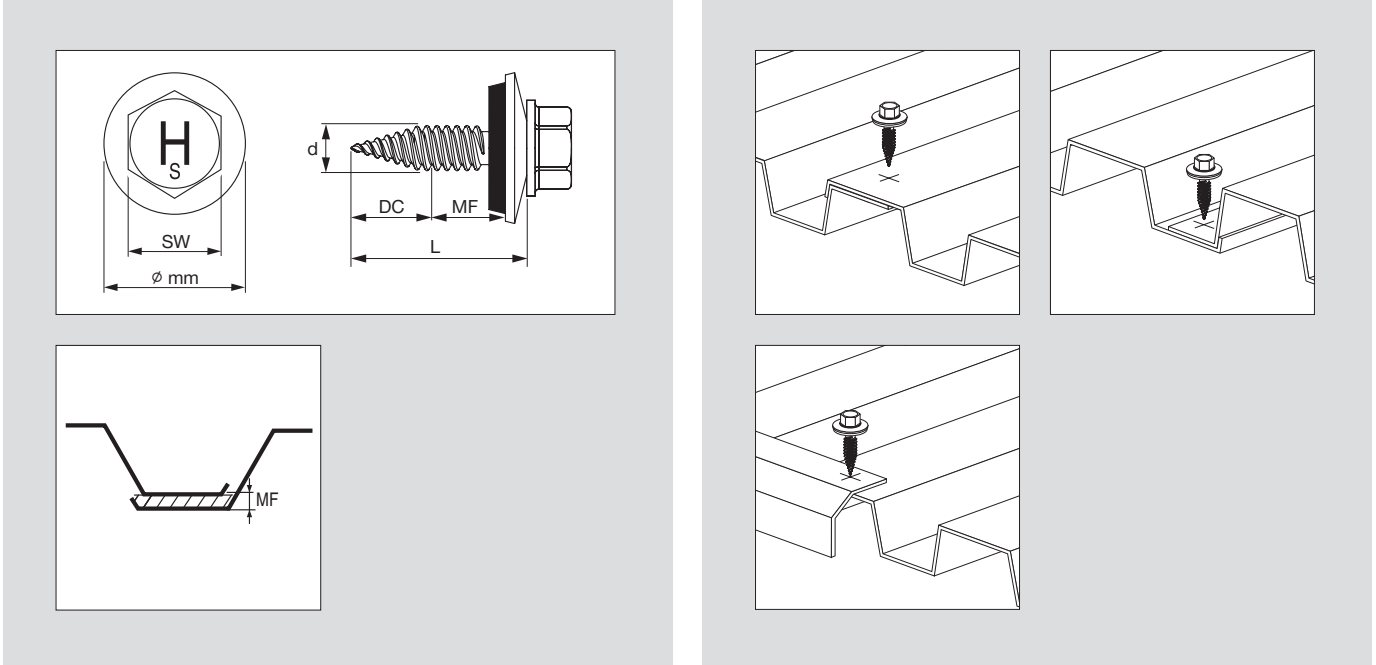
### Reference:

- Technical data see chapter 16.9

**6.2.1  
Stainless steel overlapping screw,  
chipless (Ø 14, 16)  
S-MS 41 S/51 S**



The fastest chipless overlapping screw with 14 and 16 mm sealing washer



Ordering description	Material Scaling washer	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MS 41S 4.8x20	A2	2 x 0.4 mm - 2 x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	14 mm	2 mm	Hexagon 8	500 pc	2083699
Self-drill screw S-MS 51S 4.8x20	A2	2 x 0.4 mm - 2 x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	16 mm	2 mm	Hexagon 8	500 pc	2083980
Self-drill screw S-MS 41S-A 4.8x20	Alu	2 x 0.4 mm - 2 x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	14 mm	2 mm	Hexagon 8	500 pc	2083981
Self-drill screw S-MS 51S-A 4.8x20	Alu	2 x 0.4 mm - 2 x 1.0 mm	0.8 - 4.0 mm	4.8 mm	20 mm	16 mm	2 mm	Hexagon 8	500 pc	2083982

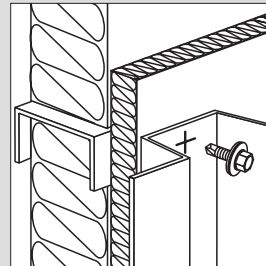
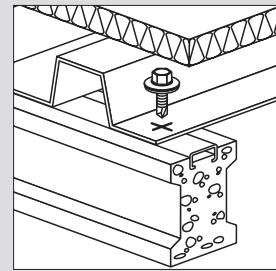
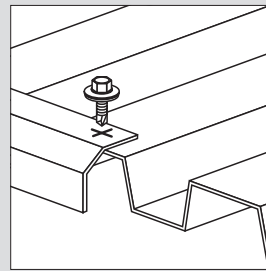
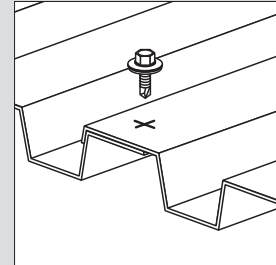
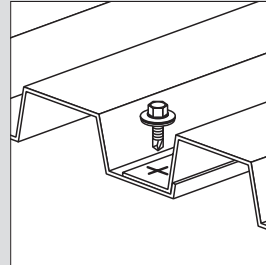
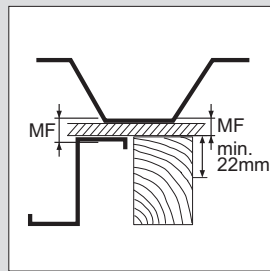
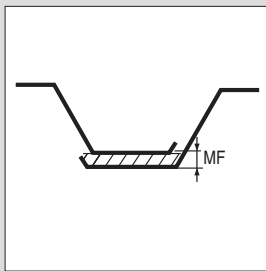
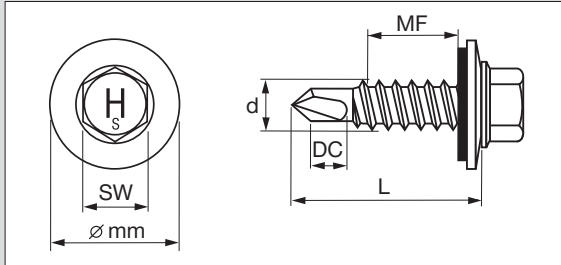
**Reference:**

- The screws can be processed without a depth gauge and without torque limitation. They are deliberately and systematically overtorqued
- More Information see approval Z-14.1-4 and Z-14.1-537 (Chapter 16)

## 6.2.2 Stainless steel self-drilling screw (Ø 16) S-MD 51 S



Stainless steel self-drilling screw with 16 mm sealing washer for light outside applications



Ordering description	Minimum thickness of base material	Drilling capacity range (DC)	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD51S 4,8X22		1.2 - 2 mm	1.2 - 6 mm	4.8 mm	22 mm	16 mm	2 mm	Hexagon 8	250 pc	375228
Self-drill screw S-MD51S 4,8X25		1.2 - 2 mm	1.2 - 9 mm	4.8 mm	25 mm	16 mm	2 mm	Hexagon 8	500 pc	375229
Self-drill screw S-MD51S 5,5x25		1.2 - 3 mm	1.2 - 8 mm	5.5 mm	25 mm	16 mm	2 mm	Hexagon 8	500 pc	378257
Self-drill screw S-MD51S 5,5X32		1.2 - 3 mm	1.2 - 15 mm	5.5 mm	32 mm	16 mm	2 mm	Hexagon 8	250 pc	375230
Self-drill screw S-MD51S 5,5X38	wood, 22 mm	1.2 - 3 mm	1.2 - 21 mm	5.5 mm	38 mm	16 mm	2 mm	Hexagon 8	250 pc	375231
Self-drill screw S-MD51S 5,5X50	wood, 22 mm	1.2 - 3 mm	1.2 - 33 mm	5.5 mm	50 mm	16 mm	2 mm	Hexagon 8	250 pc	375232

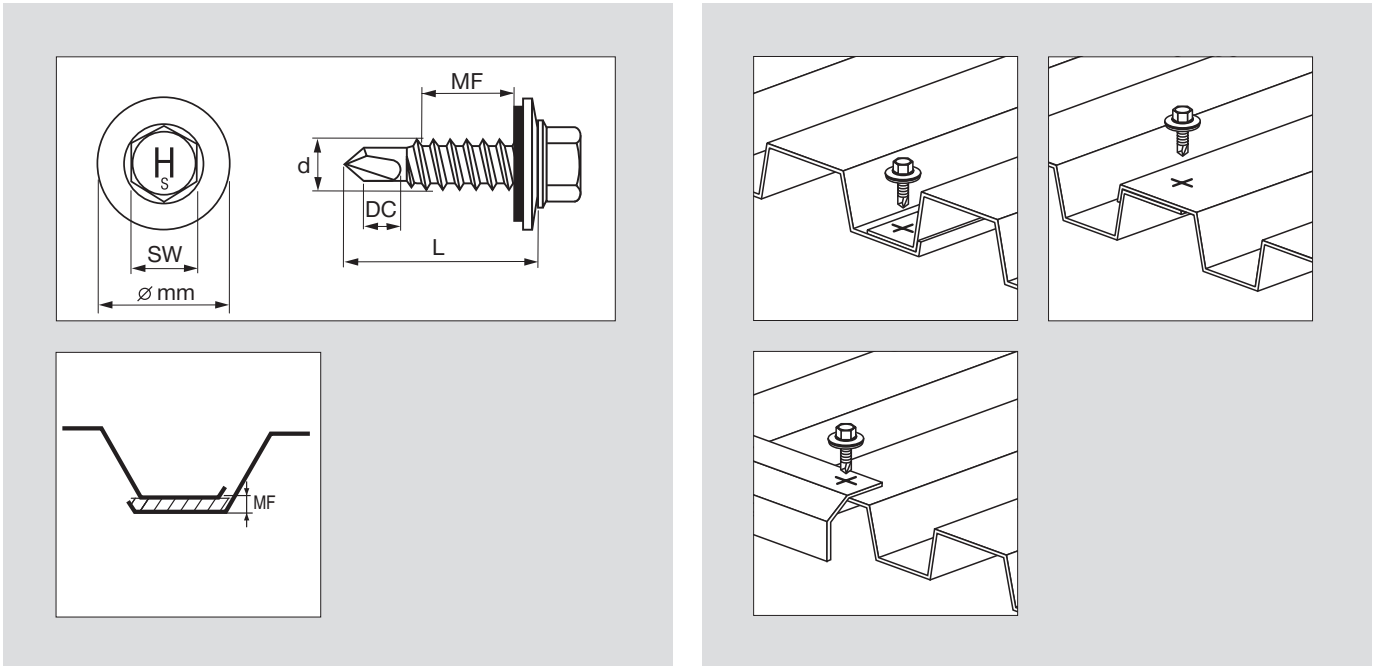
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)



### 6.2.3 Stainless steel self-drilling screw (Ø19) S-MD 61 S

Stainless steel self-drilling screw with 19 mm sealing washer for light outside applications



6

Ordering description	Drilling capacity range (DC)	Befestigungshöhe (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD61S 4,8x22	1.2 - 2 mm	1.2 - 6 mm	4.8 mm	22 mm	19 mm	2 mm	Hexagon 8	500 pc	283052

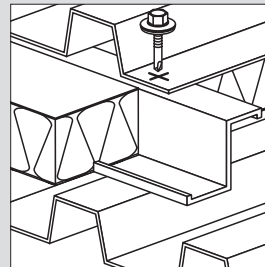
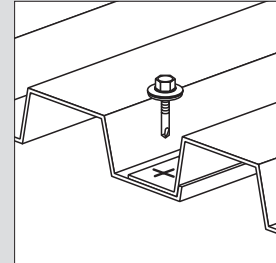
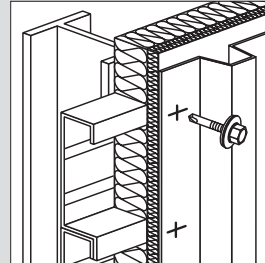
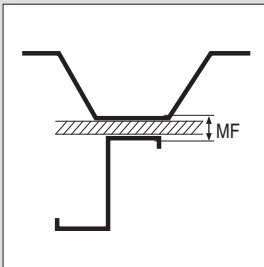
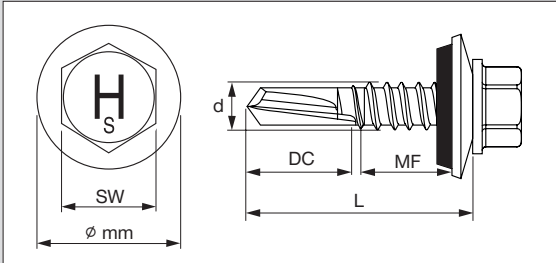
**Reference:**

- More Information see approval ETA-10/0182 (Chapter 16)

## 6.2.4 Stainless steel self-drilling screw (Ø16, 19, 22) S-MD LS



Stainless steel self-drilling screw with 16, 19 or 22 mm sealing washer for light outside applications



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD51LS 5,5x25	1.0 - 4 mm	1.0 - 5 mm	5.5 mm	25 mm	16 mm	2 mm	Hexagon 8	500 pc	378258
Self-drill screw S-MD61LS 5,5x25	1.0 - 4 mm	1.0 - 5 mm	5.5 mm	25 mm	19 mm	2 mm	Hexagon 8	500 pc	283058
Self-drill screw S-MD71LS 5,5x25	1.0 - 4 mm	1.0 - 5 mm	5.5 mm	25 mm	22 mm	2 mm	Hexagon 8	500 pc	285596

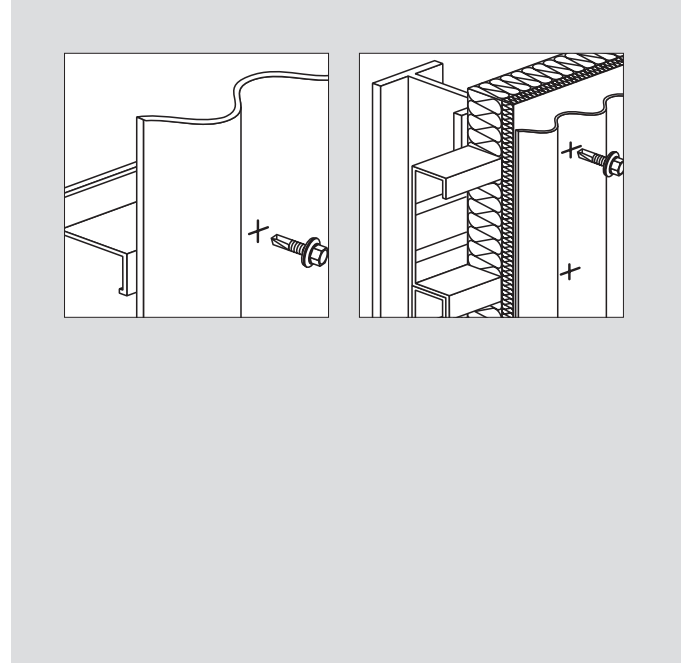
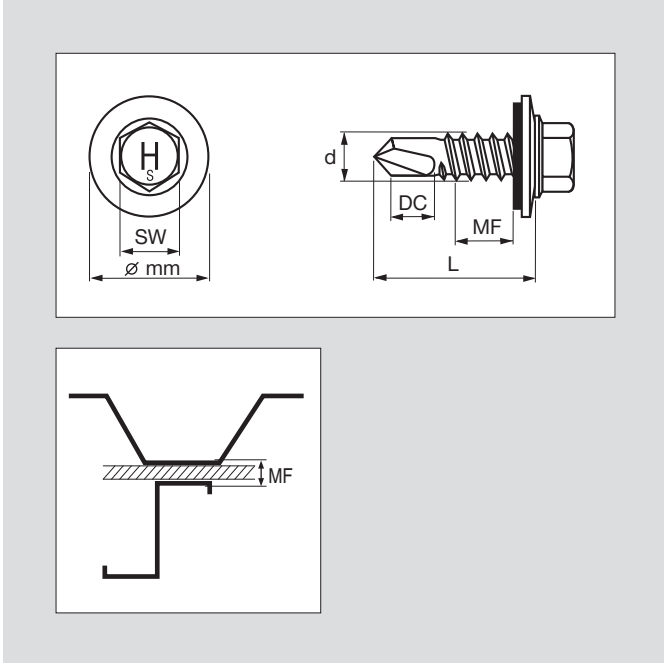
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

**6.2.5  
Stainless steel self-drilling screw (Ø14)  
S-MD 43 S**



Stainless steel self-drilling screw with 14 mm sealing washer for light and medium outside applications



6

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD43S 5,5x25	2.1 - 6 mm	2.1 - 7 mm	5.5 mm	25 mm	14 mm	2 mm	Hexagon 8	500 pc	414297
Self-drill screw S-MD43S 5,5x32	2.1 - 6 mm	2.1 - 14 mm	5.5 mm	32 mm	14 mm	2 mm	Hexagon 8	500 pc	414300
Self-drill screw S-MD43S 5,5x38	2.1 - 6 mm	2.1 - 20 mm	5.5 mm	38 mm	14 mm	2 mm	Hexagon 8	250 pc	414302
Self-drill screw S-MD43S 5,5x50	2.1 - 6 mm	2.1 - 32 mm	5.5 mm	50 mm	14 mm	2 mm	Hexagon 8	250 pc	414304
Self-drill screw S-MD43S 5,5x63	2.1 - 6 mm	2.1 - 45 mm	5.5 mm	63 mm	14 mm	2 mm	Hexagon 8	100 pc	414307

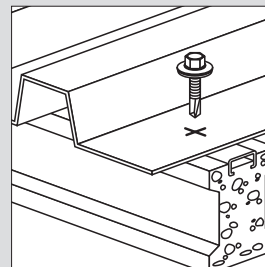
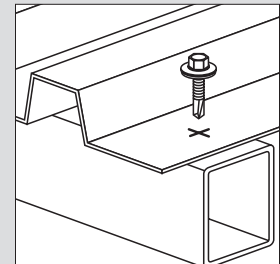
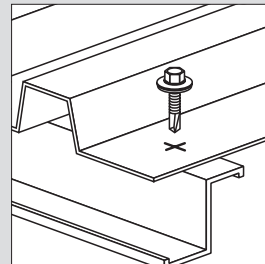
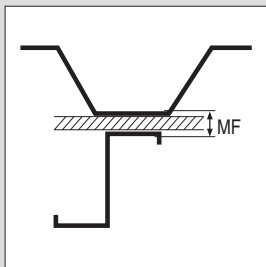
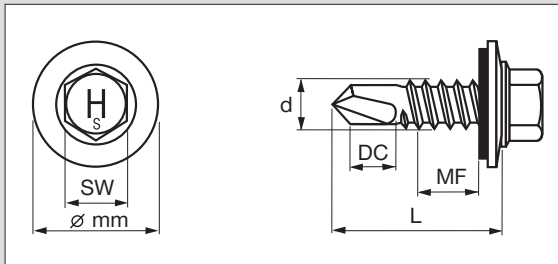
**Reference:**

- More Information see approval ETA-10/0182 (Chapter 16)

## 6.2.6 Stainless steel self-drilling screw (Ø16) S-MD 53 S



Stainless steel self-drilling screw with 16 mm sealing washer for light and medium outside applications



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD53S 5,5x25	2.1 - 6 mm	2.1 - 7 mm	5.5 mm	25 mm	16 mm	2 mm	Hexagon 8	500 pc	413434
Self-drill screw S-MD53S 5,5x32	2.1 - 6 mm	2.1 - 14 mm	5.5 mm	50 mm	16 mm	2 mm	Hexagon 8	250 pc	413435
Self-drill screw S-MD53S 5,5x38	2.1 - 6 mm	2.1 - 20 mm	5.5 mm	38 mm	16 mm	2 mm	Hexagon 8	250 pc	413436
Self-drill screw S-MD53S 5,5x50	2.1 - 6 mm	2.1 - 32 mm	5.5 mm	63 mm	16 mm	2 mm	Hexagon 8	100 pc	413437
Self-drill screw S-MD53S 5,5x63	2.1 - 6 mm	2.1 - 45 mm	5.5 mm	32 mm	16 mm	2 mm	Hexagon 8	250 pc	413438
Self-drill screw S-MD53S 6,3x25	2.1 - 6 mm	2.1 - 7 mm	6.3 mm	25 mm	16 mm	2 mm	Hexagon 8	250 pc	413439

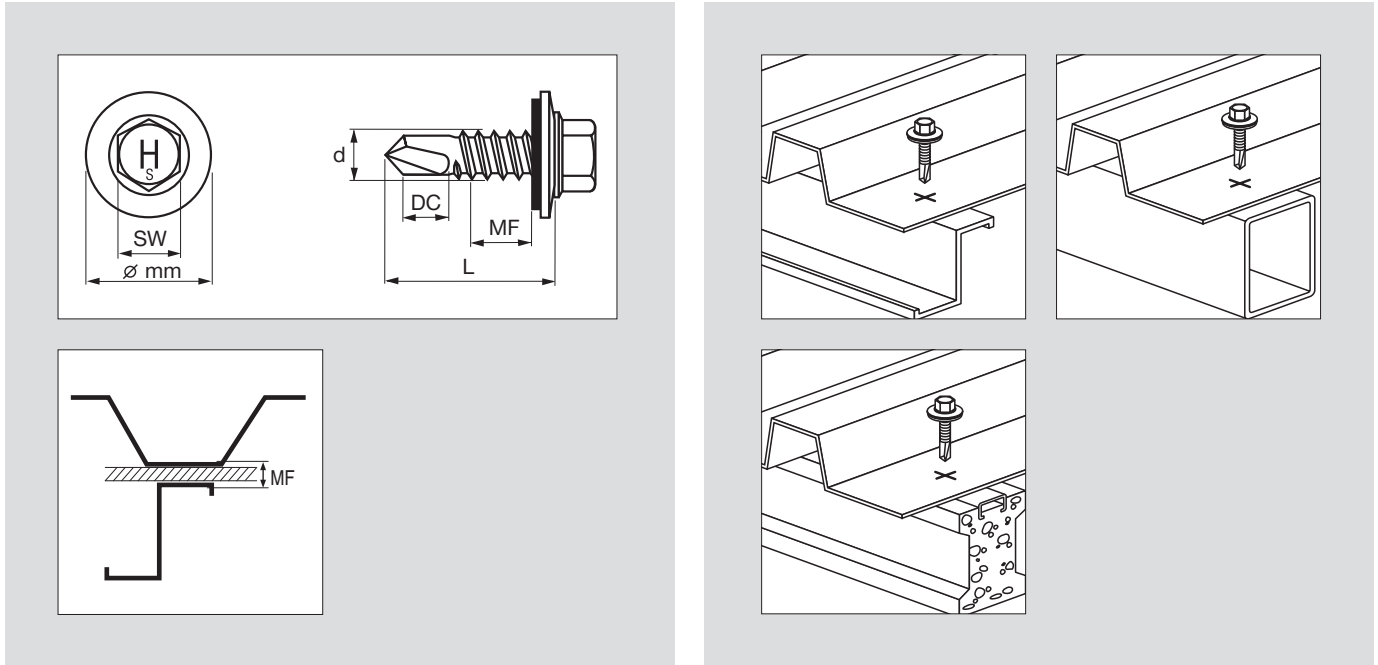
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

### 6.2.7 Stainless steel self-drilling screw (Ø19) S-MD 63 S



Stainless steel self-drilling screw with 19 mm sealing washer for light and medium outside applications



6

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD63S 5,5x25	2.1 - 6 mm	2.1 - 7 mm	5.5 mm	25 mm	19 mm	2 mm	Hexagon 8	500 pc	413450
Self-drill screw S-MD63S 5,5x32	2.1 - 6 mm	2.1 - 14 mm	5.5 mm	32 mm	19 mm	2 mm	Hexagon 8	250 pc	413451
Self-drill screw S-MD63S 5,5x38	2.1 - 6 mm	2.1 - 20 mm	5.5 mm	38 mm	19 mm	2 mm	Hexagon 8	250 pc	413452
Self-drill screw S-MD63S 5,5x50	2.1 - 6 mm	2.1 - 32 mm	5.5 mm	50 mm	19 mm	2 mm	Hexagon 8	250 pc	413453
Self-drill screw S-MD63S 5,5x63	2.1 - 6 mm	2.1 - 45 mm	5.5 mm	63 mm	19 mm	2 mm	Hexagon 8	100 pc	413454
Self-drill screw S-MD63S 6,3x25	2.1 - 6 mm	2.1 - 7 mm	6.3 mm	25 mm	19 mm	2 mm	Hexagon 8	500 pc	413455

Reference:

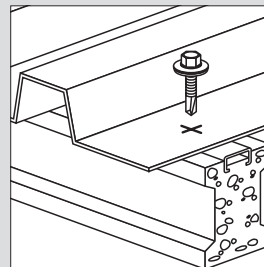
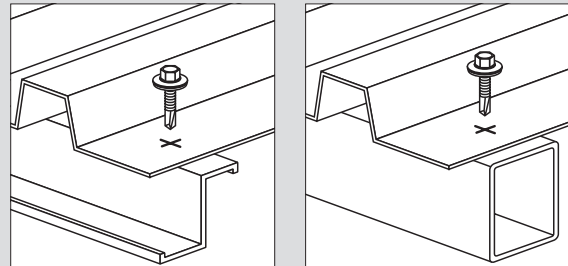
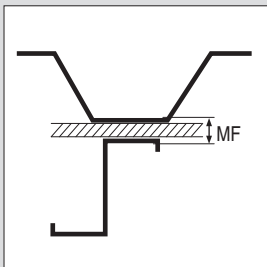
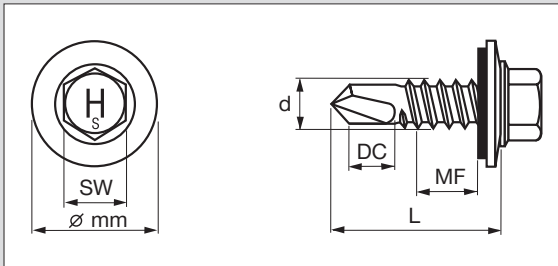
- More Information see approval ETA-10/0182 (Chapter 16)



## 6.2.8 Stainless steel self-drilling screw (Ø22) S-MD 73 S



Stainless steel self-drilling screw with 22 mm sealing washer for light and medium outside applications



6

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD73S 5,5x25	2.1 - 6 mm	2.1 - 7 mm	5.5 mm	25 mm	22 mm	2 mm	Hexagon 8	500 pc	413456
Self-drill screw S-MD73S 5,5x32	2.1 - 6 mm	2.1 - 14 mm	5.5 mm	32 mm	22 mm	2 mm	Hexagon 8	250 pc	413457
Self-drill screw S-MD73S 5,5x38	2.1 - 6 mm	2.1 - 20 mm	5.5 mm	38 mm	22 mm	2 mm	Hexagon 8	250 pc	413458
Self-drill screw S-MD73S 5,5x50	2.1 - 6 mm	2.1 - 32 mm	5.5 mm	50 mm	22 mm	2 mm	Hexagon 8	250 pc	413459
Self-drill screw S-MD73S 5,5x63	2.1 - 6 mm	2.1 - 45 mm	5.5 mm	63 mm	22 mm	2 mm	Hexagon 8	100 pc	413460
Self-drill screw S-MD73S 6,3x25	2.1 - 6 mm	2.1 - 7 mm	6.3 mm	25 mm	22 mm	2 mm	Hexagon 8	500 pc	413461

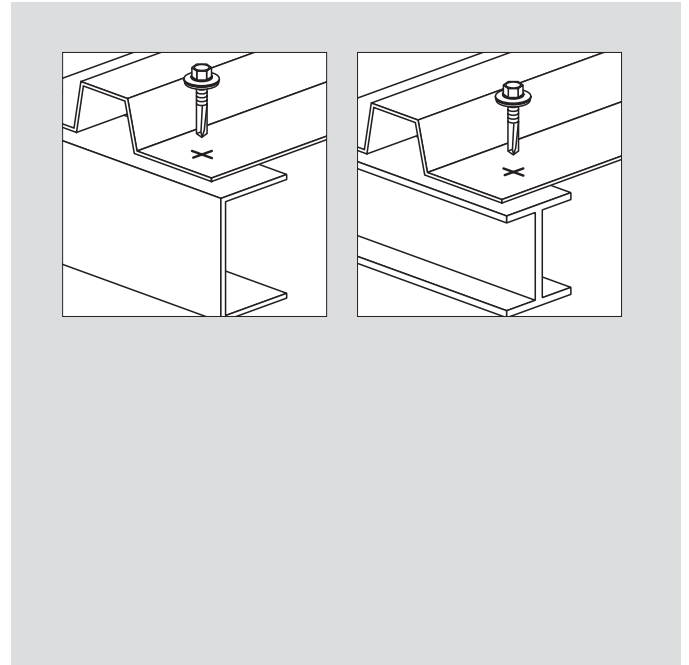
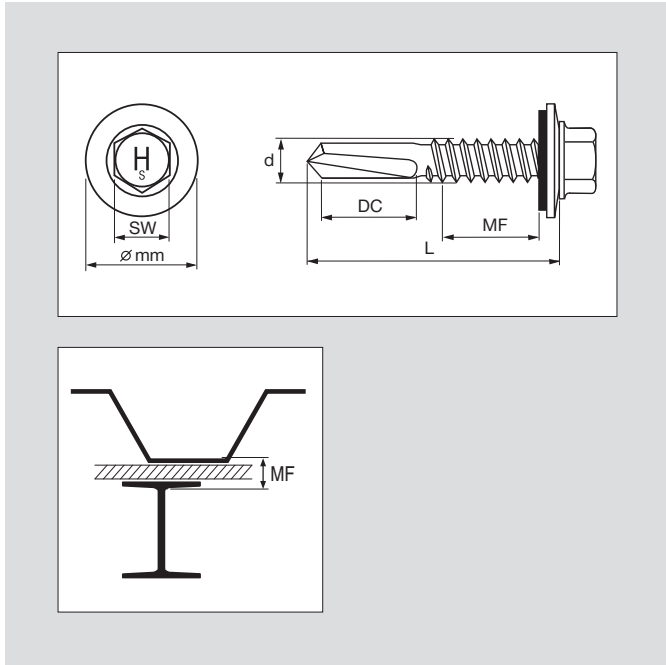
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

## 6.2.9 Stainless steel self-drilling screw (Ø16) S-MD 55 S



Stainless steel self-drilling screw with 16 mm sealing washer for medium and heavy outside applications



6

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD55S 5,5x40	4.6 - 12 mm	4.6 - 11 mm	5.5 mm	40 mm	16 mm	2 mm	Hexagon 8	250 pc	290674
Self-drill screw S-MD55S 5,5x52	4.6 - 12 mm	4.6 - 23 mm	5.5 mm	52 mm	16 mm	2 mm	Hexagon 8	250 pc	290675
Self-drill screw S-MD55S 5,5x65	4.6 - 12 mm	4.6 - 36 mm	5.5 mm	65 mm	16 mm	2 mm	Hexagon 8	100 pc	290676
Self-drill screw S-MD55S 5,5x82	4.6 - 12 mm	4.6 - 53 mm	5.5 mm	82 mm	16 mm	2 mm	Hexagon 8	100 pc	290677
Self-drill screw S-MD55S 5,5x102	4.6 - 12 mm	4.6 - 73 mm	5.5 mm	102 mm	16 mm	2 mm	Hexagon 8	100 pc	290678

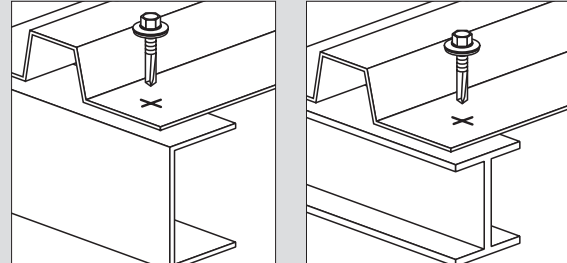
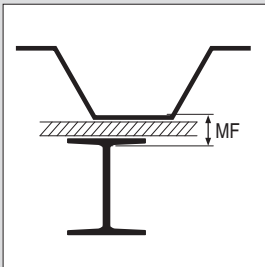
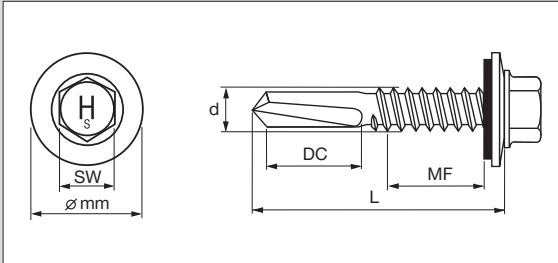
**Reference:**

- More Information see approval ETA-10/0182 (Chapter 16)

## 6.2.10 Stainless steel self-drilling screw (Ø19) S-MD 65 S



Stainless steel self-drilling screw with 19 mm sealing washer for medium and heavy outside applications



6

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD65S 5,5x40	4.6 - 12 mm	4.6 - 11 mm	5.5 mm	40 mm	19 mm	8 mm	Hexagon 8	250 pc	290679
Self-drill screw S-MD65S 5,5x52	4.6 - 12 mm	4.6 - 23 mm	5.5 mm	52 mm	19 mm	8 mm	Hexagon 8	250 pc	290684
Self-drill screw S-MD65S 5,5x65	4.6 - 12 mm	4.6 - 36 mm	5.5 mm	65 mm	19 mm	8 mm	Hexagon 8	100 pc	290685
Self-drill screw S-MD65S 5,5x82	4.6 - 12 mm	4.6 - 53 mm	5.5 mm	82 mm	19 mm	8 mm	Hexagon 8	100 pc	290686
Self-drill screw S-MD65S 5,5x102	4.6 - 12 mm	4.6 - 73 mm	5.5 mm	102 mm	19 mm	8 mm	Hexagon 8	100 pc	290687

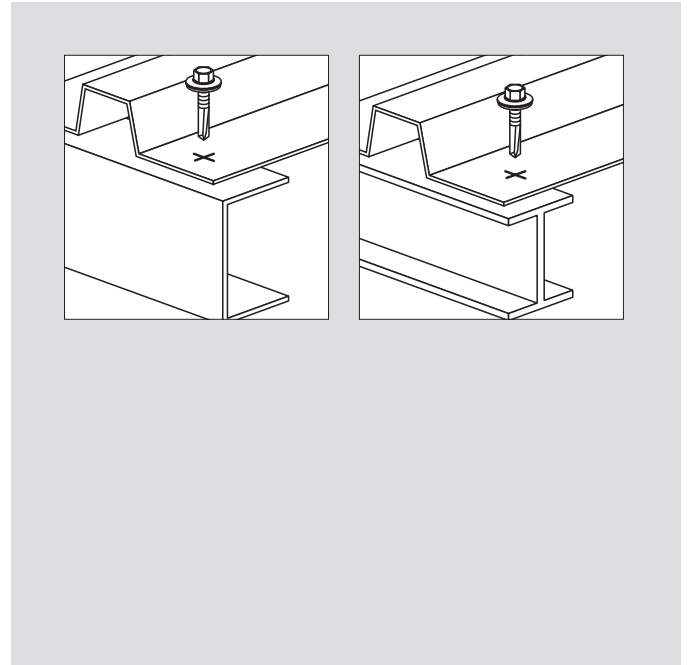
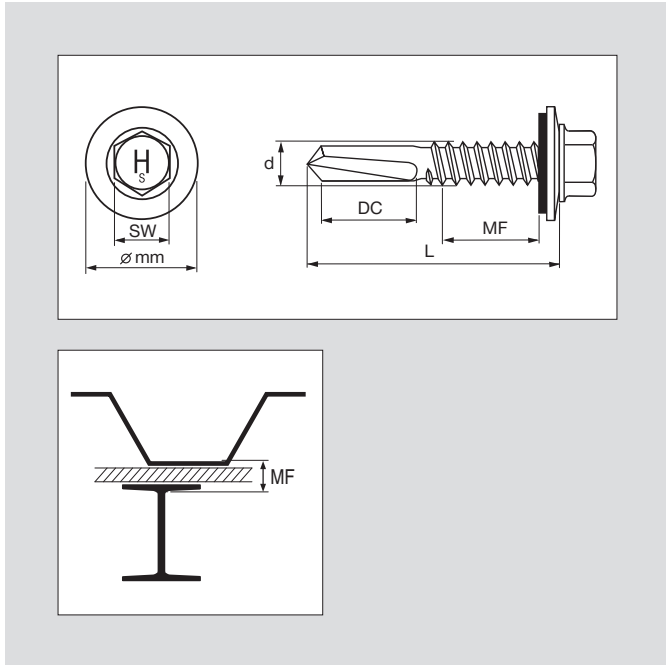
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

**6.2.11**  
**Stainless steel self-drilling screw (Ø22)**  
**S-MD 75 S**



Stainless steel self-drilling screw with 22 mm sealing washer for medium and heavy outside applications



6

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD75S 5,5x40	4.6 - 12 mm	4.6 - 11 mm	5.5 mm	40 mm	22 mm	2 mm	Hexagon 8	250 pc	290688
Self-drill screw S-MD75S 5,5x52	4.6 - 12 mm	4.6 - 23 mm	5.5 mm	52 mm	22 mm	2 mm	Hexagon 8	250 pc	290689
Self-drill screw S-MD75S 5,5x65	4.6 - 12 mm	4.6 - 36 mm	5.5 mm	65 mm	22 mm	2 mm	Hexagon 8	100 pc	290690
Self-drill screw S-MD75S 5,5x82	4.6 - 12 mm	4.6 - 53 mm	5.5 mm	82 mm	22 mm	2 mm	Hexagon 8	100 pc	290691
Self-drill screw S-MD75S 5,5x102	4.6 - 12 mm	4.6 - 73 mm	5.5 mm	102 mm	22 mm	2 mm	Hexagon 8	100 pc	290692

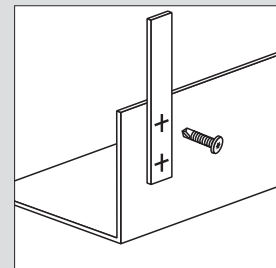
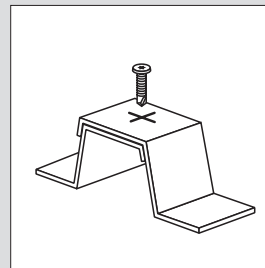
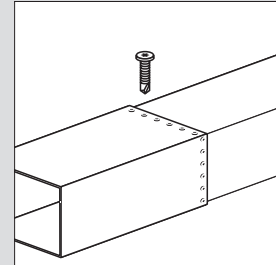
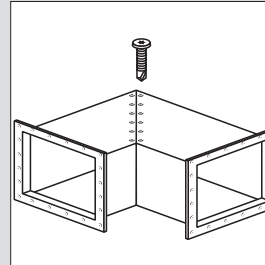
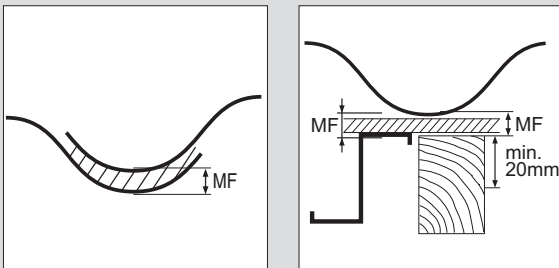
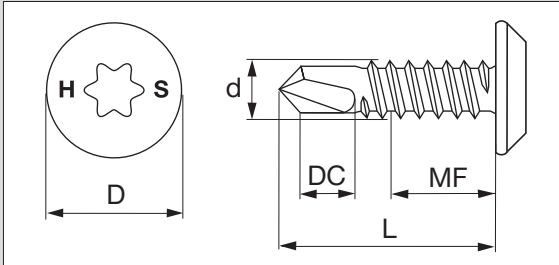
**Reference:**

- More Information see approval ETA-10/0182 (Chapter 16)

## 6.3.1

## Stainless steel self-drilling pan head screw S-MD 01 PS

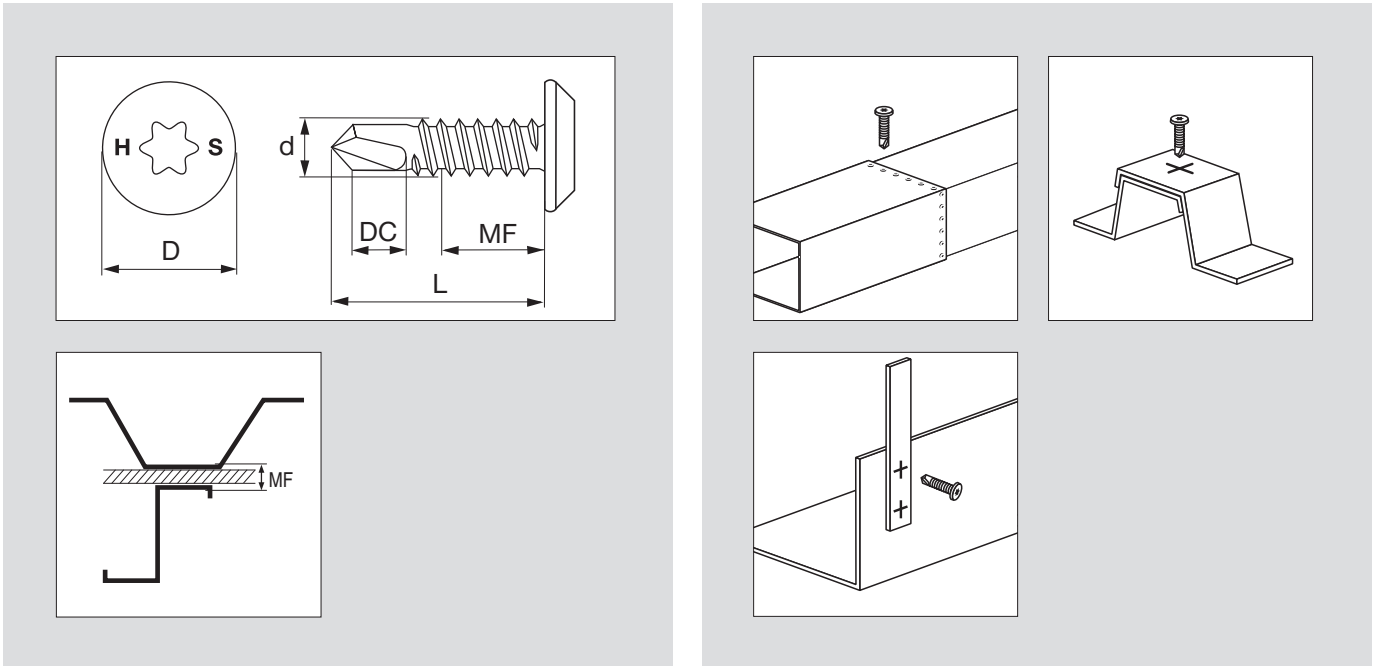
Universal stainless self-drilling screw for a wide range of light inside applications



Ordering description	Minimum thickness of base material	Drilling capacity range (DC)	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Screw head diameter	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD01PS 4,8x19		1 - 2.75 mm	1 - 5 mm	4.8 mm	19 mm	12 mm	TX 25	500 pc	202432
Self-drill screw S-MD01PS 4,8x38	wood, 20 mm	1 - 2.75 mm	1 - 25 mm	4.8 mm	38 mm	12 mm	TX 25	250 pc	387249
Self-drill screw S-MD01PS 4,8x50	wood, 20 mm	1 - 2.75 mm	1 - 37 mm	4.8 mm	50 mm	12 mm	TX 25	250 pc	202433
Self-drill screw S-MD01PS 5,5x22		1 - 3 mm	1 - 7 mm	5.5 mm	22 mm	12 mm	TX 25	500 pc	202434
Self-drill screw S-MD01PS 5,5x28		1 - 3 mm	1 - 13 mm	5.5 mm	28 mm	12 mm	TX 25	500 pc	202435
Self-drill screw S-MD01PS 5,5x38		1 - 3 mm	1 - 23 mm	5.5 mm	38 mm	12 mm	TX 25	250 pc	202436
Self-drill screw S-MD01PS 5,5x50		1 - 3 mm	1 - 35 mm	5.5 mm	50 mm	12 mm	TX 25	250 pc	202437

### 6.3.2 Stainless steel self-drilling pan head screw S-MD 03 PS

Universal stainless self-drilling screw for a wide range of light and medium inside applications



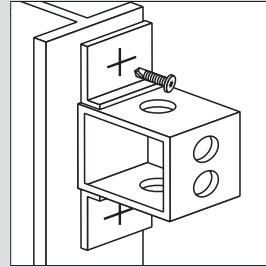
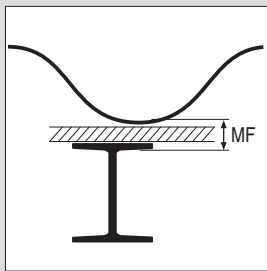
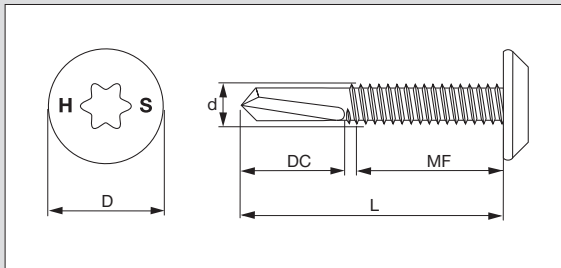
**6**

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw head diameter	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD03PS 5.5x22	2.1 - 5.5 mm	2.1 - 7 mm	5.5 mm	22 mm	12 mm	TX 25	500 pc	202438
Self-drill screw S-MD03PS 5,5x28	2.1 - 5.5 mm	2.1 - 13 mm	5.5 mm	28 mm	12 mm	TX 25	500 pc	202439
Self-drill screw S-MD03PS 5,5x38	2.1 - 5.5 mm	2.1 - 23 mm	5.5 mm	38 mm	12 mm	TX 25	250 pc	202440
Self-drill screw S-MD03PS 5,5x50	2.1 - 5.5 mm	2.1 - 35 mm	5.5 mm	50 mm	12 mm	TX 25	250 pc	202441

### 6.3.3

## Stainless steel self-drilling pan head screw S-MD 05 PS

Universal stainless self-drilling screw for a wide range of medium and heavy inside applications



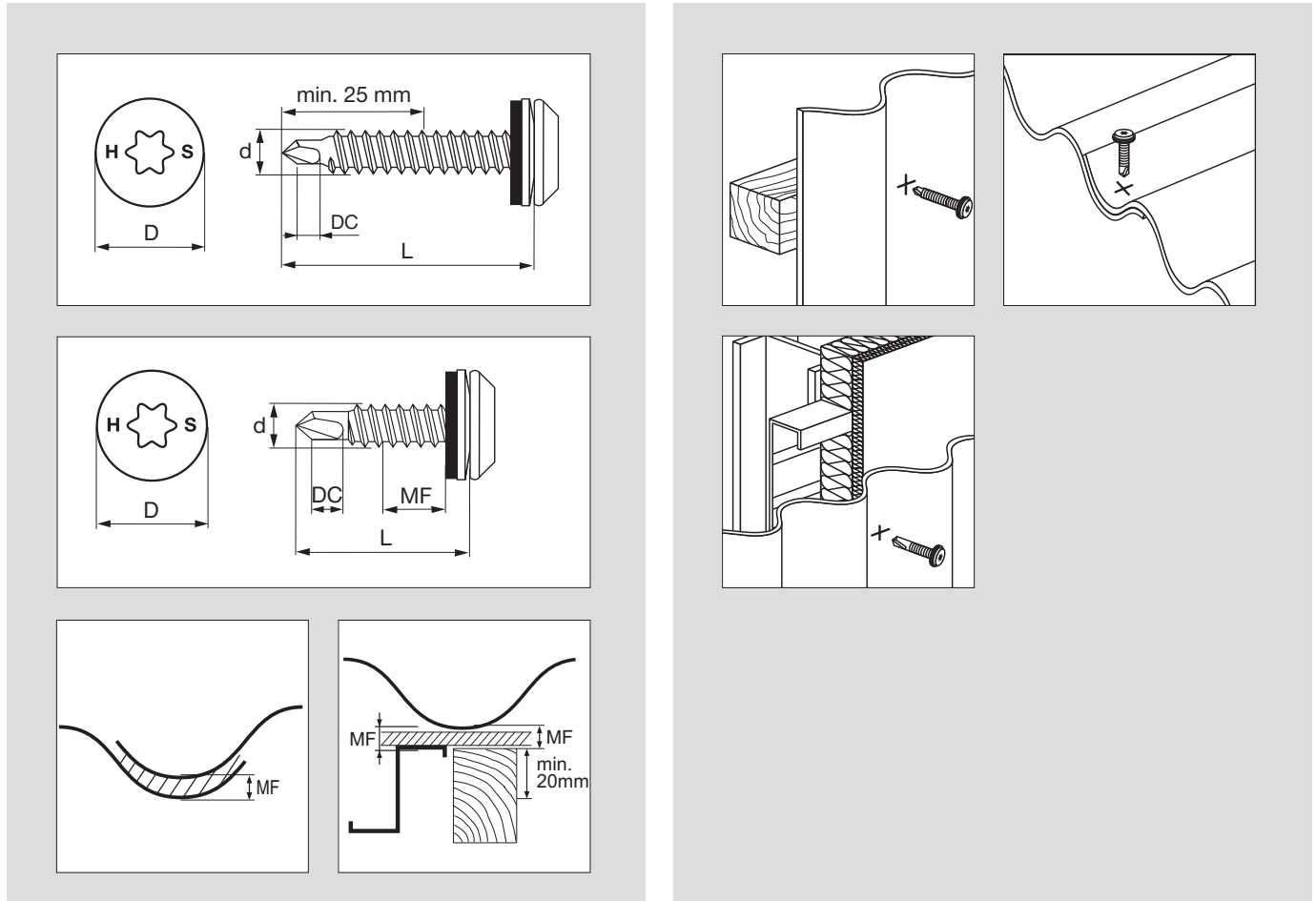
6

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw head diameter	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD05PS 5,5x45	4.6 - 12 mm	4.6 - 14 mm	5.5 mm	45 mm	12 mm	TX 25	250 pc	202442



### 6.4.1 Stainless self-drill pan head screw (Ø 12) S-MD 31 PS

Stainless steel pan head screw with 12 mm sealing washer for light outside application on steel or wood



6

Ordering description	Minimum thickness of base material	Drilling capacity range (DC)	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw head diameter	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD31PS 4,8x19		1 - 2.75 mm	1 - 3 mm	4.8 mm	19 mm	12 mm	2 mm	12 mm	TX 25	500 pc	202421
Self-drill screw S-MD31PS 4,8x38	wood, 20 mm	1 - 2.75 mm	1 - 22 mm	4.8 mm	38 mm	12 mm	2 mm	12 mm	TX 25	250 pc	387248
Self-drill screw S-MD31PS 4,8x50	wood, 20 mm	1 - 2.75 mm	1 - 34 mm	4.8 mm	50 mm	12 mm	2 mm	12 mm	TX 25	250 pc	202422
Self-drill screw S-MD31PS 5,5x22		1 - 3 mm	1 - 5 mm	5.5 mm	22 mm	12 mm	2 mm	12 mm	TX 25	500 pc	202423
Self-drill screw S-MD31PS 5,5x28		1 - 3 mm	1 - 11 mm	5.5 mm	28 mm	12 mm	2 mm	12 mm	TX 25	500 pc	202424
Self-drill screw S-MD31PS 5,5x38		1 - 3 mm	1 - 21 mm	5.5 mm	38 mm	12 mm	2 mm	12 mm	TX 25	250 pc	202425
Self-drill screw S-MD31PS 5,5x50		1 - 3 mm	1 - 33 mm	5.5 mm	50 mm	12 mm	2 mm	12 mm	TX 25	250 pc	202426

**Reference:**

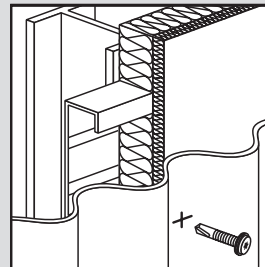
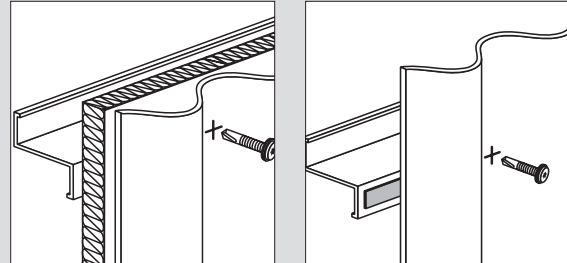
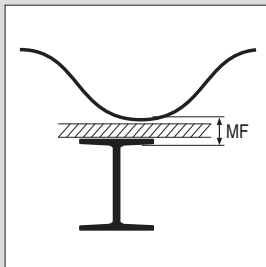
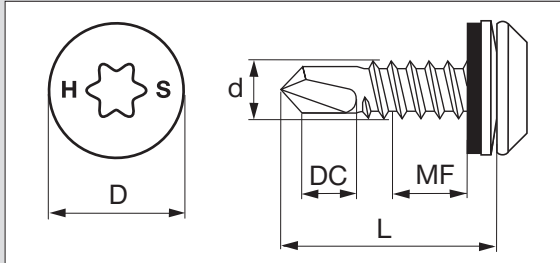
- More Information see approval ETA-10/0182 (Chapter 16)



## 6.4.2 Stainless self-drill pan head screw (Ø 12) S-MD 33 PS



Stainless steel pan head screw with 12 mm sealing washer for light and medium outside application on steel



6

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw head diameter	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD33PS 5.5x22	2.1 - 5.5 mm	2.1 - 5 mm	5.5 mm	22 mm	12 mm	2 mm	12 mm	TX 25	500 pc	202427
Self-drill screw S-MD33PS 5.5x28	2.1 - 5.5 mm	2.1 - 11 mm	5.5 mm	28 mm	12 mm	2 mm	12 mm	TX 25	500 pc	202428
Self-drill screw S-MD33PS 5.5x38	2.1 - 5.5 mm	2.1 - 21 mm	5.5 mm	38 mm	12 mm	2 mm	12 mm	TX 25	250 pc	202429
Self-drill screw S-MD33PS 5.5x50	2.1 - 5.5 mm	2.1 - 33 mm	5.5 mm	50 mm	12 mm	2 mm	12 mm	TX 25	250 pc	202430

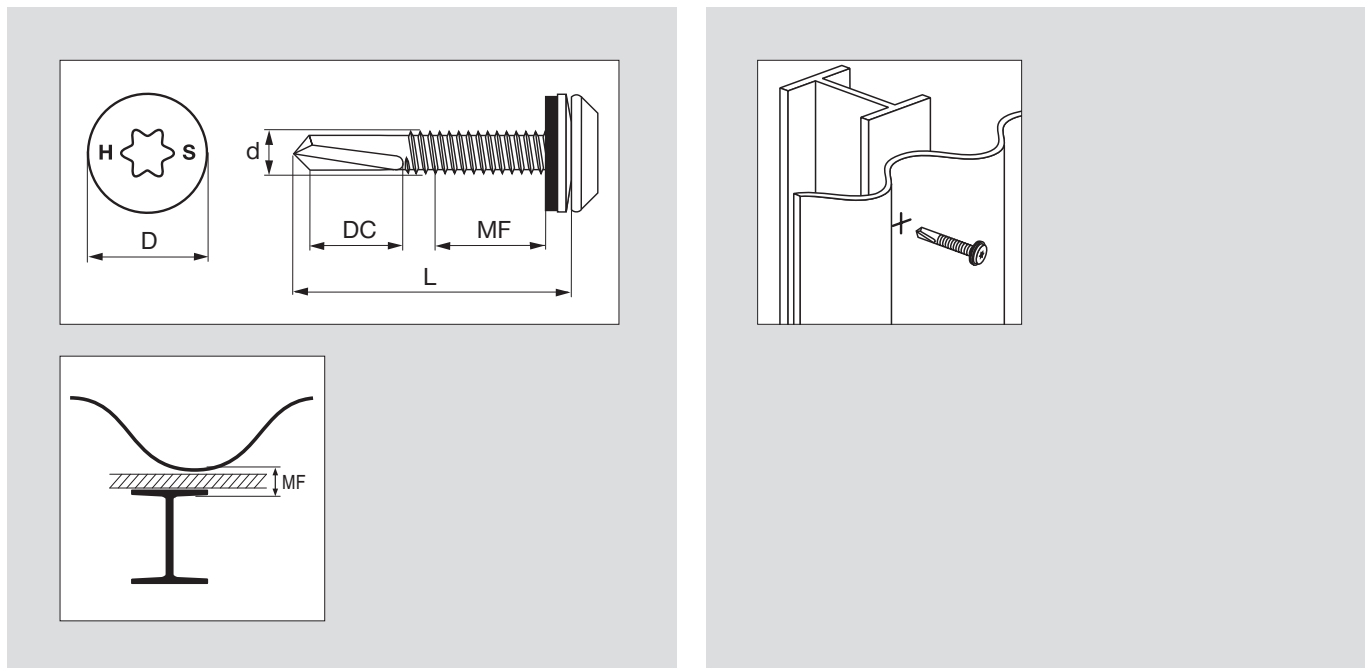
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)



### 6.4.3 Stainless self-drill pan head screw (Ø 12) S-MD 35 PS

Stainless steel pan head screw with 12 mm sealing washer for medium and heavy outside application on steel



6

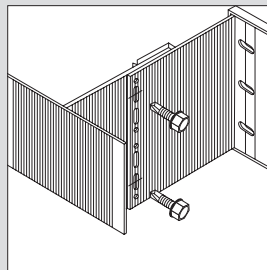
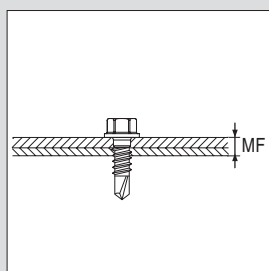
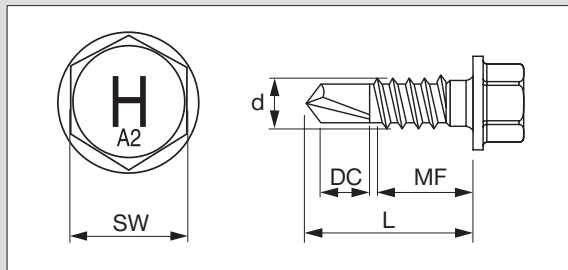
Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM thickness	Screw head diameter	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-MD35PS 5,5x45	4.6 - 12 mm	4.6 - 12 mm	5.5 mm	45 mm	12 mm	2 mm	12 mm	TX 25	250 pc	202431

**Reference:**

- More Information see approval ETA-10/0182 (Chapter 16)

## 6.5 Stainless steel self-drilling screw S-AD 01 S / S-AD 01 SS

Stainless steel self-drilling screw for fix-flex point fastening of light ventilated facade subconstruction

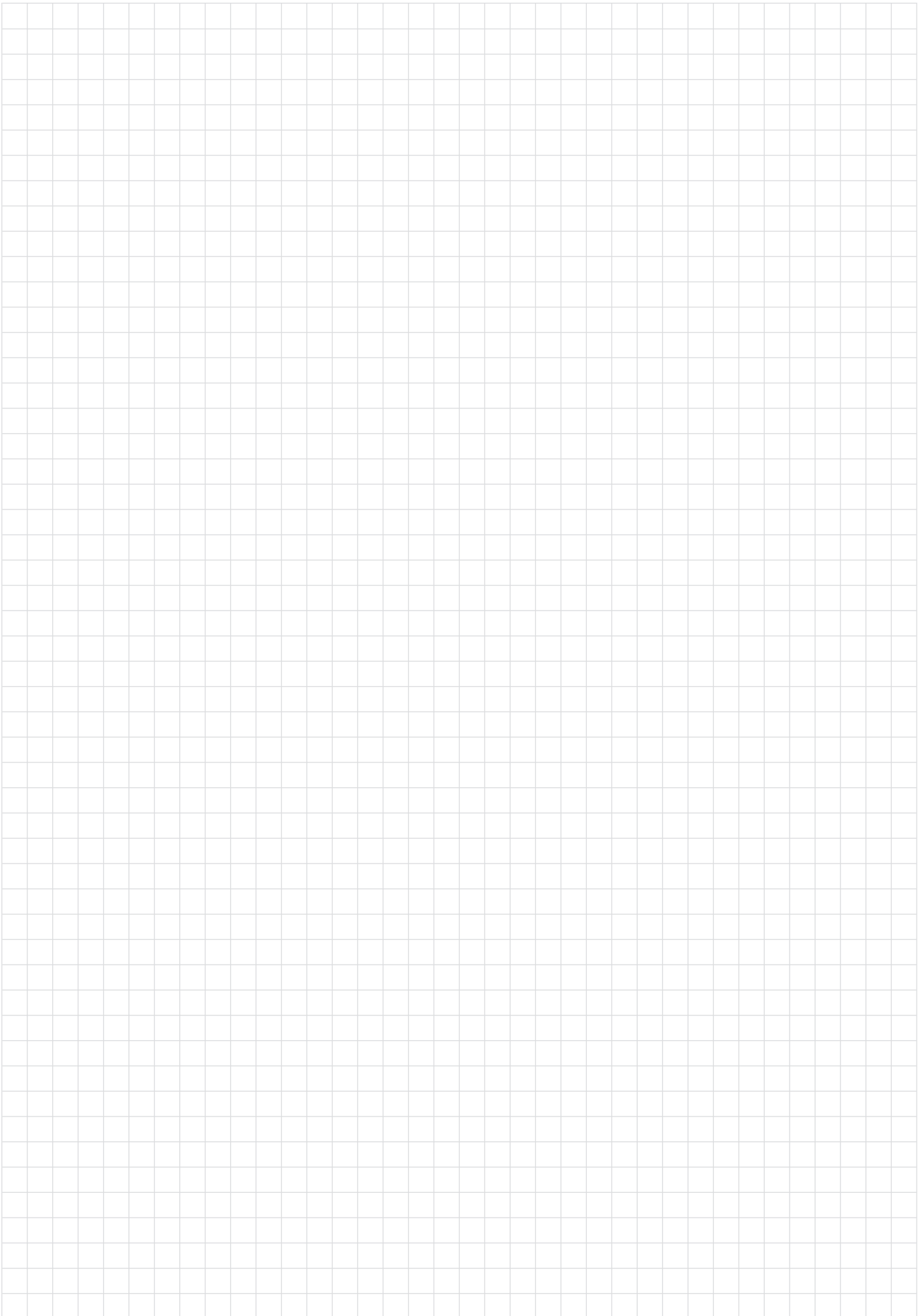


6

Ordering description	Material	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer	Screw drive/recess type	Sales quantity	Item number
Self-drill screw S-AD01S 5,5x19	A2	1.5 - 4 mm	1.5 - 10 mm	5.5 mm	19 mm	12 mm pressed-on	Hexagon 8	500 pc	2039265
Self-drill screw S-AD01SS 5,5x19	A4	1.5 - 4 mm	1.5 - 10 mm	5.5 mm	19 mm	12 mm pressed-on	Hexagon 8	500 pc	2039266

### Reference:

- More Information see Technical certificate P-BWU 02-148009 (Chapter 16)

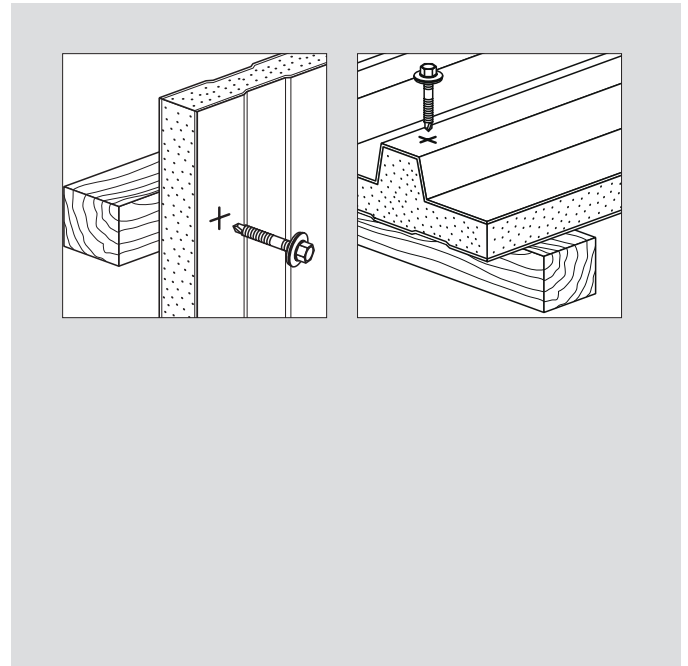
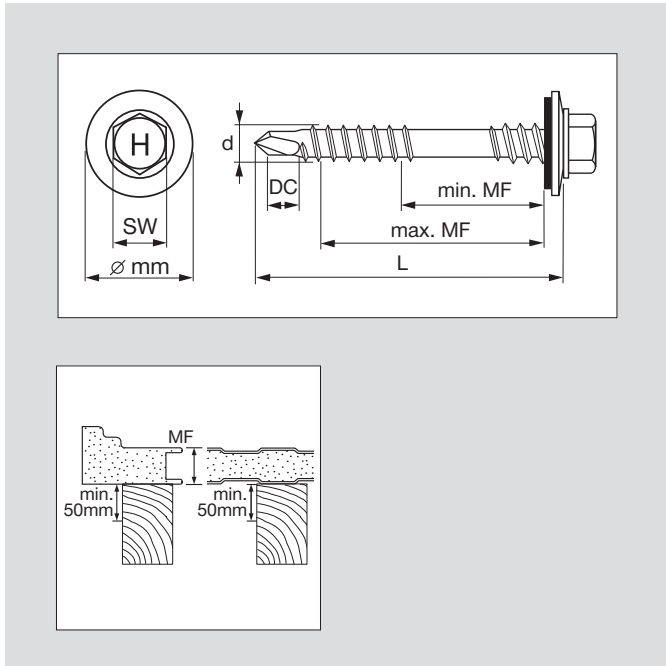


## Contents

			Page
<b>7.1</b>			
	Carbon steel sandwich panel screw (Ø19)	S-CDW 61 C	77
<b>7.2</b>			
	Carbon steel sandwich panel screw (Ø16)	S-CD 53 C	78
<b>7.3</b>			
	Carbon steel sandwich panel screw (Ø19)	S-CD 63 C	79
<b>7.4</b>			
	Carbon steel sandwich panel screw (Ø16)	S-CD 55 C	80
<b>7.5</b>			
	Carbon steel sandwich panel screw (Ø19)	S-CD 65 C	81

## 7.1 Carbon steel sandwich panel screw (Ø19) S-CDW 61 C

The sandwich panel screw for fastening on wood base materials



7

Ordering description	Minimum thickness of base material	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CDW61C 6,5X100	wood, 50 mm	27 - 47 mm	6.5 mm	100 mm	19 mm	2 mm	Hexagon 8	100 pc	206981
Sandwich panel screw S-CDW61C 6,5X110	wood, 50 mm	37 - 57 mm	6.5 mm	110 mm	19 mm	2 mm	Hexagon 8	100 pc	206982
Sandwich panel screw S-CDW61C 6,5X120	wood, 50 mm	47 - 67 mm	6.5 mm	120 mm	19 mm	2 mm	Hexagon 8	100 pc	206983
Sandwich panel screw S-CDW61C 6,5X140	wood, 50 mm	67 - 87 mm	6.5 mm	140 mm	19 mm	2 mm	Hexagon 8	100 pc	206984
Sandwich panel screw S-CDW61C 6,5X160	wood, 50 mm	87 - 107 mm	6.5 mm	160 mm	19 mm	2 mm	Hexagon 8	100 pc	206985
Sandwich panel screw S-CDW61C 6,5X180	wood, 50 mm	107 - 127 mm	6.5 mm	180 mm	19 mm	2 mm	Hexagon 8	100 pc	206986
Sandwich panel screw S-CDW61C 6,5X200	wood, 50 mm	127 - 147 mm	6.5 mm	200 mm	19 mm	2 mm	Hexagon 8	100 pc	206987
Sandwich panel screw S-CDW61C 6,5X220	wood, 50 mm	147 - 167 mm	6.5 mm	220 mm	19 mm	2 mm	Hexagon 8	100 pc	206988
Sandwich panel screw S-CDW61C 6,5X230	wood, 50 mm	157 - 177 mm	6.5 mm	230 mm	19 mm	2 mm	Hexagon 8	100 pc	206989

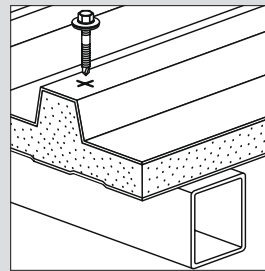
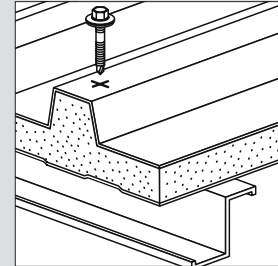
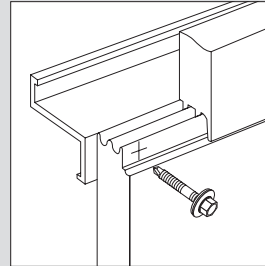
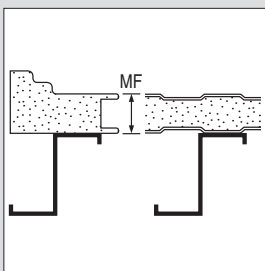
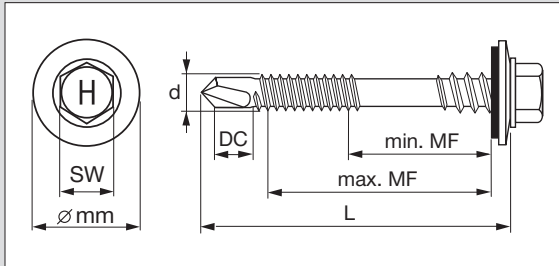
**Reference:**

- Technical data see chapter 16.9

## 7.2 Carbon steel sandwich panel screw (Ø16) S-CD 53 C



The sandwich panel screws for fastening on light and medium base materials



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CD53C 5,5x76	2 - 6 mm	38 - 48 mm	5.5 mm	76 mm	16 mm	3 mm	Hexagon 8	100 pc	2025960
Sandwich panel screw S-CD53C 5,5x86	2 - 6 mm	48 - 58 mm	5.5 mm	86 mm	16 mm	3 mm	Hexagon 8	100 pc	2025961
Sandwich panel screw S-CD53C 5,5x96	2 - 6 mm	58 - 68 mm	5.5 mm	96 mm	16 mm	3 mm	Hexagon 8	100 pc	2025962
Sandwich panel screw S-CD53C 5,5x116	2 - 6 mm	68 - 88 mm	5.5 mm	116 mm	16 mm	3 mm	Hexagon 8	100 pc	2025963
Sandwich panel screw S-CD53C 5,5x136	2 - 6 mm	78 - 108 mm	5.5 mm	136 mm	16 mm	3 mm	Hexagon 8	100 pc	2025964
Sandwich panel screw S-CD53C 5,5x156	2 - 6 mm	98 - 128 mm	5.5 mm	156 mm	16 mm	3 mm	Hexagon 8	100 pc	2025965
Sandwich panel screw S-CD53C 5,5x186	2 - 6 mm	128 - 158 mm	5.5 mm	186 mm	16 mm	3 mm	Hexagon 8	100 pc	2025966
Sandwich panel screw S-CD53C 5,5x216	2 - 6 mm	138 - 188 mm	5.5 mm	216 mm	16 mm	3 mm	Hexagon 8	100 pc	2025967
Sandwich panel screw S-CD53C 5,5x256	2 - 6 mm	178 - 228 mm	5.5 mm	256 mm	16 mm	3 mm	Hexagon 8	100 pc	2025968
Sandwich panel screw S-CD53C 5,5x286	2 - 6 mm	208 - 258 mm	5.5 mm	286 mm	16 mm	3 mm	Hexagon 8	100 pc	2025969

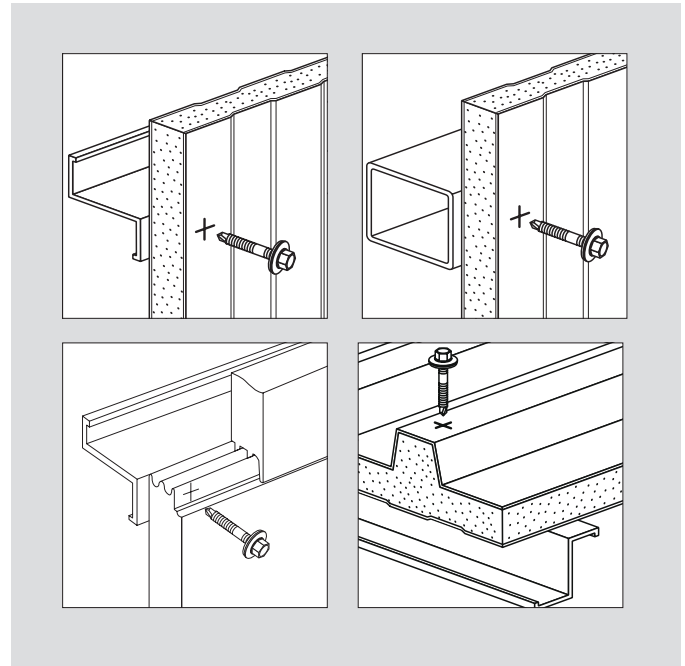
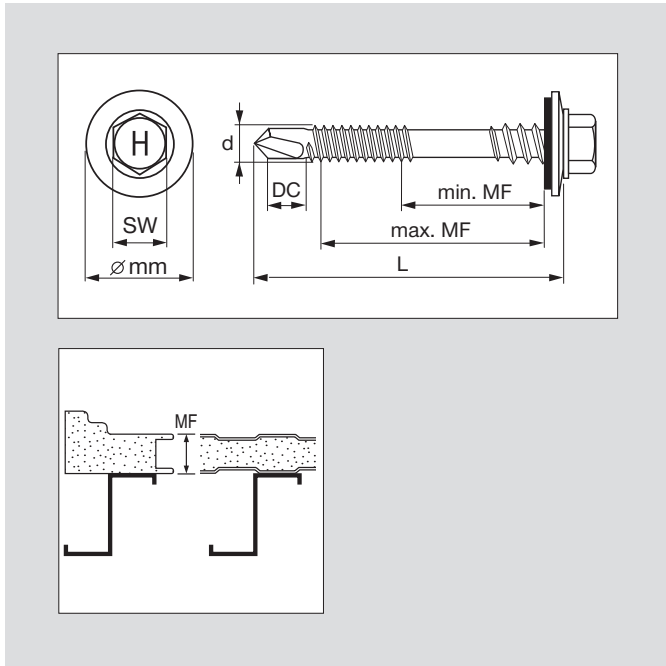
### Reference:

- Technical data see chapter 16.9



### 7.3 Carbon steel sandwich panel screw (Ø19) S-CD 63 C

The sandwich panel screws for fastening on light and medium base materials



7

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CD63C 5,5x76	2 - 6 mm	38 - 48 mm	5.5 mm	76 mm	19 mm	3 mm	Hexagon 8	100 pc	413344
Sandwich panel screw S-CD63C 5,5x86	2 - 6 mm	48 - 58 mm	5.5 mm	86 mm	19 mm	3 mm	Hexagon 8	100 pc	413345
Sandwich panel screw S-CD63C 5,5x96	2 - 6 mm	58 - 68 mm	5.5 mm	96 mm	19 mm	3 mm	Hexagon 8	100 pc	413346
Sandwich panel screw S-CD63C 5,5x116	2 - 6 mm	68 - 88 mm	5.5 mm	116 mm	19 mm	3 mm	Hexagon 8	100 pc	413339
Sandwich panel screw S-CD63C 5,5x136	2 - 6 mm	78 - 108 mm	5.5 mm	136 mm	19 mm	3 mm	Hexagon 8	100 pc	413340
Sandwich panel screw S-CD63C 5,5x156	2 - 6 mm	98 - 128 mm	5.5 mm	156 mm	19 mm	3 mm	Hexagon 8	100 pc	413341
Sandwich panel screw S-CD63C 5,5x186	2 - 6 mm	128 - 158 mm	5.5 mm	186 mm	19 mm	3 mm	Hexagon 8	100 pc	413342
Sandwich panel screw S-CD63C 5,5x216	2 - 6 mm	138 - 188 mm	5.5 mm	216 mm	19 mm	3 mm	Hexagon 8	100 pc	413343
Sandwich panel screw S-CD63C 5,5x256	2 - 6 mm	178 - 228 mm	5.5 mm	256 mm	19 mm	3 mm	Hexagon 8	100 pc	413347
Sandwich panel screw S-CD63C 5,5x286	2 - 6 mm	208 - 258 mm	5.5 mm	286 mm	19 mm	3 mm	Hexagon 8	100 pc	413348

Reference:

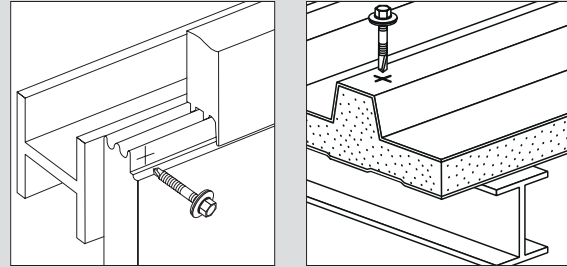
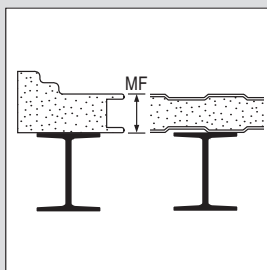
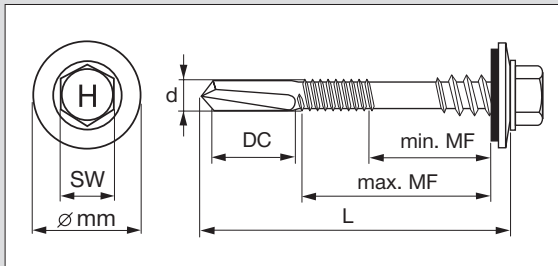
- Technical data see chapter 16.9



## 7.4 Carbon steel sandwich panel screw (Ø16) S-CD 55 C



The sandwich panel screw for thick base materials



7

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CD55C 5,5x108	3.5 - 15 mm	58 - 68 mm	5.5 mm	108 mm	16 mm	3 mm	Hexagon 8	100 pc	2025476
Sandwich panel screw S-CD55C 5,5x128	3.5 - 15 mm	68 - 88 mm	5.5 mm	128 mm	16 mm	3 mm	Hexagon 8	100 pc	2025477
Sandwich panel screw S-CD55C 5,5x148	3.5 - 15 mm	78 - 108 mm	5.5 mm	148 mm	16 mm	3 mm	Hexagon 8	100 pc	2025478
Sandwich panel screw S-CD55C 5,5x168	3.5 - 15 mm	98 - 128 mm	5.5 mm	168 mm	16 mm	3 mm	Hexagon 8	100 pc	2025479
Sandwich panel screw S-CD55C 5,5x198	3.5 - 15 mm	128 - 158 mm	5.5 mm	198 mm	16 mm	3 mm	Hexagon 8	100 pc	2025950
Sandwich panel screw S-CD55C 5,5x228	3.5 - 15 mm	138 - 188 mm	5.5 mm	228 mm	16 mm	3 mm	Hexagon 8	100 pc	2025951
Sandwich panel screw S-CD55C 5,5x268	3.5 - 15 mm	178 - 228 mm	5.5 mm	268 mm	16 mm	3 mm	Hexagon 8	100 pc	2025952
Sandwich panel screw S-CD55C 5,5x298	3.5 - 15 mm	208 - 258 mm	5.5 mm	298 mm	16 mm	3 mm	Hexagon 8	100 pc	2025953

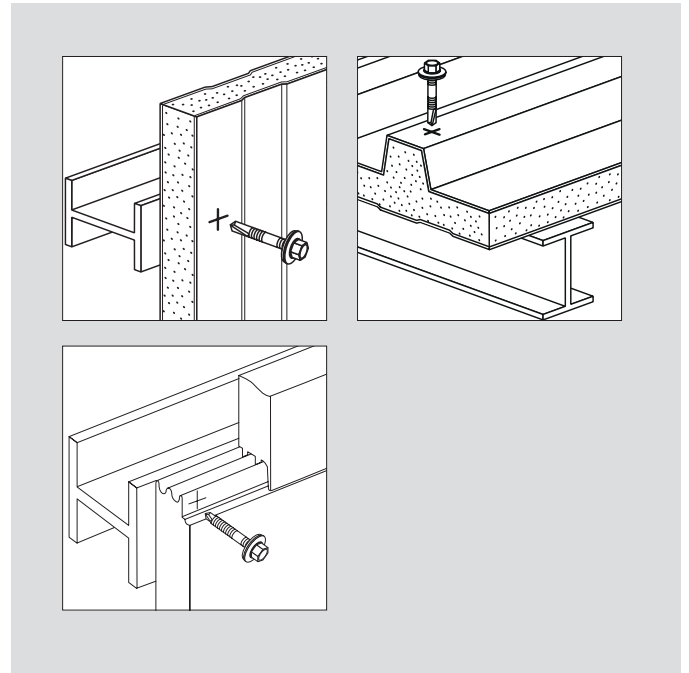
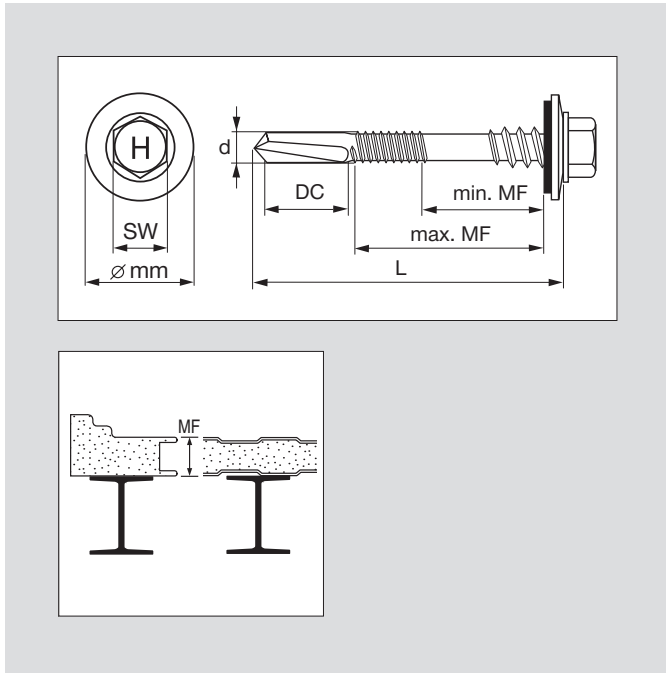
### Reference:

- Technical data see chapter 16.9

# 7.5 Carbon steel sandwich panel screw (Ø19) S-CD 65 C



The sandwich panel screw for thick base materials



7

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CD65C 5,5x108	3.5 - 15 mm	58 - 68 mm	5.5 mm	108 mm	19 mm	3 mm	Hexagon 8	100 pc	414185
Sandwich panel screw S-CD65C 5,5x128	3.5 - 15 mm	68 - 88 mm	5.5 mm	128 mm	19 mm	3 mm	Hexagon 8	100 pc	414186
Sandwich panel screw S-CD65C 5,5x148	3.5 - 15 mm	78 - 108 mm	5.5 mm	148 mm	19 mm	3 mm	Hexagon 8	100 pc	414187
Sandwich panel screw S-CD65C 5,5x168	3.5 - 15 mm	98 - 128 mm	5.5 mm	168 mm	19 mm	3 mm	Hexagon 8	100 pc	290389
Sandwich panel screw S-CD65C 5,5x198	3.5 - 15 mm	128 - 158 mm	5.5 mm	198 mm	19 mm	3 mm	Hexagon 8	100 pc	290390
Sandwich panel screw S-CD65C 5,5x228	3.5 - 15 mm	138 - 188 mm	5.5 mm	228 mm	19 mm	3 mm	Hexagon 8	100 pc	290391
Sandwich panel screw S-CD65C 5,5x268	3.5 - 15 mm	178 - 228 mm	5.5 mm	268 mm	19 mm	3 mm	Hexagon 8	100 pc	290392
Sandwich panel screw S-CD65C 5,5x298	3.5 - 15 mm	208 - 258 mm	5.5 mm	298 mm	19 mm	3 mm	Hexagon 8	100 pc	414289

**Reference:**

- Technical data see chapter 16.9

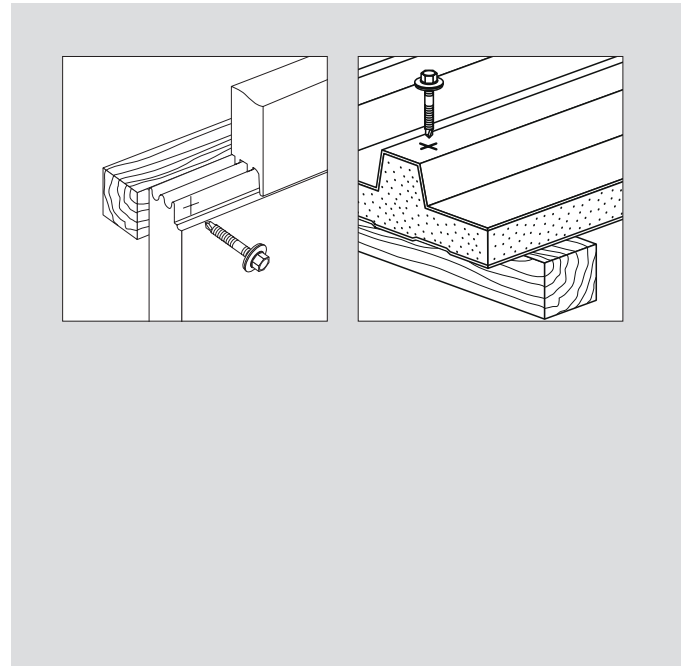
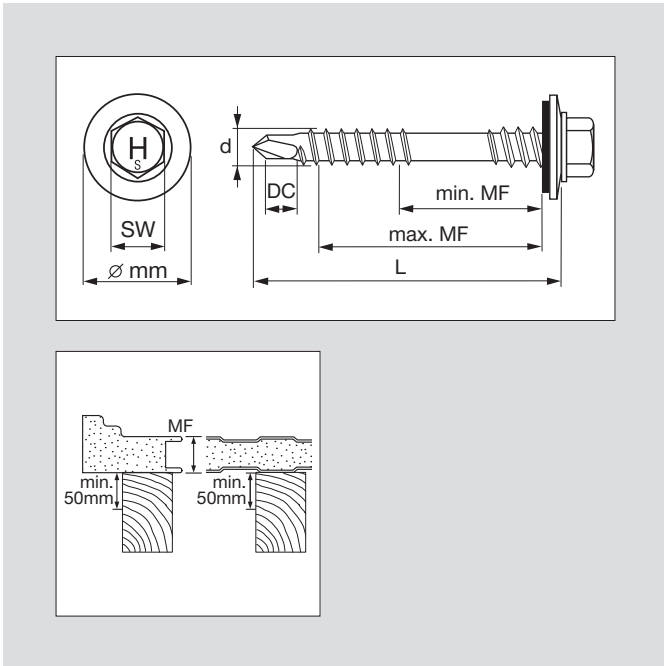
## Contents

			Page
<b>8.1</b>	Stainless steel sandwich panel screw (Ø16)	S-CDW 51 S	83
<b>8.2</b>	Stainless steel sandwich panel screw (Ø19)	S-CDW 61 S	84
<b>8.3</b>	Stainless steel sandwich panel screw (Ø22)	S-CDW 71 S	85
<b>8.4</b>	Stainless steel sandwich panel screw (Ø16)	S-CD 53 S	86
<b>8.5</b>	Stainless steel sandwich panel screw (Ø19)	S-CD 63 S	87
<b>8.6</b>	Stainless steel sandwich panel screw (Ø22)	S-CD 73 S	88
<b>8.7</b>	Stainless steel sandwich panel screw (Ø16)	S-CD 55 S	89
<b>8.8</b>	Stainless steel sandwich panel screw (Ø19)	S-CD 65 S	90
<b>8.9</b>	Stainless steel sandwich panel screw (Ø22)	S-CD 75 S	91



# 8.1 Stainless steel sandwich panel screw (Ø16) S-CDW 51 S

The sandwich panel screw for fastening on wood base materials



**8**

Ordering description	Minimum thickness of base material	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CDW51S 6,5x100	wood, 50 mm	27 - 47 mm	6.5 mm	100 mm	16 mm	2 mm	Hexagon 8	100 pc	272531
Sandwich panel screw S-CDW51S 6,5x110	wood, 50 mm	37 - 57 mm	6.5 mm	110 mm	16 mm	2 mm	Hexagon 8	100 pc	272532
Sandwich panel screw S-CDW51S 6,5x120	wood, 50 mm	47 - 67 mm	6.5 mm	120 mm	16 mm	2 mm	Hexagon 8	100 pc	272533
Sandwich panel screw S-CDW51S 6,5x140	wood, 50 mm	67 - 87 mm	6.5 mm	140 mm	16 mm	2 mm	Hexagon 8	100 pc	272534
Sandwich panel screw S-CDW51S 6,5x160	wood, 50 mm	87 - 107 mm	6.5 mm	160 mm	16 mm	2 mm	Hexagon 8	100 pc	272535
Sandwich panel screw S-CDW51S 6,5x180	wood, 50 mm	107 - 127 mm	6.5 mm	180 mm	16 mm	2 mm	Hexagon 8	100 pc	272536
Sandwich panel screw S-CDW51S 6,5x200	wood, 50 mm	127 - 147 mm	6.5 mm	200 mm	16 mm	2 mm	Hexagon 8	100 pc	272537
Sandwich panel screw S-CDW51S 6,5x220	wood, 50 mm	147 - 167 mm	6.5 mm	220 mm	16 mm	2 mm	Hexagon 8	100 pc	272538
Sandwich panel screw S-CDW51S 6,5x230	wood, 50 mm	157 - 177 mm	6.5 mm	230 mm	16 mm	2 mm	Hexagon 8	100 pc	272539

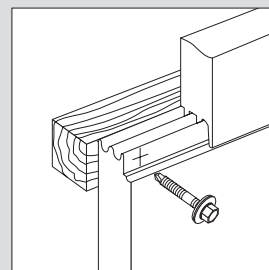
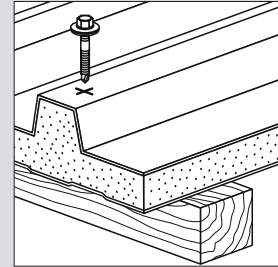
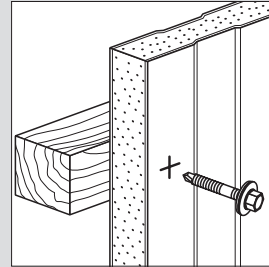
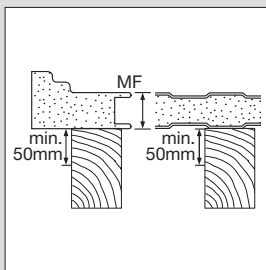
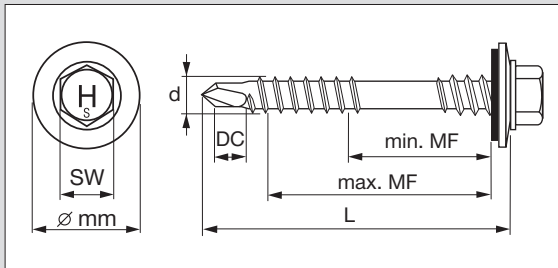
**Reference:**

- More Information see approval ETA-13/0179 (Chapter 16)

## 8.2 Stainless steel sandwich panel screw (Ø19) S-CDW 61 S



The sandwich panel screw for fastening on wood base materials



8

Ordering description	Minimum thickness of base material	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CDW61S 6,5x100	wood, 50 mm	27 - 47 mm	6.5 mm	100 mm	19 mm	2 mm	Hexagon 8	100 pc	375256
Sandwich panel screw S-CDW61S 6,5x110	wood, 50 mm	37 - 57 mm	6.5 mm	110 mm	19 mm	2 mm	Hexagon 8	100 pc	375257
Sandwich panel screw S-CDW61S 6,5x120	wood, 50 mm	47 - 67 mm	6.5 mm	120 mm	19 mm	2 mm	Hexagon 8	100 pc	375258
Sandwich panel screw S-CDW61S 6,5x140	wood, 50 mm	67 - 87 mm	6.5 mm	140 mm	19 mm	2 mm	Hexagon 8	100 pc	375259
Sandwich panel screw S-CDW61S 6,5x160	wood, 50 mm	87 - 107 mm	6.5 mm	160 mm	19 mm	2 mm	Hexagon 8	100 pc	375260
Sandwich panel screw S-CDW61S 6,5x180	wood, 50 mm	107 - 127 mm	6.5 mm	180 mm	19 mm	2 mm	Hexagon 8	100 pc	375261
Sandwich panel screw S-CDW61S 6,5x200	wood, 50 mm	127 - 147 mm	6.5 mm	200 mm	19 mm	2 mm	Hexagon 8	100 pc	284540
Sandwich panel screw S-CDW61S 6,5x220	wood, 50 mm	147 - 167 mm	6.5 mm	220 mm	19 mm	2 mm	Hexagon 8	100 pc	284541
Sandwich panel screw S-CDW61S 6,5x230	wood, 50 mm	157 - 177 mm	6.5 mm	230 mm	19 mm	2 mm	Hexagon 8	100 pc	284597

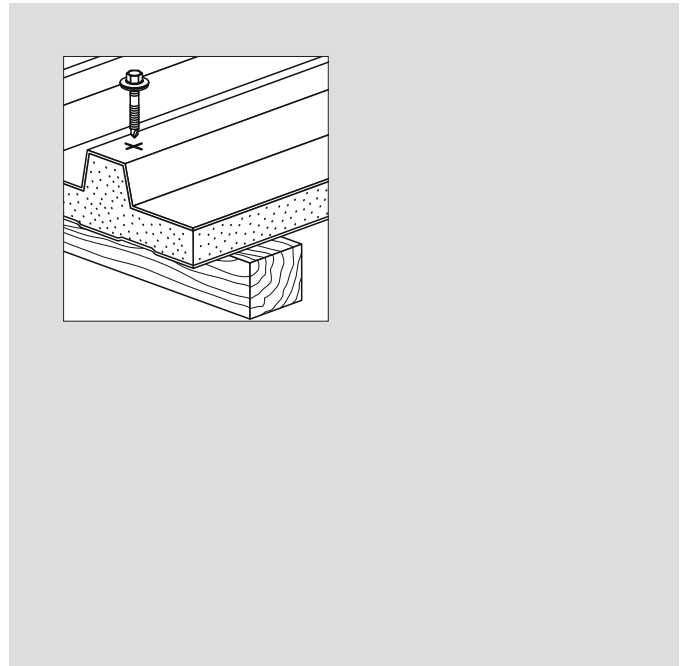
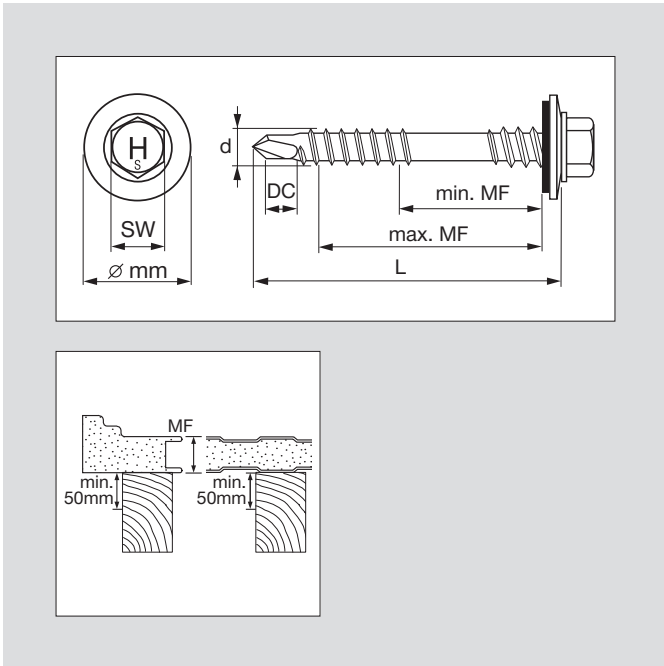
### Reference:

- More Information see approval ETA-13/0179 (Chapter 16)



### 8.3 Stainless steel sandwich panel screw (Ø22) S-CDW 71 S

The sandwich panel screw for fastening on wood base materials



Ordering description	Minimum thickness of base material	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CDW71S 6,5x100	wood, 50 mm	27 - 47 mm	6.5 mm	100 mm	22 mm	2 mm	Hexagon 8	100 pc	285658
Sandwich panel screw S-CDW71S 6,5x110	wood, 50 mm	37 - 57 mm	6.5 mm	110 mm	22 mm	2 mm	Hexagon 8	100 pc	285659
Sandwich panel screw S-CDW71S 6,5x120	wood, 50 mm	47 - 67 mm	6.5 mm	120 mm	22 mm	2 mm	Hexagon 8	100 pc	285660
Sandwich panel screw S-CDW71S 6,5x140	wood, 50 mm	67 - 87 mm	6.5 mm	140 mm	22 mm	2 mm	Hexagon 8	100 pc	285661
Sandwich panel screw S-CDW71S 6,5x160	wood, 50 mm	87 - 107 mm	6.5 mm	160 mm	22 mm	2 mm	Hexagon 8	100 pc	285662
Sandwich panel screw S-CDW71S 6,5x180	wood, 50 mm	107 - 127 mm	6.5 mm	180 mm	22 mm	2 mm	Hexagon 8	100 pc	285663
Sandwich panel screw S-CDW71S 6,5x200	wood, 50 mm	127 - 147 mm	6.5 mm	200 mm	22 mm	2 mm	Hexagon 8	100 pc	285664
Sandwich panel screw S-CDW71S 6,5x220	wood, 50 mm	147 - 167 mm	6.5 mm	220 mm	22 mm	2 mm	Hexagon 8	100 pc	285665
Sandwich panel screw S-CDW71S 6,5x230	wood, 50 mm	157 - 177 mm	6.5 mm	230 mm	22 mm	2 mm	Hexagon 8	100 pc	285666

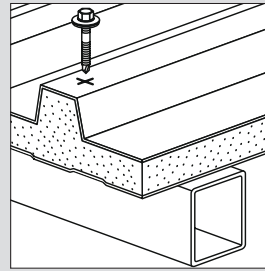
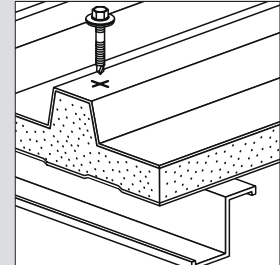
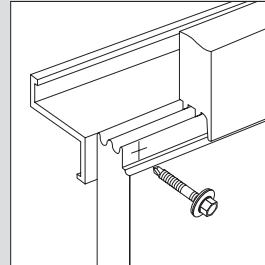
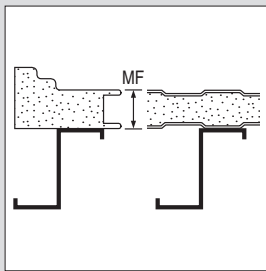
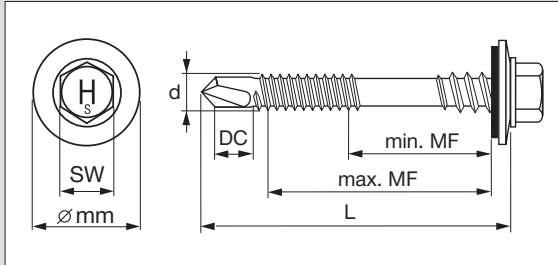
**Reference:**

- More Information see approval ETA-13/0179 (Chapter 16)

## 8.4 Stainless steel sandwich panel screw (Ø16) S-CD 53 S



The sandwich panel screws for fastening on light and medium base materials



8

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CD53S 5,5x76	2 - 6 mm	38 - 48 mm	5.5 mm	76 mm	16 mm	3 mm	Hexagon 8	100 pc	413394
Sandwich panel screw S-CD53S 5,5x86	2 - 6 mm	48 - 58 mm	5.5 mm	86 mm	16 mm	3 mm	Hexagon 8	100 pc	413395
Sandwich panel screw S-CD53S 5,5x96	2 - 6 mm	58 - 68 mm	5.5 mm	96 mm	16 mm	3 mm	Hexagon 8	100 pc	413396
Sandwich panel screw S-CD53S 5,5x116	2 - 6 mm	68 - 88 mm	5.5 mm	116 mm	16 mm	3 mm	Hexagon 8	100 pc	413389
Sandwich panel screw S-CD53S 5,5x136	2 - 6 mm	78 - 108 mm	5.5 mm	136 mm	16 mm	3 mm	Hexagon 8	100 pc	413390
Sandwich panel screw S-CD53S 5,5x156	2 - 6 mm	98 - 128 mm	5.5 mm	156 mm	16 mm	3 mm	Hexagon 8	100 pc	413391
Sandwich panel screw S-CD53S 5,5x186	2 - 6 mm	128 - 158 mm	5.5 mm	186 mm	16 mm	3 mm	Hexagon 8	100 pc	413392
Sandwich panel screw S-CD53S 5,5x216	2 - 6 mm	138 - 188 mm	5.5 mm	216 mm	16 mm	3 mm	Hexagon 8	100 pc	413393
Sandwich panel screw S-CD53S 5,5x256	2 - 6 mm	178 - 228 mm	5.5 mm	256 mm	16 mm	3 mm	Hexagon 8	100 pc	413397
Sandwich panel screw S-CD53S 5,5x286	2 - 6 mm	208 - 258 mm	5.5 mm	286 mm	16 mm	3 mm	Hexagon 8	100 pc	413398

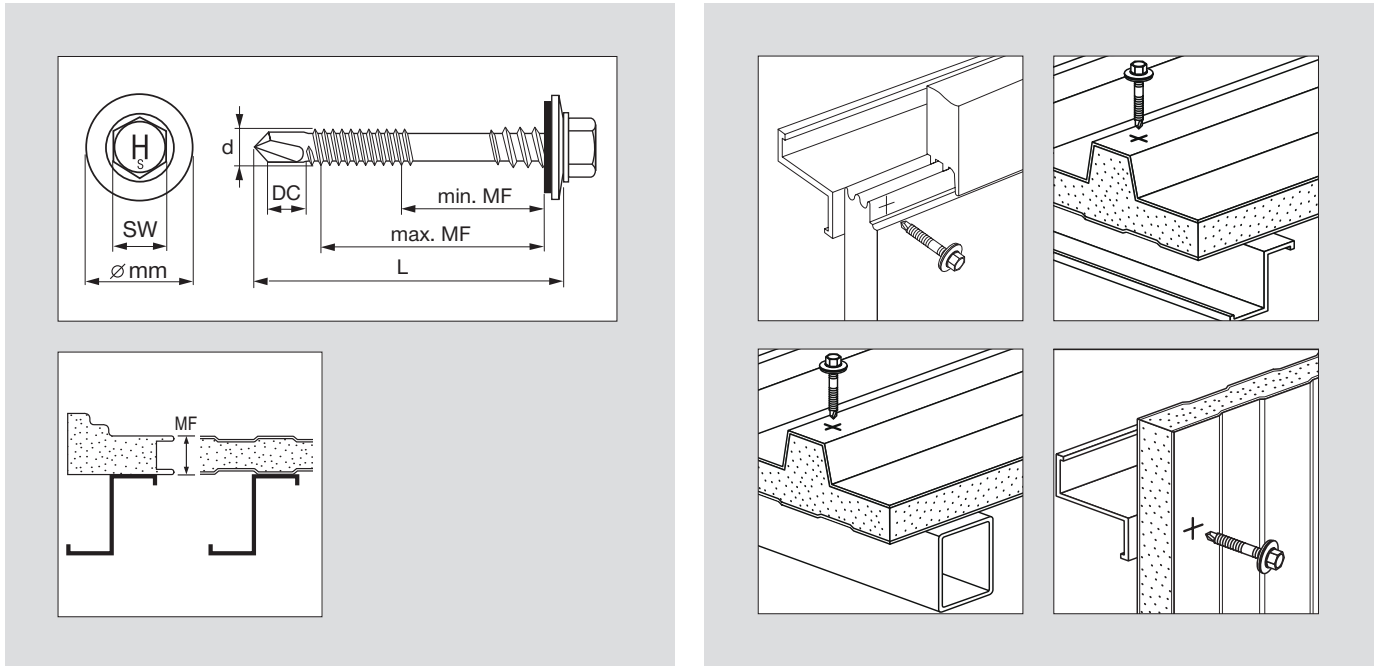
### Reference:

- More Information see approval ETA-13/0179 (Chapter 16)

# 8.5 Stainless steel sandwich panel screw (Ø19) S-CD 63 S



The sandwich panel screws for fastening on light and medium base materials



**8**

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CD63S 5,5x76	2 - 6 mm	38 - 48 mm	5.5 mm	76 mm	19 mm	3 mm	Hexagon 8	100 pc	413354
Sandwich panel screw S-CD63S 5,5x86	2 - 6 mm	48 - 58 mm	5.5 mm	86 mm	19 mm	3 mm	Hexagon 8	100 pc	413355
Sandwich panel screw S-CD63S 5,5x96	2 - 6 mm	58 - 68 mm	5.5 mm	96 mm	19 mm	3 mm	Hexagon 8	100 pc	413356
Sandwich panel screw S-CD63S 5,5x116	2 - 6 mm	68 - 88 mm	5.5 mm	116 mm	19 mm	3 mm	Hexagon 8	100 pc	413349
Sandwich panel screw S-CD63S 5,5x136	2 - 6 mm	78 - 108 mm	5.5 mm	136 mm	19 mm	3 mm	Hexagon 8	100 pc	413350
Sandwich panel screw S-CD63S 5,5x156	2 - 6 mm	98 - 128 mm	5.5 mm	156 mm	19 mm	3 mm	Hexagon 8	100 pc	413351
Sandwich panel screw S-CD63S 5,5x186	2 - 6 mm	128 - 158 mm	5.5 mm	186 mm	19 mm	3 mm	Hexagon 8	100 pc	413352
Sandwich panel screw S-CD63S 5,5x216	2 - 6 mm	138 - 188 mm	5.5 mm	216 mm	19 mm	3 mm	Hexagon 8	100 pc	413353
Sandwich panel screw S-CD63S 5,5x256	2 - 6 mm	178 - 228 mm	5.5 mm	256 mm	19 mm	3 mm	Hexagon 8	100 pc	413357
Sandwich panel screw S-CD63S 5,5x286	2 - 6 mm	208 - 258 mm	5.5 mm	286 mm	19 mm	3 mm	Hexagon 8	100 pc	413358

**Reference:**

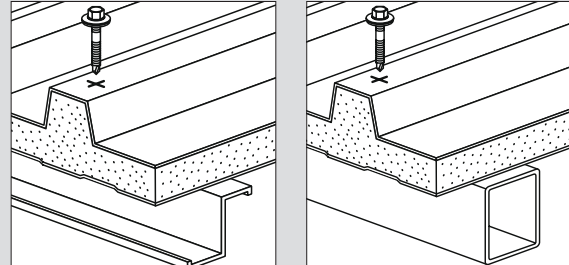
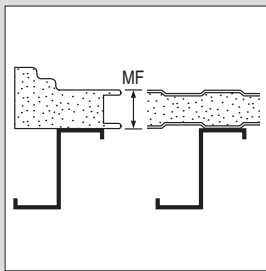
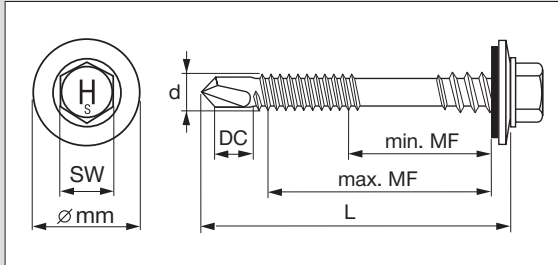
- More Information see approval ETA-13/0179 (Chapter 16)



## 8.6 Stainless steel sandwich panel screw (Ø22) S-CD 73 S



The sandwich panel screws for fastening on light and medium base materials



8

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CD73S 5,5x76	2 - 6 mm	38 - 48 mm	5.5 mm	76 mm	22 mm	3 mm	Hexagon 8	100 pc	413374
Sandwich panel screw S-CD73S 5,5x86	2 - 6 mm	48 - 58 mm	5.5 mm	86 mm	22 mm	3 mm	Hexagon 8	100 pc	413375
Sandwich panel screw S-CD73S 5,5x96	2 - 6 mm	58 - 68 mm	5.5 mm	96 mm	22 mm	3 mm	Hexagon 8	100 pc	413376
Sandwich panel screw S-CD73S 5,5x116	2 - 6 mm	68 - 88 mm	5.5 mm	116 mm	22 mm	3 mm	Hexagon 8	100 pc	413369
Sandwich panel screw S-CD73S 5,5x136	2 - 6 mm	78 - 108 mm	5.5 mm	136 mm	22 mm	3 mm	Hexagon 8	100 pc	413370
Sandwich panel screw S-CD73S 5,5x156	2 - 6 mm	98 - 128 mm	5.5 mm	156 mm	22 mm	3 mm	Hexagon 8	100 pc	413371
Sandwich panel screw S-CD73S 5,5x186	2 - 6 mm	128 - 158 mm	5.5 mm	186 mm	22 mm	3 mm	Hexagon 8	100 pc	413372
Sandwich panel screw S-CD73S 5,5x216	2 - 6 mm	138 - 188 mm	5.5 mm	216 mm	22 mm	3 mm	Hexagon 8	100 pc	413373
Sandwich panel screw S-CD73S 5,5x256	2 - 6 mm	178 - 228 mm	5.5 mm	256 mm	22 mm	3 mm	Hexagon 8	100 pc	413377
Sandwich panel screw S-CD73S 5,5x286	2 - 6 mm	208 - 258 mm	5.5 mm	286 mm	22 mm	3 mm	Hexagon 8	100 pc	413378

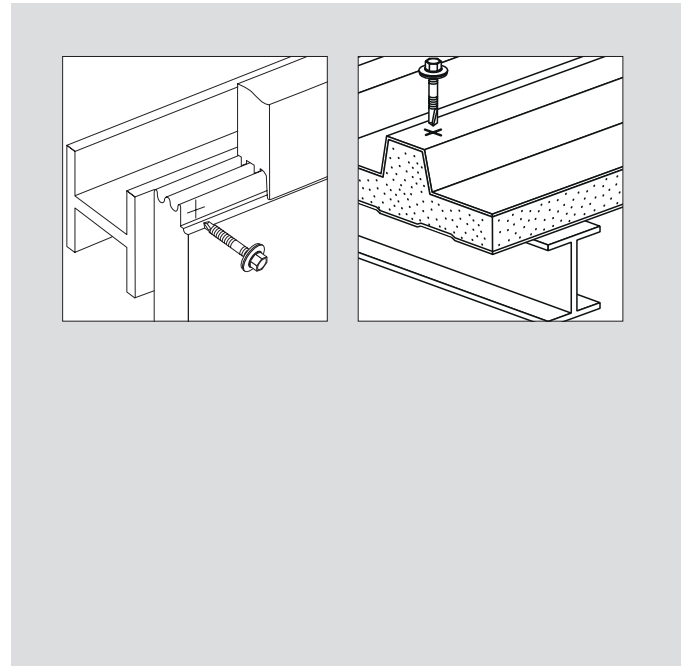
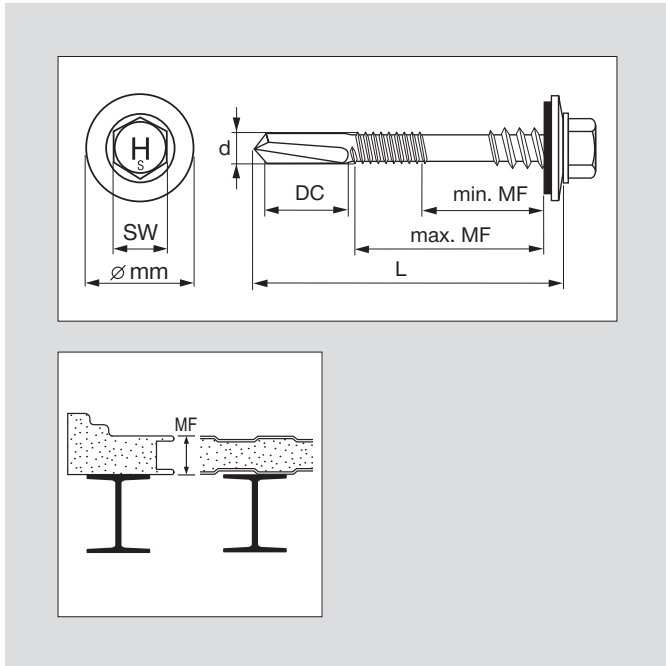
### Reference:

- More Information see approval ETA-13/0179 (Chapter 16)



## 8.7 Stainless steel sandwich panel screw (Ø16) S-CD 55 S

The sandwich panel screw for thick base materials



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CD55S 5,5x90	3.5 - 12 mm	22 - 45 mm	5.5 mm	90 mm	16 mm	3 mm	Hexagon 8	100 pc	2038154
Sandwich panel screw S-CD55S 5,5x100	3.5 - 12 mm	32 - 55 mm	5.5 mm	100 mm	16 mm	3 mm	Hexagon 8	100 pc	2038155
Sandwich panel screw S-CD55S 5,5x110	3.5 - 12 mm	42 - 65 mm	5.5 mm	110 mm	16 mm	3 mm	Hexagon 8	100 pc	2038156
Sandwich panel screw S-CD55S 5,5x130	3.5 - 12 mm	62 - 85 mm	5.5 mm	130 mm	16 mm	3 mm	Hexagon 8	100 pc	2038157
Sandwich panel screw S-CD55S 5,5x150	3.5 - 12 mm	82 - 105 mm	5.5 mm	150 mm	16 mm	3 mm	Hexagon 8	100 pc	2038158
Sandwich panel screw S-CD55S 5,5x170	3.5 - 12 mm	102 - 125 mm	5.5 mm	170 mm	16 mm	3 mm	Hexagon 8	100 pc	2038159
Sandwich panel screw S-CD55S 5,5x190	3.5 - 12 mm	122 - 145 mm	5.5 mm	190 mm	16 mm	3 mm	Hexagon 8	100 pc	2038270
Sandwich panel screw S-CD55S 5,5x220	3.5 - 12 mm	137 - 175 mm	5.5 mm	220 mm	16 mm	3 mm	Hexagon 8	100 pc	2038271

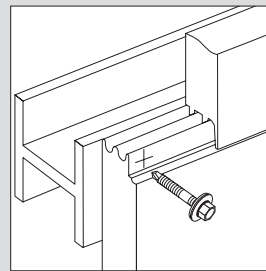
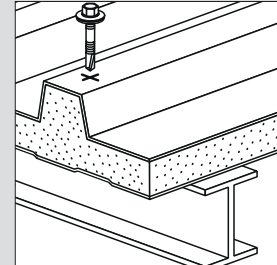
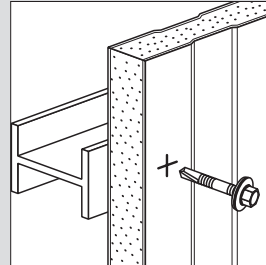
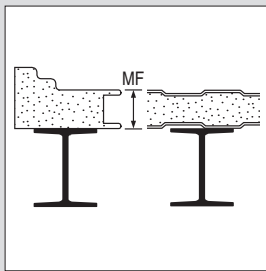
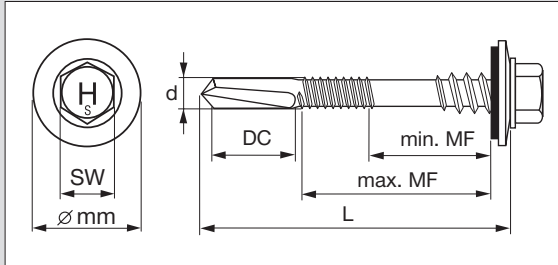
**Reference:**

- More Information see approval ETA-13/0179 (Chapter 16)

## 8.8 Stainless steel sandwich panel screw (Ø19) S-CD 65 S



The sandwich panel screw for thick base materials



8

Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CD65S 5,5X90	3.5 - 12 mm	22 - 45 mm	5.5 mm	90 mm	19 mm	2 mm	Hexagon 8	100 pc	375250
Sandwich panel screw S-CD65S 5,5X100	3.5 - 12 mm	32 - 55 mm	5.5 mm	100 mm	19 mm	2 mm	Hexagon 8	100 pc	375251
Sandwich panel screw S-CD65S 5,5X110	3.5 - 12 mm	42 - 65 mm	5.5 mm	110 mm	19 mm	2 mm	Hexagon 8	100 pc	375252
Sandwich panel screw S-CD65S 5,5X130	3.5 - 12 mm	62 - 85 mm	5.5 mm	130 mm	19 mm	2 mm	Hexagon 8	100 pc	375253
Sandwich panel screw S-CD65S 5,5X150	3.5 - 12 mm	82 - 105 mm	5.5 mm	150 mm	19 mm	2 mm	Hexagon 8	100 pc	375254
Sandwich panel screw S-CD65S 5,5X170	3.5 - 12 mm	102 - 125 mm	5.5 mm	170 mm	19 mm	2 mm	Hexagon 8	100 pc	375255
Sandwich panel screw S-CD65S 5,5x190	3.5 - 12 mm	122 - 145 mm	5.5 mm	190 mm	19 mm	2 mm	Hexagon 8	100 pc	284544
Sandwich panel screw S-CD65S 5,5x220	3.5 - 12 mm	137 - 175 mm	5.5 mm	220 mm	19 mm	2 mm	Hexagon 8	100 pc	284545

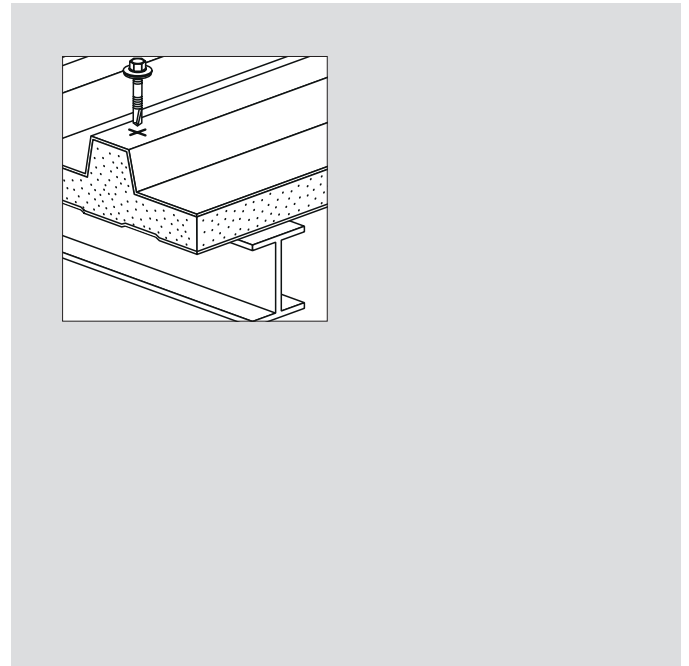
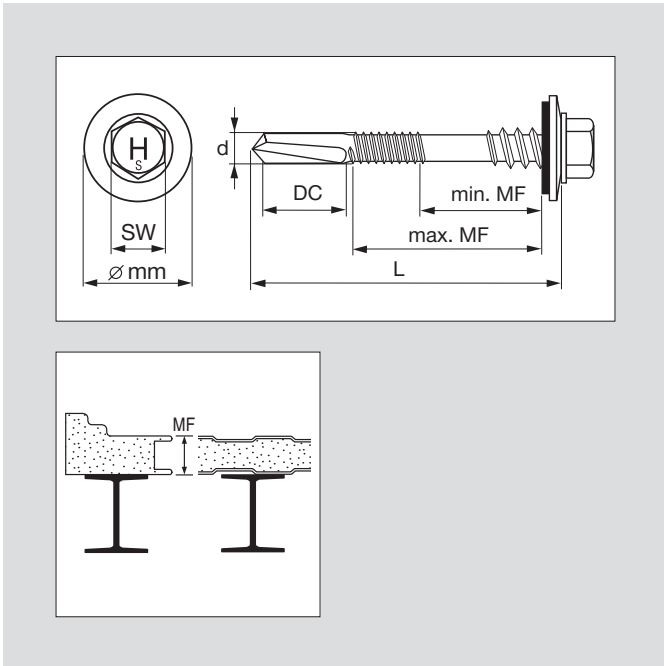
### Reference:

- More Information see approval ETA-13/0179 (Chapter 16)



## 8.9 Stainless steel sandwich panel screw (Ø22) S-CD 75 S

The sandwich panel screw for thick base materials



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Sandwich panel screw S-CD75S 5,5x90	3.5 - 12 mm	22 - 45 mm	5.5 mm	90 mm	22 mm	2 mm	Hexagon 8	100 pc	285650
Sandwich panel screw S-CD75S 5,5x100	3.5 - 12 mm	32 - 55 mm	5.5 mm	100 mm	22 mm	2 mm	Hexagon 8	100 pc	285651
Sandwich panel screw S-CD75S 5,5x110	3.5 - 12 mm	42 - 65 mm	5.5 mm	110 mm	22 mm	2 mm	Hexagon 8	100 pc	285652
Sandwich panel screw S-CD75S 5,5x130	3.5 - 12 mm	62 - 85 mm	5.5 mm	130 mm	22 mm	2 mm	Hexagon 8	100 pc	285653
Sandwich panel screw S-CD75S 5,5x150	3.5 - 12 mm	82 - 105 mm	5.5 mm	150 mm	22 mm	2 mm	Hexagon 8	100 pc	285654
Sandwich panel screw S-CD75S 5,5x170	3.5 - 12 mm	102 - 125 mm	5.5 mm	170 mm	22 mm	2 mm	Hexagon 8	100 pc	285655
Sandwich panel screw S-CD75S 5,5x190	3.5 - 12 mm	122 - 145 mm	5.5 mm	190 mm	22 mm	2 mm	Hexagon 8	100 pc	285656
Sandwich panel screw S-CD75S 5,5x220	3.5 - 12 mm	137 - 175 mm	5.5 mm	220 mm	22 mm	2 mm	Hexagon 8	100 pc	285657

**Reference:**

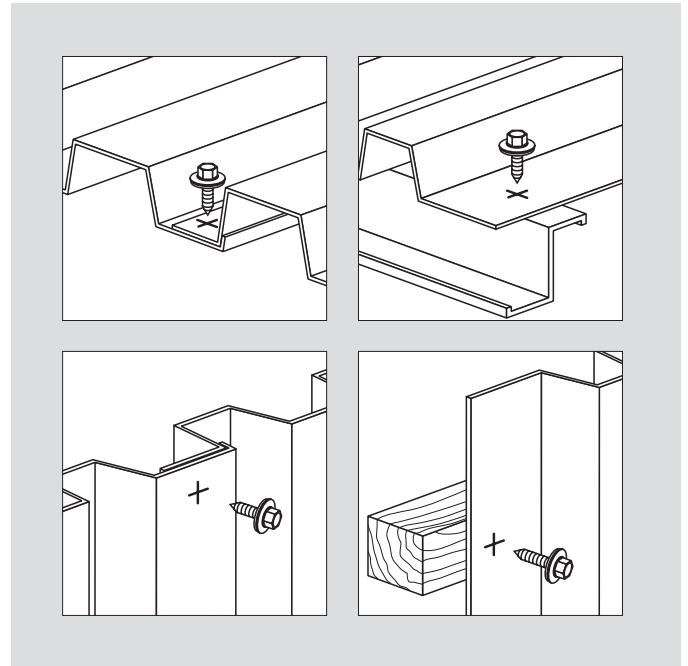
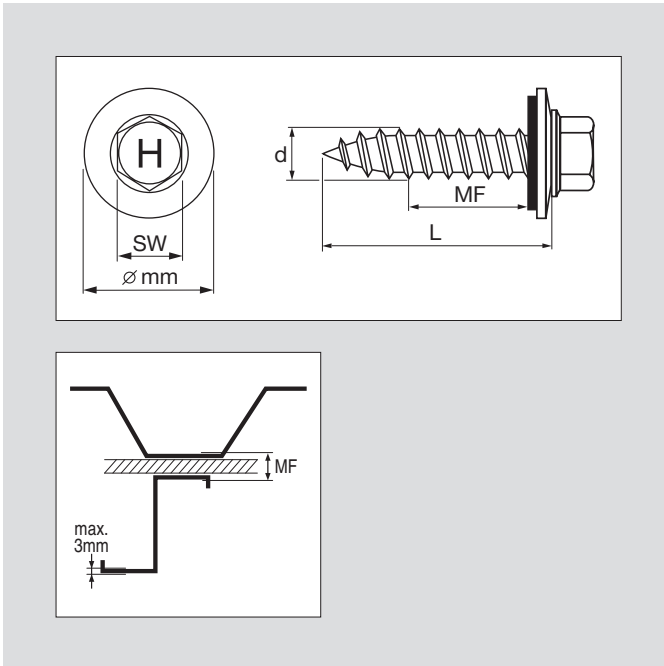
- More Information see approval ETA-13/0179 (Chapter 16)

## Content

9.1			Page
	Galvanized self-tapping screws (Ø 16 mm)	S-MP 53 Z	93
9.2			
	Galvanized self-tapping screws (Ø 16 mm)	S-MP 52 Z	94

# 9.1 Galvanized self-tapping screws (Ø16 mm) S-MP 53 Z

The universal self-tapping screw for thin materials and wood



Ordering description	Minimum thickness of base material	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP53Z 6,5x19		1.2 - 8 mm	6.5 mm	19 mm	16 mm	2 mm	Hexagon 3/8	500 pc	375288
Self-tapping screw S-MP53Z 6,5x25		1.2 - 14 mm	6.5 mm	25 mm	16 mm	2 mm	Hexagon 3/8	500 pc	375289
Self-tapping screw S-MP53Z 6,5x32		1.2 - 21 mm	6.5 mm	32 mm	16 mm	2 mm	Hexagon 3/8	250 pc	375290
Self-tapping screw S-MP53Z 6,5x38	wood, 26 mm	1.2 - 27 mm	6.5 mm	38 mm	16 mm	2 mm	Hexagon 3/8	250 pc	375291
Self-tapping screw S-MP53Z 6,5x50	wood, 26 mm	1.2 - 39 mm	6.5 mm	50 mm	16 mm	2 mm	Hexagon 3/8	250 pc	375292
Self-tapping screw S-MP53Z 6,5x63	wood, 26 mm	1.2 - 52 mm	6.5 mm	63 mm	16 mm	2 mm	Hexagon 3/8	100 pc	375293
Self-tapping screw S-MP53Z 6,5x100	wood, 26 mm	1.2 - 89 mm	6.5 mm	100 mm	16 mm	2 mm	Hexagon 3/8	100 pc	375287

Reference: max steel thickness 3 mm

### Recommended pre-drill diameter for t<sub>p</sub>

t <sub>p</sub> /mm (Steel)	0.5 - 0.63	0.7 - 0.75	0.8 - 1.3	1.4 - 3.0
Pre-drill-Ø :	3.5 mm	4.0 mm	4.5 mm	5.0 mm

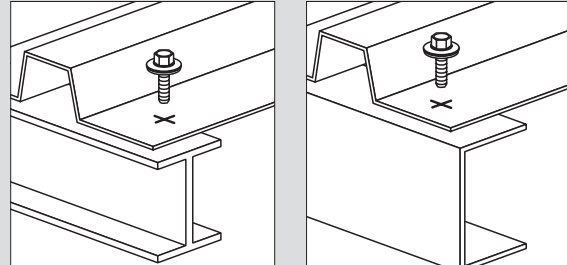
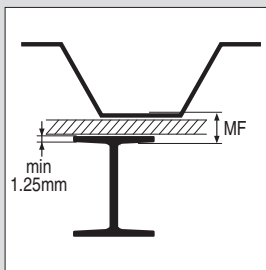
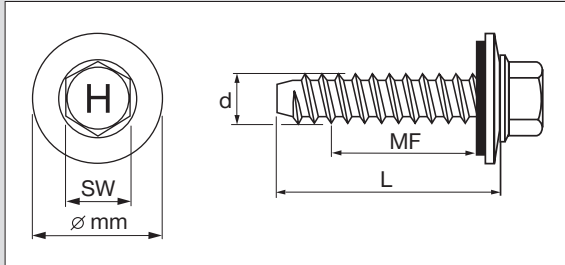
Pre-drill-Ø wood: 4.5 mm

### Reference:

- Technical data see chapter 16.9

## 9.2 Galvanized self-tapping screws (Ø16 mm) S-MP 52 Z

The universal self-tapping screw for thick base materials

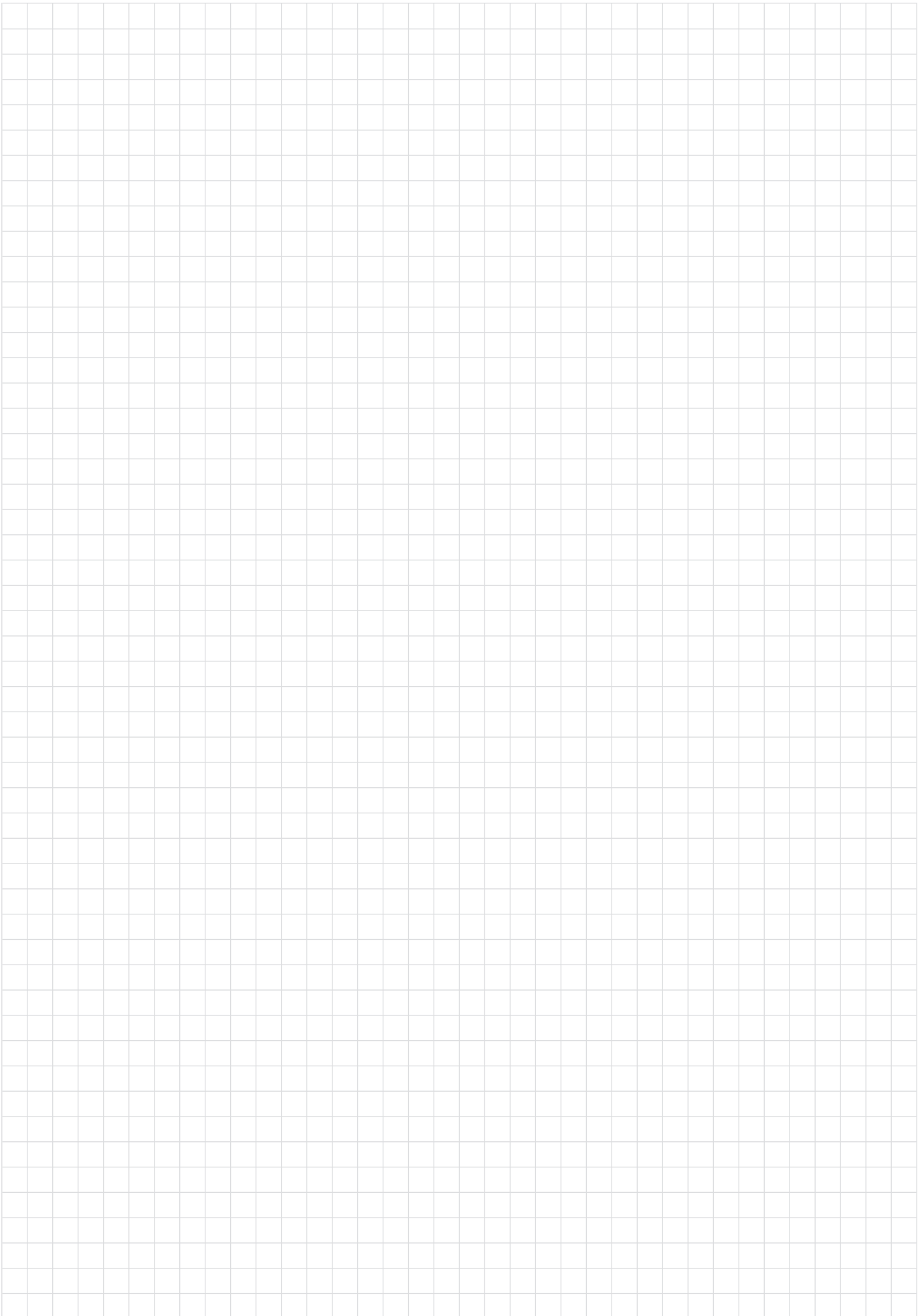


Ordering description	Minimum thickness of base material	Thickness fastened (MF)	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP52Z 6,3x19	steel, 1.25 mm	1.9 - 10 mm	6.3 mm	19 mm	16 mm	2 mm	Hexagon 3/8	500 pc	375279
Self-tapping screw S-MP52Z 6,3x25	steel, 1.25 mm	1.9 - 16 mm	6.3 mm	25 mm	16 mm	2 mm	Hexagon 3/8	500 pc	375280
Self-tapping screw S-MP52Z 6,3x32	steel, 1.25 mm	1.9 - 23 mm	6.3 mm	32 mm	16 mm	2 mm	Hexagon 3/8	250 pc	375281
Self-tapping screw S-MP52Z 6,3x38	steel, 1.25 mm	1.9 - 29 mm	6.3 mm	38 mm	16 mm	2 mm	Hexagon 3/8	250 pc	375282
Self-tapping screw S-MP52Z 6,3x50	steel, 1.25 mm	1.9 - 41 mm	6.3 mm	50 mm	16 mm	2 mm	Hexagon 3/8	250 pc	375283
Self-tapping screw S-MP52Z 6,3x63	steel, 1.25 mm	1.9 - 54 mm	6.3 mm	63 mm	16 mm	2 mm	Hexagon 3/8	100 pc	375284
Self-tapping screw S-MP52Z 6,3x75	steel, 1.25 mm	1.9 - 66 mm	6.3 mm	75 mm	16 mm	2 mm	Hexagon 3/8	100 pc	375285
Self-tapping screw S-MP52Z 6,3x88	steel, 1.25 mm	1.9 - 79 mm	6.3 mm	88 mm	16 mm	2 mm	Hexagon 3/8	100 pc	375286
Self-tapping screw S-MP52Z 6,3x100	steel, 1.25 mm	1.9 - 91 mm	6.3 mm	100 mm	16 mm	2 mm	Hexagon 3/8	100 pc	375278

Reference: max steel thickness 12 mm

### Recommended pre-drill diameter for $t_i$

$t_i$ /mm (Steel)	1.25 - 1.5	1.6 - 4.0	4.1 - 6.9	≥ 7.0
Pre-drill-Ø	5.0 mm	5.3 mm	5.5 mm	5.7 mm





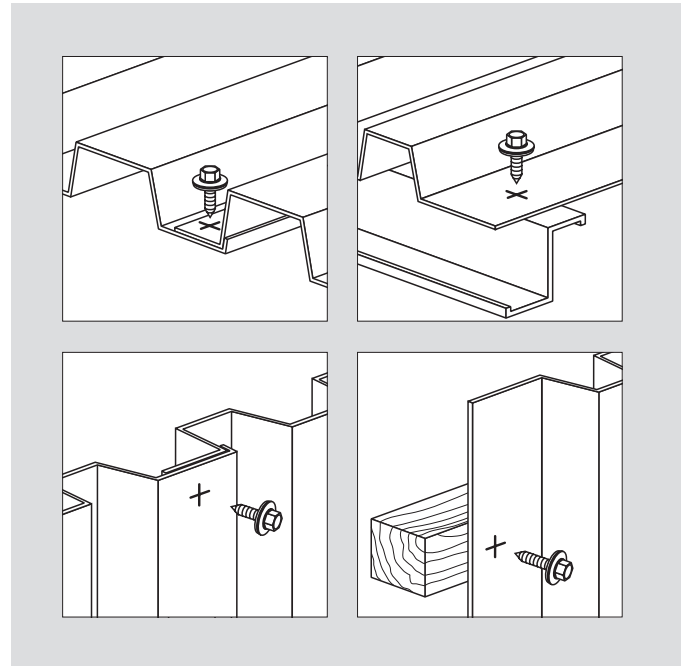
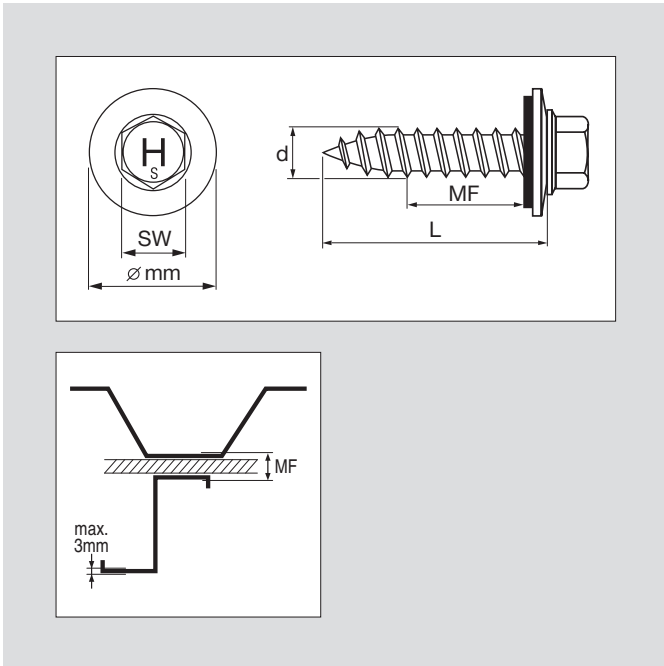
## Content

			Seite
<b>10.1</b>			
	Stainless steel self-tapping screws (Ø 16 mm)	S-MP 53 S	97
<b>10.2</b>			
	Stainless steel self-tapping screws (Ø 19 mm)	S-MP 63 S	98
<b>10.3</b>			
	Stainless steel self-tapping screws (Ø 22 mm)	S-MP 73 S	99
<b>10.4</b>			
	Stainless steel self-tapping screws (Ø 16 mm)	S-MP 52 S	100
<b>10.5</b>			
	Stainless steel self-tapping screws (Ø 19 mm)	S-MP 62 S	101
<b>10.6</b>			
	Stainless steel self-tapping screws (Ø 22 mm)	S-MP 72 S	102
<b>10.7</b>			
	Stainless steel self-tapping screws (Ø 16 mm)	S-MP 54 S	103
<b>10.8</b>			
	Stainless steel self-tapping screws (Ø 19 mm)	S-MP 64 S	104
<b>10.9</b>			
	Stainless steel self-tapping screws (Ø 22 mm)	S-MP 74 S	105



# 10.1 Stainless steel self-tapping screws (Ø16 mm) S-MP 53 S

The universal self-tapping screw for thin materials and wood



Ordering description	Minimum thickness of base material	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP53S 6,5x19		1.2 - 8 mm	6.5 mm	19 mm	16 mm	2 mm	Hexagon 3/8	500 pc	80448
Self-tapping screw S-MP53S 6,5x25		1.2 - 14 mm	6.5 mm	25 mm	16 mm	2 mm	Hexagon 3/8	500 pc	80362
Self-tapping screw S-MP53S 6,5x32		1.2 - 21 mm	6.5 mm	32 mm	16 mm	2 mm	Hexagon 3/8	250 pc	80450
Self-tapping screw S-MP53S 6,5x38	wood, 26 mm	1.2 - 27 mm	6.5 mm	38 mm	16 mm	2 mm	Hexagon 3/8	250 pc	80451
Self-tapping screw S-MP53S 6,5x50	wood, 26 mm	1.2 - 39 mm	6.5 mm	50 mm	16 mm	2 mm	Hexagon 3/8	250 pc	80337
Self-tapping screw S-MP53S 6,5x63	wood, 26 mm	1.2 - 52 mm	6.5 mm	63 mm	16 mm	2 mm	Hexagon 3/8	100 pc	85332
Self-tapping screw S-MP53S 6,5x75	wood, 26 mm	1.2 - 64 mm	6.5 mm	75 mm	16 mm	2 mm	Hexagon 3/8	100 pc	224558
Self-tapping screw S-MP53S 6,5x88	wood, 26 mm	1.2 - 77 mm	6.5 mm	88 mm	16 mm	2 mm	Hexagon 3/8	100 pc	85334
Self-tapping screw S-MP53S 6,5x100	wood, 26 mm	1.2 - 89 mm	6.5 mm	100 mm	16 mm	2 mm	Hexagon 3/8	100 pc	85335
Self-tapping screw S-MP53S 6,5x125	wood, 26 mm	1.2 - 114 mm	6.5 mm	125 mm	16 mm	2 mm	Hexagon 3/8	100 pc	219093
Self-tapping screw S-MP53S 6,5x150	wood, 26 mm	1.2 - 139 mm	6.5 mm	150 mm	16 mm	2 mm	Hexagon 3/8	100 pc	219094
Self-tapping screw S-MP53S 6,5x175	wood, 26 mm	1.2 - 164 mm	6.5 mm	175 mm	16 mm	2 mm	Hexagon 3/8	100 pc	224559

Reference: max steel thickness 3 mm

**Recommended pre-drill diameter for t<sub>i</sub>**

t <sub>i</sub> /mm (Steel)	0.5 - 0.63	0.7 - 0.75	0.8 - 1.3	1.4 - 3.0
Pre-drill-Ø	3.5 mm	4.0 mm	4.5 mm	5.0 mm

Pre-drill-Ø Wood: 4.5 mm

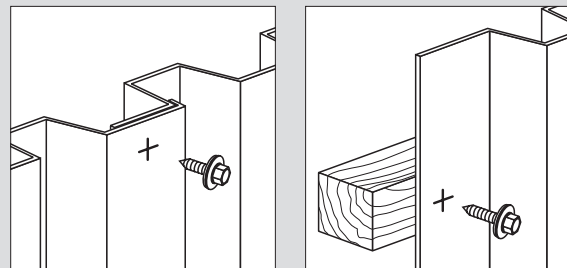
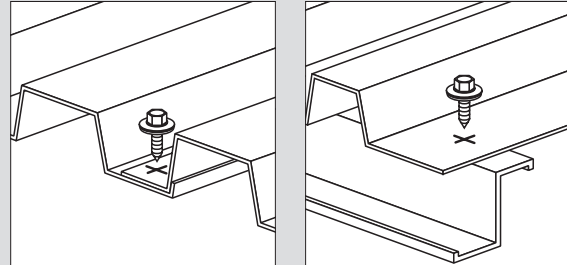
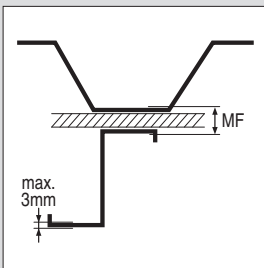
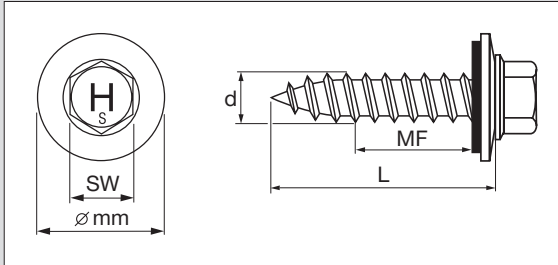
**Reference:**

- More Information see approval ETA-10/0182 (Chapter 16)

## 10.2 Stainless steel self-tapping screws (Ø19 mm) S-MP 63 S



The universal self-tapping screw for thin materials and wood



Ordering description	Minimum thickness of base material	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP63S 6,5x19		1.2 - 8 mm	6.5 mm	19 mm	19 mm	2 mm	Hexagon 3/8	500 pc	285217
Self-tapping screw S-MP63S 6,5x25		1.2 - 14 mm	6.5 mm	25 mm	19 mm	2 mm	Hexagon 3/8	500 pc	285218
Self-tapping screw S-MP63S 6,5x32		1.2 - 21 mm	6.5 mm	32 mm	19 mm	2 mm	Hexagon 3/8	250 pc	285219
Self-tapping screw S-MP63S 6,5x38	wood, 26 mm	1.2 - 27 mm	6.5 mm	38 mm	19 mm	2 mm	Hexagon 3/8	250 pc	285220
Self-tapping screw S-MP63S 6,5x50	wood, 26 mm	1.2 - 39 mm	6.5 mm	50 mm	19 mm	2 mm	Hexagon 3/8	250 pc	285221
Self-tapping screw S-MP63S 6,5x63	wood, 26 mm	1.2 - 52 mm	6.5 mm	63 mm	19 mm	2 mm	Hexagon 3/8	100 pc	285222
Self-tapping screw S-MP63S 6,5x75	wood, 26 mm	1.2 - 64 mm	6.5 mm	75 mm	19 mm	2 mm	Hexagon 3/8	100 pc	285223
Self-tapping screw S-MP63S 6,5x88	wood, 26 mm	1.2 - 77 mm	6.5 mm	88 mm	19 mm	2 mm	Hexagon 3/8	100 pc	285224
Self-tapping screw S-MP63S 6,5x100	wood, 26 mm	1.2 - 89 mm	6.5 mm	100 mm	19 mm	2 mm	Hexagon 3/8	100 pc	285225
Self-tapping screw S-MP63S 6,5x125	wood, 26 mm	1.2 - 114 mm	6.5 mm	125 mm	19 mm	2 mm	Hexagon 3/8	100 pc	285226
Self-tapping screw S-MP63S 6,5x150	wood, 26 mm	1.2 - 139 mm	6.5 mm	150 mm	19 mm	2 mm	Hexagon 3/8	100 pc	285227
Self-tapping screw S-MP63S 6,5x175	wood, 26 mm	1.2 - 164 mm	6.5 mm	175 mm	19 mm	2 mm	Hexagon 3/8	100 pc	285228

Reference: max steel thickness 3 mm

### Recommended pre-drill diameter for $t_{II}$

$t_{II}$ /mm (Steel)	0.5 - 0.63	0.7 - 0.75	0.8 - 1.3	1.4 - 3.0
Pre-drill-Ø	3.5 mm	4.0 mm	4.5 mm	5.0 mm

Pre-drill-Ø Wood: 4.5 mm

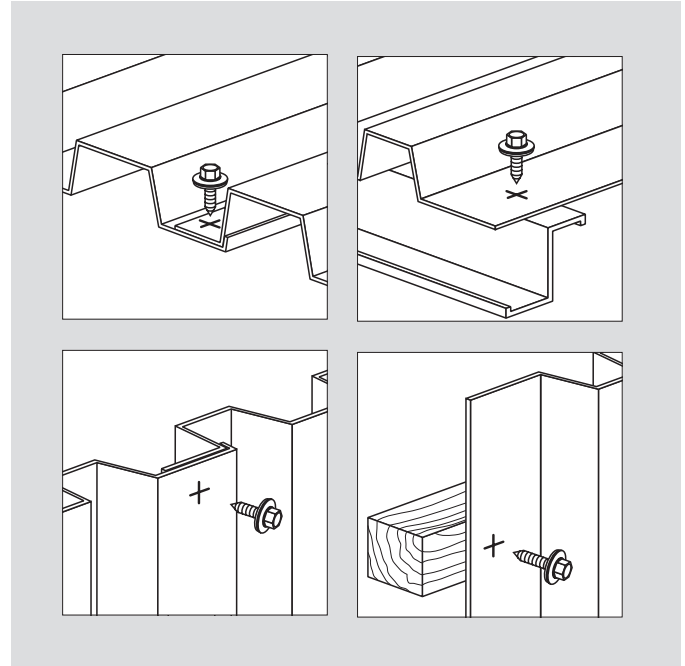
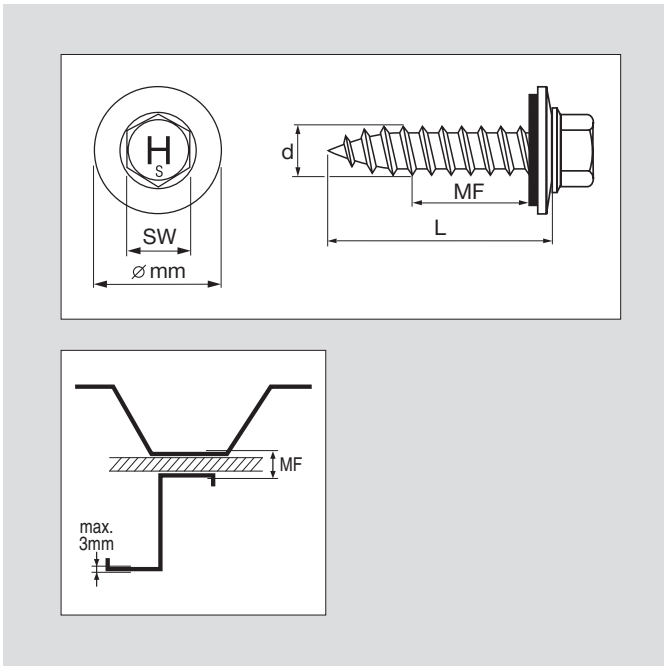
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)



### 10.3 Stainless steel self-tapping screws (Ø22 mm) S-MP 73 S

The universal self-tapping screw for thin materials and wood



Ordering description	Minimum thickness of base material	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP73S 6,5x19		1.2 - 8 mm	6.5 mm	19 mm	22 mm	2 mm	Hexagon 3/8	500 pc	285205
Self-tapping screw S-MP73S 6,5x25		1.2 - 14 mm	6.5 mm	25 mm	22 mm	2 mm	Hexagon 3/8	500 pc	285206
Self-tapping screw S-MP73S 6,5x32		1.2 - 21 mm	6.5 mm	32 mm	22 mm	2 mm	Hexagon 3/8	250 pc	285207
Self-tapping screw S-MP73S 6,5x38	wood, 26 mm	1.2 - 27 mm	6.5 mm	38 mm	22 mm	2 mm	Hexagon 3/8	250 pc	285208
Self-tapping screw S-MP73S 6,5x50	wood, 26 mm	1.2 - 39 mm	6.5 mm	50 mm	22 mm	2 mm	Hexagon 3/8	250 pc	285209
Self-tapping screw S-MP73S 6,5x63	wood, 26 mm	1.2 - 52 mm	6.5 mm	63 mm	22 mm	2 mm	Hexagon 3/8	100 pc	285210
Self-tapping screw S-MP73S 6,5x75	wood, 26 mm	1.2 - 64 mm	6.5 mm	75 mm	22 mm	2 mm	Hexagon 3/8	100 pc	285211
Self-tapping screw S-MP73S 6,5x88	wood, 26 mm	1.2 - 77 mm	6.5 mm	88 mm	22 mm	2 mm	Hexagon 3/8	100 pc	285212
Self-tapping screw S-MP73S 6,5x100	wood, 26 mm	1.2 - 89 mm	6.5 mm	100 mm	22 mm	2 mm	Hexagon 3/8	100 pc	285213
Self-tapping screw S-MP73S 6,5x125	wood, 26 mm	1.2 - 114 mm	6.5 mm	125 mm	22 mm	2 mm	Hexagon 3/8	100 pc	285214
Self-tapping screw S-MP73S 6,5x150	wood, 26 mm	1.2 - 139 mm	6.5 mm	150 mm	22 mm	2 mm	Hexagon 3/8	100 pc	285215
Self-tapping screw S-MP73S 6,5x175	wood, 26 mm	1.2 - 164 mm	6.5 mm	175 mm	22 mm	2 mm	Hexagon 3/8	100 pc	285216

Reference: max steel thickness 3 mm

#### Recommended pre-drill diameter for t<sub>p</sub>

t <sub>p</sub> /mm (Steel)	0.5 - 0.63	0.7 - 0.75	0.8 - 1.3	1.4 - 3.0
Pre-drill-Ø	3.5 mm	4.0 mm	4.5 mm	5.0 mm

Pre-drill-Ø Wood: 4.5 mm

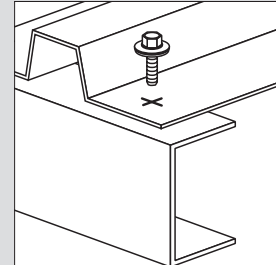
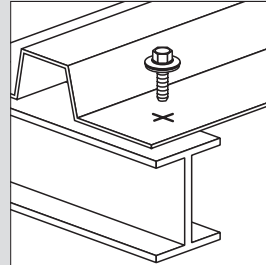
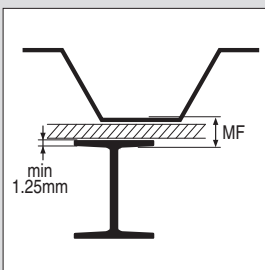
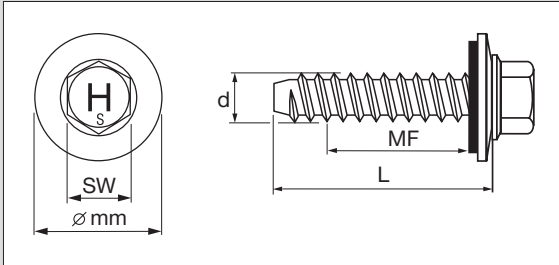
#### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)

## 10.4 Stainless steel self-tapping screws (Ø16 mm) S-MP 52 S



The universal self-tapping screw for thick base materials



Ordering description	Minimum thickness of base material	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP52S 6,3x22	Steel, 1.25 mm	1.9 - 9 mm	6.3 mm	22 mm	16 mm	2 mm	Hexagon 8	500 pc	2065045
Self-tapping screw S-MP52S 6,3x25	Steel, 1.25 mm	1.9 - 12 mm	6.3 mm	25 mm	16 mm	2 mm	Hexagon 8	500 pc	2065046
Self-tapping screw S-MP52S 6,3x32	Steel, 1.25 mm	1.9 - 19 mm	6.3 mm	32 mm	16 mm	2 mm	Hexagon 8	250 pc	2065047
Self-tapping screw S-MP52S 6,3x38	Steel, 1.25 mm	1.9 - 25 mm	6.3 mm	38 mm	16 mm	2 mm	Hexagon 8	250 pc	2065048
Self-tapping screw S-MP52S 6,3x50	Steel, 1.25 mm	1.9 - 37 mm	6.3 mm	50 mm	16 mm	2 mm	Hexagon 8	250 pc	2065049
Self-tapping screw S-MP52S 6,3x63	Steel, 1.25 mm	1.9 - 50 mm	6.3 mm	63 mm	16 mm	2 mm	Hexagon 8	100 pc	2065110
Self-tapping screw S-MP52S 6,3x75	Steel, 1.25 mm	1.9 - 62 mm	6.3 mm	75 mm	16 mm	2 mm	Hexagon 8	100 pc	2065111
Self-tapping screw S-MP52S 6,3x88	Steel, 1.25 mm	1.9 - 75 mm	6.3 mm	88 mm	16 mm	2 mm	Hexagon 8	100 pc	2065112
Self-tapping screw S-MP52S 6,3x100	Steel, 1.25 mm	1.9 - 87 mm	6.3 mm	100 mm	16 mm	2 mm	Hexagon 8	100 pc	2065113
Self-tapping screw S-MP52S 6,3x125	Steel, 1.25 mm	1.9 - 112 mm	6.3 mm	125 mm	16 mm	2 mm	Hexagon 8	100 pc	2065114
Self-tapping screw S-MP52S 6,3x150	Steel, 1.25 mm	1.9 - 138 mm	6.3 mm	150 mm	16 mm	2 mm	Hexagon 8	100 pc	2065115
Self-tapping screw S-MP52S 6,3x175	Steel, 1.25 mm	1.9 - 162 mm	6.3 mm	175 mm	16 mm	2 mm	Hexagon 8	100 pc	2065116
Self-tapping screw S-MP52S 6,3x200	Steel, 1.25 mm	1.9 - 187 mm	6.3 mm	200 mm	16 mm	2 mm	Hexagon 8	100 pc	2065117
Self-tapping screw S-MP52S 6,3x225	Steel, 1.25 mm	1.9 - 212 mm	6.3 mm	225 mm	16 mm	2 mm	Hexagon 8	100 pc	2065118
Self-tapping screw S-MP52S 6,3x250	Steel, 1.25 mm	1.9 - 237 mm	6.3 mm	250 mm	16 mm	2 mm	Hexagon 8	100 pc	2065119
Self-tapping screw S-MP52S 6,3x275	Steel, 1.25 mm	1.9 - 262 mm	6.3 mm	275 mm	16 mm	2 mm	Hexagon 8	100 pc	2065120

Reference: max steel thickness 12 mm, 6 mm steel incl. in MF

### Recommended pre-drill diameter for $t_f$

$t_f$ /mm (Steel)	1.25 - 1.5	1.6 - 4.0	4.1 - 6.9	≥ 7.0
Pre-drill-Ø	5.0 mm	5.3 mm	5.5 mm	5.7 mm

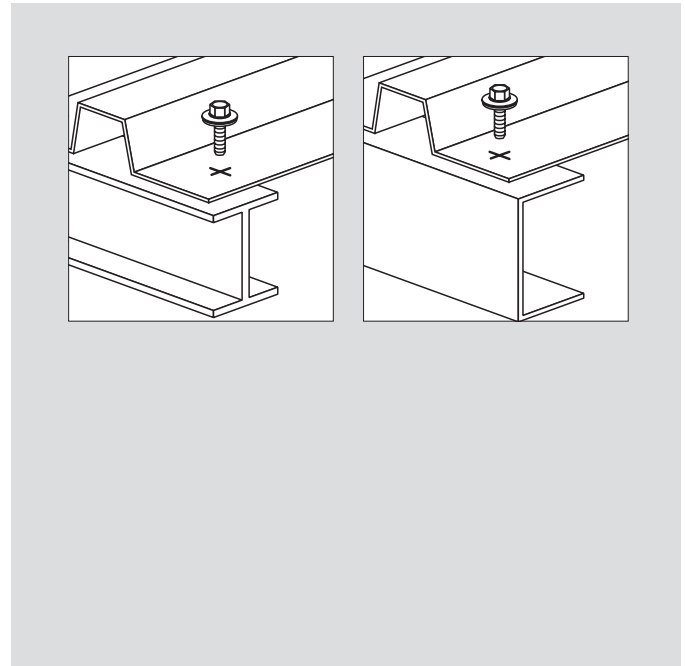
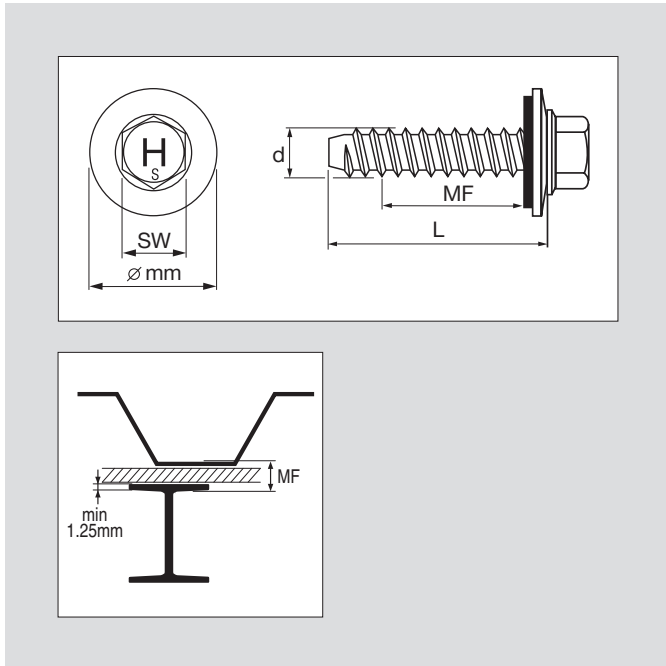
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)



# 10.5 Stainless steel self-tapping screws (Ø19 mm) S-MP 62 S

The universal self-tapping screw for thick base materials



Ordering description	Minimum thickness of base material	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP62S 6,3x22	Steel, 1,25 mm	1,9 - 9 mm	6,3 mm	22 mm	19 mm	2 mm	Hexagon 8	500 pc	2065121
Self-tapping screw S-MP62S 6,3x25	Steel, 1,25 mm	1,9 - 12 mm	6,3 mm	25 mm	19 mm	2 mm	Hexagon 8	500 pc	2065122
Self-tapping screw S-MP62S 6,3x32	Steel, 1,25 mm	1,9 - 19 mm	6,3 mm	32 mm	19 mm	2 mm	Hexagon 8	250 pc	2065123
Self-tapping screw S-MP62S 6,3x38	Steel, 1,25 mm	1,9 - 25 mm	6,3 mm	38 mm	19 mm	2 mm	Hexagon 8	250 pc	2065124
Self-tapping screw S-MP62S 6,3x50	Steel, 1,25 mm	1,9 - 37 mm	6,3 mm	50 mm	19 mm	2 mm	Hexagon 8	250 pc	2065125
Self-tapping screw S-MP62S 6,3x63	Steel, 1,25 mm	1,9 - 50 mm	6,3 mm	63 mm	19 mm	2 mm	Hexagon 8	100 pc	2065126
Self-tapping screw S-MP62S 6,3x75	Steel, 1,25 mm	1,9 - 62 mm	6,3 mm	75 mm	19 mm	2 mm	Hexagon 8	100 pc	2065127
Self-tapping screw S-MP62S 6,3x88	Steel, 1,25 mm	1,9 - 75 mm	6,3 mm	88 mm	19 mm	2 mm	Hexagon 8	100 pc	2065128
Self-tapping screw S-MP62S 6,3x100	Steel, 1,25 mm	1,9 - 87 mm	6,3 mm	100 mm	19 mm	2 mm	Hexagon 8	100 pc	2065129
Self-tapping screw S-MP62S 6,3x125	Steel, 1,25 mm	1,9 - 112 mm	6,3 mm	125 mm	19 mm	2 mm	Hexagon 8	100 pc	2065130
Self-tapping screw S-MP62S 6,3x150	Steel, 1,25 mm	1,9 - 138 mm	6,3 mm	150 mm	19 mm	2 mm	Hexagon 8	100 pc	2065131
Self-tapping screw S-MP62S 6,3x175	Steel, 1,25 mm	1,9 - 162 mm	6,3 mm	175 mm	19 mm	2 mm	Hexagon 8	100 pc	2065132
Self-tapping screw S-MP62S 6,3x200	Steel, 1,25 mm	1,9 - 187 mm	6,3 mm	200 mm	19 mm	2 mm	Hexagon 8	100 pc	2065133
Self-tapping screw S-MP62S 6,3x225	Steel, 1,25 mm	1,9 - 212 mm	6,3 mm	225 mm	19 mm	2 mm	Hexagon 8	100 pc	2065134
Self-tapping screw S-MP62S 6,3x250	Steel, 1,25 mm	1,9 - 237 mm	6,3 mm	250 mm	19 mm	2 mm	Hexagon 8	100 pc	2065136
Self-tapping screw S-MP62S 6,3x275	Steel, 1,25 mm	1,9 - 262 mm	6,3 mm	275 mm	19 mm	2 mm	Hexagon 8	100 pc	2065137

Reference: max steel thickness 12 mm, 6 mm steel incl. in MF

**Recommended pre-drill diameter for t<sub>p</sub>**

t <sub>p</sub> /mm (Steel)	1.25 - 1.5	1.6 - 4.0	4.1 - 6.9	≥ 7.0
Pre-drill-Ø	5.0 mm	5.3 mm	5.5 mm	5.7 mm

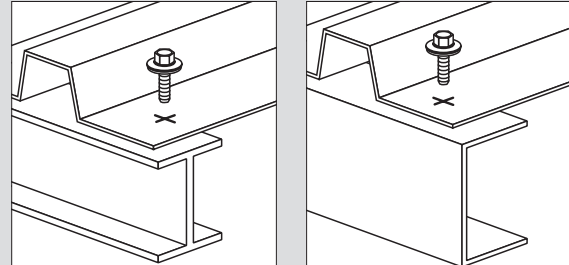
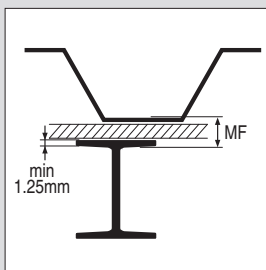
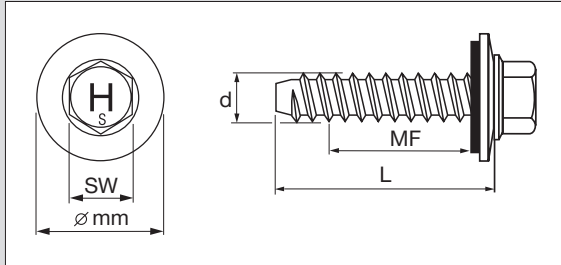
**Reference:**

- More Information see approval ETA-10/0182 (Chapter 16)

## 10.6 Stainless steel self-tapping screws (Ø22 mm) S-MP 72 S



The universal self-tapping screw for thick base materials



Ordering description	Minimum thickness of base material	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP72S 6,3x22	Steel, 1.25 mm	1.9 - 9 mm	6.3 mm	22 mm	22 mm	2 mm	Hexagon 8	500 pc	2065138
Self-tapping screw S-MP72S 6,3x25	Steel, 1.25 mm	1.9 - 12 mm	6.3 mm	25 mm	22 mm	2 mm	Hexagon 8	100 pc	2065139
Self-tapping screw S-MP72S 6,3x32	Steel, 1.25 mm	1.9 - 19 mm	6.3 mm	32 mm	22 mm	2 mm	Hexagon 8	250 pc	2065140
Self-tapping screw S-MP72S 6,3x38	Steel, 1.25 mm	1.9 - 25 mm	6.3 mm	38 mm	22 mm	2 mm	Hexagon 8	250 pc	2065141
Self-tapping screw S-MP72S 6,3x50	Steel, 1.25 mm	1.9 - 37 mm	6.3 mm	50 mm	22 mm	2 mm	Hexagon 8	250 pc	2065142
Self-tapping screw S-MP72S 6,3x63	Steel, 1.25 mm	1.9 - 50 mm	6.3 mm	63 mm	22 mm	2 mm	Hexagon 8	100 pc	2065143
Self-tapping screw S-MP72S 6,3x75	Steel, 1.25 mm	1.9 - 62 mm	6.3 mm	75 mm	22 mm	2 mm	Hexagon 8	100 pc	2065144
Self-tapping screw S-MP72S 6,3x88	Steel, 1.25 mm	1.9 - 75 mm	6.3 mm	88 mm	22 mm	2 mm	Hexagon 8	100 pc	2065145
Self-tapping screw S-MP72S 6,3x100	Steel, 1.25 mm	1.9 - 87 mm	6.3 mm	100 mm	22 mm	2 mm	Hexagon 8	100 pc	2065146
Self-tapping screw S-MP72S 6,3x125	Steel, 1.25 mm	1.9 - 112 mm	6.3 mm	125 mm	22 mm	2 mm	Hexagon 8	100 pc	2065147
Self-tapping screw S-MP72S 6,3x150	Steel, 1.25 mm	1.9 - 138 mm	6.3 mm	150 mm	22 mm	2 mm	Hexagon 8	100 pc	2065148
Self-tapping screw S-MP72S 6,3x175	Steel, 1.25 mm	1.9 - 162 mm	6.3 mm	175 mm	22 mm	2 mm	Hexagon 8	100 pc	2065149
Self-tapping screw S-MP72S 6,3x200	Steel, 1.25 mm	1.9 - 187 mm	6.3 mm	200 mm	22 mm	2 mm	Hexagon 8	100 pc	2065150
Self-tapping screw S-MP72S 6,3x225	Steel, 1.25 mm	1.9 - 212 mm	6.3 mm	225 mm	22 mm	2 mm	Hexagon 8	100 pc	2065151
Self-tapping screw S-MP72S 6,3x250	Steel, 1.25 mm	1.9 - 237 mm	6.3 mm	250 mm	22 mm	2 mm	Hexagon 8	100 pc	2065152
Self-tapping screw S-MP72S 6,3x275	Steel, 1.25 mm	1.9 - 262 mm	6.3 mm	275 mm	22 mm	2 mm	Hexagon 8	100 pc	2065153

Reference: max steel thickness 12 mm, 6 mm steel incl. in MF

### Recommended pre-drill diameter for $t_{II}$

$t_{II}$ /mm (Steel)	1.25 - 1.5	1.6 - 4.0	4.1 - 6.9	≥ 7.0
Pre-drill-Ø	5.0 mm	5.3 mm	5.5 mm	5.7 mm

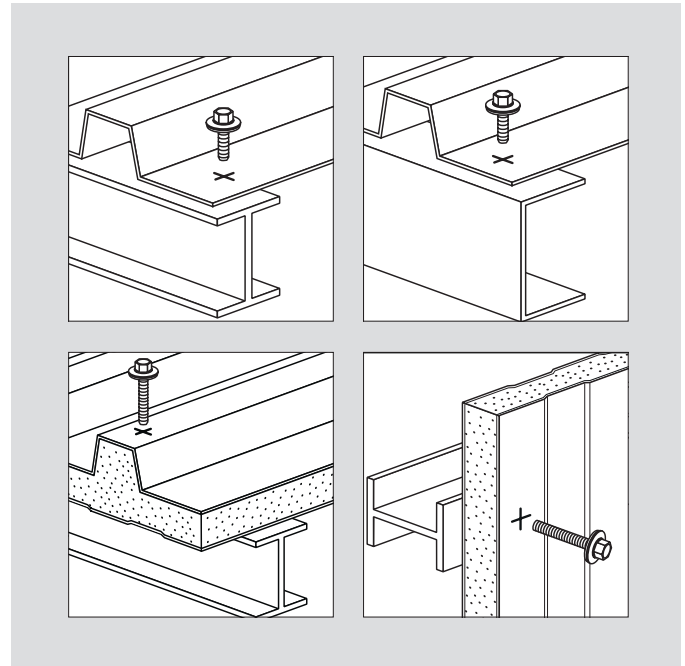
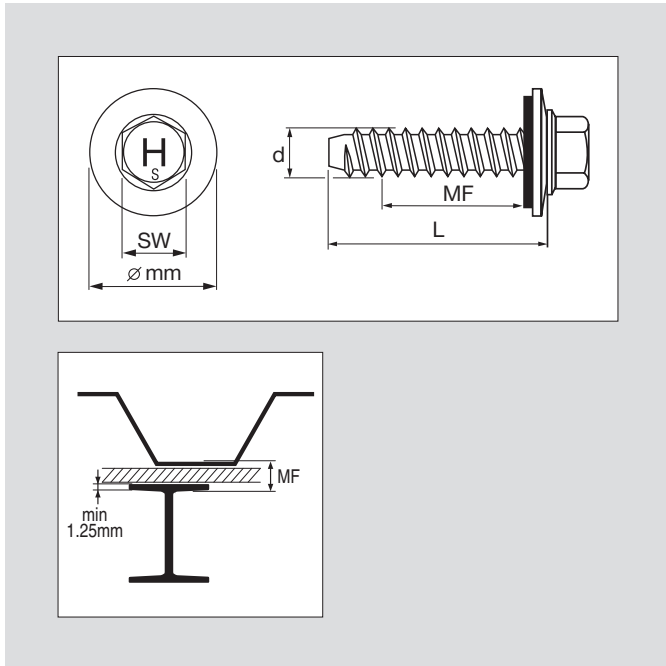
### Reference:

- More Information see approval ETA-10/0182 (Chapter 16)



# 10.7 Stainless steel self-tapping screws (Ø16 mm) S-MP 54 S

The universal self-tapping screw for thick base materials



Ordering description	Minimum thickness of base material	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP54S 6,3x22	Steel, 1,25 mm	1,9 - 9 mm	6,3 mm	22 mm	16 mm	2 mm	Hexagon 8	500 pc	244214
Self-tapping screw S-MP54S 6,3x25	Steel, 1,25 mm	1,9 - 12 mm	6,3 mm	25 mm	16 mm	2 mm	Hexagon 8	100 pc	283199
Self-tapping screw S-MP54S 6,3x32	Steel, 1,25 mm	1,9 - 19 mm	6,3 mm	32 mm	16 mm	2 mm	Hexagon 8	250 pc	283200
Self-tapping screw S-MP54S 6,3x38	Steel, 1,25 mm	1,9 - 25 mm	6,3 mm	38 mm	16 mm	2 mm	Hexagon 8	250 pc	283201
Self-tapping screw S-MP54S 6,3x50	Steel, 1,25 mm	1,9 - 37 mm	6,3 mm	50 mm	16 mm	2 mm	Hexagon 8	250 pc	283202
Self-tapping screw S-MP54S 6,3x63	Steel, 1,25 mm	1,9 - 50 mm	6,3 mm	63 mm	16 mm	2 mm	Hexagon 8	100 pc	283203
Self-tapping screw S-MP54S 6,3x75	Steel, 1,25 mm	1,9 - 62 mm	6,3 mm	75 mm	16 mm	2 mm	Hexagon 8	100 pc	283204
Self-tapping screw S-MP54S 6,3x88	Steel, 1,25 mm	1,9 - 75 mm	6,3 mm	88 mm	16 mm	2 mm	Hexagon 8	100 pc	283205
Self-tapping screw S-MP54S 6,3x100	Steel, 1,25 mm	1,9 - 87 mm	6,3 mm	100 mm	16 mm	2 mm	Hexagon 8	100 pc	283206
Self-tapping screw S-MP54S 6,3x125	Steel, 1,25 mm	1,9 - 112 mm	6,3 mm	125 mm	16 mm	2 mm	Hexagon 8	100 pc	283341
Self-tapping screw S-MP54S 6,3x150	Steel, 1,25 mm	1,9 - 138 mm	6,3 mm	150 mm	16 mm	2 mm	Hexagon 8	100 pc	283536
Self-tapping screw S-MP54S 6,3x175	Steel, 1,25 mm	1,9 - 162 mm	6,3 mm	175 mm	16 mm	2 mm	Hexagon 8	100 pc	283537
Self-tapping screw S-MP54S 6,3x200	Steel, 1,25 mm	1,9 - 187 mm	6,3 mm	200 mm	16 mm	2 mm	Hexagon 8	100 pc	403179
Self-tapping screw S-MP54S 6,3x225	Steel, 1,25 mm	1,9 - 212 mm	6,3 mm	225 mm	16 mm	2 mm	Hexagon 8	100 pc	403180
Self-tapping screw S-MP54S 6,3x250	Steel, 1,25 mm	1,9 - 237 mm	6,3 mm	250 mm	16 mm	2 mm	Hexagon 8	100 pc	403181
Self-tapping screw S-MP54S 6,3x275	Steel, 1,25 mm	1,9 - 262 mm	6,3 mm	275 mm	16 mm	2 mm	Hexagon 8	100 pc	403182

Reference: 6 mm basematerial incl. in MF

Recommended pre-drill diameter for  $t_b$

$t_b$ /mm (Steel)	1.25 - 1.5	1.6 - 4.0	4.1 - 6.9	≥ 7.0
Pre-drill-Ø	5.0 mm	5.3 mm	5.5 mm	5.7 mm

Reference:

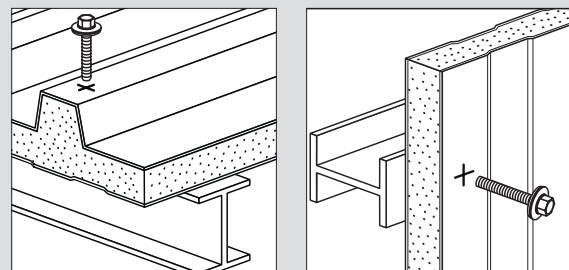
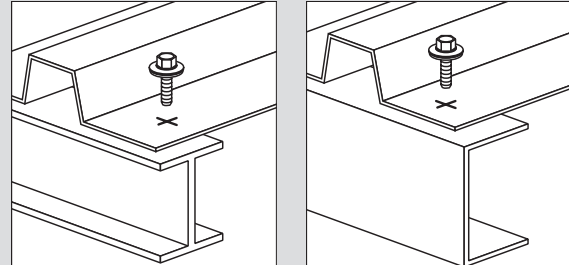
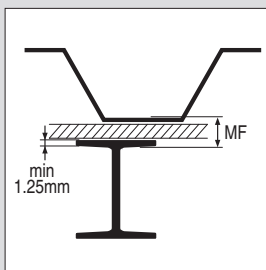
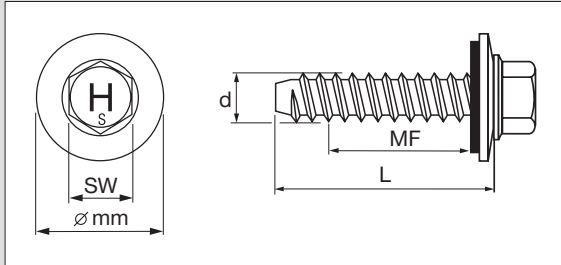
- More Information see approval ETA-10/0182 and ETA-13/0179 (Chapter 16)



## 10.8 Stainless steel self-tapping screws (Ø19 mm) S-MP 64 S



The universal self-tapping screw for thick base materials



Ordering description	Minimum thickness of base material	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP64S 6,3x22	Steel, 1.25 mm	1.9 - 9 mm	6.3 mm	22 mm	19 mm	2 mm	Hexagon 8	500 pc	283538
Self-tapping screw S-MP64S 6,3x25	Steel, 1.25 mm	1.9 - 12 mm	6.3 mm	25 mm	19 mm	2 mm	Hexagon 8	100 pc	283540
Self-tapping screw S-MP64S 6,3x32	Steel, 1.25 mm	1.9 - 19 mm	6.3 mm	32 mm	19 mm	2 mm	Hexagon 8	250 pc	283541
Self-tapping screw S-MP64S 6,3x38	Steel, 1.25 mm	1.9 - 25 mm	6.3 mm	38 mm	19 mm	2 mm	Hexagon 8	250 pc	283542
Self-tapping screw S-MP64S 6,3x50	Steel, 1.25 mm	1.9 - 37 mm	6.3 mm	50 mm	19 mm	2 mm	Hexagon 8	250 pc	283544
Self-tapping screw S-MP64S 6,3x63	Steel, 1.25 mm	1.9 - 50 mm	6.3 mm	63 mm	19 mm	2 mm	Hexagon 8	100 pc	283545
Self-tapping screw S-MP64S 6,3x75	Steel, 1.25 mm	1.9 - 62 mm	6.3 mm	75 mm	19 mm	2 mm	Hexagon 8	100 pc	283546
Self-tapping screw S-MP64S 6,3x88	Steel, 1.25 mm	1.9 - 75 mm	6.3 mm	88 mm	19 mm	2 mm	Hexagon 8	100 pc	283547
Self-tapping screw S-MP64S 6,3x100	Steel, 1.25 mm	1.9 - 87 mm	6.3 mm	100 mm	19 mm	2 mm	Hexagon 8	100 pc	283552
Self-tapping screw S-MP64S 6,3x125	Steel, 1.25 mm	1.9 - 112 mm	6.3 mm	125 mm	19 mm	2 mm	Hexagon 8	100 pc	283553
Self-tapping screw S-MP64S 6,3x150	Steel, 1.25 mm	1.9 - 138 mm	6.3 mm	150 mm	19 mm	2 mm	Hexagon 8	100 pc	283554
Self-tapping screw S-MP64S 6,3x175	Steel, 1.25 mm	1.9 - 162 mm	6.3 mm	175 mm	19 mm	2 mm	Hexagon 8	100 pc	283555
Self-tapping screw S-MP64S 6,3x200	Steel, 1.25 mm	1.9 - 187 mm	6.3 mm	200 mm	19 mm	2 mm	Hexagon 8	100 pc	403183
Self-tapping screw S-MP64S 6,3x225	Steel, 1.25 mm	1.9 - 212 mm	6.3 mm	225 mm	19 mm	2 mm	Hexagon 8	100 pc	403184
Self-tapping screw S-MP64S 6,3x250	Steel, 1.25 mm	1.9 - 237 mm	6.3 mm	250 mm	19 mm	2 mm	Hexagon 8	100 pc	403185
Self-tapping screw S-MP64S 6,3x275	Steel, 1.25 mm	1.9 - 262 mm	6.3 mm	275 mm	19 mm	2 mm	Hexagon 8	100 pc	403186

Reference: 6 mm basematerial incl. in MF

Recommended pre-drill diameter for  $t_{II}$

$t_{II}$ /mm (Steel)	1.25 - 1.5	1.6 - 4.0	4.1 - 6.9	≥ 7.0
Pre-drill-Ø	5.0 mm	5.3 mm	5.5 mm	5.7 mm

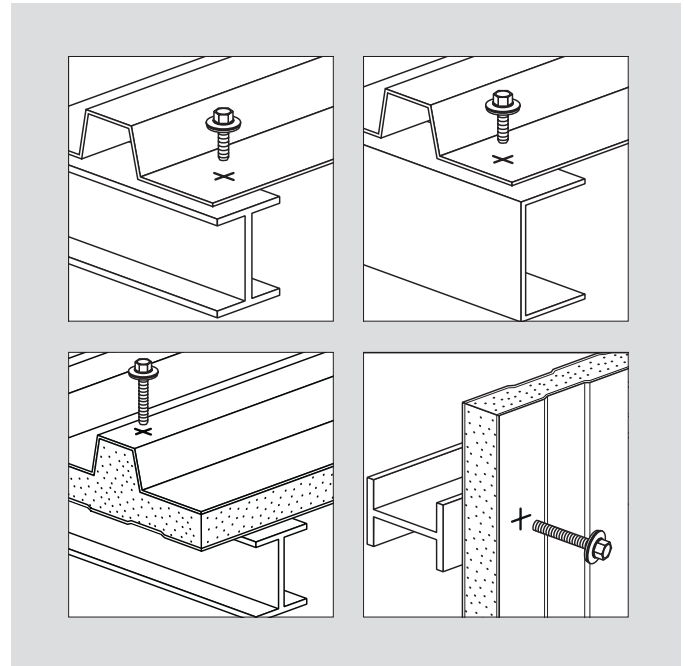
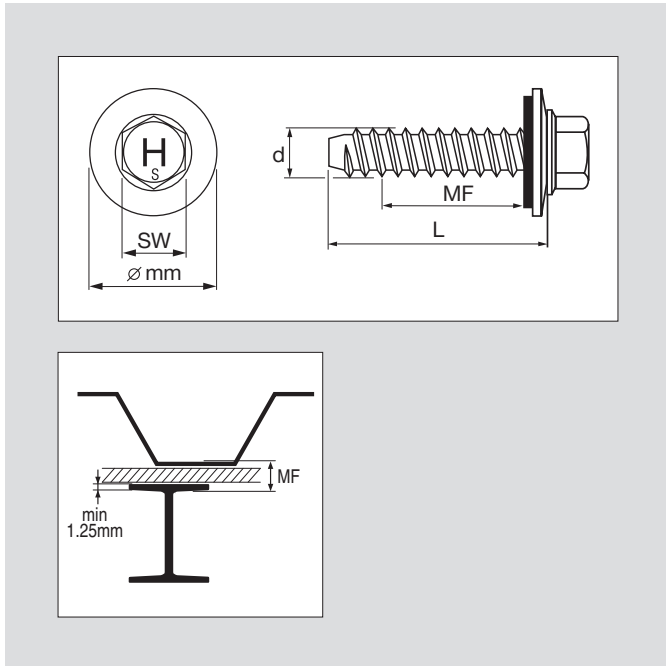
Reference:

- More Information see approval ETA-10/0182 and ETA-13/0179 (Chapter 16)



# 10.9 Stainless steel self-tapping screws (Ø22 mm) S-MP 74 S

The universal self-tapping screw for thick base materials



Ordering description	Minimum thickness of base material	Thickness fastened range (MF) steel	Screw diameter (d)	Screw length (L)	Washer size	EPDM-thickness	Screw drive/recess type	Sales quantity	Item number
Self-tapping screw S-MP74S 6,3x22	Steel, 1,25 mm	1,9 - 9 mm	6,3 mm	22 mm	22 mm	2 mm	Hexagon 8	500 pc	283556
Self-tapping screw S-MP74S 6,3x25	Steel, 1,25 mm	1,9 - 12 mm	6,3 mm	25 mm	22 mm	2 mm	Hexagon 8	100 pc	283557
Self-tapping screw S-MP74S 6,3x32	Steel, 1,25 mm	1,9 - 19 mm	6,3 mm	32 mm	22 mm	2 mm	Hexagon 8	250 pc	283558
Self-tapping screw S-MP74S 6,3x38	Steel, 1,25 mm	1,9 - 25 mm	6,3 mm	38 mm	22 mm	2 mm	Hexagon 8	250 pc	283559
Self-tapping screw S-MP74S 6,3x50	Steel, 1,25 mm	1,9 - 37 mm	6,3 mm	50 mm	22 mm	2 mm	Hexagon 8	250 pc	283560
Self-tapping screw S-MP74S 6,3x63	Steel, 1,25 mm	1,9 - 50 mm	6,3 mm	63 mm	22 mm	2 mm	Hexagon 8	100 pc	283561
Self-tapping screw S-MP74S 6,3x75	Steel, 1,25 mm	1,9 - 62 mm	6,3 mm	75 mm	22 mm	2 mm	Hexagon 8	100 pc	283562
Self-tapping screw S-MP74S 6,3x88	Steel, 1,25 mm	1,9 - 75 mm	6,3 mm	88 mm	22 mm	2 mm	Hexagon 8	100 pc	283563
Self-tapping screw S-MP74S 6,3x100	Steel, 1,25 mm	1,9 - 87 mm	6,3 mm	100 mm	22 mm	2 mm	Hexagon 8	100 pc	283564
Self-tapping screw S-MP74S 6,3x125	Steel, 1,25 mm	1,9 - 112 mm	6,3 mm	125 mm	22 mm	2 mm	Hexagon 8	100 pc	283565
Self-tapping screw S-MP74S 6,3x150	Steel, 1,25 mm	1,9 - 138 mm	6,3 mm	150 mm	22 mm	2 mm	Hexagon 8	100 pc	283623
Self-tapping screw S-MP74S 6,3x175	Steel, 1,25 mm	1,9 - 162 mm	6,3 mm	175 mm	22 mm	2 mm	Hexagon 8	100 pc	283624
Self-tapping screw S-MP74S 6,3x200	Steel, 1,25 mm	1,9 - 187 mm	6,3 mm	200 mm	22 mm	2 mm	Hexagon 8	100 pc	403187
Self-tapping screw S-MP74S 6,3x225	Steel, 1,25 mm	1,9 - 212 mm	6,3 mm	225 mm	22 mm	2 mm	Hexagon 8	100 pc	403188
Self-tapping screw S-MP74S 6,3x250	Steel, 1,25 mm	1,9 - 237 mm	6,3 mm	250 mm	22 mm	2 mm	Hexagon 8	100 pc	403189
Self-tapping screw S-MP74S 6,3x275	Steel, 1,25 mm	1,9 - 262 mm	6,3 mm	275 mm	22 mm	2 mm	Hexagon 8	100 pc	403190

Reference: 6 mm basematerial incl. in MF

Recommended pre-drill diameter for t<sub>p</sub>

t <sub>p</sub> /mm (Steel)	1,25 - 1,5	1,6 - 4,0	4,1 - 6,9	≥ 7,0
Pre-drill-Ø	5,0 mm	5,3 mm	5,5 mm	5,7 mm

Reference:

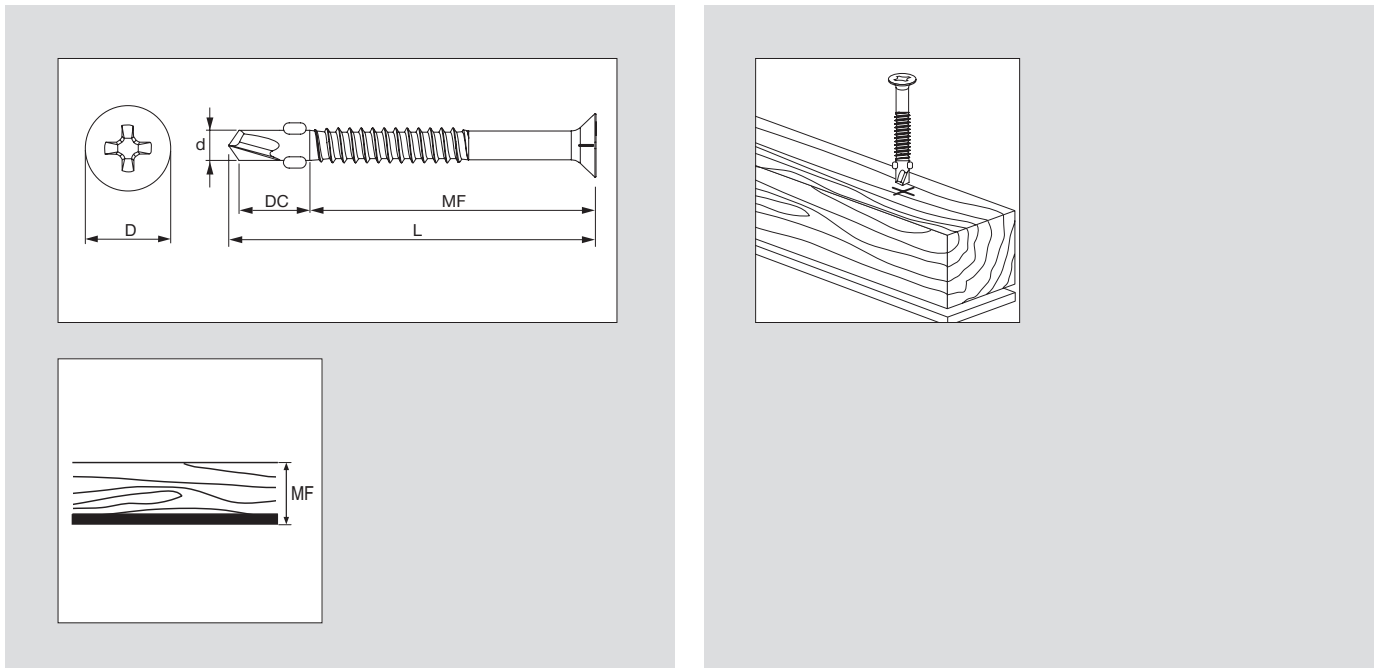
- More Information see approval ETA-10/0182 and ETA-13/0179 (Chapter 16)

## Content

		Page
<b>11.1</b>		
	Galvanized carbon steel self-drilling wing tip screw	S-WD 11 Z M 107
<b>11.2</b>		
	Galvanized steel self-drilling wing tip screw	S-WD 11 Z 108
<b>11.3</b>		
	Coated steel self-drilling wing tip screw	S-WD 11C 109
<b>11.4</b>		
	Coated steel self-drilling wing tip screw	S-WD 13 C 110
<b>11.5</b>		
	Coated steel self-drilling wing tip screw	S-WD 15 C 111

# 11.1 Galvanized carbon steel self-drilling wing tip screw S-WD 11 Z M

Carbon steel self-drilling screw for fastening of wood to light steel structures



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length - (L)	Screw head diameter	Screw drive/recess type (SW)	Sales quantity	Item number
Wing screw S-WD11Z 3,8x30 M	0.75 - 2.5 mm	10 - 15 mm	3.8 mm	30 mm	8 mm	PH #2	1000 pc	413805
Wing screw S-WD11Z 3,8x41 M	0.63 - 2.5 mm	10 - 26 mm	3.8 mm	41 mm	8 mm	PH #2	1000 pc	413806

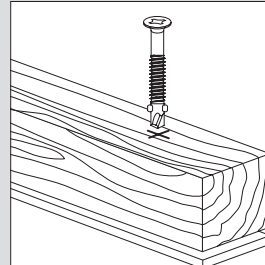
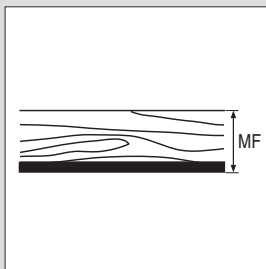
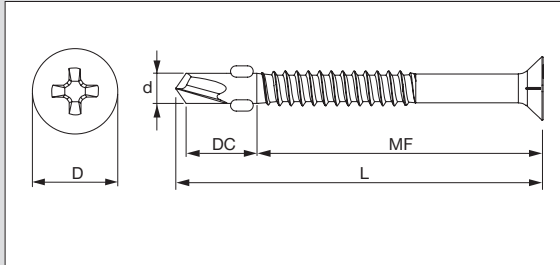
**Reference:**

- For use with SD 5000 / SD 5000-A 22 und SMD 57

## 11.2

Galvanized steel self-drilling wing tip screw  
S-WD 11 Z

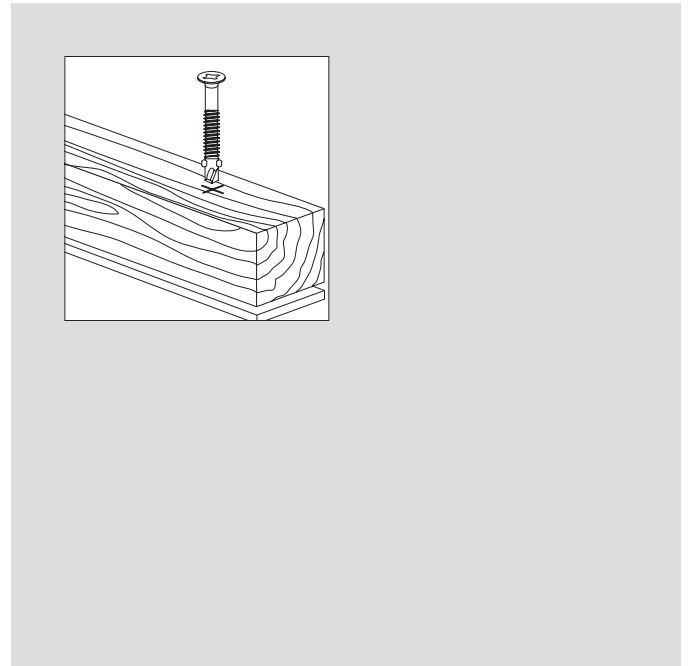
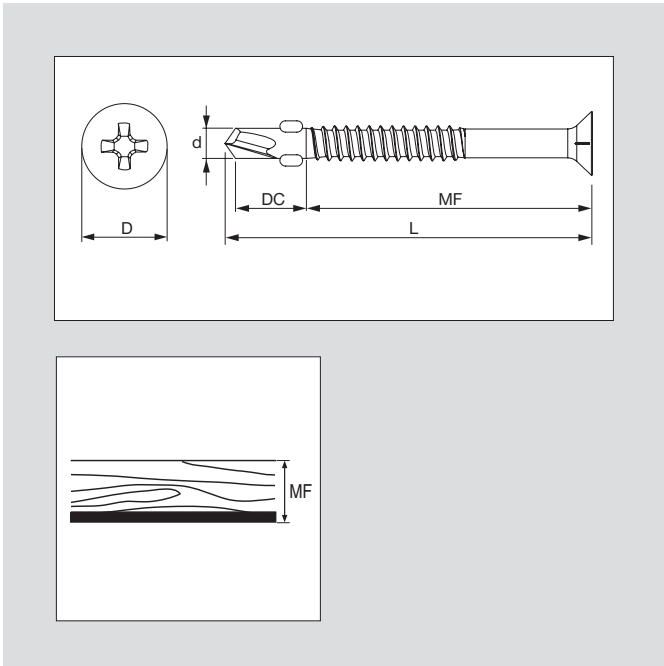
Carbon steel self-drilling screw for fastening of wood to light steel structures



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length - (L)	Screw head diameter	Screw drive/recess type (SW)	Sales quantity	Item number
Wing screw S-WD11Z 3,8x30	0.75 - 2.5 mm	10 - 15 mm	3.8 mm	30 mm	8 mm	PH #2	1000 pc	413325
Wing screw S-WD11Z 3,8x41	0.75 - 2.5 mm	10 - 26 mm	3.8 mm	41 mm	8 mm	PH #2	500 pc	413326
Wing screw S-WD11Z 3,8x57	0.75 - 2.5 mm	10 - 42 mm	3.8 mm	57 mm	8 mm	PH #2	500 pc	413804

### 11.3 Coated steel self-drilling wing tip screw S-WD 11C

Carbon steel self-drilling screw for fastening of wood to light steel structures

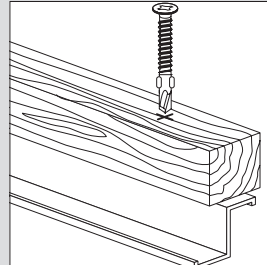
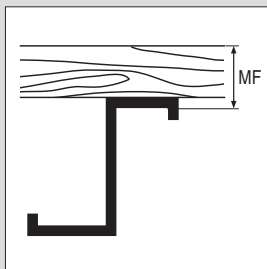
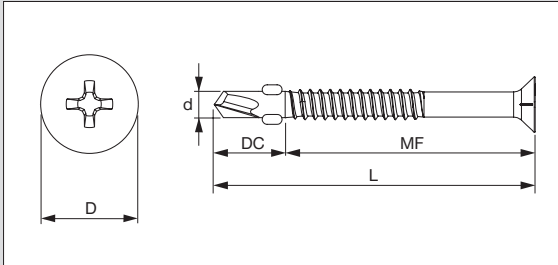


Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length - (L)	Screw head diameter	Screw drive/recess type (SW)	Sales quantity	Item number
Wing screw S-WD11C 3,8x30	0.75 - 2.5 mm	15 mm	3.8 mm	30 mm	8 mm	PH#2	200 pc	416231
Wing screw S-WD11C 3,8x41	0.75 - 2.5 mm	26 mm	3.8 mm	41 mm	8 mm	PH#2	200 pc	416233
Wing screw S-WD11C 3,8x57	0.75 - 2.5 mm	42 mm	3.8 mm	57 mm	8 mm	PH#2	100 pc	416234
Wing screw S-WD11C 4,2x25	0.75 - 2.5 mm	10 mm	4.2 mm	25 mm	8 mm	PH#2	200 pc	283635

## 11.4

## Coated steel self-drilling wing tip screw S-WD 13 C

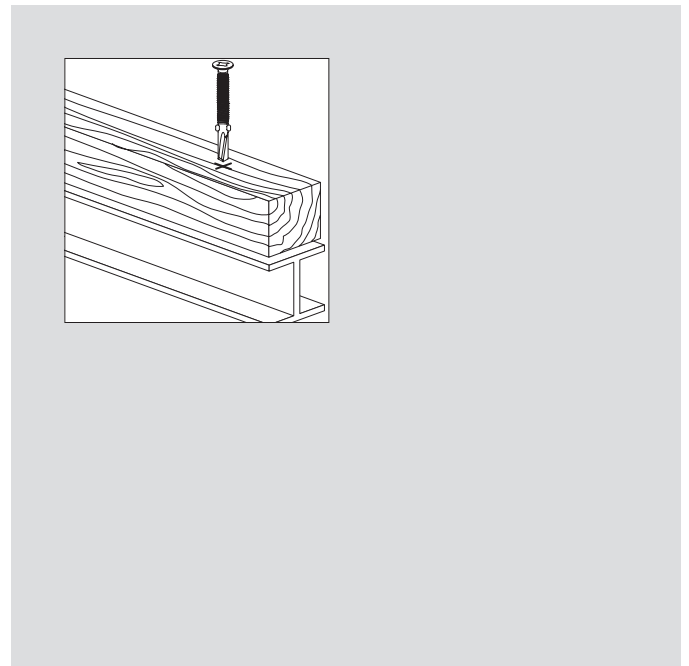
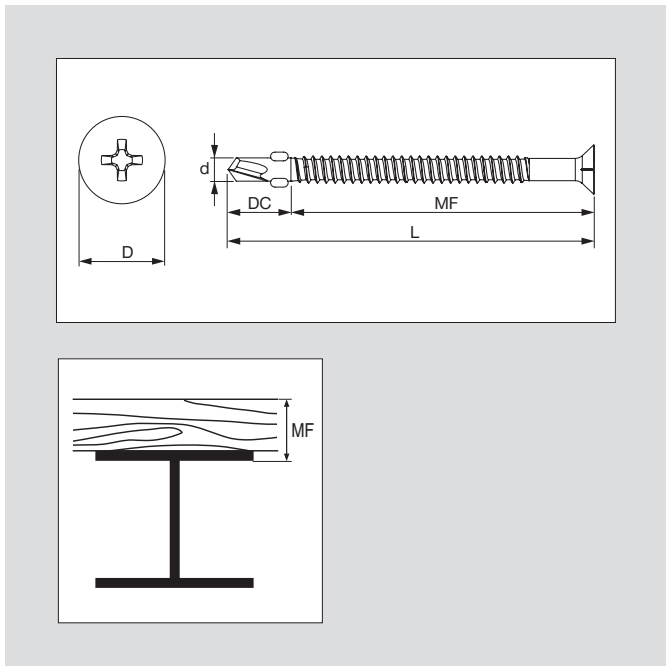
Carbon steel self-drilling screw for fastening of wood to medium steel structures



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length - (L)	Screw head diameter	Screw drive/recess type (SW)	Sales quantity	Item number
Wing screw S-WD13C 4,8x38	2.4 - 3.8 mm	10 - 20 mm	4.8 mm	38 mm	9.1 mm	PH #2	200 pc	283636
Wing screw S-WD13C 5,5x50	2.1 - 5.5 mm	10 - 27 mm	5.5 mm	50 mm	10.1 mm	PH #3	100 pc	283637
Wing screw S-WD13C 5,5x65	2.1 - 5.5 mm	10 - 40 mm	5.5 mm	65 mm	10.1 mm	PH #3	100 pc	283638
Wing screw S-WD13C 5,5x85	2.1 - 5.5 mm	10 - 53 mm	5.5 mm	85 mm	10.1 mm	PH #3	100 pc	283639
Wing screw S-WD13C 5,5x100	2.1 - 5.5 mm	10 - 80 mm	5.5 mm	100 mm	10.1 mm	PH #3	100 pc	287078
Wing screw S-WD13C 6,3x70	2.1 - 6 mm	10 - 50 mm	6.3 mm	65 mm	10.1 mm	PH #3	100 pc	416235
Wing screw S-WD13C 6,3x87	2.1 - 6 mm	10 - 63 mm	6.3 mm	87 mm	10.1 mm	PH #3	100 pc	416236

# 11.5 Coated steel self-drilling wing tip screw S-WD 15 C

Carbon steel self-drilling screw for fastening of wood to heavy steel structures



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length - (L)	Screw head diameter	Screw drive/ recess type (SW)	Sales quantity	Item number
Wing screw S-WD15C 5,5x65	4.0 - 12 mm	10 - 30 mm	5.5 mm	65 mm	10.1 mm	PH#3	300 pc	287079
Wing screw S-WD15C 5,5x85	4.0 - 12 mm	10 - 55 mm	5.5 mm	85 mm	10.1 mm	PH#3	900 pc	287573
Wing screw S-WD15C 5,5x119	4.0 - 12 mm	10 - 85 mm	5.5 mm	119 mm	10.1 mm	PH#3	900 pc	289145



## Content

### 12.1

Carbon steel flat roof screw	S-IT 01 C 4.8	113
------------------------------	---------------	-----

### 12.2

Carbon steel flat roof screw	S-IT 01 C 6.3	114
------------------------------	---------------	-----

### 12.3

Load distribution plates	S-IW	115
--------------------------	------	-----

### 12.4

Flat roof fastener (Ø 40 mm)	S-IDP 4.8C/40	116
------------------------------	---------------	-----

### 12.5

Flat roof fastener (80 mm x 40 mm)	S-IDP 4.8C/8040	117
------------------------------------	-----------------	-----

### 12.6

Flat roof fastener (Ø 40 mm)	S-IDP 6.7C/40	118
------------------------------	---------------	-----

### 12.7

Flat roof fastener (80 mm x 40 mm)	S-IDP 6.7C/8040	119
------------------------------------	-----------------	-----

### 12.8

Flat roof fastener (Ø 40 mm)	S-IDP 4.8S/40	120
------------------------------	---------------	-----

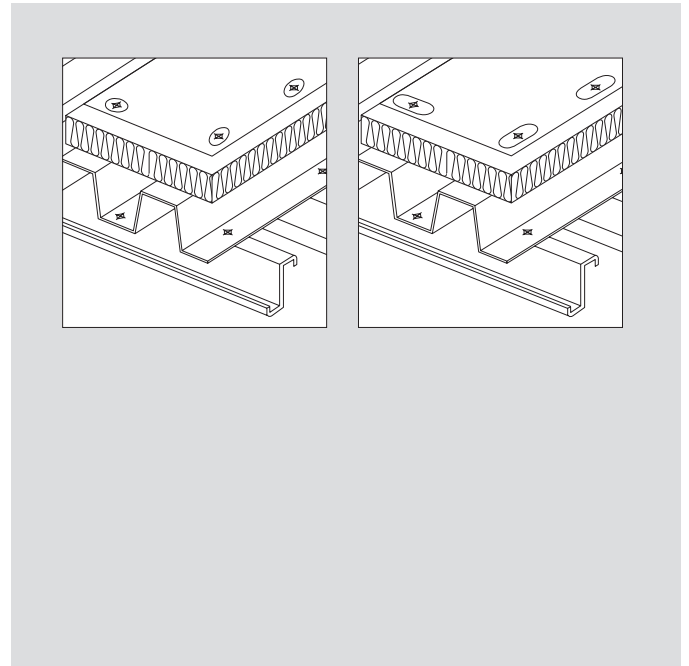
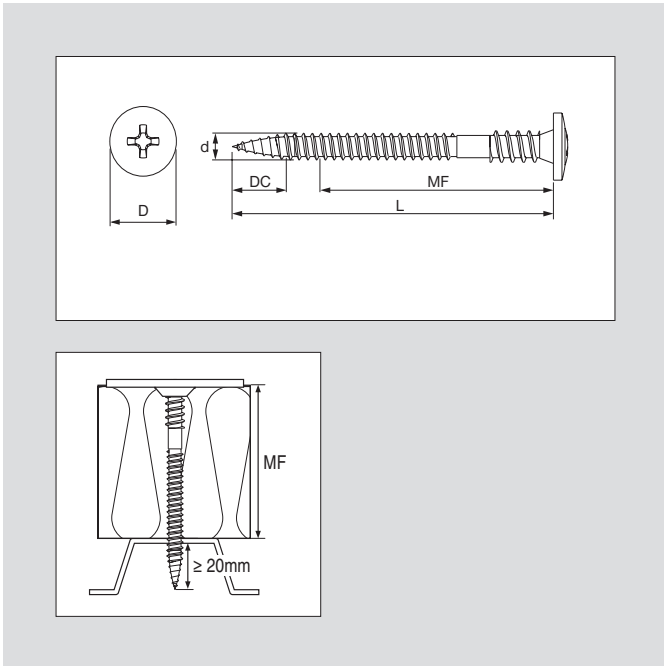
### 12.9

Flat roof fastener (80 mm x 40 mm)	S-IDP 4.8S/8040	121
------------------------------------	-----------------	-----



# 12.1 Carbon steel flat roof screw S-IT 01 C 4.8

Carbon steel screws for fastening of insulation on flat steel roofs



Ordering description	For use with	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw drive/recess type	Sales quantity	Item number
Flat roof screw S-IT01C 4,8x51	S-IW 4.9	0.5 - 1.0 mm	20 - 30 mm	4.8 mm	51 mm	PH #2	500 pc	228577
Flat roof screw S-IT01C 4,8X60	S-IW 4.9	0.5 - 1.0 mm	20 - 40 mm	4.8 mm	60 mm	PH #2	500 pc	228636
Flat roof screw S-IT01C 4,8X70	S-IW 4.9	0.5 - 1.0 mm	20 - 50 mm	4.8 mm	70 mm	PH #2	500 pc	228578
Flat roof screw S-IT01C 4,8X80	S-IW 4.9	0.5 - 1.0 mm	20 - 60 mm	4.8 mm	80 mm	PH #2	400 pc	228637
Flat roof screw S-IT01C 4,8X90	S-IW 4.9	0.5 - 1.0 mm	20 - 70 mm	4.8 mm	90 mm	PH #2	200 pc	228638
Flat roof screw S-IT01C 4,8X100	S-IW 4.9	0.5 - 1.0 mm	20 - 80 mm	4.8 mm	100 mm	PH #2	200 pc	228639
Flat roof screw S-IT01C 4,8X110	S-IW 4.9	0.5 - 1.0 mm	20 - 90 mm	4.8 mm	110 mm	PH #2	200 pc	228640
Flat roof screw S-IT01C 4,8X120	S-IW 4.9	0.5 - 1.0 mm	20 - 100 mm	4.8 mm	120 mm	PH #2	200 pc	228641
Flat roof screw S-IT01C 4,8X130	S-IW 4.9	0.5 - 1.0 mm	20 - 110 mm	4.8 mm	130 mm	PH #2	200 pc	228579
Flat roof screw S-IT01C 4,8X140	S-IW 4.9	0.5 - 1.0 mm	20 - 120 mm	4.8 mm	140 mm	PH #2	250 pc	228642
Flat roof screw S-IT01C 4,8X150	S-IW 4.9	0.5 - 1.0 mm	20 - 130 mm	4.8 mm	150 mm	PH #2	250 pc	228591
Flat roof screw S-IT01C 4,8X160	S-IW 4.9	0.5 - 1.0 mm	20 - 140 mm	4.8 mm	160 mm	PH #2	200 pc	228643
Flat roof screw S-IT01C 4,8X180	S-IW 4.9	0.5 - 1.0 mm	20 - 160 mm	4.8 mm	180 mm	PH #2	100 pc	228580
Flat roof screw S-IT01C 4,8x200	S-IW 4.9	0.5 - 1.0 mm	20 - 180 mm	4.8 mm	200 mm	PH #2	100 pc	360448
Flat roof screw S-IT01C 4,8x220	S-IW 4.9	0.5 - 1.0 mm	20 - 200 mm	4.8 mm	220 mm	PH #2	100 pc	360449

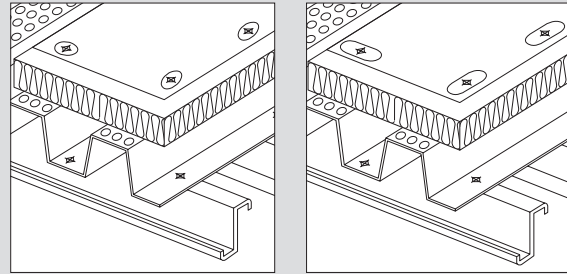
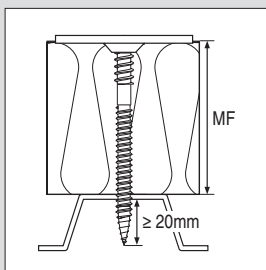
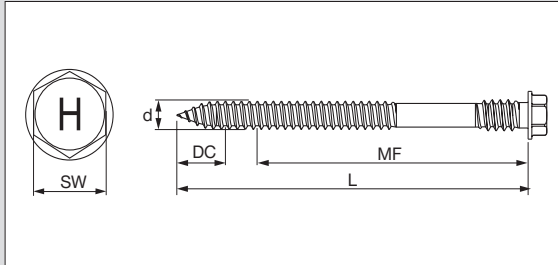
Reference:

- More information see approval ETA-12/0057 (Chapter 16)

## 12.2 Carbon steel flat roof screw S-IT 01 C 6.3



Carbon steel screws for fastening of insulation on flat steel roofs with perforated metal decking



Ordering description	For use with	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Screw length (L)	Screw drive/recess type (SW)	Sales quantity	Item number
Flat roof screw S-IT01C 6,3x50	S-IW 6.6	0.5 - 1.0 mm	20 - 30 mm	6.3 mm	50 mm	Hexagon 8	250 pc	360528
Flat roof screw S-IT01C 6,3x60	S-IW 6.6	0.5 - 1.0 mm	20 - 40 mm	6.3 mm	60 mm	Hexagon 8	100 pc	360529
Flat roof screw S-IT01C 6,3x70	S-IW 6.6	0.5 - 1.0 mm	20 - 50 mm	6.3 mm	70 mm	Hexagon 8	100 pc	360530
Flat roof screw S-IT01C 6,3x80	S-IW 6.6	0.5 - 1.0 mm	20 - 60 mm	6.3 mm	80 mm	Hexagon 8	100 pc	228581
Flat roof screw S-IT01C 6,3x90	S-IW 6.6	0.5 - 1.0 mm	20 - 70 mm	6.3 mm	90 mm	Hexagon 8	100 pc	228582
Flat roof screw S-IT01C 6,3x100	S-IW 6.6	0.5 - 1.0 mm	20 - 80 mm	6.3 mm	100 mm	Hexagon 8	100 pc	228583
Flat roof screw S-IT01C 6,3x110	S-IW 6.6	0.5 - 1.0 mm	20 - 90 mm	6.3 mm	110 mm	Hexagon 8	100 pc	228584
Flat roof screw S-IT01C 6,3x120	S-IW 6.6	0.5 - 1.0 mm	20 - 100 mm	6.3 mm	120 mm	Hexagon 8	100 pc	228585
Flat roof screw S-IT01C 6,3x130	S-IW 6.6	0.5 - 1.0 mm	20 - 110 mm	6.3 mm	130 mm	Hexagon 8	100 pc	228586
Flat roof screw S-IT01C 6,3x140	S-IW 6.6	0.5 - 1.0 mm	20 - 120 mm	6.3 mm	140 mm	Hexagon 8	100 pc	228587
Flat roof screw S-IT01C 6,3x150	S-IW 6.6	0.5 - 1.0 mm	20 - 130 mm	6.3 mm	150 mm	Hexagon 8	100 pc	228588
Flat roof screw S-IT01C 6,3x160	S-IW 6.6	0.5 - 1.0 mm	20 - 140 mm	6.3 mm	160 mm	Hexagon 8	100 pc	228589
Flat roof screw S-IT01C 6,3x180	S-IW 6.6	0.5 - 1.0 mm	20 - 160 mm	6.3 mm	180 mm	Hexagon 8	100 pc	228590
Flat roof screw S-IT01C 6,3x200	S-IW 6.6	0.5 - 1.0 mm	20 - 180 mm	6.3 mm	200 mm	Hexagon 8	100 pc	360531
Flat roof screw S-IT01C 6,3x220	S-IW 6.6	0.5 - 1.0 mm	20 - 200 mm	6.3 mm	220 mm	Hexagon 8	100 pc	360532
Flat roof screw S-IT01C 6,3x240	S-IW 6.6	0.5 - 1.0 mm	20 - 220 mm	6.3 mm	240 mm	Hexagon 8	100 pc	360533

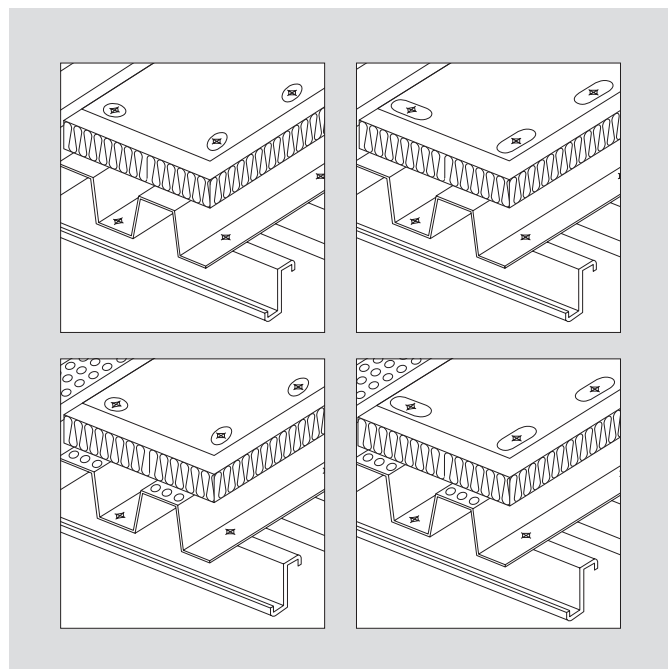
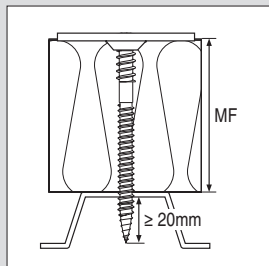
### Reference:

- More information see approval ETA-12/0057 (Chapter 16)



### 12.3 Load distribution plates S-IW

Load distribution plates for flat roof screws



Ordering description	For use with	Washer size	Sales quantity	Item number
Load distrib. plate S-IW 4,9 AZ 64x64	S-IT 01 C 4.8 x L	64x64 mm	1.000 pc	228207
Load distrib. plate S-IW 4,9 AZ 40	S-IT 01 C 4.8 x L	40 mm	1.000 pc	272354
Load distrib. plate S-IW 4,9 AZ 80x40	S-IT 01 C 4.8 x L	80x40 mm	500 pc	228205
Load distrib. plate S-IW 4,9 AZ 40x40	S-IT 01 C 4.8 x L	40x40 mm	1.000 pc	228206
Load distrib. plate S-IW 6,6 AZ 40x40	S-IT 01 C 6.3 x L	80x40 mm	500 pc	228204
Load distrib. plate S-IW 6,6 AZ 64x64	S-IT 01 C 6.3 x L	40x40 mm	1.000 pc	228201
Load distrib. plate S-IW 6,6 AZ 80x40	S-IT 01 C 6.3 x L	64x64 mm	1.000 pc	228203
Load distrib. plate S-IW 6,6 AZ 40	S-IT 01 C 6.3 x L	40 mm	1.000 pc	228202

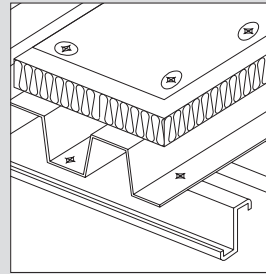
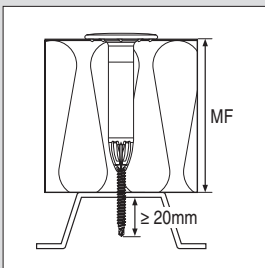
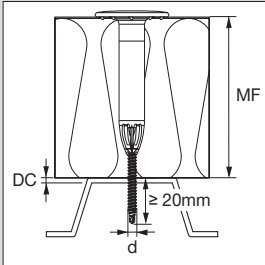
**Reference:**

- More information see approval ETA-12/0057 (Chapter 16)

## 12.4 Flat roof fastener (Ø 40 mm) S-IDP 4.8C/40



Fasteners (carbon steel screws and polyamid plugs) for fastening of insulation on flat steel roofs



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Washer size	Screw drive/recess type (SW)	Sales quantity	Item number
Insulation fastener S-IDP 4,8C/40x60	0.5 - 2x 1.25 mm	50 - 60 mm	4.8 mm	40 mm	PH #2	1.000 pc	2039410
Insulation fastener S-IDP 4,8C/40x80	0.5 - 2x 1.25 mm	70 - 80 mm	4.8 mm	40 mm	PH #2	1.000 pc	2039412
Insulation fastener S-IDP 4,8C/40x90	0.5 - 2x 1.25 mm	80 - 90 mm	4.8 mm	40 mm	PH #2	1.000 pc	2039413
Insulation fastener S-IDP 4,8C/40x100	0.5 - 2x 1.25 mm	90 - 100 mm	4.8 mm	40 mm	PH #2	500 pc	2039414
Insulation fastener S-IDP 4,8C/40x120	0.5 - 2x 1.25 mm	110 - 120 mm	4.8 mm	40 mm	PH #2	500 pc	2039416
Insulation fastener S-IDP 4,8C/40x130	0.5 - 2x 1.25 mm	120 - 130 mm	4.8 mm	40 mm	PH #2	500 pc	2039417
Insulation fastener S-IDP 4,8C/40x140	0.5 - 2x 1.25 mm	130 - 140 mm	4.8 mm	40 mm	PH #2	500 pc	2039418
Insulation fastener S-IDP 4,8C/40x160	0.5 - 2x 1.25 mm	150 - 160 mm	4.8 mm	40 mm	PH #2	500 pc	2039420
Insulation fastener S-IDP 4,8C/40x170	0.5 - 2x 1.25 mm	160 - 170mm	4.8 mm	40 mm	PH #2	500 pc	2039421
Insulation fastener S-IDP 4,8C/40x180	0.5 - 2x 1.25 mm	170 - 180 mm	4.8 mm	40 mm	PH #2	250 pc	2039422
Insulation fastener S-IDP 4,8C/40x200	0.5 - 2x 1.25 mm	190 - 200 mm	4.8 mm	40 mm	PH #2	250 pc	2039424
Insulation fastener S-IDP 4,8C/40x210	0.5 - 2x 1.25 mm	200 - 210 mm	4.8 mm	40 mm	PH #2	250 pc	2039425
Insulation fastener S-IDP 4,8C/40x220	0.5 - 2x 1.25 mm	210 - 220 mm	4.8 mm	40 mm	PH #2	250 pc	2039426
Insulation fastener S-IDP 4,8C/40x240	0.5 - 2x 1.25 mm	230 - 240 mm	4.8 mm	40 mm	PH #2	250 pc	2039428
Insulation fastener S-IDP 4,8C/40x250	0.5 - 2x 1.25 mm	240 - 250 mm	4.8 mm	40 mm	PH #2	250 pc	2039429
Insulation fastener S-IDP 4,8C/40x260	0.5 - 2x 1.25 mm	250 - 260 mm	4.8 mm	40 mm	PH #2	250 pc	2039430
Insulation fastener S-IDP 4,8C/40x280	0.5 - 2x 1.25 mm	270 - 280 mm	4.8 mm	40 mm	PH #2	250 pc	2039432
Insulation fastener S-IDP 4,8C/40x300	0.5 - 2x 1.25 mm	290 -300 mm	4.8 mm	40 mm	PH #2	250 pc	2039434

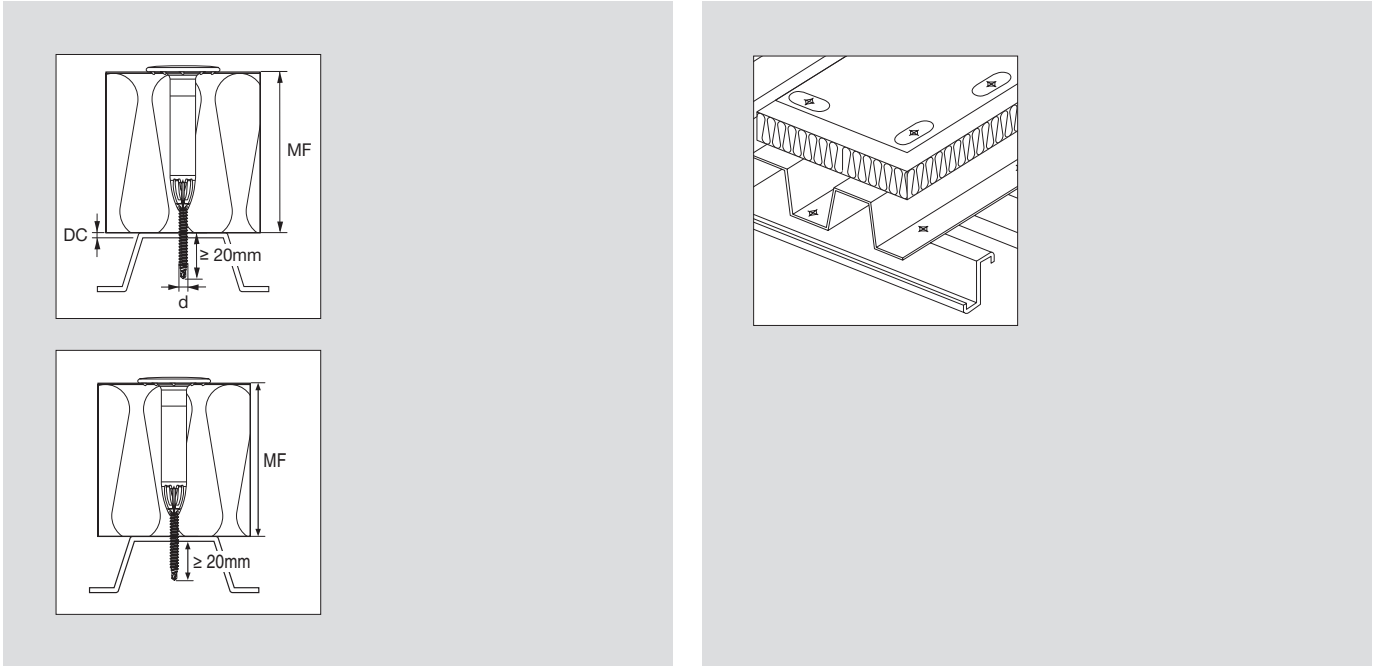
### Reference:

- More information see approval ETA-12/0057 (Chapter 16)



# 12.5 Flat roof fastener (80mm x 40mm) S-IDP 4.8C/8040

Fasteners (carbon steel screws and polyamid plugs) for fastening of insulation on flat steel roofs



Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Washer size	Screw drive/recess type (SW)	Sales quantity	Item number
Insulation fastener S-IDP 4.8C/8040x60	0.5 - 2x 1.25 mm	50 - 60 mm	4.8 mm	80 x 40 mm	PH #2	500 pc	2039488
Insulation fastener S-IDP 4.8C/8040x80	0.5 - 2x 1.25 mm	70 - 80 mm	4.8 mm	80 x 40 mm	PH #2	500 pc	2039490
Insulation fastener S-IDP 4.8C/8040x90	0.5 - 2x 1.25 mm	80 - 90 mm	4.8 mm	80 x 40 mm	PH #2	500 pc	2039491
Insulation fastener S-IDP 4.8C/8040x100	0.5 - 2x 1.25 mm	90 - 100 mm	4.8 mm	80 x 40 mm	PH #2	500 pc	2039492
Insulation fastener S-IDP 4.8C/8040x120	0.5 - 2x 1.25 mm	110 - 120 mm	4.8 mm	80 x 40 mm	PH #2	500 pc	2039494
Insulation fastener S-IDP 4.8C/8040x130	0.5 - 2x 1.25 mm	120 - 130 mm	4.8 mm	80 x 40 mm	PH #2	500 pc	2039495
Insulation fastener S-IDP 4.8C/8040x140	0.5 - 2x 1.25 mm	130 - 140 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039496
Insulation fastener S-IDP 4.8C/8040x160	0.5 - 2x 1.25 mm	150 - 160 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039498
Insulation fastener S-IDP 4.8C/8040x170	0.5 - 2x 1.25 mm	160 - 170mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039499
Insulation fastener S-IDP 4.8C/8040x180	0.5 - 2x 1.25 mm	170 - 180 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039500
Insulation fastener S-IDP 4.8C/8040x200	0.5 - 2x 1.25 mm	190 - 200 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039502
Insulation fastener S-IDP 4.8C/8040x210	0.5 - 2x 1.25 mm	200 - 210 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039503
Insulation fastener S-IDP 4.8C/8040x220	0.5 - 2x 1.25 mm	210 - 220 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039504
Insulation fastener S-IDP 4.8C/8040x240	0.5 - 2x 1.25 mm	230 - 240 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039506
Insulation fastener S-IDP 4.8C/8040x250	0.5 - 2x 1.25 mm	240 - 250 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039507
Insulation fastener S-IDP 4.8C/8040x260	0.5 - 2x 1.25 mm	250 - 260 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039508
Insulation fastener S-IDP 4.8C/8040x280	0.5 - 2x 1.25 mm	270 - 280 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039510
Insulation fastener S-IDP 4.8C/8040x300	0.5 - 2x 1.25 mm	290 - 300 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2039512

12

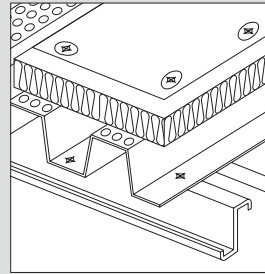
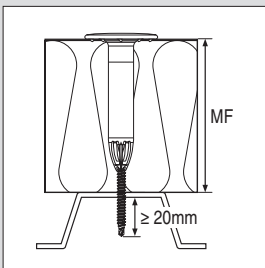
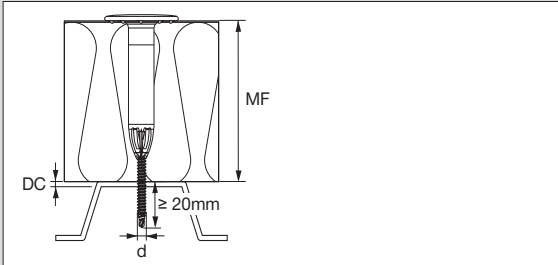
**Reference:**

- More information see approval ETA-12/0057 (Chapter 16)

## 12.6 Flat roof fastener (Ø 40 mm) S-IDP 6.7C/40



Fasteners (carbon steel screws and polyamid plugs) for fastening of insulation on flat steel roofs with perforated metal decking

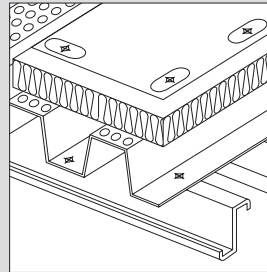
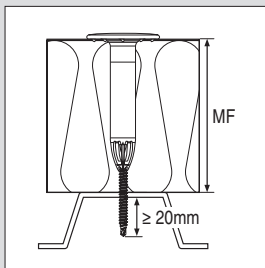
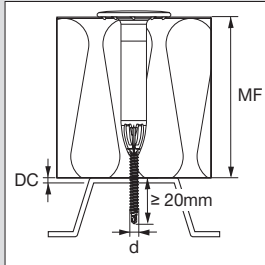


Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Washer size	Screw drive/recess type (SW)	Sales quantity	Item number
Insulation fastener S-IDP 6,7C/40x60	0.5 - 2x 1.25 mm	50 - 60 mm	6.7 mm	40 mm	PH #2	1.000 pc	2039436
Insulation fastener S-IDP 6,7C/40x80	0.5 - 2x 1.25 mm	70 - 80 mm	6.7 mm	40 mm	PH #2	1.000 pc	2039438
Insulation fastener S-IDP 6,7C/40x100	0.5 - 2x 1.25 mm	90 - 100 mm	6.7 mm	40 mm	PH #2	500 pc	2039440
Insulation fastener S-IDP 6,7C/40x120	0.5 - 2x 1.25 mm	110 - 120 mm	6.7 mm	40 mm	PH #2	500 pc	2039442
Insulation fastener S-IDP 6,7C/40x140	0.5 - 2x 1.25 mm	130 - 140 mm	6.7 mm	40 mm	PH #2	500 pc	2039444
Insulation fastener S-IDP 6,7C/40x160	0.5 - 2x 1.25 mm	150 - 160 mm	6.7 mm	40 mm	PH #2	500 pc	2039446
Insulation fastener S-IDP 6,7C/40x180	0.5 - 2x 1.25 mm	170 - 180 mm	6.7 mm	40 mm	PH #2	250 pc	2039448
Insulation fastener S-IDP 6,7C/40x200	0.5 - 2x 1.25 mm	190 - 200 mm	6.7 mm	40 mm	PH #2	250 pc	2039450
Insulation fastener S-IDP 6,7C/40x220	0.5 - 2x 1.25 mm	210 - 220 mm	6.7 mm	40 mm	PH #2	250 pc	2039452
Insulation fastener S-IDP 6,7C/40x240	0.5 - 2x 1.25 mm	230 - 240 mm	6.7 mm	40 mm	PH #2	250 pc	2039454
Insulation fastener S-IDP 6,7C/40x260	0.5 - 2x 1.25 mm	250 - 260 mm	6.7 mm	40 mm	PH #2	250 pc	2039456
Insulation fastener S-IDP 6,7C/40x280	0.5 - 2x 1.25 mm	270 - 280 mm	6.7 mm	40 mm	PH #2	250 pc	2039458
Insulation fastener S-IDP 6,7C/40x300	0.5 - 2x 1.25 mm	290 - 300 mm	6.7 mm	40 mm	PH #2	250 pc	2039460



## 12.7 Flat roof fastener (80 mm x 40 mm) S-IDP 6.7C/8040

Fasteners (carbon steel screws and polyamid plugs) for fastening of insulation on flat steel roofs with perforated metal decking



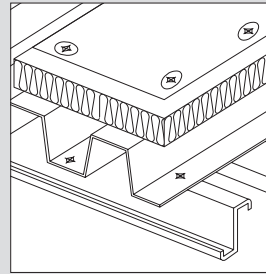
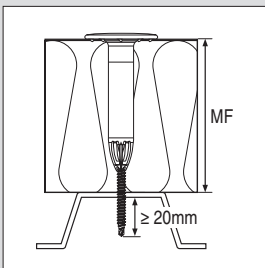
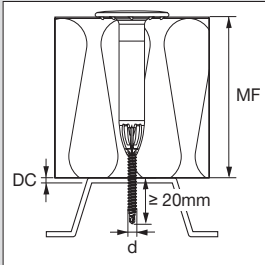
Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Washer size	Screw drive/recess type (SW)	Sales quantity	Item number
Insulation fastener S-IDP 6,7C/8040x60	0.5 - 2x 1.25 mm	50 - 60 mm	6.7 mm	80 x 40 mm	PH #2	500 pc	2039514
Insulation fastener S-IDP 6,7C/8040x80	0.5 - 2x 1.25 mm	70 - 80 mm	6.7 mm	80 x 40 mm	PH #2	500 pc	2039516
Insulation fastener S-IDP 6,7C/8040x100	0.5 - 2x 1.25 mm	90 - 100 mm	6.7 mm	80 x 40 mm	PH #2	500 pc	2039518
Insulation fastener S-IDP 6,7C/8040x120	0.5 - 2x 1.25 mm	110 - 120 mm	6.7 mm	80 x 40 mm	PH #2	500 pc	2039520
Insulation fastener S-IDP 6,7C/8040x140	0.5 - 2x 1.25 mm	130 - 140 mm	6.7 mm	80 x 40 mm	PH #2	250 pc	2039522
Insulation fastener S-IDP 6,7C/8040x160	0.5 - 2x 1.25 mm	150 - 160 mm	6.7 mm	80 x 40 mm	PH #2	250 pc	2039524
Insulation fastener S-IDP 6,7C/8040x180	0.5 - 2x 1.25 mm	170 - 180 mm	6.7 mm	80 x 40 mm	PH #2	250 pc	2039526
Insulation fastener S-IDP 6,7C/8040x200	0.5 - 2x 1.25 mm	190 - 200 mm	6.7 mm	80 x 40 mm	PH #2	250 pc	2039528
Insulation fastener S-IDP 6,7C/8040x220	0.5 - 2x 1.25 mm	210 - 220 mm	6.7 mm	80 x 40 mm	PH #2	250 pc	2039530
Insulation fastener S-IDP 6,7C/8040x240	0.5 - 2x 1.25 mm	230 - 240 mm	6.7 mm	80 x 40 mm	PH #2	250 pc	2039532
Insulation fastener S-IDP 6,7C/8040x260	0.5 - 2x 1.25 mm	250 - 260 mm	6.7 mm	80 x 40 mm	PH #2	250 pc	2039534
Insulation fastener S-IDP 6,7C/8040x280	0.5 - 2x 1.25 mm	270 - 280 mm	6.7 mm	80 x 40 mm	PH #2	250 pc	2039536
Insulation fastener S-IDP 6,7C/8040x300	0.5 - 2x 1.25 mm	290 - 300 mm	6.7 mm	80 x 40 mm	PH #2	250 pc	2039538



## 12.8 Flat roof fastener (Ø 40 mm) S-IDP 4.8S/40



Fasteners (stainless steel screws and polyamid plugs) for fastening of insulation on flat steel roofs

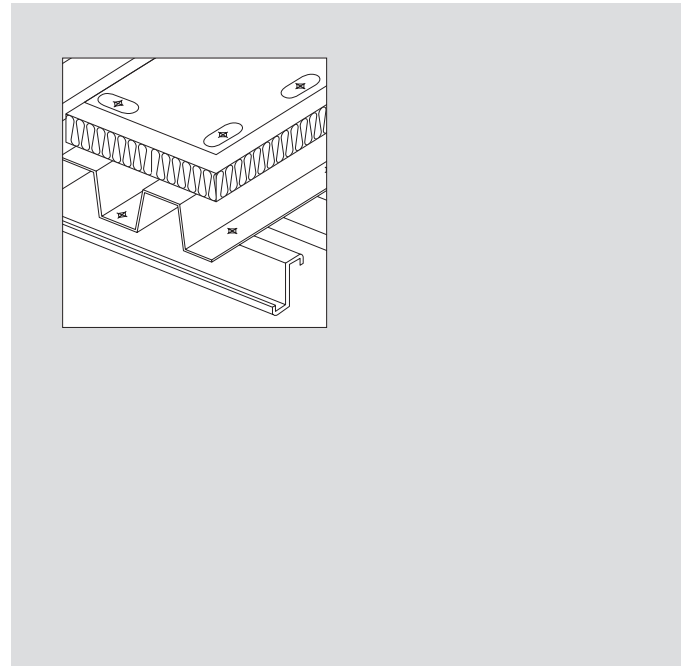
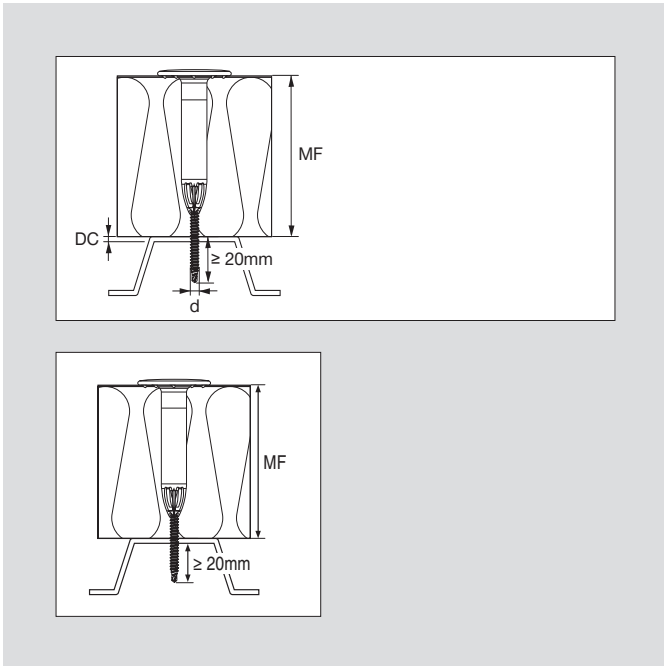


Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Washer size	Screw drive/recess type (SW)	Sales quantity	Item number
Insulation fastener S-IDP 4,8S/40x60	0.5 - 2x 1.25 mm	50 - 60 mm	4.8 mm	40 mm	PH #2	1.000 pc	2045705
Insulation fastener S-IDP 4,8S/40x80	0.5 - 2x 1.25 mm	70 - 80 mm	4.8 mm	40 mm	PH #2	1.000 pc	2045707
Insulation fastener S-IDP 4,8S/40x100	0.5 - 2x 1.25 mm	90 - 100 mm	4.8 mm	40 mm	PH #2	500 pc	2045709
Insulation fastener S-IDP 4,8S/40x120	0.5 - 2x 1.25 mm	110 - 120 mm	4.8 mm	40 mm	PH #2	500 pc	2045762
Insulation fastener S-IDP 4,8S/40x140	0.5 - 2x 1.25 mm	130 - 140 mm	4.8 mm	40 mm	PH #2	500 pc	2045764
Insulation fastener S-IDP 4,8S/40x160	0.5 - 2x 1.25 mm	150 - 160 mm	4.8 mm	40 mm	PH #2	500 pc	2045766
Insulation fastener S-IDP 4,8S/40x180	0.5 - 2x 1.25 mm	170 - 180 mm	4.8 mm	40 mm	PH #2	250 pc	2045768
Insulation fastener S-IDP 4,8S/40x200	0.5 - 2x 1.25 mm	190 - 200 mm	4.8 mm	40 mm	PH #2	250 pc	2045770
Insulation fastener S-IDP 4,8S/40x220	0.5 - 2x 1.25 mm	210 - 220 mm	4.8 mm	40 mm	PH #2	250 pc	2045772
Insulation fastener S-IDP 4,8S/40x240	0.5 - 2x 1.25 mm	230 - 240 mm	4.8 mm	40 mm	PH #2	250 pc	2045774
Insulation fastener S-IDP 4,8S/40x260	0.5 - 2x 1.25 mm	250 - 260 mm	4.8 mm	40 mm	PH #2	250 pc	2045776
Insulation fastener S-IDP 4,8C/40x280	0.5 - 2x 1.25 mm	270 - 280 mm	4.8 mm	40 mm	PH #2	250 pc	2045778
Insulation fastener S-IDP 4,8C/40x300	0.5 - 2x 1.25 mm	290 - 300 mm	4.8 mm	40 mm	PH #2	250 pc	2045780



# 12.9 Flat roof fastener (80 mm x 40 mm) S-IDP 4.8S/8040

Fasteners (stainless steel screws and polyamid plugs) for fastening of insulation on flat steel roofs



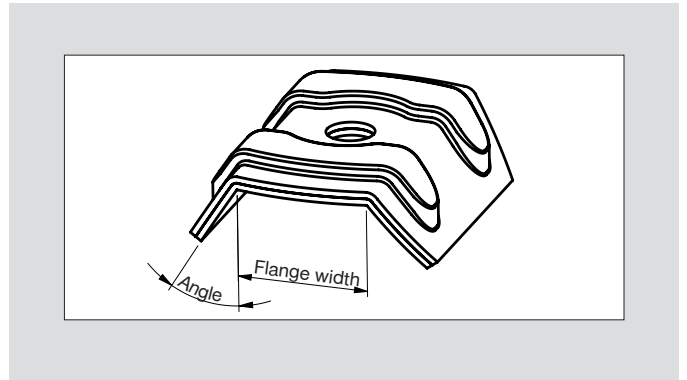
Ordering description	Drilling capacity range (DC)	Thickness fastened range (MF)	Screw diameter (d)	Washer size	Screw drive/recess type (SW)	Sales quantity	Item number
Insulation fastener S-IDP 4,8S/8040x60	0.5 - 2x 1.25 mm	50 - 60 mm	4.8 mm	80 x 40 mm	PH #2	500 pc	2045824
Insulation fastener S-IDP 4,8S/8040x80	0.5 - 2x 1.25 mm	70 - 80 mm	4.8 mm	80 x 40 mm	PH #2	500 pc	2045826
Insulation fastener S-IDP 4,8S/8040x100	0.5 - 2x 1.25 mm	90 - 100 mm	4.8 mm	80 x 40 mm	PH #2	500 pc	2045828
Insulation fastener S-IDP 4,8S/8040x120	0.5 - 2x 1.25 mm	110 - 120 mm	4.8 mm	80 x 40 mm	PH #2	500 pc	2045830
Insulation fastener S-IDP 4,8S/8040x140	0.5 - 2x 1.25 mm	130 - 140 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2045832
Insulation fastener S-IDP 4,8S/8040x160	0.5 - 2x 1.25 mm	150 - 160 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2045834
Insulation fastener S-IDP 4,8S/8040x180	0.5 - 2x 1.25 mm	170 - 180 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2045836
Insulation fastener S-IDP 4,8S/8040x200	0.5 - 2x 1.25 mm	190 - 200 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2045838
Insulation fastener S-IDP 4,8S/8040x220	0.5 - 2x 1.25 mm	210 - 220 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2045840
Insulation fastener S-IDP 4,8S/8040x240	0.5 - 2x 1.25 mm	230 - 240 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2045842
Insulation fastener S-IDP 4,8S/8040x260	0.5 - 2x 1.25 mm	250 - 260 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2045844
Insulation fastener S-IDP 4,8S/8040x280	0.5 - 2x 1.25 mm	270 - 280 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2045846
Insulation fastener S-IDP 4,8S/8040x300	0.5 - 2x 1.25 mm	290 - 300 mm	4.8 mm	80 x 40 mm	PH #2	250 pc	2045848

## Content

	Page
<b>13.1</b>	
Saddle washer for trapezoidal profile S-SWTR	123
<b>13.2</b>	
Saddle washer for trapezoidal profile S-SWTR RAL	124
<b>13.3</b>	
Saddle washer for wave profile S-SWWA	125
<b>13.4</b>	
Which saddle washer is suitable for which profile?	126
<b>13.5</b>	
13.5.1 S-AW Sealing washer application example	129
13.5.2 Product Data	129
13.5.3 Dimensions	130
13.5.4 Sealing washern for screws with „PS“ (S-MD)	130
13.5.5 Sealing washer for screws without „PS“ (S-MD, S-MP)	130
13.5.6 Sealing washer for screws S-MS	131
13.5.7 Sealing washer for screws panel (S-CD/S-CDW)	131

### 13.1 Saddle washer for trapezoidal profile S-SWTR

For crown flange assembly of roof coverings made of steel, aluminum and plastic. Stabilizes the profile panel and prevents pressing in of the crown flange



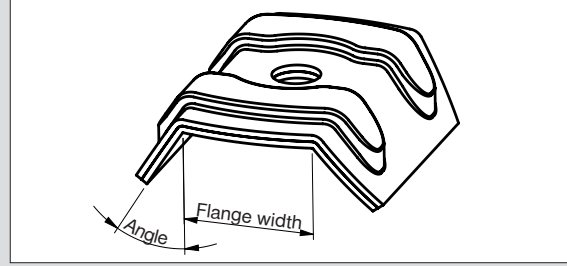
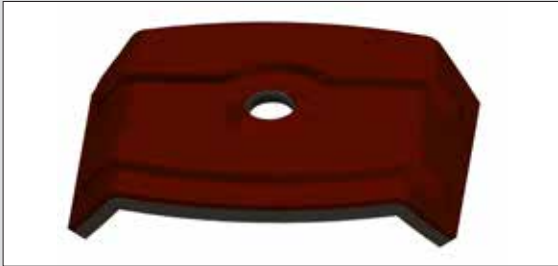
Ordering description	Angle (°)	Flange width (B)	Paint	Hole	EPDM-thickness	Material	Material thickness	Saddle washer length	Sales quantity	Item number
S-SWTR 15/20	15°	20 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2106943
S-SWTR 35/20	35°	20 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2106944
S-SWTR 30/23	30°	23 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2106945
S-SWTR 15/25	15°	25 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2106946
S-SWTR 27/25	27°	25 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2106947
S-SWTR 40/26	40°	26 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2106948
S-SWTR 35/28	35°	28 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2106949
S-SWTR 24/30	24°	30 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107120
S-SWTR 38/30	38°	30 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107121
S-SWTR 23/34	23°	34 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107122
S-SWTR 33/37	33°	37 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107123
S-SWTR 17/40	17°	40 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107124
S-SWTR 36/40	36°	40 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107125
S-SWTR 32/54	32°	54 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107126
S-SWTR 22/57	22°	57 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 ST	2107127
S-SWTR 45/33	48°	33 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 ST	2109680

Reference: Colors see 13.2 and other colors on request see Chapter 3.5

## 13.2

### Saddle washer for trapezoidal profile S-SWTR RAL

For crown flange assembly of roof coverings made of steel, aluminum and plastic.  
Stabilizes the profile panel and prevents pressing in of the crown flange.

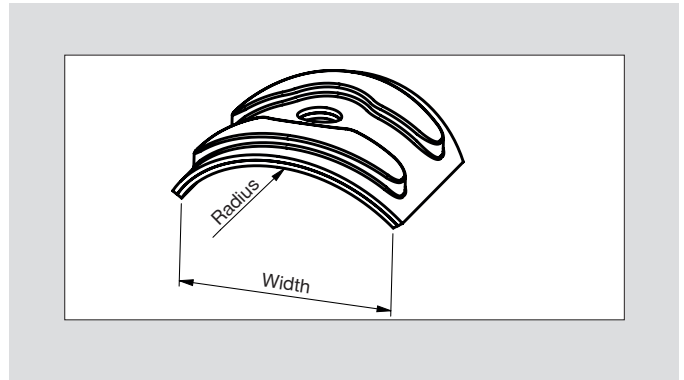


Ordering description	Angle (°)	Flange width (B)	Paint	Hole	EPDM-thickness	Material	Material thickness	Saddle washer length	Sales quantity	Item number
S-SWTR 36/40 RAL 7016	36°	40 mm	RAL 7016	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107131
S-SWTR 36/40 RAL 8012	36°	40 mm	RAL 8012	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107132
S-SWTR 36/40 RAL 3009	36°	40 mm	RAL 3009	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107133
S-SWTR 36/40 RAL 9006	36°	40 mm	RAL 9006	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107134
S-SWTR 17/40 RAL 7016	17°	40 mm	RAL 7016	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107135
S-SWTR 17/40 RAL 8012	17°	40 mm	RAL 8012	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107136
S-SWTR 17/40 RAL 3009	17°	40 mm	RAL 3009	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107137
S-SWTR 17/40 RAL 9006	17°	40 mm	RAL 9006	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107138
S-SWTR 32/54 RAL 7016	32°	54 mm	RAL 7016	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107139
S-SWTR 32/54 RAL 8012	32°	54 mm	RAL 8012	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107140
S-SWTR 32/54 RAL 3009	32°	54 mm	RAL 3009	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107141
S-SWTR 32/54 RAL 9006	32°	54 mm	RAL 9006	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107142
S-SWTR 24/30 RAL 7016	24°	30 mm	RAL 7016	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107143
S-SWTR 24/30 RAL 8012	24°	30 mm	RAL 8012	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107144
S-SWTR 24/30 RAL 3009	24°	30 mm	RAL 3009	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107145
S-SWTR 24/30 RAL 9006	24°	30 mm	RAL 9006	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107146
S-SWTR 27/25 RAL 7016	27°	25 mm	RAL 7016	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107147
S-SWTR 27/25 RAL 8012	27°	25 mm	RAL 8012	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107148
S-SWTR 27/25 RAL 3009	27°	25 mm	RAL 3009	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107149
S-SWTR 27/25 RAL 9006	27°	25 mm	RAL 9006	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107150

Reference: Other colors request see Chapter 3.5

### 13.3 Saddle washer for wave profile S-SWWA

For crown flange assembly of roof coverings made of steel, aluminum and plastic. Stabilizes the profile panel and prevents pressing in of the crown flange.



Ordering description	Radius	Flange width (B)	Paint	Hole	EPDM-thickness	Material	Material thickness	Saddle washer length	Sales quantity	Item number
S-SWWA 24/40	24 mm	40 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107128
S-SWWA 32/51	32 mm	51 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107129
S-SWWA 48/57	48 mm	57 mm	plain	7.3 mm	2 mm	Aluminium	1 mm	45 mm	100 pc	2107130

Reference: Other colors on request see Chapter 3.5

## 13.4

## Which saddle washer is suitable for which profile?

Saddle washer	Profile name	Manufacturer
W36/40	alubel 28	Alubel
W40/26	alubel 21	
W36/40	alubel 40	
W38/30	alubel 44	
W27/25	Alutech Dach	
W36/40	Aluform 20/125	Aluform
W35/20	Aluform 29/124	
W40/26	Aluform 30/153	
W23/34	Aluform 40/167	
W38/30	Aluform 42/250	
W27/25	Aluform 45/150	
W27/40	Aluform 45/200	
W27/25	Alutherm DT 900	
W38/30	Alutherm DT 1000	
R24/40	Welle 18/76	
R32/51	Welle 35/137	
R48/57	Welle 55/177	
W36/40	AL 34/207	Arcelor
W48/33	A 35/207	
W17/40	B35/207	
W27/25	39/333 T	
W17/40	AL 40/183	
W17/40	A 40/183	
W24/30	AL 42/333 S	
W32/54	44/180	
W27/25	AL 45/150	
W36/40	85/280	
W17/40	100/275	
W17/40	105/345	
W17/40	106/250	
W27/25	Ondatherm 1001 TS	
W27/25	Ondafibre 3005 T	
W27/25	Agratherm 1001 TS	
R24/40	Welle 18/76	
W36/40	20/125	Bieber
W36/40	30/262K	
W36/40	35/207	
W17/40	40/183/183 S	
W36/40	50/250	
W32/54	58/315K	
W32/54	70/200	
W36/40	80/307	
W36/40	89/305	
W17/40	100/275	
W17/40	106/250	
W17/40	110/333	
W36/40	135/310	
W36/40	150/280	
W17/40	160/250	
W17/40	170/250	
W15/25	DP72/82/102/ 122/142/162	Brucha
W40/26	DP-F	
W33/37	DP 20/35	Dansk Profitechnik
W40/26	DP 20/65	
W40/26	DP 20/100	
W36/40	DP 35/115	
R24/40	DP Sinus 18/76	
R32/51	DP Sinus 35/143	
R32/51	DP Sinus Variant 35/143	
W40/26	DS 20/115	DS Staalprofil
W36/40	DS 35/190	
W33/37	DS 35/206	
R32/51	DS Sinus 35/143	
W15/20	SISCOROOF 4G	
W15/20	SISCOTEC ROOF 4G	

Saddle washer	Profile name	Manufacturer
R 48/57	Welle 5	Eternit
R 48/52	Welle 6	
R 32/51	Welle 8	
W33/37	EL 22/214	Feilmeier
W32/54	EL 30/220	
W36/40	EL 35/207	
W33/37	EL 39/333/S	
W17/40	EL 40/183	
W35/28	EL 45/333/S	
W32/54	EL 50/250	Finish Profiles
R24/40	Welle EL 18/76	
R24/40	Dakprofiel 18 - 76	Finish Profiles
R48/57	Dakprofiel 42 - 960	
W38/30	Dakprofiel 20 - 1090	
W17/40	Dakprofiel 35 - 1000	
W17/40	Dakprofiel 40 - 915	
W32/54	Dakprofiel 50 - 1000	
W32/54	Dakprofiel 58 - 945 KD	
W32/54	Dakprofiel 70R - 800	
W36/40	35/207	Fischer
W17/40	40/183	
W32/54	50/250	
W36/40	85/280	
W17/40	100/275	
W36/40	135/310	
W36/40	150/280	
W17/40	165/250	
R24/40	Sinus 18	
R32/51	Sinus 27	
R48/57	Sinus 42	
W36/40	DL 70; 80; 100; 120; 140; 160	
W36/40	20/220	
W40/26	W-20/990	
W40/26	W-20/1100	
W17/40	W-45R/900	
W38/30	W-45ER/1000	
W17/40	W-155/840	
R24/40	W-1/1064	
W36/40	W-35/1035	
W27/25	Isocop	Isopan
W15/20	Penta 40	Italpanelli
W35/20	Jl 33.250.1000	Joriside
W30/23	Jl 45.333.1000	
W36/40	Jl 35.207.1035	
W17/40	Jl 40.183.915	
W32/54	Jl 50.250.1000	
W32/54	Jl 58.317.945	
W27/25	Jl Roof 1000	
W23/34	Jl Ecopaneel 1000	
W24/30	KS 1000 RW	Kingspan
W27/25	KS 1000 FF	
W36/40	35.207.1035	Klinger & Partner Profilvertrieb GmbH
W40/26	39.333.1000	

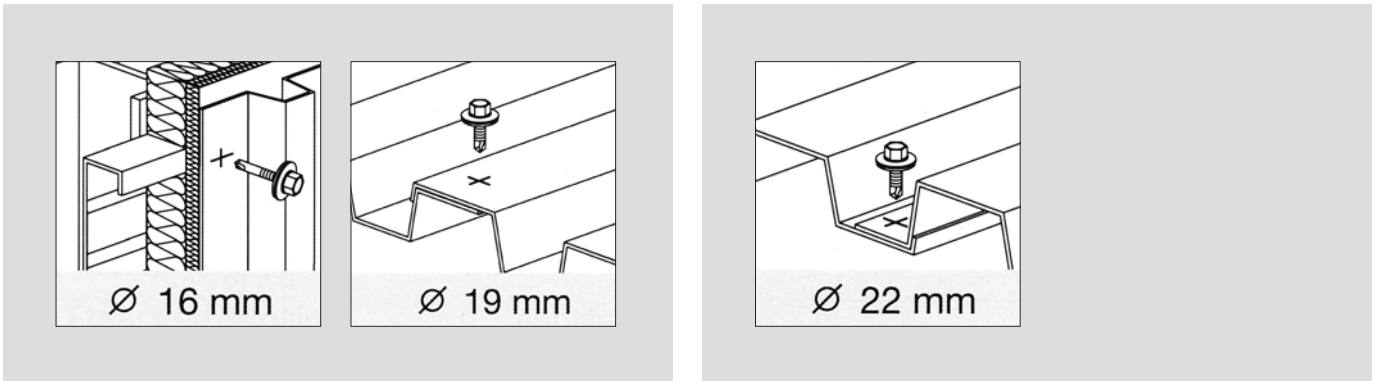
Saddle washer	Profile name	Manufacturer
W36/40	KAS AL-20/125 A	Klöckner
W27/25	KAS AL-30/153 A	
W36/40	KAS-35/207	
W23/34	KAS AL-40/167 A	
W17/40	KAS-40/183	
W17/40	KAS AL-45/200 A	
W32/54	KAS-50/250	
W17/40	KAS-85/280	
W17/40	KAS-89/305	
R24/40	KAS -18/76	
R48/57	KAS -42/160	
R48/57	KAS -55/177	
W33/37	KAS -D 65 - 115	
W15/20	KAS -D 68	
W36/40	KAS -D 80	
W17/25	KAS -D 62 - 142	
W35/20	Isocopre	Lattonedil
W15/20	Eurocinque	
W35/20	Eurocopre	
W36/40	35 - 207	Laukien
W36/40	22 - 214	
W40/26	20 - 75	
W27/25	45 - 333 S	
W38/30	40 - 100	
W36/40	50 - 250	
R24/40	18/76	
R32/51	27/111	
R48/57	42/160	
R48/57	55/177	
W27/25	LP 20	Lindab
W36/40	LP 35	
W40/26	LP 1100	
R24/40	Sinus 18	
W35/20	Eurocopre	
W27/25	LM40 250 1000	Luxmetall
W40/26	LM19 156 1094	
R32/51	LM 27-111-1000	
W27/25	35 - 207	Maas
W36/40	22 - 214	
W36/40	20 - 75	
W38/30	45 - 333 S	
W27/25	45-150	
W27/25	45-333 S	
R24/40	Welle 18-76	
R32/51	Welle 27-111	
R48/57	Welle 55-177	
W15/20	G4	Metecno
W15/20	Hipertec Dach	
W15/20	Hipertec Dach	
W35/20	Toproof DG	
W12/20	SISCO	
W40/26	SP 20	Montana
W17/40	SP 26	
W36/40	SP 30	
W36/40	SP 35	
W17/40	SP 40	
W27/40	SP 41	
W24/30	SP 44	
W36/40	SP 45	
W27/25	SP 59	
W17/40	SP 80	
W30/23	MTD TL 65	
W30/23	MTD TL 85	
W30/23	MTD TL 105	
W30/23	MTD TL 125	
W30/23	MTD TL 145	
R24/40	SP 18/1064	
R32/51	SP 27/1000	
R48/57	SP 42/960	

Saddle washer	Profile name	Manufacturer
W33/37	KP	M-Profil
W36/40	M 20/220	Münker
W48/33	M 35.1/207	
W36/40	M 35/207	
W36/40	M 40.1/183	
W17/40	M 40/183	
W27/25	M 40/333	
W27/25	M 40KD/333	
W32/54	M 50/250	
W36/40	M 85/280	
W17/40	M 100/275	
W17/40	M 150/280	
W17/40	M 160/250	
W40/26	M 40/333	
W36/40	20.125/8	O Metall
W38/30	20.136/8	
W17/40	25.280/3	
W40/26	25.268/4	
W23/34	30.207/5	
W40/26	30.153/7	
W36/40	35.207/5	
W17/40	40.183/5	
W27/25	40.250/4	
W27/25	45.150/6	
W27/25	45.333/3	
W32/54	50.250/4	
R24/40	Welle 18.76	
R48/57	Welle 55.177	
R32/51	Welle 27.111	
W40/26	Plannja 19	Plannja
W40/26	Plannja 20-102	
W30/40	Plannja 35	
R24/40	Sinus 18	
R48/57	Sinus 51	
W33/37	Plannja 20	
W17/40	Plannja 60	
W38/30	Plannja 30	
W36/40	Plannja 45	
W27/25	20/154	Proge
W36/40	26/143	
W48/33	30/207	
W36/40	30/220	
W36/40	30 KD	
W36/40	35/207	
W17/40	40/183	
W36/40	45/150	
W27/25	45/333	
W32/54	50/250	
W32/54	58 KD	
W23/34	59/225	
W32/54	70/200	
W17/40	80/277	
W36/40	85/280	
W36/40	90/305	
W17/40	100/275	
W17/40	105/345	
W17/40	106/250	
R24/40	Welle 18/76	
R32/51	Welle 27/111	
R48/57	Welle 42/160	
R48/57	Welle 55/177	
W15/25	D62; D82; D102; D122; D142	Romakowski
W36/40	SPCW; SPC2C PIR	Ruukki



Saddle washer	Profile name	Manufacturer
W27/25	19(KD)/1050	SAB
W36/40	35R/1035	
W17/40	40R/915	
W32/54	50R/1000	
W32/54	70R/800	
W36/40	85R/1120	
W36/40	89R/915	
W17/40	100R/825	
W36/40	30KD/1050	
W23/34	45KD/1000	
W32/54	58KD/945	
W33/37	D 65-75-95-115-135	
W33/37	D135.1000 TL	
R24/40	18/988	
R48/57	42/960	
R24/40	27/1000	
W36/40	PS 35/207	Salzgitter
W17/40	PS 40/183	
W32/54	PS 50/250	
W36/40	PS 85/280	
W17/40	PS 100/275	
W36/40	SIP D	
R24/40	CB 18/76	Siegmetall
W48/33	CB 35/207	
W17/40	40/183	
W27/25	40/333	
W32/54	50/250	
W36/40	CB 75/305	
W36/40	85/280	
W17/40	100/275	
W15/20	Siegfalz	Premium
W36/40	Hoesch Thermodach	ThyssenKrupp Steel Europe AG
W36/40	T 35.1	
W17/40	T 40.1	
W32/54	T 50.1	
W36/40	T 85.1	
W17/40	T 100.1	
W17/40	T 106.1	
R24/40	WP 18/76	
R48/57	WP 42/160	
R32/51	WP 27/100	
W27/25	SNV	Trimo
W36/40	WU 20/125	Wurzer Profiliertechnik GmbH
W35/20	WU 30/200	
W48/33	WU 30D/207	
W33/37	WU 30W/207	
W36/40	WU 35/207	
W17/40	WU 40/183	
W27/25	WU 45/333	
W32/54	WU 50/250	
W36/40	WU 80/307	
W17/40	WU 100/275	
R24/40	WU 18/76	
R32/51	WU 27/111	
R48/57	WU 55/177	
W36/40	plusdach DL	
W15/20	Ter	
R48/57	Welle 42-160	
W35/20	30.200/5	
W38/30	39.333/3	
W40/26	39/333	
W17/40	41/193,5	

### 13.5.1 S-AW Sealing washer application example



### 13.5.2 Product Data

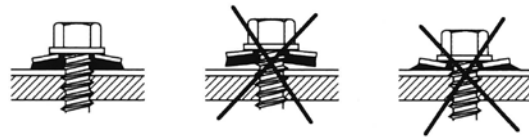
**Material specification:**

z.B.: S-AW04 S16

- S for screw fastening
- A for accessories
- W for washer
- 04 04 - screw  $\varnothing$  4,8 mm
- 05 05 - screw  $\varnothing$  5,5 mm
- 06 06 - screw  $\varnothing$  6,5 mm
- S Stainless steel 1.4301 (S for stainless steel)
- A Aluminium
- 12 - Sealing washern outside- $\varnothing$  12 mm
- 14 - Sealing washern outside- $\varnothing$  14 mm
- 16 16 - sealing washer outside- $\varnothing$  16 mm
- 19 - sealing washer outside- $\varnothing$  19 mm
- 22 - sealing washer outside- $\varnothing$  22 mm
- PS for perfect sealing screw
- MS for chipless screw
- CD for sandwich panel screw
- CDW for sandwich panel screw wood

**Fastening tools:**

Tool ST 1800 / ST 1800-A22  
with depth gauge

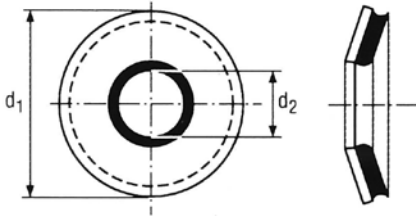


It is essential that the screw be driven correctly in order to ensure that the sealing washer will fulfill its function for many years.

### 13.5.3 Dimensions

#### Uses:

For all outdoor applications where the fastening is exposed to the weather.



### 13.5.4 Sealing washern for screws with „PS“ (S-MD)

Ordering description	Washer size	EPDM-thickness	Screw diameter (d)	Sales quantity	Item number
Sealing washer S-AW05S 16 PS	16 mm	2 mm	5,5 mm	200 pc	2045877
Sealing washer S-AW06S 16 PS	16 mm	2 mm	6,3 mm	200 pc	2045874
Sealing washer S-AW05S 19 PS	19 mm	2 mm	5,5 mm	200 pc	2045878
Sealing washer S-AW06S 19 PS	19 mm	2 mm	6,3 mm	200 pc	2045875
Sealing washer S-AW05S 22 PS	22 mm	2 mm	5,5 mm	200 pc	2045879
Sealing washer S-AW06S 22 PS	22 mm	2 mm	6,3 mm	200 pc	2045876

### 13.5.5 Sealing washer for screws without „PS“ (S-MD, S-MP)

Ordering description	Washer size	EPDM-thickness	Screw diameter (d)	Sales quantity	Item number
Sealing washer S-AW04S 12	12 mm	2 mm	4,8 mm	200 pc	2109616
Sealing washer S-AW05S 12	12 mm	2 mm	5,5 mm	200 pc	2109617
Sealing washer S-AW04S 14	14 mm	2 mm	4,8 mm	200 pc	2109618
Sealing washer S-AW05S 14	14 mm	2 mm	5,5 mm	200 pc	2109619
Sealing washer S-AW04S 16	16 mm	2 mm	4,8 mm	200 pc	284880
Sealing washer S-AW05S 16	16 mm	2 mm	5,5 mm	200 pc	284883
Sealing washer S-AW06S 16	16 mm	2 mm	6,3/6,5 mm	200 pc	284886
Sealing washer S-AW04S 19	19 mm	2 mm	4,8 mm	200 pc	284881
Sealing washer S-AW05S 19	19 mm	2 mm	5,5 mm	200 pc	284884
Sealing washer S-AW06S 19	19 mm	2 mm	6,3/6,5 mm	200 pc	284887
Sealing washer S-AW04S 22	22 mm	2 mm	4,8 mm	200 pc	284882
Sealing washer S-AW05S 22	22 mm	2 mm	5,5 mm	200 pc	284885
Sealing washer S-AW06S 22	22 mm	2 mm	6,3/6,5 mm	200 pc	284888

### 13.5.6 Sealing washer for screws S-MS

Ordering description	Washer size	EPDM-thickness	Screw diameter (d)	Sales quantity	Item number
Sealing washer S-AW04S 14 MS	14 mm	2 mm	4,8 mm	200 pc	2109660
Sealing washer S-AW04A 14 MS	14 mm	2 mm	4,8 mm	200 pc	2109661
Sealing washer S-AW04S 16 MS	16 mm	2 mm	4,8 mm	200 pc	2109662
Sealing washer S-AW04A 16 MS	16 mm	2 mm	4,8 mm	200 pc	2109663

### 13.5.7 Sealing washer for screws panel (S-CD/S-CDW)

Ordering description	Washer size	EPDM-thickness	Screw diameter (d)	Sales quantity	Item number
Sealing washer S-AW06S 16 CD	16 mm	3 mm	5,5 mm	200 ST	2109664
Sealing washer S-AW06S 19 CD	19 mm	3 mm	5,5 mm	200 ST	2109665
Sealing washer S-AW06S 22 CD	22 mm	3 mm	5,5 mm	200 ST	2109666
Sealing washer S-AW06S 29 CD	29 mm	3 mm	5,5 mm	200 ST	2109667
Sealing washer S-AW07S 16 CDW	16 mm	2 mm	6,5 mm	200 ST	2109668
Sealing washer S-AW07S 19 CDW	19 mm	2 mm	6,5 mm	200 ST	2109669
Sealing washer S-AW07S 22 CDW	22 mm	2 mm	6,5 mm	200 ST	2109670
Sealing washer S-AW07S 29 CDW	29 mm	2 mm	6,5 mm	200 ST	2109671

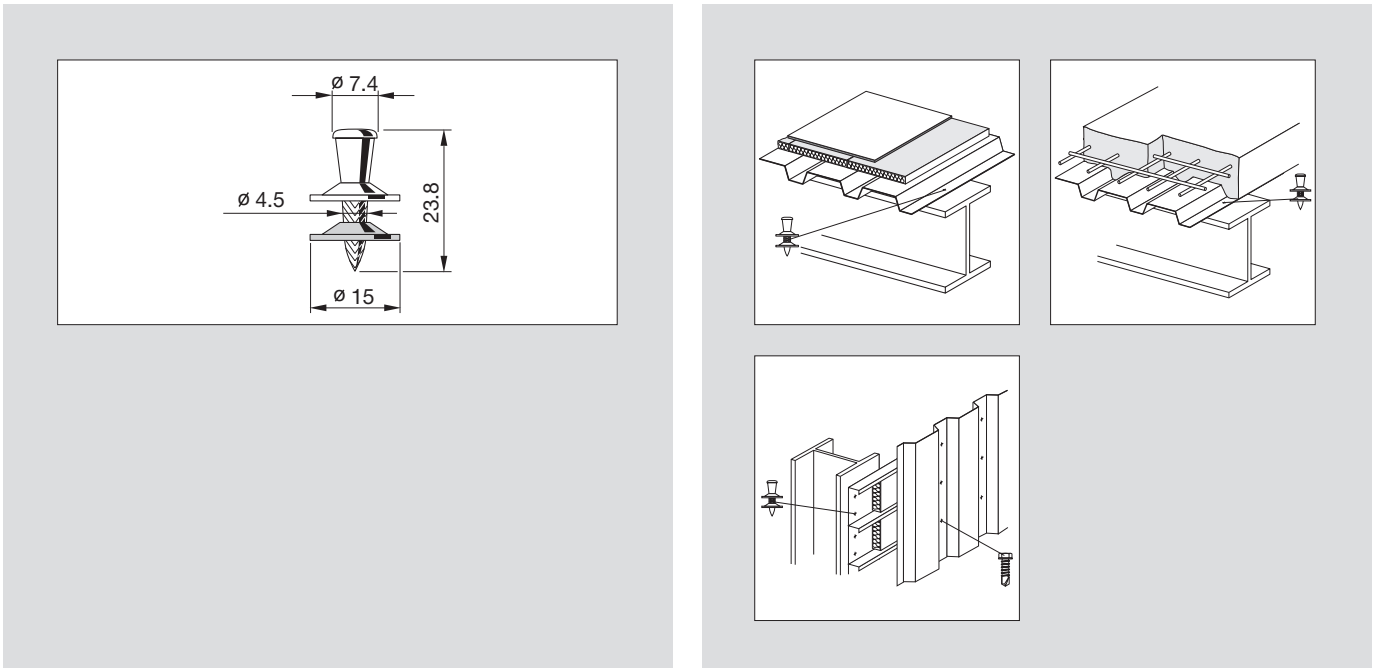
## Content

<b>14.1</b>	Page
Siding and decking nail X-ENP	133
X-ENP Nail	133
X-ENP Nail, collated for DX 76 MX/DX 76 PTR	133
X-ENP Nail, collated for DX 860-ENP	133
<b>14.2</b>	
Sealing cap for ENP SDK2/PDK2	134
<b>14.3</b>	
Setting tool for sealing caps SDK2/PDK2	134
<b>14.4</b>	
Sheet metal nail X-ENP2K	135
X-ENP2K Nail	135
X-ENP2K Nagel, magaziniert	135



# 14.1 Siding and decking nail X-ENP

High performance nail for fastening metal sheets to thick steel substructures (≥ 6 mm to full steel)



## X-ENP Nail

Ordering description	Min. thickness of base material	Shank diameter	Shank length	Washer size	Washer type	Sales Quantity	Item Number
Sheet metal nail X-ENP-19 L15	6 mm	4.5 mm	23.8 mm	15 mm	15 mm Steel dome double washer	100 ST	283506

## X-ENP Nail, collated for DX 76 MX/DX 76 PTR

Ordering description	Min. thickness of base material	Shank diameter	Shank length	Washer size	Washer type	Sales Quantity	Item Number
Sheet metal nail X-ENP-19 L15MX	6 mm	4.5 mm	23.8 mm	15 mm	15 mm Steel dome double washer collated	1000 ST	283507

## X-ENP Nail, collated for DX 860-ENP

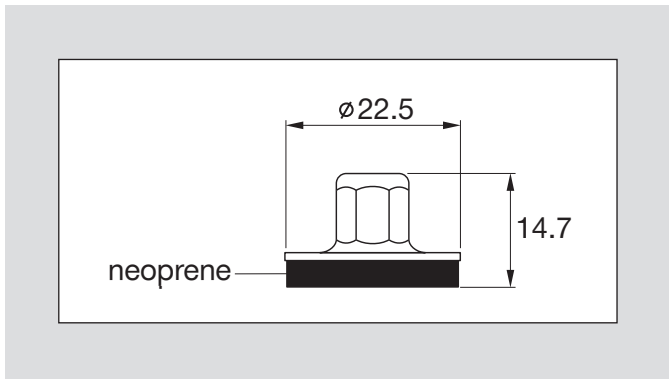
Ordering description	Min. thickness of base material	Shank diameter	Shank length	Washer size	Washer type	Sales Quantity	Item Number
Sheet metal nail X-ENP-19 L15MXR	6 mm	4.5 mm	23.8 mm	15 mm	15 mm Steel dome double washer collated	1000 ST	283508

**Hinweis:**

- More information see approval ETA-04/0101 (Chapter 16)

## 14.2 Sealing cap for ENP SDK2/PDK2

Perfect optics of fastening point, watertight sealing as well with elongated hole. Easy usage with setting tool and hammer. Fits for X-ENP-19 L15 (MX)



Ordering description	Material	Washer size	Sales Quantity	Item Number
Sealing cap PDK2	Polyethylen	16 mm	500 ST	52709
Sealing cap SDK2	Stainless steel (DIN 1.4301 ASTM 304)	22.5 mm	100 ST	52708

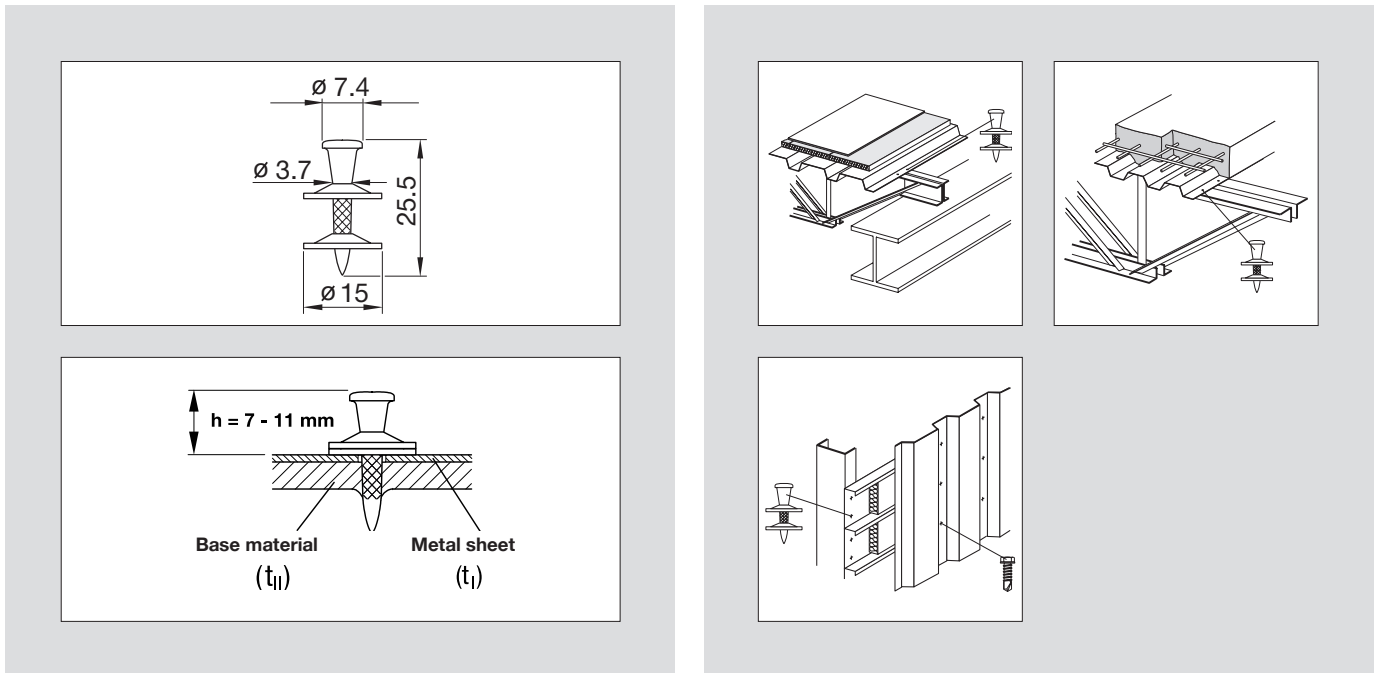
## 14.3 Setting tool for sealing caps SDK2/PDK2



Ordering description	Sales Quantity	Item Number
Setzwerkzeug PDK2	1 ST	59301
Setzwerkzeug SDK2	1 ST	59300

## 14.4 Sheet metal nail X-ENP2K

Fastening sheet metal and thin purlins from 3 mm to 6 mm thickness



### X-ENP2K Nail

Ordering description	Min. thickness of base material	Shank diameter	Shank length	Washer size	Washer type	Sales Quantity	Item Number
Sheet metal nail X-ENP2K-20 L15	3 mm	3.7 mm	22.5 mm	15 mm	15 mm Steel dome double washer	100 ST	385133

### X-ENP2K Nail, collated

Ordering description	Min. thickness of base material	Shank diameter	Shank length	Washer size	Washer type	Sales Quantity	Item Number
Sheet metal nail X-ENP2K-20 L15 MX	3 mm	3.7 mm	25.5 mm	15 mm	15 mm Steel dome double washer	1000 ST	385134



## Content

<b>15.1</b>		Page
	Battery metal construction screwdriver (Li-Ion) ST 1800-A22	137
<b>15.2</b>		
	Metal construction screwdriver ST 1800	137
<b>15.3</b>		
	Accessories	138
<b>15.4</b>		
	Nut setter S-NS (C)	138
<b>15.5</b>		
	Magnetic nut setter S-NS (M)	139
<b>15.6</b>		
	System nut setter S-SY	139
<b>15.7</b>		
	Bit and bit holder	139
<b>15.8</b>		
	Bit and bit holder	140
<b>15.9</b>		
	Special cartridgen für DX 76	140
<b>15.10</b>		
	Special cartridges for the DX 860	140

## 15.1 Battery metal construction screwdriver (Li-Ion) ST 1800-A22















Ordering description	Content	Sales Quantity	Item Number
<b>Set ST 1800-A22 + B22/3.3 (2)</b>	1x Battery-Metal construction screwdriver ST 1800-A22, 1x Nut setter S-NS 8, 1x Protective cap, 1x Hilti toolbox, 2x Batteries B22 3,3, 1x Battery charger	1 pc	XXXX
<b>Batteries-Metal construction screwdriver ST 1800-A22 Hilti toolbox</b>	1x Battery Metal construction screwdriver ST 1800-A22, 1x Nut setter S-NS 8, 1x Protective cap, 1x Hilti toolbox	1 pc	XXXX
<b>Batteries-Metal construction screwdriver ST 1800-A22 Cardboard box</b>	1x Battery Metal construction screwdriver ST 1800-A22, 1x Nut setter S-NS 8, 1x Protective cap	1 pc	XXXX

## 15.2 Metal construction screwdriver ST 1800



Ordering description	Content	Sales Quantity	Item Number
<b>Metal construction screwdriver ST 1800 230V Hilti tool box</b>	1x Metal construction screwdriver ST 1800 230V, 1x Protective cap, 1x Hilti toolbox	1 pc	XXXX
<b>Metal construction screwdriver ST 1800 230V card board box</b>	1x Metal construction screwdriver ST 1800 230V, 1x Protective cap	1 pc	XXXX

## 15.3 Accessories

Ordering description			Sales Quantity	Item Number
<b>Battery charger C 4/36-350 230V</b>	1x Battery charger C4/36-350 230V		1 pc	2028875
<b>Battery pack B 22/1.6 Li-Ion</b>	1x Battery B22 1,6		1 pc	426177
<b>Battery pack B 22/3.3 Li-Ion</b>	1x Battery B22 3,3		1 pc	2007431
<b>Stand-up tool SDT 5</b>	Including magazine, Bit-holder, Hexagon nut setter, Cable holder, in cardboard box		1 pc	2057087
<b>Magazine SDT 5</b>			1 pc	2057089
<b>Screw guide ST-SG 5.5</b> for use with long sandwich panel screw with diameter 5.5mm, min length 55 mm	1x Screw guide ST-SG 5.5, 1x Nut setter S-NS 8		1 pc	407521
<b>Screw guide ST-SG 5.5</b> for use with long sandwich panel screw with diameter 5.5mm, min length 55 mm	1x Screw guide ST-SG 5.5 3x Nut setter S-NS 8		1 pc	414440
<b>Screw guide ST-SG 6.5</b> for use with long sandwich panel screw with diameter 6.5mm, min length 55 mm	1x Screw guide ST-SG 6.5 1x Nut setter S-NS 8		1 pc	425545
<b>Screw guide ST-SG 6.5</b> for use with long sandwich panel screw with diameter 6.5mm, min length 55 mm	1x Screw guide ST-SG 6.5 3x Nut setter S-NS 8		1 pc	425539
<b>Depth gauge ST-DG 19</b> for use with self-drilling screws with sealing washer up to dia. 19 mm			1 pc	2005053
<b>Depth gauge ST-DG 22</b> for use with self-drilling screws with sealing washer up to dia. 22 mm			1 pc	2005054
<b>Depth gauge S-TA Set</b> for use with screws with sealing washer dia. 14 mm - 22 mm			1 pc	304611

## 15.4 Nut setter S-NS (C)

For use with hexagonal screw heads, non-magnetic



Ordering description	Connection end	Drive	Sales Quantity	Item Number
<b>S-NS 3/8" C 50/2"</b>	1/4" Hexagon	HEX3/8"	1 pc	2039250
<b>S-NS 7 C 50/2"</b>	1/4" Hexagon	HEX7	1 pc	2039243
<b>S-NS 8 C 50/2"</b>	1/4" Hexagon	HEX8	1 pc	2039244
<b>S-NS 10 C 50/2"</b>	1/4" Hexagon	HEX10	1 pc	2039245
<b>S-NS 13 C 50/2"</b>	1/4" Hexagon	HEX13	1 pc	2039247
<b>S-NS 13 C 90/3 1/2"</b>	1/4" Hexagon	HEX13	1 pc	2039251

## 15.5 Magnetic nut setter S-NS (M)

For use with hexagonal screw heads, magnetic



Ordering description	Connection end	Drive	Sales Quantity	Item Number
S-NS 3/8" M 50/2"	1/4" Hexagon	HEX3/8"	1 pc	2039232
S-NS 7 M 50/2"	1/4" Hexagon	HEX7	1 pc	2039225
S-NS 8 M 50/2"	1/4" Hexagon	HEX8	1 pc	2039226
S-NS 10 M 50/2"	1/4" Hexagon	HEX10	1 pc	2039227
S-NS 13 M 50/2"	1/4" Hexagon	HEX13	1 pc	2039229

## 15.6 System nut setter S-SY



Ordering description	Connection end	Drive	Sales Quantity	Item Number
S-SY SDT 30/SDT 5	1/4" Hexagon	HEX8	1 pc	2039260

## 15.7 Bit and bit holder

Ordering description		Sales Quantity	Item Number
Bit holder S-BH RC 50/2"		1 pc	2039219
S-B TX 25 25/1" T-HF (10)		10 pc	2039138
S-B TX 25 50/2" T-HF (5)		5 pc	2039143

## 15.8 Powder-actuated fastening tool with charger



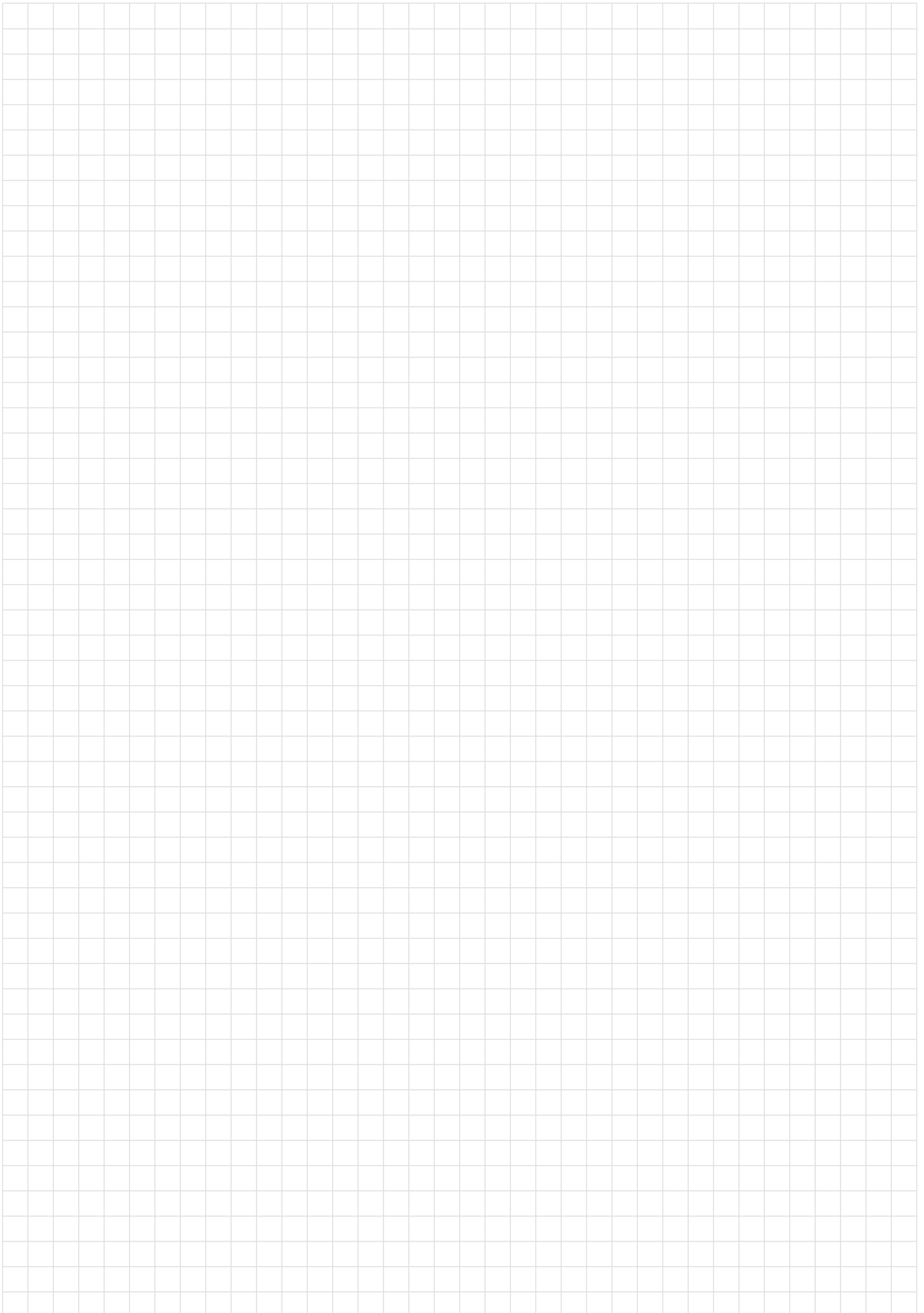
Ordering description	Content	Sales Quantity	Item Number
<b>Powder-actuated fastening tool DX 76 MX</b>	1xMagazin MX76, 1xPiston X-76-P-ENP, 1xCleaning set DX 76/860, 1xHilti toolbox	1 pc	<b>285790</b>
<b>Powder-actuated fastening tool DX 76 PTR</b>	1xMagazin MX 76 PTR, 1xPiston X-76-PTR X-ENP, 1xCleaning set DX 76/860, 1xTest gauge DX 76 PTR, 1xHilti toolbox,	1 pc	<b>384004</b>
<b>Powder-actuated fastening tool DX 860-ENP</b>	1xPowder-actuated fastening tool DX 860-ENP, 1xCleaning set DXY 76/860, 1xHilti toolbox	1 pc	<b>282481</b>

## 15.9 Special cartridges for the DX 76

Ordering description		Sales Quantity	Item Number
<b>DX Special cartridge 6.8/18 M10 STD green</b> light, only when X-ENP2K is used		100 pc	<b>416482</b>
<b>DX Special cartridge 6.8/18 M10 BULK green</b> light, only when X-ENP2K is used		1000 pc	<b>416487</b>
<b>DX Special cartridge 6.8/18 M10 STD yellow</b> medium		100 pc	<b>416483</b>
<b>DX Special cartridge 6.8/18 M10 BULK yellow</b> medium		1000 pc	<b>416488</b>
<b>DX Special cartridge 6.8/18 M10 STD blue</b> heavy		100 pc	<b>416485</b>
<b>DX Special cartridge 6.8/18 M10 BULK blue</b> heavy		1000 pc	<b>416490</b>
<b>DX Special cartridge 6.8/18 M10 STD red</b> very heavy		100 pc	<b>416484</b>
<b>DX Special cartridge 6.8/18 M10 BULK red</b> very heavy		1000 pc	<b>416489</b>
<b>DX Special cartridge 6.8/18 M10 STD black</b> very heavy		100 pc	<b>416486</b>
<b>DX Special cartridge 6.8/18 M10 BULK black</b> very heavy		1000 pc	<b>416491</b>

## 15.10 Special cartridges for the DX 860

Ordering description		Sales Quantity	Item Number
<b>DX Special cartridge 6.8/18 M40 blue</b> heavy		2400 pc	<b>412710</b>
<b>DX Special cartridge 6.8/18 M40 red</b> very heavy		2400 pc	<b>412709</b>
<b>DX Special cartridge 6.8/18 M40 black</b> very heavy		2400 pc	<b>412711</b>



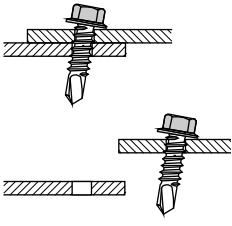
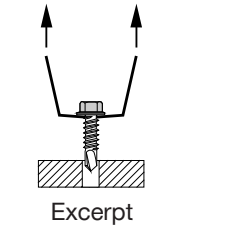
## Content

<b>16.1</b>		Page
	FAQs (frequently asked questions) about the approvals	143
<b>16.2</b>		
	Overview approval	
16.2.1	ETA-10/0182 – Fastening screws for metal members and sheeting	144
16.2.2	ETA-13/0179 – Fastening screws for sandwich panels	145
16.2.3	ETA-12/0057 – Fasteness for systems of mechanically fastened flexible roof waterproofing membranes	145
16.2.4	Z-14.1-4 – German approval for fastening screws for steel members and sheeting	146
16.2.5	Z-14.1-537 – German approval for fastening screws for steel members and sheeting	146
16.2.6	Certification report P-BWU02-148009 – Fastening screws for external ventilated facade cladding according to DIN 18516-1	146
<b>16.3</b>		
	ETA-10/0182 – Fastening screws for metal members and sheeting	147
<b>16.4</b>		
	ETA-13/0179 – Fastening screws for sandwich panels	185
<b>16.5</b>		
	ETA-12/0057 – Fasteness for systems of mechanically fastened flexible roof waterproofing membranes	195
<b>16.6</b>		
	Z-14.1-4 – German approval for fastening screws for steel members and sheeting	209
<b>16.7</b>		
	Z-14.1-537 – German approval for fastening screws for steel members and sheeting	215
<b>16.8</b>		
	Certification report P-BWU02-148009 – Fastening screws for external ventilated facade cladding according to DIN 18516-1	228
<b>16.9</b>		
	Technical data for screws without approval	
	S-MD 25Z 5.5xL carbon steel self-drilling screw	235
	S-MD 21Z 5.5xL carbon steel self-drilling screw	235
	S-MD 51LZ 4.8xL carbon steel self-drilling screw	236
	S-MD 01ZW 5.5xL carbon steel self-drilling screw	236
	S-MD 05ZW 5.5xL carbon steel self-drilling screw	237
	S-MD 03ZW 5.5xL carbon steel self-drilling screw	237
	S-MD 01S 4.8xL stainless steel self-drilling screw	238
	S-MD 01LS 5.5xL stainless steel self-drilling screw	238
	S-MD 03S 6.3xL stainless steel self-drilling screw	239
	S-MD 03S 5.5xL stainless steel self-drilling screw	239
	S-MD 05SxL stainless steel self-drilling screw	240
	S-CDW 61C 6.5xL carbon steel self-drilling screw	240
	S-CD 65C 5.5xL carbon steel self-drilling screw	241
	S-CD 63C 5.5xL carbon steel self-drilling screw	241
	S-CD 63S 5.5xL/S-CD73S 5.5xL stainless steel self-drilling screw	242
	S-CD 65S 5.5xL/S-CD75S 5.5xL stainless steel self-drilling screw	242
	S-CDW 61S 6.5xL/S-CDW71S 6.5xL stainless steel self-drilling screw	243
	S-MP 53Z 6.5xL carbon steel self-tapping screw	244
	S-MP 52Z 6.3xL carbon steel self-tapping screw	244
	S-WD 13C 4.8xL; 5.5xL carbon steel self-drilling wing screw	245
	S-WD 11C 3.8xL; 4.2xL carbon steel self-drilling wing screw	245
	S-WD 13C 6.3xL carbon steel self-drilling wing screw	246
	S-WD 15C 5.5xL carbon steel self-drilling wing screw	246
<b>16.10</b>		
	16.10 ETA-04-0101 X-ENP-19L15 vom 01.03.2013	247

### 16.1

## FAQs (frequently asked questions) about the approvals

Interpreting the load value tables – the connector's characteristic shear load carrying capacity and transverse tensile strength  $V_{R,k}$  and  $N_{R,k}$

$t_{N,II}$ [mm]	1,50	2,00	3,00	4,00	5,00	6,00		
$M_{t,nom}$	—	$\Sigma t \leq 3,00$ mm: 7 Nm $\Sigma t > 3,00$ mm: 8 Nm						
 <p>Failure of base material (Building component II)</p>	$t_{N,I}$ [mm]							
	$V_{R,k}$ [kN] für $t_{N,I}$ [mm]							
	0,50	—	—	—	—	—	—	
	0,55	—	—	—	—	—	—	
	0,63	—	2,60	ac	2,60	ac	2,60	
	0,75	—	3,70	ac	3,70	ac	3,70	
	0,88	—	4,50	—	4,50	—	5,00	
	1,00	—	4,50	—	4,50	—	6,50	
	1,13	—	4,90	—	4,90	—	7,00	
	1,25	—	5,30	—	5,30	—	7,40	
1,50	—	6,20	—	6,20	—	8,30		
1,75	—	6,20	—	6,20	—	8,30		
2,00	—	7,80	—	7,80	—	9,40		
 <p>Failure of profile metal sheet (Building component I)</p>	$t_{N,I}$ [mm]							
	$N_{R,k}$ [kN] für $t_{N,I}$ [mm]							
	0,50	—	—	—	—	—	—	
	0,55	—	—	—	—	—	—	
	0,63	—	1,70	ac	1,70	ac	1,70	
	0,75	—	2,20	ac	2,20	ac	2,20	
	0,88	—	2,90	—	2,90	—	2,90	
	1,00	—	3,09	—	3,50	—	3,50	
	1,13	—	3,09	—	4,30	—	4,30	
	1,25	—	3,09	—	4,35	—	5,10	
1,50	—	3,09	—	4,35	—	5,61		
1,75	—	3,09	—	4,35	—	5,61		
2,00	—	3,09	—	4,35	—	5,61		

**Note:** It isn't clearly possible to conclude to the failure mode of the screw only with the help of the load values in the tables of the annex in the approval. Especially in case of shear loads the failure of the screw connection can happen in different modes. The load value in the load table corresponds to the minimum value of the different failure modes and is therefore the decisive load value.

### Wooden sub-constructions

Two pieces of evidence must be provided screws that are also suitable for fastening profile metal sheets to wooden base materials.

1. The load carrying capacity in wood must be calculated with the determined  $M_y, R_k$  and  $f_{ax,k}$  values in accordance with EN 1995-1-1.
2. The load carrying capacity in wood calculated in accordance with EN 1995-1-1 must then be compared with the sheet metal load carrying capacities  $V_{I,R,k}$  and  $N_{I,R,k}$ . The lower value must then be used as the connector's load carrying capacity.

The procedure and further details are also described in section 4.2.2 of the ETA (European Technical Approval).

### Appendix sheets for different steel grades

For some screw types, load values were calculated separately for two sheet metal steel grades. In these instances, the appendix sheets with the data for the higher-strength sheet metals were marked with the corresponding sheet metal tensile strength, e.g. 390 for sheet metals of S320GD grade or better.

### Load information if the base material building component thickness $t_{II} \geq 6$ mm

In the case of screws that are screwed at least 6 mm into the steel sub-structure, it can be assumed that the screw breakage failure mode is decisive for the failure of the connector. The load values at  $t_{II} = 6$  mm therefore also represent all base material thicknesses greater than 6 mm; also see section 4.3 of the corresponding ETA.

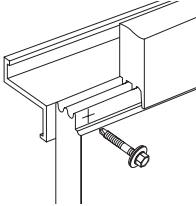
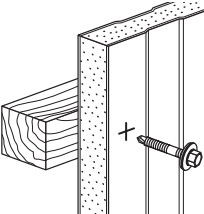


## 16.2 Overview approval

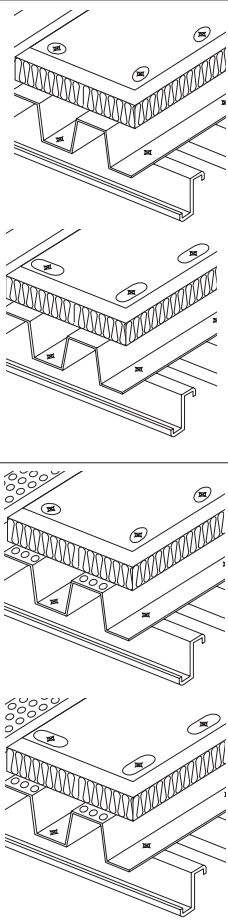
### 16.2.1 ETA-10/0182 - Fastening screws for metal members and sheeting

Application	Description	Component I	Component II	Screw	ETA Annex	
	Metal sheet on Timber	Aluminium	Timber	S-MD 51, 61, 71 S 5,5 x L	17	
				S-MD 31 PS 4,8 x L	52	
				S-MP 53, 63, 73 S 6,5 x L (pre-drilling required)	50	
			Timber	Steel	S-MD 51, 61, 71 S 5,5 x L	17
					S-MD 31 PS 4,8 x L	51
					S-MP 53, 63, 73 S 6,5 x L (pre-drilling required)	50
	Metal sheet to cold formed steel, cold formed steel to metal sheet ( $\Sigma t \leq 6.0$ mm)	Steel	Steel	S-MD 03, 53 Z 4,8 x L	25, 26	
				S-MD 03, 23, 53 Z 5,5 x L	27, 28, 29	
				S-MD 03, 23, 53 Z 6,3 x L	30, 31, 32	
				S-MD 53, 63, 73 S 5,5 x L	37, 38	
				S-MD 43 S 5,5 x L	40, 41	
				S-MD 53, 63, 73 S 6,3 x L	44, 45	
		Aluminium	Steel	S-MD 43, 53, 63, 73 S 5,5 x L	39	
				S-MP 53, 63, 73 S 6,5 x L (pre-drilling required)	50	
		Steel	Aluminium	S-MD 33 PS 5,5 x L	56	
				S-MD 43, 53, 63, 73 S 5,5 x L	39	
		Aluminium	Aluminium	S-MD 33 PS 5,5 x L	58	
				S-MD 43, 53, 63, 73 S 5,5 x L	39	
	Metal sheet on thin steel, HTU channels ( $\Sigma t \leq 6.0$ mm)	Steel	Steel	S-MD 23 Z 6.3 x L	31	
				S-MD 23 Z 5.5 x L	28	
		Aluminium	Steel	S-MD 43, 53, 63, 73 S 5,5 x L	39	
	Overlap connection, thin sheet to sheet ( $\Sigma t \leq 3.0$ mm)	Aluminium	Aluminium	S-MD 31 PS 4,8 x L	52	
				S-MD 31 PS 5,5 x L	54	
				S-MP 53, 63, 73 S 6,5 x L (pre-drilling required)	50	
		Steel	Steel	S-MD 01, 51 Z 4,2 x L	6, 7	
				S-MD 01, 51 Z 4,8 x L	8, 9	
				S-MD 01, 51 Z 5,5 x L	10, 11	
				S-MD 01, 51 Z 6,3 x L	12, 13	
				S-MD 51, 61 S 4,8 x L	14	
				S-MD 51 S 5,5 x L	15, 16	
				S-MD 51, 61, 71 LS 5,5 x L	20, 21	
				S-MS 01 Z 4,8 x 20	46	
				S-MD 31 PS 4,8 x L	51	
				S-MD 31 PS 5,5 x L	53	
					Metal sheet on liner trays, comp. I on 1x and 2x comp. II ( $\Sigma t \leq 4$ mm)	Aluminium
S-MD 31 PS 5,5 x L	55					
S-MD 33 PS 5,5 x L	59					
Steel	Aluminium	S-MD 51, 61, 71 LS 5,5 x L	24			
Aluminium	Aluminium	S-MD 41, 51, 61, 71 LS 5,5 x L	23			
Steel	Steel	S-MD 51, 61, 71 LS 5,5, x L	18, 19			
	Metal sheet on structural steel ( $\Sigma t \leq 15$ mm)	Steel	Steel	S-MD 05, 55 Z 5,5 x L	33, 34	
				S-MD 05, 55 GZ 5,5 x L	35, 36	
				S-MD 55, 65, 75 S 5,5 x L	42, 43	
				S-MD 35 PS 5,5 x L	60	
				S-MP 52, 62, 72 S 6,3 x L (pre-drilling required)	47	
		S-MP 54, 64, 74 S 6,3 x L (pre-drilling required)	48			
Alu	Steel	S-MD 35 PS 5,5 x L	61			

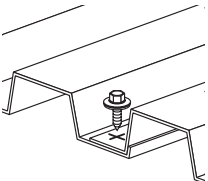
### 16.2.2 ETA-13/0179 - Fastening screws for sandwich panels

Application	Description	Component I	Component II	Screw	ETA Annex
	Fasteners for sandwich panels	Sandwich	Steel	S-CD 63, 73 S 5,5 x L	2
				S-CD 53S 5,5 x L	3
				S-CD 65, 75 S 5,5 x L	4
				S-CD 55 S 5,5 x L	5
				S-MP 54, 64, 74 S 6,3 x L (pre-drilling required)	6
	Fasteners for sandwich panels	Steel	Timber	S-CDW 61, 71 S 6,5 x L	7
				S-CDW 51 S 6,5 x L	8

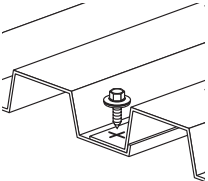
### 16.2.3 ETA-12/0057 - Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

Application	Description	Component I	Component II	Screw	ETA Annex
	Fastener for systems of mechanically fastened flexible roof waterproofing membranes	Water-proofing membrane	Profiled metal decking	S-IT 01C 4.8 x L + S-IW 4,9 AZ 40	5
				S-IT 01C 4.8 x L + S-IW 4,9 AZ 40x40	6
				S-IT 01C 4.8 x L + S-IW 4,9 AZ 64x64	7
				S-IT 01C 4.8 x L + S-IW 4,9 AZ 80x40	8
				S-ID 01C 4,8 x L + S-IP 40 x L	13
				S-ID 01C 4,8 x L + S-IP 50 x L	14
				S-ID 01C 4,8 x L + S-IP 8040 x L	15
				S-ID 01S 4,8 x L + S-IP 40 x L	16
				S-ID 01S 4,8 x L + S-IP 50 x L	17
			S-ID 01S 4,8 x L + S-IP 8040 x L	18	
			Profiled metal decking (acoustic)	S-IT 01C 6.3 x L + S-IW 6,6 AZ 40	9
				S-IT 01C 6.3 x L + S-IW 6,6 AZ 40x40	10
				S-IT 01C 6.3 x L + S-IW 6,6 AZ 64x64	11
				S-IT 01C 6.3 x L + S-IW 6,6 AZ 80x40	12
				S-ID 01C 6,7 x L + S-IP 40 x L	19
				S-ID 01C 6,7 x L + S-IP 50 x L	20
				S-ID 01C 6,7 x L + S-IP 8040 x L	21

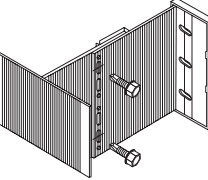
### 16.2.4 Z-14.1-4 - German approval for fastening screws for steel members and sheeting

Application	Description	Component I	Component II	Screw	ETA Annex
	Overlap connection sheet to sheet ( $\sum ti \leq 3.0$ mm)	Steel	Steel	S-MS 41, 51 S 4,8 x L	3.326
				S-MS 41, 51 Z 4,8 x L	3.327
				S-MS 01 S 4,8 x L	3.328

### 16.2.5 Z-14.1-537 - German approval for fastening screws for steel members and sheeting

Application	Description	Component I	Component II	Screw	ETA Annex
	Overlap connection sheet to sheet ( $\sum ti \leq 3.0$ mm)	Aluminium	Aluminium	S-MS 41, 51 S 4,8 x L	3.1.41
				S-MS 41, 51 S-A 4,8 x L	3.1.42
				S-MS 41, 51 Z 4,8 x L	3.1.43, 3.1.44
				S-MS 01 S 4,8 x L	3.1.45, 3.1.46
		Aluminium	Steel	S-MS 41, 51 S 4,8 x L	3.2.31, 3.2.32
				S-MS 41, 51 S-A 4,8 x L	3.2.31, 3.2.32
				S-MS 41, 51 Z 4,8 x L	3.2.33, 3.2.34
				S-MS 01 S 4,8 x L	3.2.35, 3.2.36

### 16.2.6 Certification report P-BWU02-148009 - Fastening screws for external ventilated facade cladding according to DIN 18516-1

Application	Description	Component I	Component II	Screw	ETA Annex
	Fastening of brackets for ventilated facade	Aluminium	Aluminium	S-AD 01 S 5,5 x L S-AD 01 SS 5,5 x L	1-4

Deutsches Institut für Bautechnik  
Zulassungsstelle für Bauprodukte und Bauarten  
Bautechnisches Präfixamt  
Eine vom Bund und den Ländern  
gemeinsam getragene Anstalt des  
öffentlichen Rechts  
Kohnenstraße 30 B  
D-10929 Berlin  
Tel.: +49 30 78730-0  
Fax: +49 30 78730-320  
E-Mail: dibt@dibt.de  
www.dibt.de



★ ★ ★ ★ ★  
★ Authorized  
and notified according  
to Article 10 of the Council  
Directive of 21 December 1988  
on the approximation of laws,  
regulations and administrative  
provisions of Member States  
relating to construction  
products (89/106/EEC) ★

Mitglied der EOTA  
Member of EOTA

## European Technical Approval ETA-10/0182

English translation prepared by DIBt - Original version in German language

Befestigungsschrauben S-MD, S-MP, S-MDW, S-MDU und S-MS  
Fastening screws S-MD, S-MP, S-MDW, S-MDU and S-MS

Hilti AG  
Feldkircherstraße 100  
9494 Schaan

FÜRSTENTUM LIECHTENSTEIN

Befestigungsschrauben für Metallbauteile und Bleche  
Fastening screws for metal members and sheeting

Validity:  
vom  
from  
bis  
to

Herstellwerke  
Manufacturing plants  
Hilti AG, Werk 2855  
Hilti AG, Werk 4929  
Hilti AG, Werk 6103  
Hilti AG, Werk 6522  
Hilti AG, Werk 7855  
Hilti AG, Plant 2855  
Hilti AG, Plant 4929  
Hilti AG, Plant 6103  
Hilti AG, Plant 6522  
Hilti AG, Plant 7855

Diese Zulassung umfasst  
This approval contains  
76 Seiten einschließlich 65 Anhänge  
76 pages including 65 annexes

Diese Zulassung ersetzt  
This approval replaces  
ETA-10/0182 mit Geltungsdauer vom 22.06.2012 bis 17.08.2015  
ETA-10/0182 with validity from 22.06.2012 to 17.08.2015



Europäische Organisation für Technische Zulassungen  
European Organisation for Technical Approvals

Z36823.13

8.06.02-32712

# 16.3 ETA-10/0182 - Fastening screws for metal members and sheeting



European technical approval  
ETA-10/0182  
English translation prepared by DIBt  
Page 2 of 76 | 25 April 2013

## I LEGAL BASES AND GENERAL CONDITIONS

1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
- Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BaupG) vom 28. April 1998<sup>4</sup>, as amended by Article 2 of the law of 8 November 2011<sup>5</sup>;
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.

2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.

3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.

4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.

5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.

6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities L 40, 11 February 1989, p. 12  
2 Official Journal of the European Communities L 220, 30 August 1993, p. 1  
3 Official Journal of the European Union L 284, 31 October 2003, p. 25  
4 Bundesgesetzblatt Teil I 1998, p. 812  
5 Bundesgesetzblatt Teil I 2011, p. 2178  
6 Official Journal of the European Communities L 17, 20 January 1994, p. 34

Z36823.13

8.06.02-32712

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 Definition of product and intended use

#### 1.1 Definition of the construction product

The fastening screws S S-MD, S-MP, S-MDW, S-MDU and S-MP are self drilling and self tapping screws listed in Table 1. The fastening screws are made of case hardened carbon steel or stainless steel. They are partly completed with metallic washers and EPDM sealing rings. For details see the appropriate Annexes.

Screws or washers for which the stainless steel grade A2 according to EN ISO 3506-1 is given in the respective Annexes (e. g. 1.4301 or 1.4567) may be made of stainless steel grade A4 (e. g. 1.4401 or 1.4578) as well.

Examples of fastening screws and the corresponding connections are shown in Annex 1.

The fastening screws and the corresponding connections are subject to tension and shear forces.

Table 1 Different types of the fastening screws

Annex	Fastening screw	Description
Annex 6	S-MD 01 Z 4,2 x L	with hexagon head
Annex 7	S-MD 51 Z 4,2 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 8	S-MD 01 Z 4,8 x L	with hexagon head
Annex 9	S-MD 51 Z 4,8 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 10	S-MD 01 Z 5,5 x L	with hexagon head
Annex 11	S-MD 51 Z 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 12	S-MD 01 Z 6,3 x L	with hexagon head
Annex 13	S-MD 51 Z 6,3 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 14	S-MD 51 S 4,8 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 15	S-MD 61 S 4,8 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 16	S-MD 51 S 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 17	S-MD 51 S 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 18	S-MD 51 LS 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
	S-MD 61 LS 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
	S-MD 71 LS 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 19	S-MD 51 LS 5,5 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
	S-MD 61 LS 5,5 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
	S-MD 71 LS 5,5 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 20	S-MD 51 LS 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
	S-MD 61 LS 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
	S-MD 71 LS 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 21	S-MD 51 LS 5,5 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
	S-MD 61 LS 5,5 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
	S-MD 71 LS 5,5 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 16 mm

Annex 22	S-MD 41 LS 5,5 x L S-MD 51 LS 5,5 x L S-MD 61 LS 5,5 x L S-MD 71 LS 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 23	S-MD 41 LS 5,5 x L S-MD 51 LS 5,5 x L S-MD 61 LS 5,5 x L S-MD 71 LS 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 24	S-MD 51 LS 5,5 x L - 390 S-MD 61 LS 5,5 x L - 390 S-MD 71 LS 5,5 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 24	S-MD 03 Z 4,8 x L	with hexagon head
Annex 26	S-MD 53 Z 4,8 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 27	S-MD 03 Z 5,5 x L	with hexagon head
Annex 28	S-MD 23 Z 5,5 x L	with hexagon head
Annex 29	S-MD 53 Z 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 30	S-MD 03 Z 6,3 x L	with hexagon head
Annex 31	S-MD 23 Z 6,3 x L	with hexagon head
Annex 32	S-MD 53 Z 6,3 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 33	S-MD 05 Z 5,5 x L	with hexagon head
Annex 34	S-MD 55 Z 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 35	S-MD 05 GZ 5,5 x L	with hexagon head
Annex 36	S-MD 55 GZ 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 37	S-MD 53 S 5,5 x L S-MD 63 S 5,5 x L S-MD 73 S 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 38	S-MD 53 S 5,5 x L - 390 S-MD 63 S 5,5 x L - 390 S-MD 73 S 5,5 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 39	S-MD 43 S 5,5 x L S-MD 53 S 5,5 x L S-MD 63 S 5,5 x L S-MD 73 S 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 40	S-MD 43 S 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 14 mm
Annex 41	S-MD 43 S 5,5 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 14 mm
Annex 42	S-MD 55 S 5,5 x L S-MD 65 S 5,5 x L S-MD 75 S 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 43	S-MD 55 S 5,5 x L - 390 S-MD 65 S 5,5 x L - 390 S-MD 75 S 5,5 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 44	S-MD 53 S 6,3 x L S-MD 63 S 6,3 x L S-MD 73 S 6,3 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm

Annex 45	S-MD 53 S 6,3 x L - 390 S-MD 63 S 6,3 x L - 390 S-MD 73 S 6,3 x L - 390	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 46	S-MS 01 Z 4,8 x 20	with hexagon head
Annex 47	S-MP 52 S 6,3 x L S-MP 62 S 6,3 x L S-MP 72 S 6,3 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 48	S-MP 54 S 6,3 x L S-MP 64 S 6,3 x L S-MP 74 S 6,3 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 49*)	S-MP 53 S 6,5 x L S-MP 63 S 6,5 x L S-MP 73 S 6,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 50*)	S-MP 53 S 6,5 x L S-MP 63 S 6,5 x L S-MP 73 S 6,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 51*)	S-MD 31 PS 4,8 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 52*)	S-MD 31 PS 4,8 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 53	S-MD 31 PS 5,5 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 54	S-MD 31 PS 5,5 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 55	S-MD 31 PS 5,5 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 56	S-MD 33 PS 5,5 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 57	S-MD 33 PS 5,5 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 58	S-MD 33 PS 5,5 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 59	S-MD 33 PS 5,5 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 60	S-MD 35 PS 5,5 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 61	S-MD 35 PS 5,5 x L	with round head with Torx® drive system and sealing washer $\varnothing$ 12 mm
Annex 62*)	S-MDW 51 S 6,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 63*)	S-MDW 61 S 6,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 19 mm

Annex 64	S-MDU 51 S 5,5 x L S-MDU 61 S 5,5 x L S-MDU 71 S 5,5 x L	with hexagon head and sealing washer $\geq \varnothing$ 16 mm
Annex 65	S-MDU 41 S 4,8 x L S-MDU 51 S 4,8 x L S-MDU 61 S 4,8 x L S-MDU 71 S 4,8 x L	with hexagon head and sealing washer $\geq \varnothing$ 14 mm

\*) These fastening screws are applicable for fastening to timber substructure.

## 1.2

### Intended use

The fastening screws are intended to be used for fastening metal sheeting to metal substructures and as far as stated in Table 1 to timber substructures. 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 other thin gauge metal members.

The component to be fastened is component I and the substructure is component II.

The intended use comprises fastening screws and connections for indoor and outdoor applications. Fastening screws which are made of stainless steel are intended to be used in external environments with a high or very high corrosion category.

The intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads).

The provisions made in this European technical approval are based on an assumed working life of the fastening screws of 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

## 2 Characteristics of product and methods of verification

### 2.1

#### Characteristics of product

The fastening screws shall correspond to the drawings given in the appropriate Annexes (see Table 1).

The characteristic material values, dimensions and tolerances of the fastening screws neither indicated in this section nor in the Annexes shall correspond to the respective values laid down in the technical documentation<sup>7</sup> to this European technical approval.

The characteristic values of the shear and tension resistance of the connections made with the fastening screws are given in the appropriate Annexes or in section 4.2.

The fastening screws are considered to satisfy the requirements of performance class A1 of the characteristic reaction to fire.

<sup>7</sup> The technical documentation to this European technical approval is deposited at Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure is handed over to the approved bodies.



## 2.2 Methods of verification

The assessment of the fitness of the fastening screws for the intended use in relation to the Essential Requirements ER 1 (Mechanical resistance and stability), ER 2 (Safety in case of fire), ER 4 (Safety in use) and additional aspects of durability has been made in accordance with section 3.2 of the Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.

The assessment of the resistance to fire performance is only relevant to the assembled system (fastening screws, sheeting, substructure) which is not part of the ETA.

The fastening screws are considered to satisfy the requirements of performance class A 1 of the characteristic reaction to fire, in accordance with the provisions of the EC Decision 96/603/EC (as amended) without the need for testing on the basis of its listing in that decision.

Concerning Essential Requirements No. 1 (Mechanical resistance and stability) and No. 4 (Safety in use) the following applies:

The characteristic values of resistance given in the Annexes were determined by shear and tension tests.

The formulas to calculate the design resistance are given in clause 4.2.1.

## 3 Evaluation and attestation of conformity and CE marking

### 3.1 System of attestation of conformity

According to the Decision 99/92 of the European Commission<sup>8</sup> system 3 of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 3: Declaration of conformity of the product by the manufacturer on the basis of:

- (a) Tasks for the manufacturer:
  - (1) factory production control;
  - (2) Tasks for the approved body;
- (b) initial type-testing of the product.

Note: Approved bodies are also referred to as "notified bodies".

### 3.2 Responsibilities

#### 3.2.1 Tasks for the manufacturer

##### 3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use initial materials stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the "control plan relating to this European technical approval" which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.<sup>9</sup>

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

#### 3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of fastening screws in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

#### 3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial type-testing of the product,

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in written reports.

### 3.3 CE marking

The CE marking shall be affixed on each packaging of fastening screws. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the European technical approval,
- the name of the product.

## 4 Assumptions under which the fitness of the product for the intended use was favourably assessed

### 4.1 Manufacturing

The fastening screws are manufactured in accordance with the provisions of the European technical approval using the manufacturing process as laid down in the technical documentation. The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

<sup>9</sup> The "control plan" is a confidential part of the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

#### 4.2 Design

##### 4.2.1 General

Fastening screws completely or partly exposed to external weather or similar conditions are made of stainless steel or are protected against corrosion. For the corrosion protection the rules given in EN 1090-2:2008 + A1:2011, EN 1993-1-3:2006 + AC:2009 and EN 1993-1-4:2006 are taken into account.

For the types of connection (a, b, c, d) listed in the Annexes it is not necessary to take into account the effect of constraints due to temperature. For other types of connection it shall be considered for design as long as constraining forces due to temperature do not occur or are not significant (e.g. sufficient flexibility of the structure).

The loading is predominantly static. (Remark: Wind loads are regarded as predominantly static.) Dimensions, material properties, torque moments  $M_{1, norm}$ , minimum effective screw-in length  $l_{ef}$  and nominal material thicknesses  $t_M$  as stated in the ETA or in the Annexes are observed.

The verification concept stated in EN 1990:2002 + A1:2005 + A1:2005/AC:2010 is used for the design of the connections made with the fastening screws. The characteristic values (shear and tension resistance) stated in the Annexes are used for the design of the entire connections.

The following formulas are used to calculate the values of design resistance:

$$N_{Rd} = \frac{N_{Rk}}{\gamma_M}$$

$$V_{Rd} = \frac{V_{Rk}}{\gamma_M}$$

The recommended partial safety factor  $\gamma_M = 1,33$  is used in order to determine the corresponding design resistances, provided no values are given in national regulations of the member state in which the fastening screws are used or in the respective National Annex to Eurocode 3.

In case of combined tension and shear forces the linear interaction formula according to EN 1993-1-3:2006 + AC:2009, section 8.3 (8) is taken into account.

$$\frac{N_{Ed}}{N_{Rd}} + \frac{V_{Ed}}{V_{Rd}} \leq 1,0$$

The possibly required reduction of the tension resistance (pull-through resistance) due to the position of the fastener is taken into account:

- in accordance with EN 1993 1 3:2006+ AC:2009, section 8.3 (7) and Fig. 8.2 (component I is made of steel) or EN 1999-1-4:2007 + A1:2011, section 8.1 (6) and Table 8.3 (component I is made of aluminium),
- of 0.7 if the supporting structure is an asymmetric profile (e.g. Z-profile) with  $t_{li} < 5 \text{ mm}$

#### 4.2.2 Additional rules for connections with timber substructures

As far as no other provisions are made in the following EN 1995-1-1:2004 + A1:2008 applies. Drill points of self drilling screws are not taken into account for the effective screw-in length. The following terms are used:

$l_g$  - Screw-in length - part of thread screwed into component II including drill point.

$l_b$  - Length of unthreaded part of the drill-point.

$l_{ef}$  - effective screw-in length  $l_{ef} = l_g - l_b$

$$N_{R,k} = F_{ax,Rk} \cdot k_{mpod}$$

$$V_{R,k} = F_{v,Rk} \cdot k_{mpod}$$

$F_{ax,Rk}$  according to EN 1995-1-1:2004 + A1:2008, equation (8.40a)

Remark:  $F_{ax,Rk} = F_{ax,Rk}$  with  $\alpha = 90^\circ$

$F_{v,Rk}$  according to EN 1995-1-1:2004 + A1:2008, clause 8.2.3

$k_{mpod}$  according to EN 1995-1-1:2004 + A1:2008, Table 3.1

$M_{v,Rk}$  in equation (8.9) of EN 1995-1-1:2004 + A1:2008 and  $f_{v,Rk}$  in equation (8.40a) of EN 1995-1-1:2004 + A1:2008 are given in the Annexes of this ETA.

The characteristic values for pullout and bearing resistance (timber substructure) calculated according to EN 1995-1-1:2004 + A1:2008 are compared with the characteristic values for component I (pull over and bearing resistance) stated in the right column of the table in the appropriate Annexes. The lower value is used for further calculations.

#### 4.2.3 Additional rules for fastening of perforated sheets

For the fastening of perforated sheets (structural part I) only fastening screws with diameters given in Annexes 2, 3, 4 or 5 are used for which characteristic values are given in the following Annexes for unperforated sheets of same thickness and strength class as for the perforated sheets.

For the calculation of the connection the characteristic values for the connection of unperforated sheets according to the relevant Annex and the characteristic values for the connection of perforated sheets according to Annex 2, 3, 4 or 5 are determined. The lower values are used for further calculations.

The fastening to perforated sheets (structural part II) is not ruled in this ETA.

#### 4.3 Installation

The installation is only carried out according to the manufacturer's instructions. The manufacturer hands over the assembly instructions to the assembler.

It is guaranteed by the execution that no bimetallic corrosion will occur.

For regular shear forces the components I and II are directly connected to each other so that the fastening screws do not get additional bending. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

The fastening screws are fixed rectangular to the surface of the components to guarantee a correct load bearing and if necessary rain-proof connection.

Fastening screws for steel substructures are screwed in with the cylindrical part of the thread at least 6 mm if the substructure has a thickness over 6 mm unless otherwise declared in the manufacturer's instruction. Welded drill points are not taken into account for the screw-in length. The conformity of the installed fasteners with the provisions of the ETA is attested by the executing company.



European technical approval  
ETA-10/0182  
English translation prepared by DIBt

Page 11 of 76 | 25 April 2013

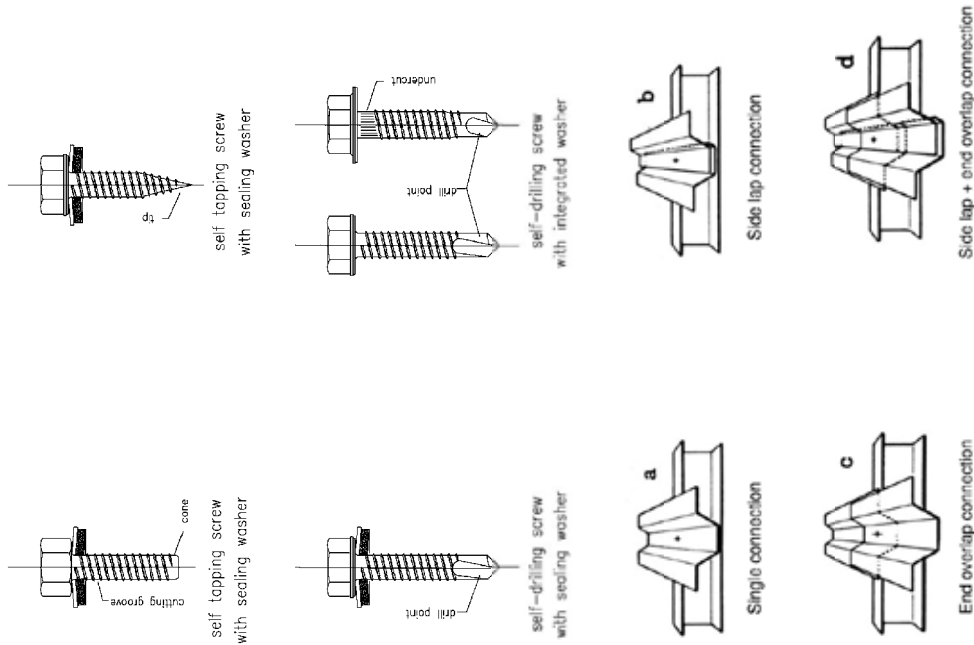
**5 Indications to the manufacturer**

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1, 2, 4.2 and 4.3 (including Annexes referred to) is given to those who are concerned. This information may be given by reproduction of the respective parts of the European technical approval.

In addition all installation data (predrill diameter, torque moment, application limits) shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

Georg Feistel  
Head of Department

beglaubigt:  
Ulbrich



Fastening screws S-MD, S-MP, S-MDW, S-MDU and S-MMS

Examples for screws  
Types of connection

Annex 1



**Type of Fastener:**  
self tapping screw  $\phi 6,3$  mm and  $\phi 6,5$  mm  
and  
self drilling screw from  $\phi 5,5$  mm to  $\phi 6,3$  mm

**Materials:**  
Fastener: stainless steel - EN 10088 or similar  
Washer: stainless steel - EN 10088  
EPDM sealing washer

**Component I:** S280GD, S320GD or S350GD - EN 10346  
**Component II:** at least S235 - EN 10025-1 or at least S280GD - EN 10346 or structural timber at least strength grade C24

sheet / $\phi$ washer	perforated sheets made of S280GD with $R_{t, \text{min}} = 360 \text{ N/mm}^2$		perforated sheets made of S320GD with $R_{t, \text{min}} = 390 \text{ N/mm}^2$		perforated sheets made of S350GD with $R_{t, \text{min}} = 420 \text{ N/mm}^2$	
	16 mm   19 mm   22 mm   25 mm	16 mm   19 mm   22 mm   25 mm	16 mm   19 mm   22 mm   25 mm	16 mm   19 mm   22 mm   25 mm	16 mm   19 mm   22 mm   25 mm	16 mm   19 mm   22 mm   25 mm
$M_{t, \text{nom}}$	5 Nm					
$V_{Rk}$ [kN] for $t$ [mm]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50	2,16 2,22 2,64 3,04 3,42 3,80 4,46	2,38 2,78 3,16 3,56 4,00 4,56	2,44 2,86 3,30 3,70 4,10 4,64	2,54 3,00 3,42 3,86 4,32 4,84	2,62 3,10 3,52 4,00 4,42 5,04
$N_{Rk}$ [kN] for $t$ [mm]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50	— — — — — — — — —	— — — — — — — — —	— — — — — — — — —	— — — — — — — — —	— — — — — — — — —

The thickness of the perforated sheets which are exposed to wind loads shall be at least 1,00 mm.  
For intermediate values of the washer diameter the characteristic values for the washer with the smaller diameter shall be used.

Self drilling screw / self tapping screw

Fastening of perforated sheets

Annex 2



**Type of Fastener:**  
self tapping screw  $\phi 6,3$  mm and  $\phi 6,5$  mm  
and  
self drilling screw from  $\phi 5,5$  mm to  $\phi 6,3$  mm

**Materials:**  
Fastener: stainless steel - EN 10088 or similar  
Washer: stainless steel - EN 10088  
EPDM sealing washer

**Component I:** S280GD - EN 10346  
**Component II:** at least S235 - EN 10025-1 or at least S280GD - EN 10346 or structural timber at least strength grade C24

screw / $\phi$ washer	self drilling screws $\phi 5,5$ mm and $\phi 6,0$ mm		self tapping screws and self drilling screws $\phi 6,3$ mm and $\phi 6,5$ mm	
	16 mm   19 mm   22 mm   25 mm	16 mm   19 mm   22 mm   25 mm	16 mm   19 mm   22 mm   25 mm	19 mm   22 mm   25 mm
$M_{t, \text{nom}}$	5 Nm			
$V_{Rk}$ [kN] for $t$ [mm]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50	2,48 3,04 3,42 3,84 4,40 4,92 5,76	2,62 3,12 3,50 4,00 4,50 5,06 6,04	2,64 3,28 3,96 4,70 5,40 6,62
$N_{Rk}$ [kN] for $t$ [mm]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50	— — — — — — — — —	— — — — — — — — —	— — — — — — — — —

The thickness of the perforated sheets which are exposed to wind loads shall be at least 1,00 mm.  
For intermediate values of the washer diameter the characteristic values for the washer with the smaller diameter shall be used.

Self drilling screw / self tapping screw

Fastening of perforated sheets

Annex 3

**Type of Fastener:**  
self tapping screw  $\phi 6.3$  mm and  $\phi 6.5$  mm and self drilling screw from  $\phi 5.5$  mm to  $\phi 6.3$  mm

**Materials:**  
Fastener: stainless steel - EN 10088 or similar  
Washer: stainless steel - EN 10088  
EPDM sealing washer  
Component I: S320GD - EN 10346  
Component II: at least: S235 - EN 10025-1 or at least: S280GD - EN 10346 or structural timber at least: strength grade C24

screw / $\phi$ washer	self drilling screws $\phi 5.5$ mm and $\phi 6.0$ mm					self tapping screws and self drilling screws $\phi 6.3$ mm and $\phi 6.5$ mm				
	16 mm	19 mm	22 mm	25 mm	25 mm	16 mm	19 mm	22 mm	25 mm	25 mm
$M_{t, min}$	—	—	—	—	—	—	—	—	—	—
0.50	—	—	—	—	—	—	—	—	—	—
0.55	—	—	—	—	—	—	—	—	—	—
0.63	—	—	—	—	—	—	—	—	—	—
0.75	2.68	2.74	3.08	3.00	2.68	2.88	3.42	3.50	3.50	3.50
0.88	3.30	3.38	3.70	3.60	3.36	3.60	4.10	4.22	4.22	4.22
1.00	3.86	4.00	4.16	4.16	4.02	4.30	4.72	4.88	4.88	4.88
1.13	4.48	4.62	4.76	4.76	4.76	5.08	5.42	5.60	5.60	5.60
1.25	5.06	5.24	5.32	5.36	5.50	5.84	6.08	6.30	6.30	6.30
1.50	6.24	6.54	6.40	6.60	7.10	7.52	7.46	7.76	7.76	7.76
0.50	—	—	—	—	—	—	—	—	—	—
0.55	—	—	—	—	—	—	—	—	—	—
0.63	—	—	—	—	—	—	—	—	—	—
0.75	3.12	3.42	3.50	3.40	3.12	3.68	4.06	4.26	4.26	4.26
0.88	3.70	4.04	4.08	4.00	3.70	4.32	4.68	4.86	4.86	4.86
1.00	4.24	4.64	4.54	4.54	4.24	4.92	5.24	5.40	5.40	5.40
1.13	4.84	5.26	5.28	5.12	4.84	5.54	5.86	5.96	5.96	5.96
1.25	5.38	5.88	5.88	5.70	5.38	6.14	6.40	6.48	6.48	6.48
1.50	6.54	7.16	7.16	6.92	6.54	7.38	7.54	7.52	7.52	7.52

The thickness of the perforated sheets which are exposed to wind loads shall be at least 1.00 mm. For intermediate values of the washer diameter the characteristic values for the washer with the smaller diameter shall be used.

Self drilling screw / self tapping screw

Fastening of perforated sheets

Annex 4

**Type of Fastener:**  
self tapping screw  $\phi 6.3$  mm and  $\phi 6.5$  mm and self drilling screw from  $\phi 5.5$  mm to  $\phi 6.3$  mm

**Materials:**  
Fastener: stainless steel - EN 10088 or similar  
Washer: stainless steel - EN 10088  
EPDM sealing washer  
Component I: S350GD - EN 10346  
Component II: at least: S235 - EN 10025-1 or at least: S280GD - EN 10346 or structural timber at least: strength grade C24

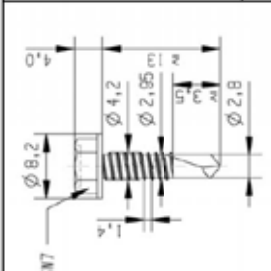
screw / $\phi$ washer	self drilling screws $\phi 5.5$ mm and $\phi 6.0$ mm					self tapping screws and self drilling screws $\phi 6.3$ mm and $\phi 6.5$ mm				
	16 mm	19 mm	22 mm	25 mm	25 mm	16 mm	19 mm	22 mm	25 mm	25 mm
$M_{t, min}$	—	—	—	—	—	—	—	—	—	—
0.50	—	—	—	—	—	—	—	—	—	—
0.55	—	—	—	—	—	—	—	—	—	—
0.63	—	—	—	—	—	—	—	—	—	—
0.75	2.88	2.92	3.30	3.20	2.98	3.20	3.72	3.82	3.82	3.82
0.88	3.54	3.62	3.96	3.86	3.62	3.88	4.42	4.54	4.54	4.54
1.00	4.14	4.28	4.46	4.46	4.24	4.52	5.08	5.12	5.12	5.12
1.13	4.80	4.94	5.10	5.10	4.92	5.24	5.78	5.74	5.74	5.74
1.25	5.44	5.62	5.70	5.72	5.56	5.92	6.46	6.32	6.32	6.32
1.50	6.24	6.54	6.40	7.02	6.94	7.36	7.86	7.48	7.48	7.48
0.50	—	—	—	—	—	—	—	—	—	—
0.55	—	—	—	—	—	—	—	—	—	—
0.63	—	—	—	—	—	—	—	—	—	—
0.75	3.34	3.66	3.76	3.64	3.52	4.16	4.52	4.64	4.64	4.64
0.88	3.96	4.36	4.38	4.28	3.98	4.74	5.04	5.24	5.24	5.24
1.00	4.54	4.98	4.96	4.86	4.40	5.24	5.50	5.76	5.76	5.76
1.13	5.16	5.64	5.64	5.48	4.86	5.76	5.96	6.32	6.32	6.32
1.25	5.80	6.28	6.28	6.14	5.38	6.24	6.40	6.80	6.80	6.80
1.50	6.54	7.16	7.16	7.46	6.54	7.38	7.54	7.80	7.80	7.80

The thickness of the perforated sheets which are exposed to wind loads shall be at least 1.00 mm. For intermediate values of the washer diameter the characteristic values for the washer with the smaller diameter shall be used.

Self drilling screw / self tapping screw

Fastening of perforated sheets


Annex 5



**Material:** carbon steel  
**Fastener:** case hardened and galvanized  
**Washer:** none  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S235 - EN 10025-1  
**S320GD, S320GD - EN 10346**

**Drilling capacity:**  $\Sigma t_1 \leq 2,50$  mm

**Timber substructures:**  
 no performance determined



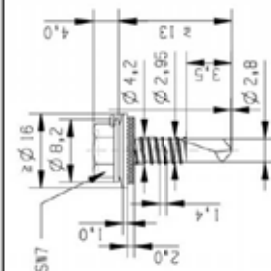
$t_1$ [mm]	$t_1$ [mm]									
	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00	2,00
$V_{Rk}$ [kN]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00	2,00
$N_{Rk}$ [kN]	0,55	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00	2,00
$M_{t,perm}$ [Nm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00	2,00
$\Sigma t_1 \leq 1,25$ mm: 2 Nm										
$\Sigma t_1 > 1,25$ mm: 4 Nm										

No additional regulations.

Self drilling screw

 Hilti S-MD 01 Z 4.2 x L  
 with hexagon head


Annex 6



**Material:** carbon steel  
**Fastener:** case hardened and galvanized  
**Washer:** carbon steel, galvanized stainless Steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S235 - EN 10025-1  
**S280GD, S320GD - EN 10346**

**Drilling capacity:**  $\Sigma t_1 \leq 2,50$  mm

**Timber substructures:**  
 no performance determined



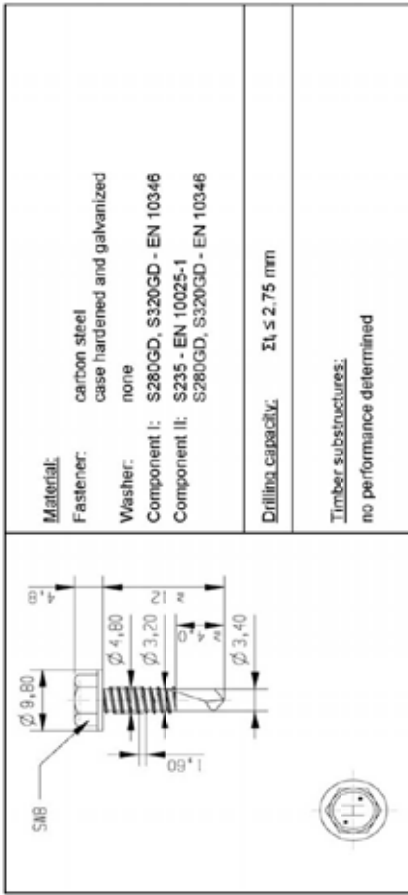
$t_1$ [mm]	$t_1$ [mm]									
	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00	2,00
$V_{Rk}$ [kN]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00	2,00
$N_{Rk}$ [kN]	0,55	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00	2,00
$M_{t,perm}$ [Nm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00	2,00
$\Sigma t_1 \leq 1,25$ mm: 2 Nm										
$\Sigma t_1 > 1,25$ mm: 4 Nm										

No additional regulations.

Self drilling screw

 Hilti S-MD 51 Z 4.2 x L  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 7



$t_1$ [mm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_R$ [kN]	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90
$N_{R,k}$ [kN]	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90
$M_{R,geom}$ [Nm]	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90

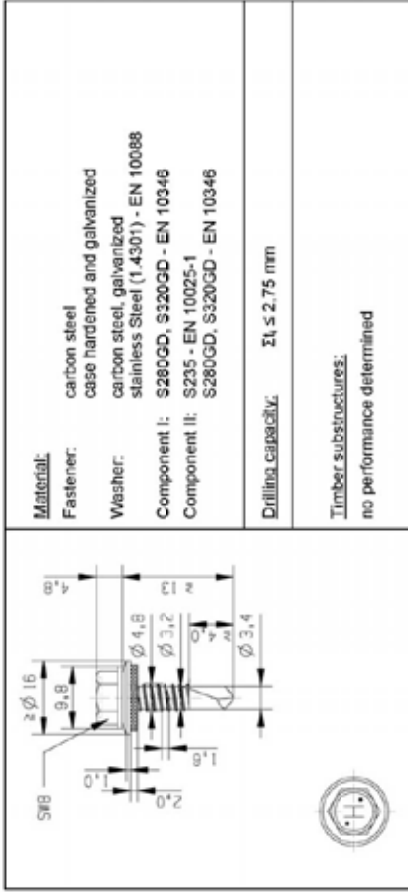
$\Sigma t \leq 1,25$  mm: 2 Nm       $\Sigma t > 1,25$  mm: 5 Nm

No additional regulations.

Self drilling screw

Hilti S-MD 01 Z 4,8 x L  
with hexagon head

Annex 8



$t_1$ [mm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_R$ [kN]	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90
$N_{R,k}$ [kN]	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90
$M_{R,geom}$ [Nm]	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90

$\Sigma t \leq 1,25$  mm: 2 Nm       $\Sigma t > 1,25$  mm: 5 Nm

No additional regulations.

Self drilling screw

Hilti S-MD 51 Z 4,8 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 9

	<b>Material:</b> carbon steel case hardened and galvanized
	<b>Fastener:</b> none
<b>Washer:</b> Component I: S280GD, S320GD - EN 10346 Component II: S235 - EN 10025-1 S280GD, S320GD - EN 10346	
<b>Drilling capacity:</b> $\Sigma t_1 \leq 3,00$ mm	
<b>Timber substructures:</b> no performance determined	

$t_1$ [mm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{ak}$ [kN]	0,50	0,65	0,80	0,95	1,10	1,25	1,40	1,70	2,30
$N_{ak}$ [kN]	0,55	0,70	0,85	1,00	1,15	1,30	1,50	1,70	2,30
$M_{t,perm}$ [Nm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$\Sigma t_1 \leq 1,25$ mm: 3 Nm $\Sigma t_1 > 1,25$ mm: 6 Nm									

No additional regulations.

Self drilling screw

 Hilti S-MD 01 Z 5,5 x L  
 with hexagon head

Annex 10

	<b>Material:</b> carbon steel case hardened and galvanized
	<b>Fastener:</b> carbon steel, galvanized stainless Steel (1.4301) - EN 10088
<b>Washer:</b> Component I: S280GD, S320GD - EN 10346 Component II: S235 - EN 10025-1 S280GD, S320GD - EN 10346	
<b>Drilling capacity:</b> $\Sigma t_1 \leq 3,00$ mm	
<b>Timber substructures:</b> no performance determined	

$t_1$ [mm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{ak}$ [kN]	0,50	0,65	0,80	0,95	1,10	1,25	1,40	1,70	2,30
$N_{ak}$ [kN]	0,55	0,70	0,85	1,00	1,15	1,30	1,50	1,70	2,30
$M_{t,perm}$ [Nm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$\Sigma t_1 \leq 1,25$ mm: 3 Nm $\Sigma t_1 > 1,25$ mm: 6 Nm									

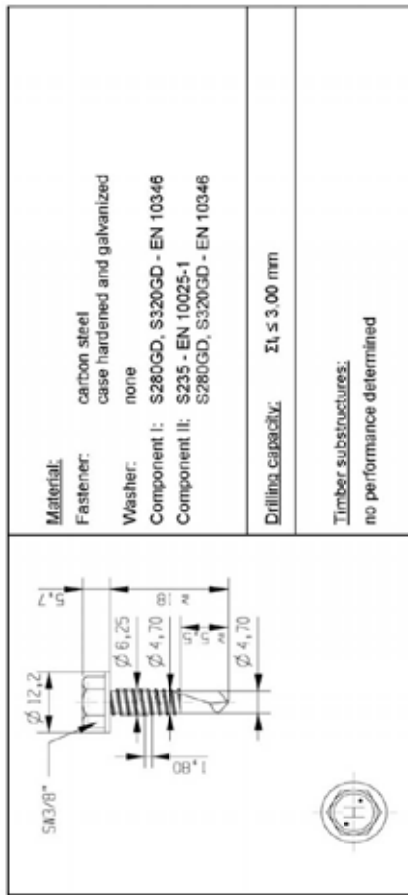
No additional regulations.

Self drilling screw

 Hilti S-MD 51 Z 5,5 x L  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 11





**Material:** carbon steel  
**Fastener:** case hardened and galvanized  
**Washer:** none  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S235 - EN 10025-1  
 S280GD, S320GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 3,00 \text{ mm}$



**Timber substructures:**  
no performance determined

$t_1$ [mm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_R$ [kN]	0,55	1,50	2,00	2,50	2,90	3,50	3,70	3,70	3,70
$N_R$ [kN]	0,55	1,90	2,30	2,80	3,30	3,80	4,30	4,80	4,80
	0,63	2,00	2,40	2,90	3,30	3,80	4,30	5,10	6,00
	0,75	2,10	2,50	3,00	3,40	3,90	4,40	5,40	7,20
	0,88	2,10	2,50	3,10	3,60	4,20	4,80	6,00	—
	1,00	2,10	2,60	3,20	3,90	4,60	5,20	6,70	—
	1,25	2,10	2,60	3,30	3,90	4,60	5,20	6,70	—
	1,50	2,10	2,60	3,30	3,90	4,60	5,20	6,70	—
	1,75	2,10	2,60	3,30	3,90	4,60	5,20	6,70	—
	2,00	2,10	2,60	3,30	3,90	4,60	5,20	6,70	—
	2,00	2,10	2,60	3,30	3,90	4,60	5,20	6,70	—
	$M_{t,perm}$ [Nm]	0,50	1,20	1,20	1,50	1,80	1,80	1,80	1,80

$\Sigma t > 1,25 \text{ mm}: 4 \text{ Nm}$   
 $\Sigma t > 1,25 \text{ mm}: 8 \text{ Nm}$

No additional regulations.

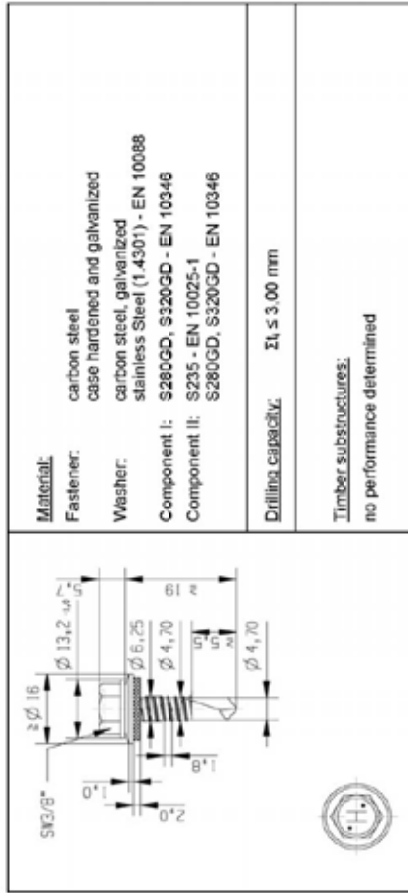
Self drilling screw

Hilti S-MD 01 Z 6,3 x L  
with hexagon head

Annex 12

Z36920.13

8.06.02-327/12



**Material:** carbon steel  
**Fastener:** case hardened and galvanized  
**Washer:** carbon steel, galvanized  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S235 - EN 10025-1  
 S280GD, S320GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 3,00 \text{ mm}$



**Timber substructures:**  
no performance determined

$t_1$ [mm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_R$ [kN]	0,55	1,60	2,10	2,70	3,30	3,30	3,30	3,30	3,30
$N_R$ [kN]	0,55	1,60	2,10	2,70	3,30	4,10	4,20	4,20	4,20
	0,63	1,70	2,20	2,80	3,40	4,10	4,40	5,20	5,20
	0,75	1,80	2,40	3,00	3,50	4,10	4,60	5,80	6,30
	0,88	1,80	2,40	3,00	3,50	4,20	4,80	6,20	—
	1,00	1,80	2,40	3,00	3,60	4,20	5,00	6,50	—
	1,25	1,80	2,40	3,00	3,60	4,20	5,00	6,50	—
	1,50	2,00	2,60	3,30	4,00	4,80	5,50	7,20	—
	1,75	2,00	2,60	3,30	4,00	4,80	5,50	7,20	—
	2,00	2,00	2,60	3,30	4,00	4,80	5,50	7,20	—
	2,00	2,00	2,60	3,30	4,00	4,80	5,50	7,20	—
	$M_{t,perm}$ [Nm]	0,50	1,20	1,20	1,50	1,80	1,80	1,80	1,80

$\Sigma t \leq 1,25 \text{ mm}: 4 \text{ Nm}$   
 $\Sigma t > 1,25 \text{ mm}: 8 \text{ Nm}$

No additional regulations.

Self drilling screw

Hilti S-MD 51 Z 6,3 x L  
with hexagon head and sealing washer  $\geq \phi 16 \text{ mm}$

Annex 13

Z36920.13

8.06.02-327/12

	<b>Material:</b> stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 Component I: S280GD, S320GD - EN 10346 Component II: S235 - EN 10025-1 Component II: S280GD, S320GD - EN 10346
	<b>Drilling capacity:</b> $\Sigma t_1 \leq 2,00$ mm  <b>Timber substructures:</b> no performance determined

$t_1$ [mm]	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{Ak}$ [kN]	0,50	0,55	0,63	1,00	1,30	1,80	2,40	2,80
$N_{Ak}$ [kN]	0,50	0,55	0,63	1,00	1,30	1,80	2,40	2,80
$M_{t,perm}$ [Nm]	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00

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

Self drilling screw

 Hilti S-MD 51 S 4.8 x L  
 Hilti S-MD 61 S 4.8 x L  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 14

	<b>Material:</b> stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 Component I: S280GD, S320GD - EN 10346 Component II: S235 - EN 10025-1 Component II: S280GD, S320GD - EN 10346
	<b>Drilling capacity:</b> $\Sigma t_1 \leq 3,00$ mm  <b>Timber substructures:</b> no performance determined

$t_1$ [mm]	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{Ak}$ [kN]	0,50	0,55	0,63	1,00	1,30	1,80	2,40	2,80
$N_{Ak}$ [kN]	0,50	0,55	0,63	1,00	1,30	1,80	2,40	2,80
$M_{t,perm}$ [Nm]	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00

No additional regulations.

Self drilling screw

 Hilti S-MD 51 S 5.5 x L  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 15





	<p><b>Material:</b> stainless steel (1.4301) - EN 10088</p> <p><b>Fastener:</b> stainless steel (1.4301) - EN 10088</p> <p><b>Washer:</b> stainless steel (1.4301) - EN 10088</p> <p><b>Component I:</b> S320GD, S350GD - EN 10346</p> <p><b>Component II:</b> S275 - EN 10025-1</p> <p><b>Component III:</b> S320GD, S350GD - EN 10346</p>	<p><b>Drilling capacity:</b> <math>\Sigma t \leq 3.00</math> mm</p> <p><b>Timber substructures:</b> no performance determined</p>	<table border="1"> <thead> <tr> <th><math>t_f</math> [mm]</th> <th>0.63</th> <th>0.75</th> <th>0.88</th> <th>1.00</th> <th>1.13</th> <th>1.25</th> <th>1.50</th> <th>2.00</th> </tr> </thead> <tbody> <tr> <td><math>V_{Rk}</math> [kN]</td> <td>0.50</td> <td>0.54</td> <td>0.58</td> <td>0.63</td> <td>0.68</td> <td>0.70</td> <td>0.75</td> <td>0.78</td> </tr> <tr> <td><math>N_{Rk}</math> [kN]</td> <td>0.55</td> <td>0.58</td> <td>0.63</td> <td>0.68</td> <td>0.70</td> <td>0.75</td> <td>0.78</td> <td>0.80</td> </tr> <tr> <td><math>M_{Rk,rem}</math> [Nm]</td> <td>0.50</td> <td>0.54</td> <td>0.58</td> <td>0.63</td> <td>0.68</td> <td>0.70</td> <td>0.75</td> <td>0.78</td> </tr> </tbody> </table>	$t_f$ [mm]	0.63	0.75	0.88	1.00	1.13	1.25	1.50	2.00	$V_{Rk}$ [kN]	0.50	0.54	0.58	0.63	0.68	0.70	0.75	0.78	$N_{Rk}$ [kN]	0.55	0.58	0.63	0.68	0.70	0.75	0.78	0.80	$M_{Rk,rem}$ [Nm]	0.50	0.54	0.58	0.63	0.68	0.70	0.75	0.78
	$t_f$ [mm]			0.63	0.75	0.88	1.00	1.13	1.25	1.50	2.00																												
$V_{Rk}$ [kN]	0.50	0.54	0.58	0.63	0.68	0.70	0.75	0.78																															
$N_{Rk}$ [kN]	0.55	0.58	0.63	0.68	0.70	0.75	0.78	0.80																															
$M_{Rk,rem}$ [Nm]	0.50	0.54	0.58	0.63	0.68	0.70	0.75	0.78																															
<p><b>Drilling capacity:</b> <math>\Sigma t \leq 3.00</math> mm</p> <p><b>Timber substructures:</b> no performance determined</p>		<table border="1"> <thead> <tr> <th><math>t_f</math> [mm]</th> <th>0.63</th> <th>0.75</th> <th>0.88</th> <th>1.00</th> <th>1.13</th> <th>1.25</th> <th>1.50</th> <th>2.00</th> </tr> </thead> <tbody> <tr> <td><math>V_{Rk}</math> [kN]</td> <td>0.50</td> <td>0.54</td> <td>0.58</td> <td>0.63</td> <td>0.68</td> <td>0.70</td> <td>0.75</td> <td>0.78</td> </tr> <tr> <td><math>N_{Rk}</math> [kN]</td> <td>0.55</td> <td>0.58</td> <td>0.63</td> <td>0.68</td> <td>0.70</td> <td>0.75</td> <td>0.78</td> <td>0.80</td> </tr> <tr> <td><math>M_{Rk,rem}</math> [Nm]</td> <td>0.50</td> <td>0.54</td> <td>0.58</td> <td>0.63</td> <td>0.68</td> <td>0.70</td> <td>0.75</td> <td>0.78</td> </tr> </tbody> </table>	$t_f$ [mm]	0.63	0.75	0.88	1.00	1.13	1.25	1.50	2.00	$V_{Rk}$ [kN]	0.50	0.54	0.58	0.63	0.68	0.70	0.75	0.78	$N_{Rk}$ [kN]	0.55	0.58	0.63	0.68	0.70	0.75	0.78	0.80	$M_{Rk,rem}$ [Nm]	0.50	0.54	0.58	0.63	0.68	0.70	0.75	0.78	
$t_f$ [mm]	0.63	0.75	0.88	1.00	1.13	1.25	1.50	2.00																															
$V_{Rk}$ [kN]	0.50	0.54	0.58	0.63	0.68	0.70	0.75	0.78																															
$N_{Rk}$ [kN]	0.55	0.58	0.63	0.68	0.70	0.75	0.78	0.80																															
$M_{Rk,rem}$ [Nm]	0.50	0.54	0.58	0.63	0.68	0.70	0.75	0.78																															

Hilti S-MD 51 S 5.5 x L - 390  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 16

Self drilling screw

No additional regulations.



	<p><b>Material:</b> stainless steel (1.4301) - EN 10088</p> <p><b>Fastener:</b> stainless steel (1.4301) - EN 10088</p> <p><b>Washer:</b> Al alloy with <math>R_{tens} = 185</math> N/mm<sup>2</sup> - EN 573</p> <p><b>Component I:</b> S280GD, S320GD, S350GD - EN 10346</p> <p><b>Component II:</b> Structural timber - EN 14081</p>	<p><b>Drilling capacity:</b> <math>\Sigma t \leq 3.00</math> mm</p> <p><b>Timber substructures:</b> performance determined with</p> <p><math>M_{y,Rk} = 6.310</math> Nm <math>f_{y,Rk} = 7.856</math> N/mm<sup>2</sup> for <math>l_w \geq 22.0</math> mm</p>	<table border="1"> <thead> <tr> <th><math>t_f</math> [mm]</th> <th>0.50</th> <th>0.60</th> <th>0.70</th> <th>0.80</th> <th>0.90</th> <th>1.00</th> <th>1.10</th> <th>1.20</th> <th>1.30</th> <th>1.40</th> <th>1.50</th> <th>1.60</th> <th>1.70</th> <th>1.80</th> <th>1.90</th> <th>2.00</th> <th>2.10</th> <th>2.20</th> <th>2.30</th> <th>2.40</th> <th>2.50</th> <th>2.60</th> <th>2.70</th> <th>2.80</th> <th>2.90</th> <th>3.00</th> </tr> </thead> <tbody> <tr> <td><math>V_{Rk}</math> [kN]</td> <td>0.50</td> <td>0.60</td> <td>0.70</td> <td>0.80</td> <td>0.90</td> <td>1.00</td> <td>1.10</td> <td>1.20</td> <td>1.30</td> <td>1.40</td> <td>1.50</td> <td>1.60</td> <td>1.70</td> <td>1.80</td> <td>1.90</td> <td>2.00</td> <td>2.10</td> <td>2.20</td> <td>2.30</td> <td>2.40</td> <td>2.50</td> <td>2.60</td> <td>2.70</td> <td>2.80</td> <td>2.90</td> <td>3.00</td> </tr> <tr> <td><math>N_{Rk}</math> [kN]</td> <td>0.50</td> <td>0.60</td> <td>0.70</td> <td>0.80</td> <td>0.90</td> <td>1.00</td> <td>1.10</td> <td>1.20</td> <td>1.30</td> <td>1.40</td> <td>1.50</td> <td>1.60</td> <td>1.70</td> <td>1.80</td> <td>1.90</td> <td>2.00</td> <td>2.10</td> <td>2.20</td> <td>2.30</td> <td>2.40</td> <td>2.50</td> <td>2.60</td> <td>2.70</td> <td>2.80</td> <td>2.90</td> <td>3.00</td> </tr> <tr> <td><math>M_{Rk,rem}</math> [Nm]</td> <td>1.30</td> <td>1.40</td> <td>1.50</td> <td>1.60</td> <td>1.70</td> <td>1.80</td> <td>1.90</td> <td>2.00</td> <td>2.10</td> <td>2.20</td> <td>2.30</td> <td>2.40</td> <td>2.50</td> <td>2.60</td> <td>2.70</td> <td>2.80</td> <td>2.90</td> <td>3.00</td> <td>3.10</td> <td>3.20</td> <td>3.30</td> <td>3.40</td> <td>3.50</td> <td>3.60</td> <td>3.70</td> <td>3.80</td> <td>3.90</td> <td>4.00</td> </tr> </tbody> </table>	$t_f$ [mm]	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	$V_{Rk}$ [kN]	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	$N_{Rk}$ [kN]	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	$M_{Rk,rem}$ [Nm]	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00
	$t_f$ [mm]			0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00																																																																																				
$V_{Rk}$ [kN]	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00																																																																																							
$N_{Rk}$ [kN]	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00																																																																																							
$M_{Rk,rem}$ [Nm]	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00																																																																																					
<p><b>Drilling capacity:</b> <math>\Sigma t \leq 3.00</math> mm</p> <p><b>Timber substructures:</b> performance determined with</p> <p><math>M_{y,Rk} = 6.310</math> Nm <math>f_{y,Rk} = 7.856</math> N/mm<sup>2</sup> for <math>l_w \geq 22.0</math> mm</p>		<table border="1"> <thead> <tr> <th><math>t_f</math> [mm]</th> <th>0.40</th> <th>0.50</th> <th>0.55</th> <th>0.63</th> <th>0.75</th> <th>0.88</th> <th>1.00</th> <th>1.13</th> <th>1.25</th> <th>1.35</th> <th>1.45</th> <th>1.55</th> <th>1.65</th> <th>1.75</th> <th>1.85</th> <th>1.95</th> <th>2.05</th> <th>2.15</th> <th>2.25</th> <th>2.35</th> <th>2.45</th> <th>2.55</th> <th>2.65</th> <th>2.75</th> <th>2.85</th> <th>2.95</th> <th>3.05</th> </tr> </thead> <tbody> <tr> <td><math>V_{Rk}</math> [kN]</td> <td>0.50</td> <td>0.60</td> <td>0.70</td> <td>0.80</td> <td>0.90</td> <td>1.00</td> <td>1.10</td> <td>1.20</td> <td>1.30</td> <td>1.40</td> <td>1.50</td> <td>1.60</td> <td>1.70</td> <td>1.80</td> <td>1.90</td> <td>2.00</td> <td>2.10</td> <td>2.20</td> <td>2.30</td> <td>2.40</td> <td>2.50</td> <td>2.60</td> <td>2.70</td> <td>2.80</td> <td>2.90</td> <td>3.00</td> </tr> <tr> <td><math>N_{Rk}</math> [kN]</td> <td>0.50</td> <td>0.60</td> <td>0.70</td> <td>0.80</td> <td>0.90</td> <td>1.00</td> <td>1.10</td> <td>1.20</td> <td>1.30</td> <td>1.40</td> <td>1.50</td> <td>1.60</td> <td>1.70</td> <td>1.80</td> <td>1.90</td> <td>2.00</td> <td>2.10</td> <td>2.20</td> <td>2.30</td> <td>2.40</td> <td>2.50</td> <td>2.60</td> <td>2.70</td> <td>2.80</td> <td>2.90</td> <td>3.00</td> </tr> <tr> <td><math>M_{Rk,rem}</math> [Nm]</td> <td>1.30</td> <td>1.40</td> <td>1.50</td> <td>1.60</td> <td>1.70</td> <td>1.80</td> <td>1.90</td> <td>2.00</td> <td>2.10</td> <td>2.20</td> <td>2.30</td> <td>2.40</td> <td>2.50</td> <td>2.60</td> <td>2.70</td> <td>2.80</td> <td>2.90</td> <td>3.00</td> <td>3.10</td> <td>3.20</td> <td>3.30</td> <td>3.40</td> <td>3.50</td> <td>3.60</td> <td>3.70</td> <td>3.80</td> <td>3.90</td> <td>4.00</td> </tr> </tbody> </table>	$t_f$ [mm]	0.40	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25	1.35	1.45	1.55	1.65	1.75	1.85	1.95	2.05	2.15	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95	3.05	$V_{Rk}$ [kN]	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	$N_{Rk}$ [kN]	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	$M_{Rk,rem}$ [Nm]	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00
$t_f$ [mm]	0.40	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25	1.35	1.45	1.55	1.65	1.75	1.85	1.95	2.05	2.15	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95	3.05																																																																																						
$V_{Rk}$ [kN]	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00																																																																																							
$N_{Rk}$ [kN]	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00																																																																																							
$M_{Rk,rem}$ [Nm]	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00																																																																																					

The grey highlighted values  $N_{Rk}$  may be increased by 6.0% when using the types "S-MD6x" and by 17.5% when using the types "S-MD7x".  
The values listed above in dependence on the screw length  $l_w$  are valid for  $K_{mod} = 0.90$  and timber strength grade C24 ( $\rho_k = 350$  kg/m<sup>3</sup>). For other combinations of  $K_{mod}$  and timber strength grades see section 4.2.2.

with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Hilti S-MD 51 S 5.5 x L  
Hilti S-MD 61 S 5.5 x L  
Hilti S-MD 71 S 5.5 x L

Annex 17

Self drilling screw

	<b>Material:</b> stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 Component I: S280GD, S320GD - EN 10346 Component II: S235 - EN 10025-1 S280GD, S320GD - EN 10346
	<b>Drilling capacity:</b> $\Sigma t_1 \leq 4,00$ mm  <b>Timber substructures:</b> no performance determined

$t_1$ [mm]	$t_1$ [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			
0,50	—	—	—	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—	—	—	—
0,63	2,20	2,70	2,70	2,70	2,90	3,10	3,10	3,10	3,10	3,10	—
0,75	2,40	3,10	3,10	3,10	3,30	3,60	3,60	3,60	3,60	3,60	—
0,88	2,70	3,10	3,10	3,10	3,50	4,00	4,00	4,00	4,00	4,00	—
1,00	3,10	3,20	3,20	3,20	3,80	4,40	4,40	4,40	4,40	4,40	—
1,13	3,40	3,40	3,80	4,20	4,50	4,90	4,90	4,90	4,90	4,90	—
1,25	3,70	3,70	4,40	5,10	5,30	5,40	5,40	5,40	5,40	5,40	—
1,50	3,70	3,70	4,40	5,10	5,30	5,40	5,40	5,40	5,40	5,40	—
1,75	—	—	—	—	—	—	—	—	—	—	—
2,00	—	—	—	—	—	—	—	—	—	—	—
0,50	1,03	1,13	1,24	1,24	1,24	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	1,57	1,57	1,57	—
0,63	1,90	2,10	2,30	2,30	2,30	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	3,30	3,30	3,30	—
0,88	1,90	2,10	2,40	2,80	3,30	3,80	4,30	4,30	4,30	4,30	—
1,00	1,90	2,10	2,40	2,80	3,30	3,80	4,30	4,80	4,80	4,80	—
1,13	1,90	2,10	2,40	2,80	3,30	3,80	4,30	4,80	4,80	4,80	—
1,25	1,90	2,10	2,40	2,80	3,30	3,80	4,30	4,80	4,80	4,80	—
1,50	1,90	2,10	2,40	2,80	3,30	3,80	4,30	4,80	4,80	4,80	—
1,75	—	—	—	—	—	—	—	—	—	—	—
2,00	—	—	—	—	—	—	—	—	—	—	—
$M_{t,perm}$ [Nm]	5 Nm										

No additional regulations.

Self-drilling screw

Annex 18

 Hilti S-MD 51 LS 5,5 x L  
 Hilti S-MD 61 LS 5,5 x L  
 Hilti S-MD 71 LS 5,5 x L  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

	<b>Material:</b> stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 Component I: S320GD, S350GD - EN 10346 Component II: S275 - EN 10025-1 S320GD, S350GD - EN 10346
	<b>Drilling capacity:</b> $\Sigma t_1 \leq 4,00$ mm  <b>Timber substructures:</b> no performance determined

$t_1$ [mm]	$t_1$ [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			
0,50	—	—	—	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—	—	—	—
0,63	2,40	2,90	2,90	2,90	3,10	3,30	3,30	3,30	3,30	3,30	—
0,75	2,60	3,30	3,30	3,30	3,60	3,90	3,90	3,90	3,90	3,90	—
0,88	3,00	3,00	3,30	3,30	3,80	4,30	4,30	4,30	4,30	4,30	—
1,00	3,30	3,50	3,50	3,50	4,10	4,70	4,70	4,70	4,70	4,70	—
1,13	3,70	3,70	4,10	4,50	4,90	5,30	5,30	5,30	5,30	5,30	—
1,25	4,00	4,00	4,80	5,50	5,70	5,70	5,70	5,70	5,70	5,70	—
1,50	4,00	4,00	4,80	5,50	5,70	5,70	5,70	5,70	5,70	5,70	—
1,75	—	—	—	—	—	—	—	—	—	—	—
2,00	—	—	—	—	—	—	—	—	—	—	—
0,50	1,08	1,19	1,40	1,46	1,46	1,46	1,46	1,46	1,46	1,46	—
0,55	1,36	1,50	1,77	1,77	1,77	1,77	1,77	1,77	1,77	1,77	—
0,63	2,00	2,20	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	—
0,75	2,00	2,20	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	—
0,88	2,00	2,20	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	—
1,00	2,00	2,20	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	—
1,13	2,00	2,20	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	—
1,25	2,00	2,20	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	—
1,50	2,00	2,20	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	—
1,75	—	—	—	—	—	—	—	—	—	—	—
2,00	—	—	—	—	—	—	—	—	—	—	—
$M_{t,perm}$ [Nm]	5 Nm										

No additional regulations.

Self-drilling screw

Annex 19

 Hilti S-MD 51 LS 5,5 x L - 390  
 Hilti S-MD 61 LS 5,5 x L - 390  
 Hilti S-MD 71 LS 5,5 x L - 390  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

**Material:**  
stainless steel (1.4301) - EN 10088

**Festener:**  
stainless steel (1.4301) - EN 10088

**Washer:**  
stainless steel (1.4301) - EN 10088

**Component I:** S280GD, S320GD - EN 10346

**Component II:** S235 - EN 10025-1  
S280GD, S320GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 4,00$  mm

Timber substructures:  
no performance determined

$t_1$ [mm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	1,75
$V_{R,k}$ [kN]	0,65	0,99	1,35	1,58	1,80	2,00	2,20	2,20	2,20
	0,65	1,31	1,48	1,84	2,02	2,20	2,20	2,20	2,20
	0,88	1,34	1,72	2,10	2,15	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
	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
$M_{t,perm}$ [Nm]	5 Nm								

No additional regulations.

Self drilling screw

Hilti S-MD 51 LS 5,5 x L  
Hilti S-MD 61 LS 5,5 x L  
Hilti S-MD 71 LS 5,5 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 20

**Material:**  
stainless steel (1.4301) - EN 10088

**Festener:**  
stainless steel (1.4301) - EN 10088

**Washer:**  
stainless steel (1.4301) - EN 10088

**Component I:** S320GD, S350GD - EN 10346

**Component II:** S275 - EN 10025-1  
S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 4,00$  mm

Timber substructures:  
no performance determined

$t_1$ [mm]	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	1,75
$V_{R,k}$ [kN]	0,65	1,08	1,46	1,71	1,95	2,16	2,38	2,38	2,38
	0,65	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
	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
$M_{t,perm}$ [Nm]	5 Nm								

No additional regulations.

Self drilling screw

Hilti S-MD 51 LS 5,5 x L - 390  
Hilti S-MD 61 LS 5,5 x L - 390  
Hilti S-MD 71 LS 5,5 x L - 390  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 21



**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** Al alloy with R<sub>te,ver</sub> = 185 N/mm<sup>2</sup> - EN 573

**Drilling capacity:** Σt ≤ 4,00 mm

**Timber substructures:** no performance determined

t <sub>1</sub> [mm]	1,00	1,20	1,40	1,60	1,80	2,00	3,00
V <sub>k</sub> [kN]	0,50	—	—	—	—	—	—
	0,65	—	—	—	—	—	—
	0,63	1,12	1,32	1,51	1,71	2,10	2,59
	0,75	1,16	1,38	1,60	1,83	2,26	2,63
	0,88	1,20	1,45	1,70	1,94	2,43	2,68
1,00	1,24	1,51	1,79	2,06	2,60	2,72	
1,13	1,28	1,58	1,88	2,18	2,77	—	
1,25	1,32	1,64	1,96	2,29	2,92	—	
1,50	1,40	1,77	2,15	2,52	3,26	—	
1,75	1,48	1,90	2,32	2,74	3,58	—	
2,00	1,56	2,03	2,51	2,98	3,45	—	
N <sub>k</sub> [kN]	0,50	—	—	—	—	—	—
	0,65	—	—	—	—	—	—
	0,63	0,69	0,90	1,10	1,21	1,21	1,21
	0,75	0,69	0,90	1,10	1,21	1,21	1,21
	0,88	0,69	0,90	1,10	1,21	1,21	1,21
1,00	0,69	0,90	1,10	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	
M <sub>te,ver</sub> [Nm]	Σt ≤ 2,15 mm: 2 Nm						
	Σt > 2,15 mm: 6 Nm						

No additional regulations.

Self drilling screw

Hilti S-MD 51 LS 5,5 x L  
 Hilti S-MD 61 LS 5,5 x L  
 Hilti S-MD 71 LS 5,5 x L  
 with hexagon head and sealing washer ≥ Ø16 mm

Annex 24

**Material:** carbon steel  
**Fastener:** case hardened and galvanized  
**Washer:** none  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S235 - EN 10025-1  
**Component III:** S280GD, S320GD - EN 10346

**Drilling capacity:** Σt ≤ 6,00 mm

**Timber substructures:** no performance determined

t <sub>1</sub> [mm]	1,50	2,00	2,50	3,00	4,00	5,00	6,00
V <sub>k</sub> [kN]	0,50	—	—	—	—	—	—
	0,65	—	—	—	—	—	—
	0,63	2,30	2,70	3,00	3,80	4,90	6,00
	0,75	2,30	3,00	3,50	4,90	6,00	6,00
	0,88	2,60	4,00	4,60	6,00	6,00	6,00
1,00	2,90	4,00	4,60	6,00	6,00	6,00	
1,13	3,50	4,60	5,20	7,10	7,30	7,30	
1,25	4,10	6,00	7,10	7,30	7,30	7,30	
1,50	5,20	6,00	7,30	7,30	7,30	7,30	
1,75	5,20	6,00	7,30	7,30	7,30	7,30	
2,00	5,20	6,00	7,30	7,30	7,30	7,30	
N <sub>k</sub> [kN]	0,50	—	—	—	—	—	—
	0,65	—	—	—	—	—	—
	0,63	1,60	1,60	2,20	2,20	3,00	3,00
	0,75	1,60	2,20	2,20	2,20	3,00	3,00
	0,88	1,60	2,40	2,40	3,00	3,90	4,10
1,00	1,60	2,40	2,40	3,00	3,90	4,10	
1,13	1,60	2,40	2,40	3,00	3,90	4,10	
1,25	1,60	2,40	2,40	3,00	3,90	4,10	
1,50	1,60	2,40	2,40	3,00	3,90	4,10	
1,75	1,60	2,40	2,40	3,00	3,90	4,10	
2,00	1,60	2,40	2,40	3,00	3,90	4,10	
M <sub>te,ver</sub> [Nm]	Σt ≤ 2,15 mm: 2 Nm			Σt > 2,15 mm: 6 Nm			

No additional regulations.

Self drilling screw

Hilti S-MD 03 Z 4,8 x L  
 with hexagon head

Annex 25



	<b>Material:</b> carbon steel case hardened and galvanized carbon steel, galvanized stainless Steel (1.4301) - EN 10088 Component I: S280GD, S320GD - EN 10346 Component II: S235 - EN 10025-1 S280GD, S320GD - EN 10346
	<b>Drilling capacity:</b> $\Sigma t_i \leq 6,00$ mm  Timber substructures: no performance determined

$t_i$ [mm]	1,50	2,00	3,00	4,00	5,00	6,00	—	
$V_{Rk}$ [kN]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	— ac 2,70 3,90 4,10 3,70 5,00 5,30 5,60 6,90 6,90	— ac 2,70 3,90 5,40 6,60 6,70 6,80 6,90 6,90 6,90	— ac 2,70 3,90 5,40 6,60 6,70 6,80 6,90 6,90	— ac 2,70 3,90 5,40 6,60 6,70 6,80 6,90 6,90	— ac 2,70 3,90 5,40 6,60 6,70 6,80 6,90 6,90	— ac 2,70 3,90 5,40 6,60 6,70 6,80 6,90 6,90	—
$N_{Rk}$ [kN]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	— ac 2,70 3,90 4,20 3,30 5,00 5,20 5,20 5,20 5,20	— ac 2,70 3,90 4,20 3,30 5,00 5,20 5,20 5,20 5,20	— ac 2,70 3,90 4,20 3,30 5,00 5,20 5,20 5,20 5,20	— ac 2,70 3,90 4,20 3,30 5,00 5,20 5,20 5,20 5,20	— ac 2,70 3,90 4,20 3,30 5,00 5,20 5,20 5,20 5,20	— ac 2,70 3,90 4,20 3,30 5,00 5,20 5,20 5,20 5,20	—
$M_{t,perm}$ [Nm]	—	$\Sigma t_i \leq 2,15$ mm: 2 Nm					$\Sigma t_i > 2,15$ mm: 6 Nm	—

No additional regulations.

Self drilling screw

 Hilti S-MD 53 Z 4,8 x L  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 26

	<b>Material:</b> carbon steel case hardened and galvanized none Component I: S280GD, S320GD, S350GD - EN 10346 Component II: S235, S275, S355 - EN 10025-1 S280GD, S320GD, S350GD - EN 10346
	<b>Drilling capacity:</b> $\Sigma t_i \leq 6,00$ mm  Timber substructures: no performance determined

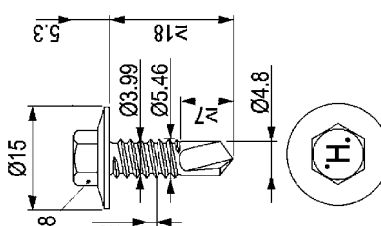
$t_i$ [mm]	1,50	2,00	2,50	3,00	4,00	5,00	6,00	—	
$V_{Rk}$ [kN]	0,50 0,55 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	— — 2,60 3,70 4,50 4,50 4,90 5,30 6,20 7,80	— — 2,60 3,70 4,50 4,50 4,90 5,30 6,20 7,80	— — 2,60 3,70 5,00 6,50 7,00 7,40 8,30 9,40	— — 2,60 3,70 5,00 6,50 7,00 7,40 8,30 9,40	— — 2,60 3,70 5,00 6,50 7,00 7,40 8,30 9,40	— — 2,60 3,70 5,00 6,50 7,00 7,40 8,30 9,40	— — 2,60 3,70 5,00 6,50 7,00 7,40 8,30 9,40	—
$N_{Rk}$ [kN]	0,50 0,55 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	— — 2,20 2,90 3,09 3,09 3,09 3,09 3,09	— — 2,20 2,90 3,09 3,09 3,09 3,09 3,09	— — 2,20 2,90 3,09 3,09 3,09 3,09 3,09	— — 2,20 2,90 3,09 3,09 3,09 3,09 3,09	— — 2,20 2,90 3,09 3,09 3,09 3,09 3,09	— — 2,20 2,90 3,09 3,09 3,09 3,09 3,09	— — 2,20 2,90 3,09 3,09 3,09 3,09 3,09	—
$M_{t,perm}$ [Nm]	—	$\Sigma t_i \leq 3,00$ mm: 7 Nm					$\Sigma t_i > 3,00$ mm: 8 Nm	—	

No additional regulations.

Self drilling screw

 Hilti S-MD 03 Z 5,5 x L  
 with hexagon head

Annex 27



**Material:** carbon steel  
**Fastener:** case hardened and galvanized  
**Washer:** none  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** S235, S275, S355 - EN 10025-1  
 S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t_i \leq 6.00$  mm

**Timber substructures:**  
no performance determined

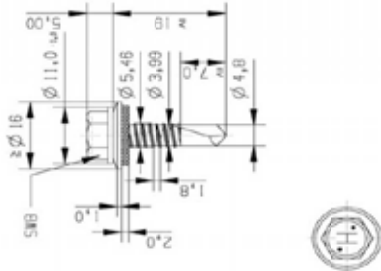
$t_i$ [mm]	1.50	2.00	2.50	3.00	4.00	5.00	6.00	—	
$V_{R,k}$ [kN]	0.50 0.55 0.63 0.75 0.88 1.00 1.13 1.25 1.50 1.75 2.00	— 2.60 ac 3.70 ac 4.50 ac 4.50 ac 4.90 ac 5.30 ac 6.20 ac 6.20 ac 7.80 ac	— 2.60 ac 3.70 ac 4.50 ac 4.50 ac 4.90 ac 5.30 ac 6.20 ac 6.20 ac 7.80 ac	— 2.60 ac 3.70 ac 5.00 ac 6.50 a 7.90 ac 7.40 ac 8.30 ac 8.30 ac 9.40 ac	— 2.60 ac 3.70 ac 5.00 ac 6.50 a 7.90 ac 9.30 ac 9.50 ac 9.50 ac 9.50 ac	— 2.60 ac 3.70 ac 5.00 ac 6.50 a 7.90 ac 9.30 ac 9.50 ac 9.50 ac 9.50 ac	— 2.60 ac 3.70 ac 5.00 ac 6.50 a 7.90 ac 9.30 ac 9.50 ac 9.50 ac 9.50 ac	— 2.60 ac 3.70 ac 5.00 ac 6.50 a 7.90 ac 9.30 ac 9.50 ac 9.50 ac 9.50 ac	—
$N_{R,k}$ [kN]	0.50 0.55 0.63 0.75 0.88 1.00 1.13 1.25 1.50 1.75 2.00	— 2.61 ac 2.61 ac 2.61 ac 2.61 ac 2.61 ac 2.61 ac 2.61 ac 2.61 ac 2.61 ac	— 2.61 ac 2.61 ac 2.61 ac 2.61 ac 2.61 ac 2.61 ac 2.61 ac 2.61 ac 2.61 ac	— 3.11 ac 3.75 ac 4.90 ac 4.90 a 4.90 ac 4.90 ac 4.90 ac 4.90 ac 4.90 ac	— 3.11 ac 4.61 ac 6.25 ac 6.25 a 6.25 ac 6.25 ac 6.25 ac 6.25 ac 6.25 ac	— 3.11 ac 4.61 ac 6.25 ac 6.25 a 6.25 ac 6.25 ac 6.25 ac 6.25 ac 6.25 ac	— 3.11 ac 4.61 ac 6.25 ac 6.25 a 6.25 ac 6.25 ac 6.25 ac 6.25 ac 6.25 ac	— 3.11 ac 4.61 ac 6.25 ac 6.25 a 6.25 ac 6.25 ac 6.25 ac 6.25 ac 6.25 ac	—
$M_{t,perm}$ [Nm]	—	$\Sigma t_i \leq 3.00$ mm: 7 Nm						$\Sigma t_i > 3.00$ mm: 8 Nm	—

No additional regulations.

Self drilling screw

Hilti S-MD 23 Z 5.5 x L  
with hexagon head

Annex 28



**Material:** carbon steel  
**Fastener:** case hardened and galvanized  
**Washer:** carbon steel, galvanized  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** S235, S275, S355 - EN 10025-1  
 S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t_i \leq 6.00$  mm

**Timber substructures:**  
no performance determined

$t_i$ [mm]	1.50	2.00	2.50	3.00	4.00	5.00	6.00	—	
$V_{R,k}$ [kN]	0.50 0.55 0.63 0.75 0.88 1.00 1.13 1.25 1.50 1.75 2.00	— 3.10 ac 3.80 ac 4.60 ac 5.30 ac 5.30 ac 6.10 ac 6.10 ac 7.80 ac 7.80 ac	— 3.10 ac 3.80 ac 4.60 ac 5.30 ac 5.30 ac 6.10 ac 6.10 ac 7.80 ac 7.80 ac	— 3.10 ac 3.80 ac 4.60 ac 5.40 a 6.20 ac 7.80 ac 9.10 ac 9.10 ac 9.50 ac	— 3.10 ac 3.80 ac 4.60 ac 5.40 a 6.20 ac 7.80 ac 9.10 ac 9.10 ac 9.50 ac	— 3.10 abcd 3.80 ac 4.60 ac 5.40 a 6.20 ac 7.80 ac 9.10 ac 9.10 ac 9.50 ac	— 3.10 abcd 3.80 ac 4.60 ac 5.40 a 6.20 ac 7.80 ac 9.10 ac 9.10 ac 9.50 ac	— 3.10 abcd 3.80 ac 4.60 ac 5.40 a 6.20 ac 7.80 ac 9.10 ac 9.10 ac 9.50 ac	—
$N_{R,k}$ [kN]	0.50 0.55 0.63 0.75 0.88 1.00 1.13 1.25 1.50 1.75 2.00	— 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac	— 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac	— 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac	— 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac 3.09 ac	— 3.09 abcd 3.20 ac 3.20 abcd 3.90 ac 4.35 ac 4.35 ac 4.35 ac 4.35 ac 4.35 ac	— 3.09 abcd 3.20 ac 3.20 abcd 3.90 ac 4.80 a 5.60 a 5.61 ac 5.61 ac 5.61 ac	— 3.09 abcd 3.20 ac 3.20 abcd 3.90 ac 4.80 a 5.60 a 5.61 ac 5.61 ac 5.61 ac	—
$M_{t,perm}$ [Nm]	—	$\Sigma t_i \leq 3.00$ mm: 7 Nm				$\Sigma t_i > 3.00$ mm: 8 Nm			—

No additional regulations.

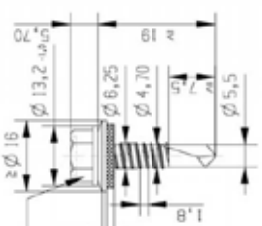
Self drilling screw

Hilti S-MD 53 Z 5.5 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 29








**Material:** carbon steel  
**Fastener:** case hardened and galvanized  
**Washer:** carbon steel, galvanized stainless steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** S235, S275, S355 - EN 10025-1  
**Component III:** S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma l \leq 6,00$  mm

**Timber substructures:**  
no performance determined



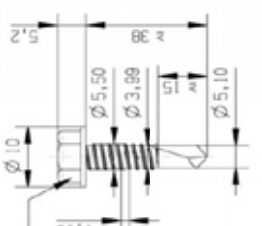
$l_t$ [mm]	1,50	2,00	2,50	3,00	4,00	5,00	6,00	—
$V_{Rk}$ [kN]	0,50 0,65	—	3,00 ac 3,80 ac	3,00 abcd 3,80 abcd	3,00 abcd 3,80 abcd	3,00 abcd 3,80 abcd	3,00 abcd 3,80 abcd	—
$N_{Rk}$ [kN]	0,83 0,75	3,00 ac 4,80 ac	4,80 ac 5,10 ac	5,70 ac 6,80 a	6,80 a 7,90 a	9,00 a 10,00 a	10,00 a 9,40	—
$M_{t,perm}$ [Nm]	0,50 0,55	1,78 ac 2,25 ac	1,78 abcd 2,25 abcd	1,78 abcd 2,25 abcd	1,78 abcd 2,25 abcd	1,78 abcd 2,25 abcd	1,78 abcd 2,25 abcd	—
	0,63 0,75	3,21 ac 3,21 ac	3,30 ac 4,00 ac	3,30 abcd 4,00 abcd	3,30 abcd 4,00 abcd	3,30 abcd 4,00 abcd	3,30 abcd 4,00 abcd	—
	0,88 1,00	3,21 ac 3,21 ac	4,62 ac 4,62 ac	4,80 ac 5,60 ac	4,80 abc 5,60 ac	4,80 abc 5,60 ac	4,80 abc 5,60 ac	—
	1,13 1,25	3,21 ac 3,21 ac	6,03 ac 6,03 ac	6,03 a 7,20 a	6,03 a 7,20 a	6,03 a 7,20 a	6,03 a 7,20 a	—
	1,50 1,75	3,21 ac 3,21 ac	4,62 ac 4,62 ac	6,03 ac 6,03 ac	7,20 a 7,20 a	7,20 a 7,20 a	7,20 a 7,20 a	—
	2,00	3,21 ac	4,62 ac	6,03 ac	7,20 a	7,20 a	7,20 a	—
		$\Sigma l \leq 3,00$ mm: 7 Nm						
		$\Sigma l > 3,00$ mm: 8 Nm						

No additional regulations.

Self drilling screw

Hilti S-MD 53 Z 6,3 x L  
with hexagon head and sealing washer  $\geq \phi 16$  mm


Annex 32



**Material:** carbon steel  
**Fastener:** case hardened and galvanized  
**Washer:** none  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S235 - EN 10025-1  
**Component III:** S280GD, S320GD - EN 10346

**Drilling capacity:**  $\Sigma l \leq 15,00$  mm

**Timber substructures:**  
no performance determined



$l_t$ [mm]	2,00	3,00	4,00	5,00	6,00	> 6,00	—	
$V_{Rk}$ [kN]	0,50 0,65	—	2,70 abcd 3,40 abcd	2,70 abcd 3,40 abcd	2,70 abcd 3,40 abcd	2,70 abcd 3,40 abcd	—	
$N_{Rk}$ [kN]	0,83 0,75	—	4,20 ac 4,90 ac	4,20 ac 4,90 ac	4,20 ac 4,90 ac	4,20 ac 4,90 ac	—	
$M_{t,perm}$ [Nm]	0,50 0,55	—	7,60 7,60	7,60 7,60	7,60 7,60	7,60 7,60	—	
	0,63 0,75	—	1,50 abcd 1,80 abcd	1,50 abcd 1,80 abcd	1,50 abcd 1,80 abcd	1,50 abcd 1,80 abcd	—	
	0,88 1,00	—	2,10 ac 2,40 ac	2,10 ac 2,40 ac	2,10 ac 2,40 ac	2,10 ac 2,40 ac	—	
	1,13 1,25	—	2,70 ac 3,00 ac	2,70 ac 3,00 ac	2,70 ac 3,00 ac	2,70 ac 3,00 ac	—	
	1,50 1,75	—	3,60 ac 3,60 ac	3,60 ac 3,60 ac	3,60 ac 3,60 ac	3,60 ac 3,60 ac	—	
	2,00	—	4,80 ac	4,80 ac	4,80 ac	4,80 ac	—	
		$\Sigma l \leq 15,00$ mm						

No additional regulations.

Self drilling screw

Hilti S-MD 05 Z 5,5 x L  
with hexagon head

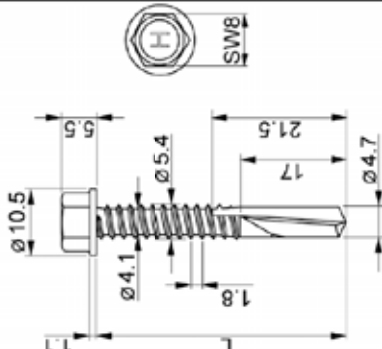
Annex 33

Page 46 of European technical approval  
ETA-100182 of 25 April 2013  
English translation prepared by DIBt

Deutsches Institut für Bautechnik

Page 45 of European technical approval  
ETA-100182 of 25 April 2013  
English translation prepared by DIBt

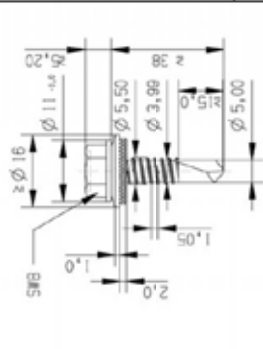
Deutsches Institut für Bautechnik



**Material:**  
Fastener: carbon steel case hardened and galvanized  
Washer: none  
Component I: S280GD, S320GD - EN 10346  
Component II: S235 - EN 10025-1  
S280GD, S320GD - EN 10346

**Drilling capacity:**  $\Sigma l_i \leq 15,00$  mm

**Timber substructures:**  
no performance determined



**Material:**  
Fastener: carbon steel case hardened and galvanized  
Washer: carbon steel, galvanized stainless steel (1.4301) - EN 10088  
Component I: S280GD, S320GD - EN 10346  
Component II: S235 - EN 10025-1  
S280GD, S320GD - EN 10346

**Drilling capacity:**  $\Sigma l_i \leq 15,00$  mm

**Timber substructures:**  
no performance determined

$l_i$ [mm]	2,00	3,00	4,00	6,00	8,00	10,0	12,0	≥ 14,0
$V_{Rk}$ [kN]	0,50	0,65	0,88	1,00	1,13	1,25	1,50	2,00
$N_{Rk}$ [kN]	2,49	3,04	3,87	4,91	6,24	7,69	7,69	7,69
$M_{t,perm}$ [Nm]	—	—	—	—	—	—	—	—

$l_i$ [mm]	2,00	3,90	4,00	5,00	6,00	> 6,0
$V_{Rk}$ [kN]	0,50	0,63	0,75	0,88	1,00	1,13
$N_{Rk}$ [kN]	1,57	1,98	2,90	3,20	3,40	3,60
$M_{t,perm}$ [Nm]	—	—	—	—	—	—

No additional regulations.

Self drilling screw

Hilti S-MD 05 GZ 5.5 x L  
with hexagon head

Annex 35

No additional regulations.

Self drilling screw

Hilti S-MD 55 Z 5.5 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 34



**Material:** carbon steel  
**Fastener:** case hardened and galvanized  
**Washer:** carbon steel, galvanized  
 stainless Steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S235 - EN 10025-1  
 S280GD, S320GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 15,00$  mm

**Timber substructures:**  
no performance determined

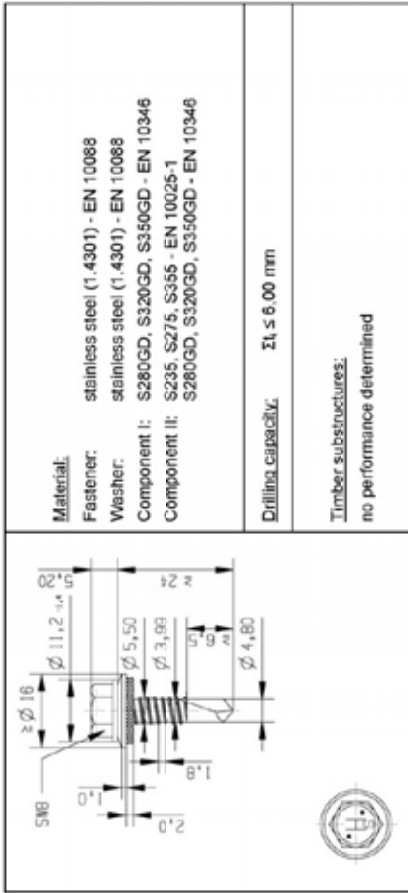
$t_1$ [mm]	2,00	3,00	4,00	6,00	8,00	10,0	12,0	$\geq 14,0$	
$V_R$ [kN]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	— — — — — — — — — — —	— — — — — — — — — — —	— — — — — — — — — — —	— — — — — — — — — — —	— — — — — — — — — — —	— — — — — — — — — — —	— — — — — — — — — — —	— — — — — — — — — — —
$N_{R,k}$ [kN]	—	2,49 3,04 3,87 4,91 6,24 7,69 7,69 7,69 8,23	2,49 3,04 3,87 4,91 6,24 7,69 7,69 7,69 8,23	2,49 3,04 3,87 4,91 6,24 7,69 7,69 7,69 8,23	2,49 3,04 3,87 4,91 6,24 7,69 7,69 7,69 8,23	2,49 3,04 3,87 4,91 6,24 7,69 7,69 7,69 8,23	2,49 3,04 3,87 4,91 6,24 7,69 7,69 7,69 8,23	2,49 3,04 3,87 4,91 6,24 7,69 7,69 7,69 8,23	2,49 3,04 3,87 4,91 6,24 7,69 7,69 7,69 8,23
$M_{t,perm}$ [Nm]	—	—	—	—	—	—	—	—	

No additional regulations.

Self drilling screw

Hilti S-MD 55 GZ 5.5 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 36



**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** S235, S275, S355 - EN 10025-1  
 S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 6,00$  mm

**Timber substructures:**  
no performance determined

$t_1$ [mm]	1,50	2,00	2,50	3,00	4,00	6,00	
$V_R$ [kN]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	— — — — — — — — — — —	— — — — — — — — — — —	— — — — — — — — — — —	— — — — — — — — — — —	— — — — — — — — — — —	— — — — — — — — — — —
$N_{R,k}$ [kN]	—	2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60	2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60	2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60	2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60	2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60	2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60 2,60
$M_{t,perm}$ [Nm]	—	—	—	—	—	—	

No additional regulations.

Self drilling screw

Hilti S-MD 53 S 5.5 x L  
Hilti S-MD 63 S 5.5 x L  
Hilti S-MD 73 S 5.5 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 37



Page 50 of European technical approval  
ETA-10/0182 of 25 April 2013  
English translation prepared by DIBt

**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** Al alloy with  $R_{t,ens} = 185 \text{ N/mm}^2$  - EN 573  
**Component II:** Al alloy with  $R_{t,ens} = 185 \text{ N/mm}^2$  - EN 573  
 S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 6,00 \text{ mm}$

**Timber substructures:**  
no performance determined

$t_1$ [mm]	1.50	1.75	2.00	2.50	3.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
$N_{k,1}$ [kN]	0.50	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
	0.66	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
$N_{k,2}$ [kN]	0.80	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46
	0.90	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
$M_{t,10mm}$ [Nm]	1.00	1.68	1.73	1.78	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
	1.40	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22
$M_{t,15mm}$ [Nm]	1.60	2.54	2.54	2.54	2.54	2.54	2.54	2.54	2.54	2.54	2.54	2.54	2.54
	1.80	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
$M_{t,20mm}$ [Nm]	2.00	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28
	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
$M_{t,2.50}$ [Nm]	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
$M_{t,3.00}$ [Nm]	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
$M_{t,4.00}$ [Nm]	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	1.08	1.08	1.08	1.08	1.08	1.08
$M_{t,5.00}$ [Nm]	1.40	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26
	1.60	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
$M_{t,6.00}$ [Nm]	1.80	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
	2.00	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35

The grey highlighted values  $N_{k,1}$  may be increased by 6.9% when using the types "S-MD5x" by 16.5% when using the types "S-MD6x" and 25.4% when using the types "S-MD7x".

Self drilling screw

Hilti S-MD 43 S 5,5 x L  
 Hilti S-MD 53 S 5,5 x L  
 Hilti S-MD 63 S 5,5 x L  
 Hilti S-MD 73 S 5,5 x L

with hexagon head and sealing washer  $\geq \varnothing 16 \text{ mm}$

Annex 39

Z36920.13

8.06.02-32712



Page 49 of European technical approval  
ETA-10/0182 of 25 April 2013  
English translation prepared by DIBt

**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S320GD, S350GD - EN 10346  
**Component II:** S275, S355 - EN 10025-1  
 S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 6,00 \text{ mm}$

**Timber substructures:**  
no performance determined

$t_1$ [mm]	1.50	2.00	2.50	3.00	4.00	6.00	—
$N_{k,1}$ [kN]	0.50	—	—	—	—	—	—
	0.66	2.30	2.80	3.20	3.70	3.70	—
$N_{k,2}$ [kN]	0.75	2.70	3.20	3.80	4.30	4.30	—
	0.88	2.90	3.60	4.30	5.00	5.00	—
$M_{t,10mm}$ [Nm]	1.00	3.20	5.20	6.20	6.50	6.50	—
	1.25	3.60	5.40	6.20	7.40	7.40	—
$M_{t,15mm}$ [Nm]	1.30	4.80	6.20	7.00	7.80	7.80	—
	1.75	4.80	6.20	7.00	7.80	7.80	—
$M_{t,20mm}$ [Nm]	2.00	5.90	7.00	7.00	7.80	7.80	—
	0.50	1.03	1.51	1.51	1.51	1.51	—
$M_{t,2.50}$ [Nm]	0.55	1.30	1.91	1.91	1.91	1.91	—
	0.63	1.90	2.80	2.80	2.80	2.80	—
$M_{t,3.00}$ [Nm]	0.75	1.90	2.90	3.60	3.60	3.60	—
	0.88	1.90	2.90	4.00	4.40	4.40	—
$M_{t,4.00}$ [Nm]	1.00	1.90	2.90	4.00	5.10	5.10	—
	1.13	1.90	2.90	4.00	5.10	5.80	—
$M_{t,5.00}$ [Nm]	1.25	1.90	2.90	4.00	5.10	6.30	—
	1.50	1.90	2.90	4.00	5.10	6.60	—
$M_{t,6.00}$ [Nm]	1.75	1.90	2.90	4.00	5.10	6.60	—
	2.00	1.90	2.90	4.00	5.10	6.60	—

No additional regulations.

Self drilling screw

Hilti S-MD 53 S 5,5 x L - 390  
 Hilti S-MD 63 S 5,5 x L - 390  
 Hilti S-MD 73 S 5,5 x L - 390

with hexagon head and sealing washer  $\geq \varnothing 16 \text{ mm}$

Annex 38

Z36920.13

8.06.02-32712



**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** S235, S275, S355 - EN 10025-1  
 S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 6.00$  mm

**Timber substructures:**  
no performance determined

$t_1$ [mm]	1.50	2.00	2.50	3.00	4.00	6.00	—
$V_{Rk}$ [kN]	0.50	—	—	—	—	—	—
	0.55	—	—	—	—	—	—
	0.63	2.50	2.60	2.70	2.70	ac	—
	0.75	2.80	2.80	2.80	3.70	ac	—
	0.88	3.00	3.00	3.00	3.70	a	—
	1.00	3.30	3.70	4.30	4.90	a	—
	1.13	3.50	3.90	4.60	5.30	—	—
	1.25	3.80	4.10	4.90	5.80	—	—
	1.50	3.80	5.30	5.60	6.40	—	—
	1.75	3.80	5.30	5.60	5.90	—	—
$N_{Rk}$ [kN]	0.50	—	—	—	—	—	—
	0.55	—	—	—	—	—	—
	0.63	1.90	2.30	2.30	2.30	ac	—
	0.75	1.90	2.50	3.20	3.20	ac	—
	0.88	1.90	2.50	3.30	4.10	a	—
	1.00	1.90	2.50	3.30	4.90	a	—
	1.13	1.90	2.50	3.30	4.20	—	—
	1.25	1.90	2.50	3.30	4.20	—	—
	1.50	1.90	2.50	3.30	4.20	—	—
	1.75	1.90	2.50	3.30	4.20	—	—
$M_{t,perm}$ [Nm]	2.00	1.90	2.50	3.30	5.60	5.60	—
	$\Sigma t \leq 3.00$ mm: 2 Nm						$\Sigma t > 3.00$ mm: 5 Nm

No additional regulations.

Self drilling screw

Hilti S-MD 43 S 5 x L  
with hexagon head and sealing washer  $\geq \varnothing 14$  mm

Annex 40

**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S320GD, S350GD - EN 10346  
**Component II:** S275, S355 - EN 10025-1  
 S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 6.00$  mm

**Timber substructures:**  
no performance determined

$t_1$ [mm]	1.50	2.00	2.50	3.00	4.00	6.00	—
$V_{Rk}$ [kN]	0.50	—	—	—	—	—	—
	0.55	—	—	—	—	—	—
	0.63	2.70	2.70	2.80	2.90	ac	—
	0.75	3.00	3.00	3.30	3.70	ac	—
	0.88	3.30	3.30	3.90	4.50	ac	—
	1.00	3.50	4.00	4.70	5.30	ac	—
	1.13	3.80	4.20	5.00	5.80	—	—
	1.25	4.10	4.40	5.30	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	—
$N_{Rk}$ [kN]	0.50	—	—	—	—	—	—
	0.55	—	—	—	—	—	—
	0.63	2.10	2.60	2.60	2.60	ac	—
	0.75	2.10	2.80	3.60	3.60	ac	—
	0.88	2.10	2.80	3.70	4.50	ac	—
	1.00	2.10	2.80	3.70	4.70	ac	—
	1.13	2.10	2.80	3.70	6.10	—	—
	1.25	2.10	2.80	3.70	4.70	—	—
	1.50	2.10	2.80	3.70	4.70	6.40	—
	1.75	2.10	2.80	3.70	4.70	6.40	—
$M_{t,perm}$ [Nm]	2.00	2.10	2.80	3.70	6.40	6.40	—
	$\Sigma t \leq 3.00$ mm: 2 Nm						$\Sigma t > 3.00$ mm: 5 Nm

No additional regulations.

Self drilling screw

Hilti S-MD 43 S 5.5 x L - 390  
with hexagon head and sealing washer  $\geq \varnothing 14$  mm

Annex 41



**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S235 - EN 10025-1

**Drilling capacity:**  $\Sigma t_1 \leq 12,00$  mm

**Timber substructures:**  
 no performance determined

$t_1$ [mm]	4,00	5,00	5,00	6,00	6,00	8,00	10,00	10,00	
$V_{ak}$ [kN]	0,50 0,65	2,70 2,90 3,50 4,00	ac ac ac ac	2,70 2,90 3,50 4,00	abcd abcd ac ac	2,70 2,90 3,50 4,00	abcd abcd ac ac	2,70 2,90 3,50 4,00	abcd abcd ac ac
$N_{ak}$ [kN]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	1,35 1,71 2,50 3,30 4,10 4,70 5,40 5,90 6,90 8,00	ac ac ac ac ac ac ac ac ac ac	1,35 1,71 2,50 3,30 4,10 4,70 5,40 5,90 6,90 8,00	abcd abcd abcd abcd ac ac ac ac ac ac	1,35 1,71 2,50 3,30 4,10 4,70 5,40 5,90 6,90 8,00	abcd abcd abcd abcd ac ac ac ac ac ac	1,35 1,71 2,50 3,30 4,10 4,70 5,40 5,90 6,90 8,00	abcd abcd abcd abcd ac ac ac ac ac ac
$M_{t,perm}$ [Nm]	2,00 8,00	8,00	8,00	8,00	8,00	8,00	8,00	8,00	8,20

No additional regulations.

Self drilling screw

 Hilti S-MD 55 S 5,5 x L  
 Hilti S-MD 65 S 5,5 x L  
 Hilti S-MD 75 S 5,5 x L  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 42

**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S320GD, S350GD - EN 10346  
**Component II:** S275 - EN 10025-1

**Drilling capacity:**  $\Sigma t_1 \leq 12,00$  mm

**Timber substructures:**  
 no performance determined

$t_1$ [mm]	4,00	5,00	5,00	6,00	6,00	8,00	10,00	10,00	
$V_{ak}$ [kN]	0,50 0,65	2,70 3,10 3,60 4,10	ac ac ac ac	2,70 3,10 3,60 4,10	abcd abcd ac ac	2,70 3,10 3,60 4,10	abcd abcd ac ac	2,70 3,10 3,60 4,10	abcd abcd ac ac
$N_{ak}$ [kN]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	1,51 1,91 2,80 3,60 4,40 5,10 5,80 6,30 7,20 8,20	ac ac ac ac ac ac ac ac ac ac	1,51 1,91 2,80 3,60 4,40 5,10 5,80 6,30 7,20 8,20	abcd abcd abcd abcd ac ac ac ac ac ac	1,51 1,91 2,80 3,60 4,40 5,10 5,80 6,30 7,20 8,20	abcd abcd abcd abcd ac ac ac ac ac ac	1,51 1,91 2,80 3,60 4,40 5,10 5,80 6,30 7,20 8,20	abcd abcd abcd abcd ac ac ac ac ac ac
$M_{t,perm}$ [Nm]	2,00 8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20

No additional regulations.

Self drilling screw

 Hilti S-MD 55 S 5,5 x L - 390  
 Hilti S-MD 65 S 5,5 x L - 390  
 Hilti S-MD 75 S 5,5 x L - 390  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 43



**Material:** stainless steel (1.4301) - EN 10088  
**Festener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** S235, S275, S355 - EN 10025-1  
 S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 6,00$  mm

**Timber substructures:**  
no performance determined

$t_1$ [mm]	1.50	2.00	2.50	3.00	4.00	6.00	—	
$V_R$ [kN]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	0,76 2,20 2,70 3,00 3,30 3,70 4,00 4,10 5,10 5,00 5,00 6,70	1,46 2,50 3,20 4,50 5,20 6,70 6,70 6,90 6,90 6,90 6,90 6,90	1,62 3,00 4,10 5,30 6,40 6,70 6,90 6,90 7,50 7,50 7,50 7,50	1,82 2,05 3,00 3,90 4,80 5,40 5,40 6,20 6,80 7,20 7,20 7,20	2,05 3,00 3,90 4,80 5,40 5,40 6,20 6,80 7,20 7,20 7,20 7,20	2,05 3,00 3,90 4,80 5,40 5,40 6,20 6,80 7,20 7,20 7,20 7,20	—
$N_{k,perm}$ [N/m]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	0,76 2,20 2,70 3,00 3,30 3,70 4,00 4,10 5,10 5,00 5,00 6,70	1,46 2,50 3,20 4,50 5,20 6,70 6,70 6,90 6,90 6,90 6,90 6,90	1,62 3,00 4,10 5,30 6,40 6,70 6,90 6,90 7,50 7,50 7,50 7,50	1,82 2,05 3,00 3,90 4,80 5,40 5,40 6,20 6,80 7,20 7,20 7,20	2,05 3,00 3,90 4,80 5,40 5,40 6,20 6,80 7,20 7,20 7,20 7,20	2,05 3,00 3,90 4,80 5,40 5,40 6,20 6,80 7,20 7,20 7,20 7,20	—
$\Sigma t \leq 3,00$ mm; 2 Nm							$\Sigma t > 3,00$ mm; 5 Nm	—

No additional regulations.

Self drilling screw

Hilti S-MD 53 S 6,3 x L  
 Hilti S-MD 63 S 6,3 x L  
 Hilti S-MD 73 S 6,3 x L  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 44



**Material:** stainless steel (1.4301) - EN 10088  
**Festener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S320GD, S350GD - EN 10346  
**Component II:** S275, S355 - EN 10025-1  
 S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 6,00$  mm

**Timber substructures:**  
no performance determined

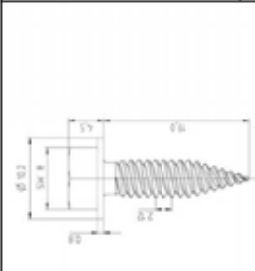
$t_1$ [mm]	1.50	2.00	2.50	3.00	4.00	6.00	—	
$V_R$ [kN]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	0,92 2,40 2,90 3,20 3,50 4,00 4,00 4,50 5,40 5,40 7,20	1,67 2,70 3,40 4,10 4,30 5,10 5,10 5,50 6,80 6,80 7,20	1,84 3,00 3,90 4,90 5,60 6,20 6,20 6,50 7,40 7,40 7,40	1,84 3,30 4,50 5,70 6,90 7,20 7,50 7,50 8,10 8,10 8,10	1,84 3,30 4,50 5,70 6,90 7,20 7,50 7,50 8,10 8,10 8,10	1,84 3,30 4,50 5,70 6,90 7,20 7,50 7,50 8,10 8,10 8,10	—
$N_{k,perm}$ [N/m]	0,50 0,55 0,63 0,75 0,88 1,00 1,13 1,25 1,50 1,75 2,00	0,92 2,40 2,90 3,20 3,50 4,00 4,00 4,50 5,40 5,40 7,20	1,67 2,70 3,40 4,10 4,30 5,10 5,10 5,50 6,80 6,80 7,20	1,84 3,00 3,90 4,90 5,60 6,20 6,20 6,50 7,40 7,40 7,40	1,84 3,30 4,50 5,70 6,90 7,20 7,50 7,50 8,10 8,10 8,10	1,84 3,30 4,50 5,70 6,90 7,20 7,50 7,50 8,10 8,10 8,10	1,84 3,30 4,50 5,70 6,90 7,20 7,50 7,50 8,10 8,10 8,10	—
$\Sigma t \leq 3,00$ mm; 2 Nm						$\Sigma t > 3,00$ mm; 5 Nm	—	

No additional regulations.

Self drilling screw

Hilti S-MD 53 S 6,3 x L - 390  
 Hilti S-MD 63 S 6,3 x L - 390  
 Hilti S-MD 73 S 6,3 x L - 390  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 45

	<b>Material:</b> carbon steel case hardened and galvanized none
	<b>Fastener:</b> none <b>Washer:</b> none <b>Component I:</b> S280GD, S320GD, S350GD - EN 10346 <b>Component II:</b> S280GD, S320GD, S350GD - EN 10346
<b>Drilling capacity:</b> $\Sigma l_i \leq 2.50$ mm	
<b>Timber substructures:</b> no performance determined	

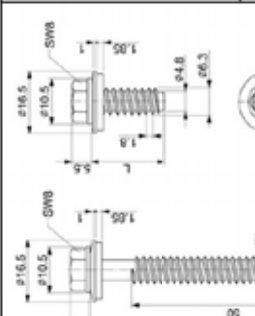
$l_i$ [mm]	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25	
$V_{Rk}$ [kN]	0.50 0.55 0.63 0.75 0.88 1.00 1.13 1.25 1.50 1.75 2.00	1.29 1.37 1.54 1.54 1.54 1.54 1.54 1.54 — — —	1.51 1.65 1.80 1.80 1.80 1.80 1.80 1.80 — — —	1.71 1.82 2.00 2.00 2.00 2.00 2.00 2.00 — — —	1.71 1.82 2.00 2.00 2.00 2.00 2.00 2.00 — — —	1.82 1.92 2.00 2.00 2.00 2.00 2.00 2.00 — — —	1.93 2.09 2.09 2.09 2.09 2.09 2.09 2.09 — — —	1.93 2.09 2.09 2.09 2.09 2.09 2.09 2.09 — — —	1.71 2.06 2.34 2.34 2.34 2.34 2.34 2.34 — — —
$M_{t,mean}$ [Nm]	$\Sigma l_i \leq 2 \times 0.75$ mm: 4 Nm								
	$\Sigma l_i > 2 \times 0.75$ mm: 8 Nm								

No additional regulations.

Self drilling screw

Hilti S-MS 01 Z 4,8 x 20  
with hexagon head

Annex 46

	<b>Material:</b> stainless steel (1.4301) - EN 10088 stainless steel (1.4301) - EN 10088 <b>Fastener:</b> <b>Washer:</b> <b>Component I:</b> S280GD, S320GD - EN 10346 <b>Component II:</b> S235 - EN 10025-1 <b>Component II:</b> S280GD, S320GD - EN 10346
	<b>Predrill diameter:</b> see Table below
<b>Timber substructures:</b> no performance determined	

$l_i$ [mm]	$l_i$ [mm]								
	1.25	1.50	2.00	2.50	3.00	4.00	5.00	$\geq 7.00$	
$V_{Rk}$ [kN]	0.50 0.55 0.63 0.75 0.88 1.00 1.13 1.25 1.50 1.75 2.00	0.97 1.23 1.80 2.00 2.00 2.00 2.00 2.00 3.70 4.70 5.00	1.35 1.71 2.50 2.60 2.60 2.60 2.60 2.60 4.00 4.40 4.40	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00
$N_{Rk}$ [kN]	0.50 0.55 0.63 0.75 0.88 1.00 1.13 1.25 1.50 1.75 2.00	0.97 1.23 1.80 2.00 2.00 2.00 2.00 2.00 3.70 4.70 5.00	1.35 1.71 2.50 2.60 2.60 2.60 2.60 2.60 4.00 4.40 4.40	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00	1.51 1.91 2.80 3.10 3.10 3.10 3.10 3.10 4.60 5.00 5.00
$M_{t,mean}$ [Nm]	$5$ Nm								
$d_{pred}$ [mm]	$l_i \leq 1.50$ mm: $d_{pred} = \emptyset 5.0$ mm $1.50$ mm $< l_i \leq 4.0$ mm: $d_{pred} = \emptyset 5.3$ mm $4.0$ mm $< l_i < 7.0$ mm: $d_{pred} = \emptyset 5.5$ mm $l_i \geq 7.0$ mm: $d_{pred} = \emptyset 5.7$ mm								

No additional regulations.

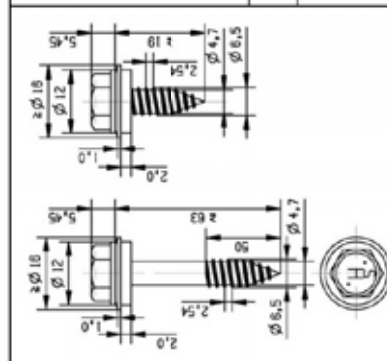
Self tapping screw

Hilti S-MP 52 S 6.3 x L  
Hilti S-MP 62 S 6.3 x L  
Hilti S-MP 72 S 6.3 x L  
with hexagon head and sealing washer  $\geq \emptyset 16$  mm

Annex 47







**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** Al alloy with  $R_{t,5\%} = 185 \text{ N/mm}^2$  - EN 573  
**Component II:** Al alloy with  $R_{t,5\%} = 185 \text{ N/mm}^2$  - EN 573  
**Component II:** S280GD, S320GD, S350GD - EN 10346  
**Structural timber:** EN 14081

**Pre-drill diameter:** see Table below

**Timber substructures:**  
 performance determined with

$M_{t,RS} = 9.742 \text{ Nm}$   
 $f_{t,RS} = 8.575 \text{ N/mm}^2$  for  $l_{ef} \geq 26.0 \text{ mm}$

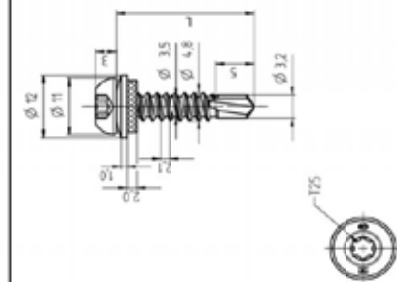
$l_1$ [mm]	$0.63 \text{ mm} \leq l_{sh} \leq 3.00 \text{ mm}$									
	0.75	0.85	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
$V_{t,Rk}$ [kN]	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23
$N_{t,Rk}$	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
$N_{t,Rk}$	0.76	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
$V_{t,Rk}$ [kN]	0.80	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48
$N_{t,Rk}$	0.90	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
$N_{t,Rk}$	1.00	1.72	1.79	1.87	1.94	1.94	1.94	1.94	1.94	1.94
$V_{t,Rk}$ [kN]	1.10	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
$N_{t,Rk}$	1.20	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02
$N_{t,Rk}$	1.30	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02
$N_{t,Rk}$	1.90	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02
$N_{t,Rk}$	2.00	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02
$N_{t,Rk}$	0.50	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
$N_{t,Rk}$	0.60	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
$N_{t,Rk}$	0.70	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
$N_{t,Rk}$	0.80	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
$N_{t,Rk}$	0.90	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
$N_{t,Rk}$	1.00	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
$N_{t,Rk}$	1.10	1.00	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
$N_{t,Rk}$	1.20	1.00	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
$N_{t,Rk}$	1.30	1.00	1.20	1.25	1.25	1.25	1.25	1.25	1.25	1.25
$N_{t,Rk}$	1.90	1.00	1.20	1.40	1.44	1.44	1.44	1.44	1.44	1.44
$N_{t,Rk}$	2.00	1.00	1.20	1.40	1.44	1.44	1.44	1.44	1.44	1.44
$M_{t,5\%}$ [Nm]	3 Nm									
$d_{p,2}$ [mm]	$t_{sh} \leq 0.75 \text{ mm}$ $d_p \geq 64.0 \text{ mm}$									
$d_{p,2}$ [mm]	$0.75 \text{ mm} < t_{sh} \leq 1.50 \text{ mm}$ $d_p \geq 65.0 \text{ mm}$									
$d_{p,2}$ [mm]	$t_{sh} \geq 1.50 \text{ mm}$ $d_p \geq 65.0 \text{ mm}$									

The grey highlighted values  $N_{t,Rk}$  may be increased by 9.0% when using the types "S-MD6x" and by 17.3% when using the types "S-MD7x".  
 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 ( $\rho_a = 350 \text{ kg/m}^3$ ). For other combinations of  $k_{mod}$  and timber strength grades see section 4.2.2.

Self tapping screw

- Hilti S-MP 53 S 6.5 x L
  - Hilti S-MP 63 S 6.5 x L
  - Hilti S-MP 73 S 6.5 x L
- with hexagonal head and sealing washer  $\geq \phi 16 \text{ mm}$

Annex 50



**Material:** stainless steel (1.4567) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** S235 - EN 10025-1  
**Component II:** S280GD, S320GD, S350GD - EN 10346  
**Structural timber:** EN 14081

**Drilling capacity:**  $z_k \leq 2.75 \text{ mm}$

**Timber substructures:**  
 performance determined with

$M_{t,RS} = 4.429 \text{ Nm}$   
 $f_{t,RS} = 8.575 \text{ N/mm}^2$  for  $l_{ef} \geq 20.0 \text{ mm}$

$l_1$ [mm]	$t_s$ [mm]											
	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25	1.50	1.75	2.00	
$V_{t,Rk}$ [kN]	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25	1.50	1.75	2.00	
$N_{t,Rk}$	0.66	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	
$N_{t,Rk}$	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	
$N_{t,Rk}$	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
$N_{t,Rk}$	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
$N_{t,Rk}$	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	
$N_{t,Rk}$	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	
$N_{t,Rk}$	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	
$N_{t,Rk}$	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
$N_{t,Rk}$	0.50	0.59	0.67	0.87	1.12	1.37	1.37	1.37	1.37	1.37	1.37	
$N_{t,Rk}$	0.63	0.75	0.87	1.12	1.37	1.37	1.37	1.37	1.37	1.37	1.37	
$N_{t,Rk}$	0.75	0.87	1.12	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	
$N_{t,Rk}$	0.88	0.87	1.12	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	
$N_{t,Rk}$	1.00	0.87	1.12	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	
$N_{t,Rk}$	1.13	0.87	1.12	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	
$N_{t,Rk}$	1.25	0.87	1.12	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	
$N_{t,Rk}$	1.50	0.87	1.12	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	
$N_{t,Rk}$	1.75	0.87	1.12	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	
$N_{t,Rk}$	2.00	0.87	1.12	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	
$M_{t,5\%}$ [Nm]	2.00											

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 ( $\rho_a = 350 \text{ kg/m}^3$ ). For other combinations of  $k_{mod}$  and timber strength grades see section 4.2.2.

Self drilling screw

- Hilti S-MD 31 PS 4.8 x L
- with round head with Torx® drive system and sealing washer  $\phi 12 \text{ mm}$

Annex 51

16



		<p><b>Material:</b> stainless steel (1.4567) - EN 10088</p> <p><b>Fastener:</b> stainless steel (1.4301) - EN 10088</p> <p><b>Washer:</b> Al alloy with <math>R_{tens} = 185 \text{ N/mm}^2</math> - EN 573</p> <p><b>Component I:</b> Al alloy with <math>R_{tens} = 185 \text{ N/mm}^2</math> - EN 573</p> <p><b>Component II:</b> Structural timber - EN 14081</p>
<p><b>Drilling capacity:</b> <math>\Sigma l_T \leq 2.75 \text{ mm}</math></p>		
<p><b>Timber substructures:</b> performance determined with <math>M_{t,RS} = 4.429 \text{ Nm}</math> <math>f_{t,RS} = 8.575 \text{ N/mm}^2</math> for <math>l_w \geq 20.0 \text{ mm}</math></p>		
$V_{Rk} [\text{kN}]$	$N_{Rk} [\text{kN}]$	$M_{t,comb} [\text{Nm}]$
$l_T$ [mm]	$l_0$ [mm]	$l_{T,comb}$ [mm]
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50

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 ( $\rho_w = 350 \text{ kg/m}^3$ ). For other combinations of  $k_{mod}$  and timber strength grades see section 4.2.2.

**Self drilling screw**

Hilti S-MD 31 PS 4.8 x L  
with round head with Torx® drive system and sealing washer Ø12 mm

Annex 52

Z36920.13

8.06.02-327/12

		<p><b>Material:</b> stainless steel (1.4567) - EN 10088</p> <p><b>Fastener:</b> stainless steel (1.4301) - EN 10088</p> <p><b>Washer:</b> S280GD, S320GD, S350GD - EN 10346</p> <p><b>Component II:</b> S235 - EN 10025-1 S280GD, S320GD, S350GD - EN 10346</p>
<p><b>Drilling capacity:</b> <math>\Sigma l_T \leq 3.00 \text{ mm}</math></p>		
<p><b>Timber substructures:</b> no performance determined</p>		
$V_{Rk} [\text{kN}]$	$N_{Rk} [\text{kN}]$	$M_{t,comb} [\text{Nm}]$
$l_T$ [mm]	$l_0$ [mm]	$l_{T,comb}$ [mm]
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50
0.50	0.50	0.50
0.60	0.60	0.60
0.70	0.70	0.70
0.80	0.80	0.80
0.90	0.90	0.90
1.00	1.00	1.00
1.10	1.10	1.10
1.20	1.20	1.20
1.30	1.30	1.30
1.40	1.40	1.40
1.50	1.50	1.50

No additional regulations.

**Self drilling screw**

Hilti S-MD 31 PS 5 x L  
with round head with Torx® drive system and sealing washer Ø12 mm

Annex 53

Z36920.13

8.06.02-327/12

**Material:**  
Fastener: stainless steel (1.4567) - EN 10088  
Washer: stainless steel (1.4301) - EN 10088  
Component I: Al alloy with  $R_{t,ens} = 185 \text{ N/mm}^2$  - EN 573  
Component II: Al alloy with  $R_{t,ens} = 185 \text{ N/mm}^2$  - EN 573

**Drilling capacity:**  $\Sigma t \leq 3,00 \text{ mm}$

**Timber substructures:**  
no performance determined

$t_1$ [mm]	$t_2$ [mm]									
	0.50	0.60	0.70	0.80	0.90	1.00	1.50	2.00		
0.50	0.35	0.48	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.60	0.37	0.49	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
0.70	0.39	0.50	0.60	0.60	0.80	0.80	0.80	0.80	0.80	0.80
0.80	0.39	0.50	0.60	0.60	1.00	1.00	1.00	1.00	1.00	1.00
1.00	0.39	0.50	0.60	0.60	1.20	1.20	1.20	1.20	1.20	1.20
1.10	0.39	0.50	0.60	0.60	1.00	1.20	1.20	1.20	1.20	1.20
1.20	0.39	0.50	0.60	0.60	1.00	1.20	1.20	1.20	1.20	1.20
1.30	0.39	0.50	0.60	0.60	1.00	1.20	1.20	1.20	1.20	1.20
1.40	0.39	0.50	0.60	0.60	1.00	1.20	1.20	1.20	1.20	1.20
1.50	0.39	0.50	0.60	0.60	1.00	1.20	1.20	1.20	1.20	1.20
$V_{Ak}$ [kN]	0.50	0.23	0.31	0.39	0.53	0.61	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
	0.70	0.23	0.31	0.39	0.53	0.64	0.69	0.83	0.83	0.83
$N_{Ak}$ [kN]	0.50	0.23	0.31	0.39	0.53	0.64	0.69	0.99	0.99	0.99
	0.60	0.23	0.31	0.39	0.53	0.64	0.69	1.19	1.19	1.19
	0.70	0.23	0.31	0.39	0.53	0.64	0.69	1.25	1.42	1.42
$M_{t,ens}$ [Nm]	1.00	0.23	0.31	0.39	0.53	0.64	0.69	1.25	1.25	1.25
	1.10	0.23	0.31	0.39	0.53	0.64	0.69	1.25	1.25	1.25
	1.20	0.23	0.31	0.39	0.53	0.64	0.69	1.25	1.25	1.25
$M_{t,ens}$ [Nm]	1.30	0.23	0.31	0.39	0.53	0.64	0.69	1.25	1.25	1.25
	1.40	0.23	0.31	0.39	0.53	0.64	0.69	1.25	1.25	1.25
	1.50	0.23	0.31	0.39	0.53	0.64	0.69	1.25	1.25	1.25

No additional regulations.

Self-drilling screw

Hilti S-MD 31 PS 5.5 x L  
with round head with Torx® drive system and sealing washer  $\phi 12 \text{ mm}$

Annex 54

**Material:**  
Fastener: stainless steel (1.4567) - EN 10088  
Washer: stainless steel (1.4301) - EN 10088  
Component I: Al alloy with  $R_{t,ens} = 185 \text{ N/mm}^2$  - EN 573  
Component II: S235 - EN 10025-1  
S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 3,00 \text{ mm}$

**Timber substructures:**  
no performance determined

$t_1$ [mm]	$t_2$ [mm]					
	2 x 0.63	2 x 0.75	2 x 0.85	2 x 1.00	2 x 1.13	—
0.50	0.94	0.94	0.94	0.94	0.94	—
0.60	0.94	0.94	1.21	0.94	0.94	—
0.70	0.94	1.21	1.21	1.21	1.21	—
0.80	0.94	1.21	1.21	1.21	1.21	—
0.90	0.94	1.21	1.21	1.21	1.21	—
1.00	0.94	1.21	1.21	1.21	1.21	—
1.10	0.94	1.21	1.21	1.21	1.21	—
1.20	0.94	1.21	1.21	1.21	1.21	—
1.30	0.94	1.21	1.21	1.21	1.21	—
1.40	0.94	1.21	1.21	1.21	1.21	—
1.50	0.94	1.21	1.21	1.21	1.21	—
$V_{Ak}$ [kN]	0.50	0.61	0.61	0.61	0.61	—
	0.60	0.70	0.70	0.70	0.70	—
	0.70	0.83	0.83	0.83	0.83	—
$N_{Ak}$ [kN]	0.80	0.99	0.99	0.99	0.99	—
	0.90	1.19	1.19	1.19	1.19	—
	1.00	1.37	1.42	1.42	1.42	—
$M_{t,ens}$ [Nm]	1.10	1.37	1.70	1.70	1.70	—
	1.20	1.37	2.02	2.02	2.02	—
	1.30	1.37	2.02	2.02	2.02	—
$M_{t,ens}$ [Nm]	1.40	1.37	2.02	2.02	2.02	—
	1.50	1.37	2.02	2.02	2.02	—

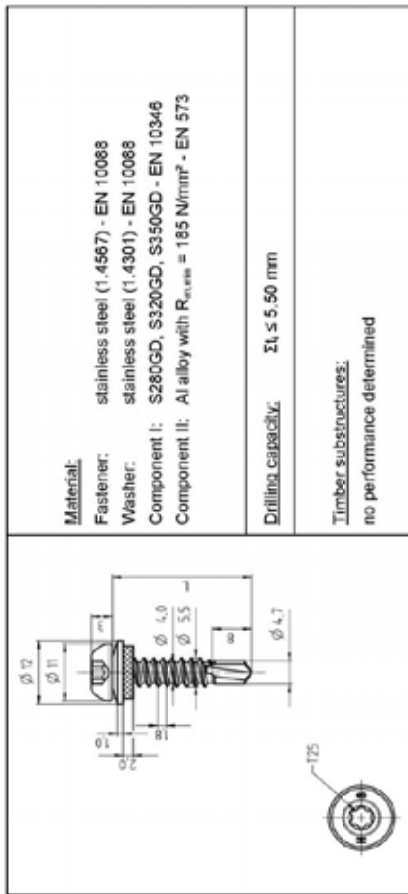
No additional regulations.

Self-drilling screw

Hilti S-MD 31 PS 5.5 x L  
with round head with Torx® drive system and sealing washer  $\phi 12 \text{ mm}$

Annex 55





**Material:** stainless steel (1.4567) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** Al alloy with  $R_{t,0.2} = 185 \text{ N/mm}^2$  - EN 573

**Drilling capacity:**  $Z_t \leq 5.50 \text{ mm}$

**Timber substructures:**  
no performance determined

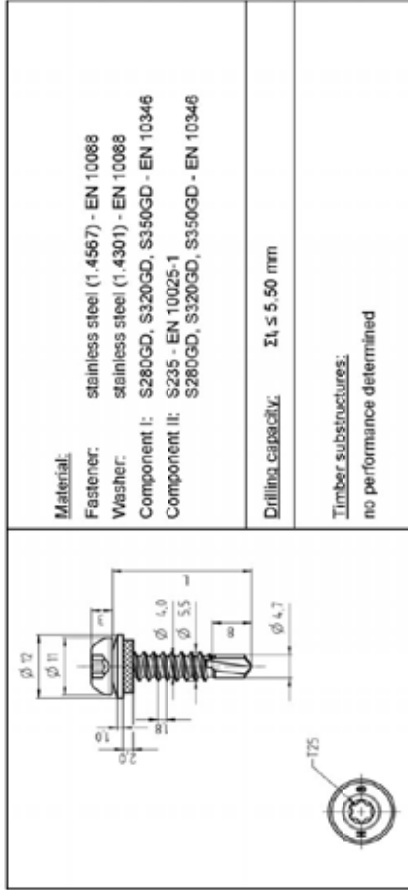
$t_f$ [mm]	1.00	1.50	2.00	2.50	3.00	—	—	—
$V_{Rk}$ [kN]	0.50	0.65	0.83	1.10	1.46	1.73	1.99	—
$N_{Rk}$ [kN]	0.55	0.75	0.99	1.25	1.56	1.81	2.05	—
$M_{t,perm}$ [Nm]	0.50	0.55	0.63	0.75	0.88	1.00	1.13	—

No additional regulations.

Self drilling screw

Hilti S-MD 33 PS 5.5 x L  
with round head with Torx® drive system and sealing washer  $\phi 12 \text{ mm}$

Annex 56



**Material:** stainless steel (1.4567) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** stainless steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** S235 - EN 10025-1  
**S280GD, S320GD, S350GD - EN 10346**

**Drilling capacity:**  $Z_t \leq 5.50 \text{ mm}$

**Timber substructures:**  
no performance determined

$t_f$ [mm]	0.50	0.65	0.75	0.88	1.00	1.25	1.51	1.75	2.00	2.25	2.51	2.76	3.01
$V_{Rk}$ [kN]	0.50	0.65	0.83	1.10	1.46	1.73	1.99	2.25	2.51	2.76	3.01	3.27	3.52
$N_{Rk}$ [kN]	0.55	0.75	0.99	1.25	1.56	1.81	2.05	2.30	2.55	2.80	3.05	3.30	3.55
$M_{t,perm}$ [Nm]	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25	1.38	1.51	1.64	1.76	1.89

No additional regulations.

Self drilling screw

Hilti S-MD 33 PS 5.5 x L  
with round head with Torx® drive system and sealing washer  $\phi 12 \text{ mm}$

Annex 57

**Material:**  
 Fastener: stainless steel (1.4567) - EN 10088  
 Washer: stainless steel (1.4301) - EN 10088  
 Component I: Al alloy with  $R_{m,ens} = 185 \text{ N/mm}^2$  - EN 573  
 Component II: S235 - EN 10025-1  
 S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma l \leq 5.50 \text{ mm}$

**Timber substructures:**  
 no performance determined

**Material:**  
 Fastener: stainless steel (1.4567) - EN 10088  
 Washer: stainless steel (1.4301) - EN 10088  
 Component I: Al alloy with  $R_{m,ens} = 185 \text{ N/mm}^2$  - EN 573  
 Component II: Al alloy with  $R_{m,ens} = 185 \text{ N/mm}^2$  - EN 573

**Drilling capacity:**  $\Sigma l \leq 5.50 \text{ mm}$

**Timber substructures:**  
 no performance determined

$l_t$ [mm]	$l_t$ [mm]							
	0.75	0.85	1.00	1.25	2 x 0.75	2 x 0.88	2 x 1.00	2 x 1.25
$V_{Rk}$ [kN]	0.50	0.69	0.99	0.99	0.99	1.18	1.18	1.18
$N_{Rk}$ [kN]	0.70	0.99	0.99	0.99	0.99	1.18	1.18	1.18
$M_{t,nom}$ [Nm]	0.80	0.99	0.99	0.99	0.99	1.18	1.18	1.18
	1.00	0.99	1.31	1.31	1.31	1.18	1.18	1.18
	1.10	0.99	0.99	1.31	1.31	1.18	1.18	1.18
	1.20	0.99	0.99	1.31	1.31	1.18	1.18	1.18
	1.30	0.99	0.99	1.31	1.31	1.18	1.18	1.18
	1.40	0.99	0.99	1.31	1.31	1.18	1.18	1.18
	1.50	0.99	0.99	1.31	1.31	1.18	1.18	1.18
	0.50	0.45	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	0.45	0.83	0.83	0.83	0.83	0.83	0.83
	0.80	0.45	0.85	0.85	0.85	0.85	0.85	0.85
	0.90	0.45	0.85	0.85	0.85	0.85	0.85	0.85
	1.00	0.45	0.85	0.85	0.85	0.85	0.85	0.85
	1.10	0.45	0.85	0.85	0.85	0.85	0.85	0.85
	1.20	0.45	0.85	0.85	0.85	0.85	0.85	0.85
	1.30	0.45	0.85	0.85	0.85	0.85	0.85	0.85
	1.40	0.45	0.85	0.85	0.85	0.85	0.85	0.85
	1.50	0.45	0.85	0.85	0.85	0.85	0.85	0.85

$l_t$ [mm]	$l_t$ [mm]							
	1.00	1.50	2.00	2.50	3.00	—	—	—
$V_{Rk}$ [kN]	0.50	0.65	0.91	0.91	0.91	—	—	—
$N_{Rk}$ [kN]	0.70	1.03	1.03	1.03	1.03	—	—	—
$M_{t,nom}$ [Nm]	0.80	0.85	1.10	1.10	1.10	—	—	—
	1.00	1.07	1.25	1.25	1.25	—	—	—
	1.10	1.07	1.25	1.25	1.25	—	—	—
	1.20	1.07	1.25	1.25	1.25	—	—	—
	1.30	1.07	1.25	1.25	1.25	—	—	—
	1.40	1.07	1.25	1.25	1.25	—	—	—
	1.50	1.07	1.25	1.25	1.25	—	—	—
	0.50	0.61	0.61	0.61	0.61	—	—	—
	0.60	0.70	0.70	0.70	0.70	—	—	—
	0.70	0.78	0.83	0.83	0.83	—	—	—
	0.80	0.78	0.99	0.99	0.99	—	—	—
	0.90	0.78	1.17	1.19	1.19	—	—	—
	1.00	0.78	1.17	1.42	1.42	—	—	—
	1.10	0.78	1.17	1.66	1.70	—	—	—
	1.20	0.78	1.17	1.66	2.02	—	—	—
	1.30	0.78	1.17	1.66	2.02	—	—	—
	1.40	0.78	1.17	1.66	2.02	—	—	—
	1.50	0.78	1.17	1.66	2.02	—	—	—

No additional regulations.

No additional regulations.

Self drilling screw

Self drilling screw

 Hilti S-MD 33 PS 5.5 x L  
 with round head with Torx® drive system and sealing washer  $\phi 12 \text{ mm}$ 

 Hilti S-MD 33 PS 5.5 x L  
 with round head with Torx® drive system and sealing washer  $\phi 12 \text{ mm}$ 

Annex 59

Annex 58

**Material:**  
 Fastener: stainless steel (1.4567) - EN 10088  
 Washer: stainless steel (1.4301) - EN 10088  
 Component I: S280GD, S320GD, S350GD - EN 10346  
 Component II: S235 - EN 10025-1  
 S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 12,50$  mm

**Timber substructures:**  
 no performance determined

$t_1$ [mm]	4.00	5.00	6.00	8.00	10.00	
$V_{k1}$ [kN]	0,50	0,65	0,75	0,83	0,88	—
$V_{k2}$ [kN]	2,69	2,93	3,16	3,16	3,16	—
	2,85	3,11	3,27	3,27	3,27	—
	3,46	3,73	4,01	4,01	4,01	—
	3,97	4,36	4,74	4,74	4,74	—
	4,97	5,16	5,35	5,35	5,35	—
	5,97	5,97	5,97	5,97	5,97	—
	5,97	6,23	6,49	6,49	6,49	—
	5,97	6,33	6,69	6,69	6,69	—
	2,00	5,97	6,43	6,89	6,89	—
$N_{k1}$ [kN]	0,50	0,55	0,63	0,63	0,63	—
	2,34	2,34	2,34	2,34	2,34	—
	2,34	2,34	2,34	2,34	2,34	—
	2,34	2,34	2,34	2,34	2,34	—
	2,34	2,34	2,34	2,34	2,34	—
	2,34	2,34	2,34	2,34	2,34	—
	2,34	2,34	2,34	2,34	2,34	—
$M_{k,rem}$ [Nm]	2,00	2,34	2,34	2,34	2,34	—

No additional regulations.

Self drilling screw

Hilti S-MD 35 PS 5.5 x L  
 with round head with Torx® drive system and sealing washer Ø12 mm

Annex 60

**Material:**  
 Fastener: stainless steel (1.4567) - EN 10088  
 Washer: stainless steel (1.4301) - EN 10088  
 Component I: Al alloy with  $R_{e,tem} = 185$  N/mm<sup>2</sup> - EN 573  
 Component II: S235 - EN 10025-1  
 S280GD, S320GD, S350GD - EN 10346

**Drilling capacity:**  $\Sigma t \leq 12,50$  mm

**Timber substructures:**  
 no performance determined

$t_1$ [mm]	4.00	5.00	6.00	8.00	10.00	
$V_{k1}$ [kN]	0,50	0,60	0,70	0,70	0,70	—
$V_{k2}$ [kN]	1,03	1,27	1,51	1,51	1,51	—
	1,27	1,51	1,79	1,79	1,79	—
	2,07	2,07	2,07	2,07	2,07	—
	2,35	2,35	2,35	2,35	2,35	—
	2,35	2,35	2,35	2,35	2,35	—
	2,35	2,35	2,35	2,35	2,35	—
	2,35	2,35	2,35	2,35	2,35	—
	2,35	2,35	2,35	2,35	2,35	—
	0,61	0,61	0,61	0,61	0,61	—
	0,70	0,70	0,70	0,70	0,70	—
	0,83	0,83	0,83	0,83	0,83	—
	0,99	0,99	0,99	0,99	0,99	—
	1,19	1,19	1,19	1,19	1,19	—
	1,42	1,42	1,42	1,42	1,42	—
	1,70	1,70	1,70	1,70	1,70	—
	2,02	2,02	2,02	2,02	2,02	—
	2,02	2,02	2,02	2,02	2,02	—
	2,02	2,02	2,02	2,02	2,02	—
	2,02	2,02	2,02	2,02	2,02	—
$M_{k,rem}$ [Nm]	1,50	2,02	2,02	2,02	2,02	—

No additional regulations.

Self drilling screw

Hilti S-MD 35 PS 5.5 x L  
 with round head with Torx® drive system and sealing washer Ø12 mm

Annex 61

**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** Structural timber - EN 14081

**Drilling capacity:**  $Eh \leq 1,00$  mm

**Timber substructures:** performance determined with

$M_{t,PS} = 14,830$  Nm  
 $f_{t,ack} = 8,575$  N/mm<sup>2</sup> for  $l_{ef} \geq 35,0$  mm

$t_i$ [mm]	$l_{ef}$ [mm]											$V_{t,ack}$	
	35	38	41	44	47	50	53	56	59	62	65	65	$N_{t,ack}$
0.50	1.24	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38
0.60	1.24	1.38	1.52	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
0.70	1.24	1.38	1.52	1.66	1.81	1.95	2.00	2.00	2.00	2.00	2.00	2.00	2.00
0.80	1.24	1.38	1.52	1.66	1.81	1.95	2.09	2.23	2.38	2.52	2.62	2.62	2.62
0.90	1.24	1.38	1.52	1.66	1.81	1.95	2.09	2.23	2.38	2.52	2.66	2.71	2.71
1.00	1.24	1.38	1.52	1.66	1.81	1.95	2.09	2.23	2.38	2.52	2.66	2.79	2.79
1.10	—	—	—	—	—	—	—	—	—	—	—	—	—
1.20	—	—	—	—	—	—	—	—	—	—	—	—	—
1.30	—	—	—	—	—	—	—	—	—	—	—	—	—
1.40	—	—	—	—	—	—	—	—	—	—	—	—	—
1.50	—	—	—	—	—	—	—	—	—	—	—	—	—
0.50	1.30	1.45	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
0.60	1.30	1.45	1.61	1.76	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
0.70	1.30	1.45	1.61	1.76	1.91	2.06	2.10	2.10	2.10	2.10	2.10	2.10	2.10
0.80	1.30	1.45	1.61	1.76	1.91	2.06	2.21	2.36	2.51	2.62	2.62	2.62	2.62
0.90	1.30	1.45	1.61	1.76	1.91	2.06	2.21	2.36	2.51	2.66	2.81	3.09	3.09
1.00	1.30	1.45	1.61	1.76	1.91	2.06	2.21	2.36	2.51	2.66	2.81	3.55	3.55
1.10	—	—	—	—	—	—	—	—	—	—	—	—	—
1.20	—	—	—	—	—	—	—	—	—	—	—	—	—
1.30	—	—	—	—	—	—	—	—	—	—	—	—	—
1.40	—	—	—	—	—	—	—	—	—	—	—	—	—
1.50	—	—	—	—	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]	—	—	—	—	—	—	—	—	—	—	—	—	—

If component I is made of S320GD or S350GD the grey highlighted values may be increased by 8%.  
 The values listed above in dependence on the screw-in length  $l_{ef}$  are valid for  $K_{wood} = 0.90$  and timber strength grade C24 ( $p_s = 350$  kg/m<sup>2</sup>). For other combinations of  $K_{wood}$  and timber strength grades see section 4.2.2.

Self drilling screw

Hilti S-MDW 51 S 6.5 x L  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 62

**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** stainless steel (1.4301) - EN 10088  
**Washer:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** Structural timber - EN 14081

**Drilling capacity:**  $Eh \leq 1,00$  mm

**Timber substructures:** performance determined with

$M_{t,PS} = 14,830$  Nm  
 $f_{t,ack} = 8,575$  N/mm<sup>2</sup> for  $l_{ef} \geq 35,0$  mm

$t_i$ [mm]	$l_{ef}$ [mm]											$V_{t,ack}$	
	35	38	41	44	47	50	53	56	59	62	65	65	$N_{t,ack}$
0.50	1.24	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38
0.60	1.24	1.38	1.52	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
0.70	1.24	1.38	1.52	1.66	1.81	1.95	2.00	2.00	2.00	2.00	2.00	2.00	2.00
0.80	1.24	1.38	1.52	1.66	1.81	1.95	2.09	2.23	2.38	2.52	2.62	2.62	2.62
0.90	1.24	1.38	1.52	1.66	1.81	1.95	2.09	2.23	2.38	2.52	2.66	2.71	2.71
1.00	1.24	1.38	1.52	1.66	1.81	1.95	2.09	2.23	2.38	2.52	2.66	2.79	2.79
1.10	—	—	—	—	—	—	—	—	—	—	—	—	—
1.20	—	—	—	—	—	—	—	—	—	—	—	—	—
1.30	—	—	—	—	—	—	—	—	—	—	—	—	—
1.40	—	—	—	—	—	—	—	—	—	—	—	—	—
1.50	—	—	—	—	—	—	—	—	—	—	—	—	—
0.50	1.30	1.45	1.61	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
0.60	1.30	1.45	1.61	1.76	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
0.70	1.30	1.45	1.61	1.76	1.91	2.06	2.21	2.23	2.23	2.23	2.23	2.23	2.23
0.80	1.30	1.45	1.61	1.76	1.91	2.06	2.21	2.36	2.51	2.62	2.62	2.62	2.62
0.90	1.30	1.45	1.61	1.76	1.91	2.06	2.21	2.36	2.51	2.66	2.81	3.25	3.25
1.00	1.30	1.45	1.61	1.76	1.91	2.06	2.21	2.36	2.51	2.66	2.81	3.69	3.69
1.10	—	—	—	—	—	—	—	—	—	—	—	—	—
1.20	—	—	—	—	—	—	—	—	—	—	—	—	—
1.30	—	—	—	—	—	—	—	—	—	—	—	—	—
1.40	—	—	—	—	—	—	—	—	—	—	—	—	—
1.50	—	—	—	—	—	—	—	—	—	—	—	—	—
$M_{t,nom}$ [Nm]	—	—	—	—	—	—	—	—	—	—	—	—	—

If component I is made of S320GD or S350GD the grey highlighted values may be increased by 8%.  
 The values listed above in dependence on the screw-in length  $l_{ef}$  are valid for  $K_{wood} = 0.90$  and timber strength grade C24 ( $p_s = 350$  kg/m<sup>2</sup>). For other combinations of  $K_{wood}$  and timber strength grades see section 4.2.2.

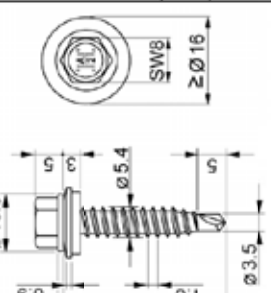
Self drilling screw

Hilti S-MDW 61 S 6.5 x L  
 with hexagon head and sealing washer  $\geq \varnothing 19$  mm

Annex 63



**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** organic coated  
**Washer:** stainless Steel (1.4301) - EN 10088 with vulcanized EPDM-sealing  
**Component I:** S280GD, S320GD, S350GD - EN 10346  
**Component II:** S280GD, S320GD, S350GD - EN 10346



**Drilling capacity:**  $Z_t \leq 2.50$  mm

**Timber substructures:** no performance determined

$t_f$ [mm]	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25
$V_{k1}$ [kN]	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
	0.55	1.19	1.44	1.44	1.44	1.44	1.44	1.44
	0.63	1.19	1.44	1.84	1.84	1.84	1.84	1.84
	0.75	1.03	1.44	2.25	2.25	2.25	2.25	2.25
	0.88	1.03	1.44	1.84	2.66	2.66	2.66	2.66
	1.00	1.03	1.44	1.84	2.25	2.66	2.66	2.66
	1.13	1.03	1.44	1.84	2.25	2.66	2.66	2.66
	1.25	1.03	1.44	1.84	2.25	2.66	2.66	2.66
	1.50	1.03	1.44	1.84	2.25	2.66	2.66	2.66
	1.75	1.03	1.44	1.84	2.25	2.66	2.66	2.66
	2.00	1.03	1.44	1.84	2.25	2.66	2.66	2.66
$N_{k1}$ [kN]	0.54	0.57	0.70	1.00	1.30	1.46	1.46	1.46
	0.54	0.57	0.70	1.00	1.30	1.46	1.71	1.71
	0.63	0.54	0.70	1.00	1.30	1.60	1.90	2.10
	0.75	0.54	0.70	1.00	1.30	1.60	1.90	2.20
	0.88	0.54	0.70	1.00	1.30	1.60	1.90	2.20
	1.00	0.54	0.70	1.00	1.30	1.60	1.90	2.20
	1.13	0.54	0.70	1.00	1.30	1.60	1.90	2.20
	1.25	0.54	0.70	1.00	1.30	1.60	1.90	2.20
	1.50	0.54	0.70	1.00	1.30	1.60	1.90	2.20
	1.75	0.54	0.70	1.00	1.30	1.60	1.90	2.20
	2.00	0.54	0.70	1.00	1.30	1.60	1.90	2.20
$M_{t,rem}$ [Nm]	—	—	—	—	—	—	—	—

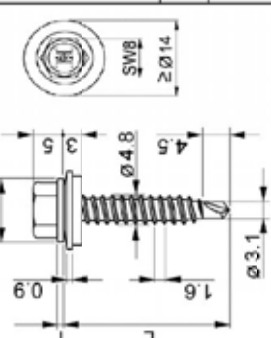
If both components I and II are made of S320GD or S350GD the grey highlighted values may be increased by 8.0%.

Self drilling screw

Hilti S-MDU 51 S 5.5 x L  
 Hilti S-MDU 61 S 5.5 x L  
 Hilti S-MDU 71 S 5.5 x L  
 with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 64

**Material:** stainless steel (1.4301) - EN 10088  
**Fastener:** organic coated  
**Washer:** stainless Steel (1.4301) - EN 10088 with vulcanized EPDM-sealing  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S280GD, S320GD - EN 10346



**Drilling capacity:**  $Z_t \leq 2.50$  mm

**Timber substructures:** no performance determined

$t_f$ [mm]	0.40	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25
$V_{k2}$ [kN]	0.40	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
	0.63	0.59	0.71	0.71	0.71	0.71	0.71	0.71	0.71
	0.75	0.59	0.59	0.90	0.90	1.50	2.10	2.10	2.10
	0.88	0.59	0.59	0.71	0.90	1.70	2.40	2.40	2.40
	1.00	0.59	0.59	0.71	0.90	1.90	2.83	2.83	2.83
	1.13	0.59	0.59	0.71	0.90	1.90	2.83	2.83	2.83
	1.25	0.59	0.59	0.71	0.90	1.90	2.83	2.83	2.83
	1.50	0.59	0.59	0.71	0.90	1.90	2.83	2.83	2.83
	1.75	0.59	0.59	0.71	0.90	1.90	2.83	2.83	2.83
$N_{k2}$ [kN]	0.40	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.45
	0.50	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.65
	0.63	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.75
	0.75	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.90
	0.88	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.90
	1.00	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.90
	1.13	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.90
	1.25	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.90
	1.50	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.90
	1.75	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.90
$M_{t,rem}$ [Nm]	1.75	0.41	0.53	0.60	0.70	0.70	1.00	1.30	1.45

No additional regulations.

Self drilling screw

Hilti S-MDU 41 S 4.8 x L  
 Hilti S-MDU 51 S 4.8 x L  
 Hilti S-MDU 61 S 4.8 x L  
 Hilti S-MDU 71 S 4.8 x L  
 with hexagon head and sealing washer  $\geq \varnothing 14$  mm

Annex 65

# 16.4 ETA-13/0179 - Fastening screws for sandwich panels



European technical approval  
 ETA-13/0179  
 English translation prepared by DIBt

Page 2 of 19 | 25 April 2013

## I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
  - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products, modified by Council Directive 93/68/EEC and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>1</sup>;
  - Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998<sup>2</sup>, as amended by Article 2 of the law of 8 November 2011<sup>3</sup>;
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>4</sup>.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.
- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

- 1 Official Journal of the European Communities L 40, 11 February 1989, p. 12
- 2 Official Journal of the European Communities L 220, 30 August 1993, p. 1
- 3 Official Journal of the European Union L 284, 31 October 2003, p. 25
- 4 Bundesgesetzblatt Teil I 1998, p. 812
- 5 Bundesgesetzblatt Teil I 2011, p. 2178
- 6 Official Journal of the European Communities L 17, 20 January 1994, p. 34

Z16358.13

8.06.02-208/10



Deutsches Institut für Bautechnik  
 Zulassungstelle für Bauprodukte und Bauarten  
 Bautechnisches Profamt

Eine vom Bund und den Ländern  
 gemeinsam getragene Anstalt des  
 öffentlichen Rechts

\* Authorised  
 and notified according  
 to Article 10 of the Council  
 Directive of 21 December 1988  
 on the approximation of laws,  
 regulations and administrative  
 provisions of Member States  
 relating to construction  
 products (89/106/EEC)

Koblenzstraße 30 B  
 D-10929 Berlin  
 Tel.: +49 30 78730-0  
 Fax: +49 30 78730-320  
 E-Mail: dibt@ditb.de  
 www.ditb.de

Mitglied der EOTA  
 Member of EOTA

## European Technical Approval ETA-13/0179

English translation prepared by DIBt - Original version in German language

Befestigungsschrauben für Sandwichelemente  
 Fastening screws for sandwich panels

Hilti AG  
 Feldkircherstraße 100  
 9494 Schaan

FÜRSTENTUM LIECHTENSTEIN

Befestigungsschrauben für Sandwichpanele

Fastening screws for sandwich panels

25 April 2013

25 April 2018

Hilti AG, Werk 6103  
 Hilti AG, Werk 7855  
 Hilti AG, Plant 6103  
 Hilti AG, Plant 7855

Handelsbezeichnung Trade name	
Zulassungsinhaber Holder of approval	
Zulassungsgegenstand und Verwendungszweck Generic type and use of construction product	
Geltungsdauer: Validity:	from from bis to
Herstellwerke Manufacturing plants	

Diese Zulassung umfasst  
 This Approval contains

19 Seiten einschließlich 10 Anhänge  
 19 pages including 10 annexes



Europäische Organisation für Technische Zulassungen  
 European Organisation for Technical Approvals

Z16358.13

8.06.02-208/10

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 Definition of product/ products and intended use

#### 1.1 Definition of the construction product

The fastening screws for sandwich panels are self drilling and self tapping screws listed in Table 1. The fastening screws for sandwich panels are made of stainless steel. They are partly completed with metallic washers and EPDM sealing rings. For details see the appropriate Annexes.

Screws or washers for which the stainless steel grade A2 according to EN ISO 3506-1 is given in the respective Annexes (e.g. 1.4301 or 1.4567) may be made of stainless steel grade A4 (e.g. 1.4401 or 1.4578) as well.

Examples of fastening screws for sandwich panels and a corresponding connection are shown in Annex 1.

The fastening screws for sandwich panels and the corresponding connections are subject to tension and shear forces.

**Table 1** Different types of fastening screws for sandwich panels

Annex	Fastening screw	Description
Annex 2	Hilti S-CD63S 5,5 x L	Self drilling screw with hexagon head and sealing washer $\geq \varnothing 19$ mm
	Hilti S-CD73S 5,5 x L	Self drilling screw with hexagon head and sealing washer $\varnothing 16$ mm
Annex 3	Hilti S-CD53S 5,5 x L	Self drilling screw with hexagon head and sealing washer $\geq \varnothing 19$ mm
Annex 4	Hilti S-CD65S 5,5 x L	Self drilling screw with hexagon head and sealing washer $\geq \varnothing 19$ mm
	Hilti S-CD75S 5,5 x L	Self drilling screw with hexagon head and sealing washer $\varnothing 16$ mm
Annex 5	Hilti S-CD55S 5,5 x L	Self tapping screw with hexagon head and sealing washer $\geq \varnothing 19$ mm
	Hilti S-MP64S 6,3 x L	Self tapping screw with hexagon head and sealing washer $\geq \varnothing 19$ mm
	Hilti S-MP74S 6,3 x L	Self tapping screw with hexagon head and sealing washer $\geq \varnothing 19$ mm
Annex 7*	Hilti S-CDW61S 6,5 x L	Self drilling screw with hexagon head and sealing washer $\geq \varnothing 19$ mm
	Hilti S-CDW71S 6,5 x L	Self drilling screw with hexagon head and sealing washer $\varnothing 16$ mm
Annex 8*	Hilti S-CDW51S 6,5 x L	Self drilling screw with hexagon head and sealing washer $\varnothing 16$ mm
Annex 9*	Hilti S-CDW50S 6,5 x L	Self drilling screw with hexagon head and sealing washer $\varnothing 16$ mm
Annex 10*	Hilti S-CDW60S 6,5 x L	Self drilling screw with hexagon head and sealing washer $\varnothing 19$ mm

\*) This fastening screws for sandwich panels are applicable for fastening to timber substructure

### 1.2 Intended use

The fastening screws for sandwich panels are intended to be used for fastening of flat, lightly profiled or profiled sandwich panels to metal supporting structures and as far as stated in Table 1 to timber supporting structures. The core material of the sandwich panel shall be made of polystyrene (PS) - or polyurethane (PUR) – ridged foam or mineral wool with a minimum compression resistance of the core material of 0.04 N/mm<sup>2</sup> (according to the specifications to the sandwich elements for instance in the CE-marking). The sandwich panels can either be used as wall or as roof cladding.

The component to be fastened is component 1 and the supporting structure is component II.

The intended use comprises fastening screws for sandwich panels and connections for indoor and outdoor applications. Fastening screws for sandwich panels which are made of stainless steel are intended to be used in external environments with a high or very high corrosion category.

The intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads).

The provisions made in this European technical approval are based on an assumed working life of the fastening screws for sandwich panels of 25 years when installed in the works or 50 years if the screws are not accessible after installation and they are sufficient protected against corrosion (e.g. made of stainless steel). The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

## 2 Characteristics of product and methods of verification

### 2.1 Characteristics of product

The fastening screws for sandwich panels shall correspond to the drawings given in the appropriate Annexes (see Table 1).

The characteristic material values, dimensions and tolerances of the fastening screws for sandwich panels neither indicated in this section nor in the Annexes shall correspond to the respective values laid down in the technical documentation<sup>7</sup> to this European technical approval. The characteristic values of the shear and tension resistance of the connections made with the fastening screws for sandwich panels as well as the maximum head displacement are given in the appropriate Annexes or in section 4.2.

The fastening screws for sandwich panels are considered to satisfy the requirements of performance class A1 of the characteristic reaction to fire.

### 2.2 Methods of verification

The assessment of the fitness of the fastening screws for sandwich panels for the intended use in relation to the Essential Requirements ER 1 (Mechanical resistance and stability), ER 2 (Safety in case of fire), ER 4 (Safety in use) and additional aspects of durability has been made in accordance with section 3.2 of the Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.

The assessment of the resistance to fire performance is only relevant to the assembled system (fastening screws for sandwich panels, sandwich panels, supporting structure) which is not part of the ETA.

The technical documentation to this European technical approval is deposited at Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure is handed over to the approved bodies.

7

The fastening screws for sandwich panels are considered to satisfy the requirements of performance class A 1 of the characteristic reaction to fire, in accordance with the provisions of the EC Decision 96/603/EC (as amended) without the need for testing on the basis of its listing in that decision.

Concerning Essential Requirements No. 1 (Mechanical resistance and stability) and No. 4 (Safety in use) the following applies:

The characteristic values of resistance given in the Annexes were determined by shear and tension tests and the values for the maximum head displacement were determined by bending tests.

The formulas to calculate the design resistance are given in clause 4.2.1.

### 3 Evaluation and attestation of conformity and CE marking

#### 3.1 System of attestation of conformity

According to the Decision 99/92/EC of the European Commission<sup>8</sup> system 2+ of the attestation of conformity applies.

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

- (a) Tasks for the manufacturer:
  - (1) initial type-testing of the product;
  - (2) factory production control;
  - (3) testing of samples taken at the factory in accordance with a prescribed test plan.
- (b) Tasks for the approved body:
  - (4) certification of factory production control on the basis of:
    - initial inspection of factory and of factory production control;
    - continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

#### 3.2 Responsibilities

##### 3.2.1 Tasks for the manufacturer

###### 3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.<sup>9</sup>

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

<sup>8</sup> Official Journal of the European Communities L 80 of 18.03.1998

<sup>9</sup> The control plan is a confidential part of the European technical approval and only handed over to the approved bodies involved in the procedure of attestation of conformity. See section 3.2.2.

#### 3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of prefabricated structural components made of hot-rolled steel products in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

#### 3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in written reports.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

#### 3.3 CE marking

The CE marking shall be affixed on the accompanying commercial documents. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate for the factory production control,
- the number of the European technical approval,
- the name of the product.

### 4 Assumptions under which the fitness of the product for the intended use was favourably assessed

#### 4.1 Manufacturing

The fastening screws for sandwich panels are manufactured in accordance with the provisions of the European technical approval using the manufacturing process as laid down in the technical documentation.

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.



The possibly required reduction of the tension resistance to 70% of the characteristic values of panel resistance given in the Annexes is taken into account for connections of sandwich panels to thin-walled (plate thickness  $t < 5\text{ mm}$ ) asymmetric profiles like Z – or C – shaped profiles.

#### 4.2.2 Additional rules for connections with timber substructures

As far as no other provisions are made in the following EN 1995-1-1:2004 + A1:2008 applies. Drill points of self drilling screws are not taken into account for the effective screw-in length. The following terms are used:

$l_g$  - Screw-in length – part of thread screwed into component II including drill point.  
 $l_b$  - Length of unthreaded part of the drill-point.

$l_{ef}$  - effective screw-in length  $l_{ef} = l_g - l_b$

$N_{R,k}$  =  $F_{ax,Rk} \cdot K_{mod}$

$V_{R,k}$  =  $F_{v,Rk} \cdot K_{mod}$

$F_{ax,Rk}$  according to EN 1995-1-1:2004 + A1:2008, equation (8.40a)

Remark:  $F_{ax,Rk} = F_{ax,\alpha,Rk}$  with  $\alpha = 90^\circ$

$F_{v,Rk}$  according to EN 1995-1-1:2004 + A1:2008, clause 8.2.3

$K_{mod}$  according to EN 1995-1-1:2004 + A1:2008, Table 3.1

$M_{t,Rk}$  in equation (8.9) of EN 1995-1-1:2004 + A1:2008 and  $f_{ax,k}$  in equation (8.40a) of EN 1995-1-1:2004 + A1:2008 are given in the Annexes of this ETA.

The characteristic values for pullout and bearing resistance (timber substructure) calculated according to EN 1995-1-1:2004 + A1:2008 are compared with the characteristic values for component I (pull over and bearing resistance) stated in the therefore foreseen column or line of the table in the appropriate Annexes. The lower value is used for further calculations.

#### 4.3 Installation

The installation is only carried out according to the manufacturer's instructions. The manufacturer hands over the assembly instructions to the assembler.

It is guaranteed by the execution that no bimetallic corrosion will occur.

Screws with washers and EPDM sealing rings exposed to external weather are screwed-in with electric screw driver with appropriate set depth stop.

The use of impact wrenches is not allowed.

The fastening elements are fixed rectangular to the surface of the components to guarantee a correct load bearing and if necessary rain-proof connection.

Component I and component II are in contact to each other in the connection area. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

During installation of fastening screws admissible for timber substructures, except self-drilling screws, the components I and II which shall be connected are predrilled with  $d_{pd} = 0.7 d$  (d nominal screw diameter) as long as no other instructions are given in the Annexes.

Fastening screws for steel substructures are screwed-in with the cylindrical part of the thread

- through the material if component II has a thickness up to 6 mm and

- at least 6 mm if component II has a thickness over 6 mm.

Welded drill bits or hardened tips are therefore not to be taken into account.

#### 4.2 Design

##### 4.2.1 General

Fastening screws for sandwich panels completely or partly exposed to external weather or similar conditions are made of stainless steel or are protected against corrosion. For the corrosion protection the rules given in EN 1090-2:2008 + A1:2011, EN 1993-1-3:2006 + AC:2009 and EN 1993-1-4:2006 are taken into account.

In the following and in the Annexes the structural components to be fastened are called component I and the supporting structure or base material are called component II. Furthermore the following symbols are used, see also Annex 1:

d or D Thickness of the sandwich panel

$t_{h1}$  Thickness of the outer face / top plate (on the side of the screw head)

$t_{h2}$  Thickness of the inner face / bottom plate (on the side of the supporting structure)

$t_i$  Thickness of the supporting structure

u from screw axes measured screw head displacement, resulting from the displacement of the outer face of the sandwich panels by thermal expansion e. g. caused by solar radiation

max u maximum allowed screw head displacement,  $u < \max u$

For calculation of shear resistance of the connection the value for the plate thickness  $t_{h2}$  (plate in contact with the supporting structure) is used as relevant. For calculation of tension resistance of the connection and pull-over the relevant thickness is plate thickness  $t_{h1}$  (plate in contact with screw head).

The loading is predominantly static. (Remark: Wind loads are regarded as predominantly static.) Dimensions, material properties, torque moments  $M_{t,nom}$ , minimum effective screw-in length  $l_{ef}$ , nominal material thicknesses  $t_{h1}$  and  $t_{h2}$ , and maximum head displacement as stated in the ETA or in the Annexes are observed.

The verification concept stated in EN 1990:2002 + A1:2005 + A1:2005/AC:2010 is used for the design of the connections made with the fastening screws for sandwich panels. The characteristic values (shear and tension resistance) stated in the Annexes are used for the design of the entire connections.

For intermediate thicknesses of component I or component II the characteristic value for the thinner component is taken.

The following formulas are used to calculate the values of design resistance:

$$N_{R,d} = \frac{N_{R,k}}{Y_M}$$

$$V_{R,d} = \frac{V_{R,k}}{Y_M}$$

The recommended partial safety factor  $\gamma_{M} = 1.33$  is used in order to determine the corresponding design resistances, provided no values are given in national regulations of the member state in which the fastening screws for sandwich panels are used or in the respective National Annex to Eurocode 3.

In case of combined tension and shear forces the linear interaction formula according to EN 1993-1-3:2006 + AC:2009, section 8.3 (6) is taken into account.

$$\frac{N_{S,d}}{N_{R,d}} + \frac{V_{S,d}}{V_{R,d}} \leq 1.0$$

The manufacturer's information about the maximum clamp length is considered. Already loaded screws in regular load bearing connections are if required only replaced by thread forming screws with a larger diameter. Therefore the hole has to be predrilled for the thicker fastening screw. The conformity of the installed fasteners with the provisions of the ETA is attested by the executing company.

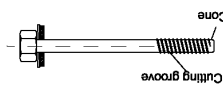
**5 Indications to the manufacturer**

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1, 2, 4.2 and 4.3 (including Annexes referred to) is given to those who are concerned. This information may be given by reproduction of the respective parts of the European technical approval.

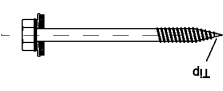
In addition all installation data (e. g. application limits) shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

Georg Feistel  
Head of Department

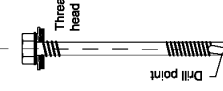
*beglaubigt:*  
Ulbrich



Self tapping screw  
with sealing washer



Self tapping screw  
with sealing washer

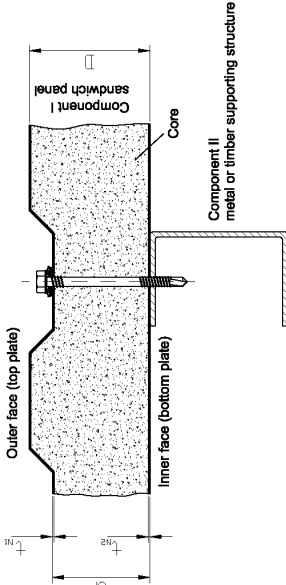


Self drilling screw  
with sealing washer

**Examples of screws**

Cutting groove    Cone    Thread under screw head is optionally

Drill point

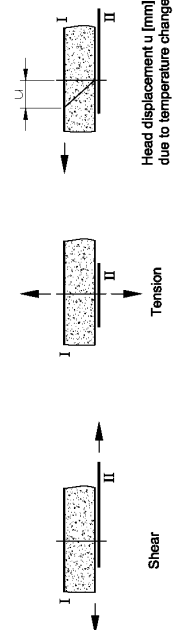


**Example of execution of a connection**

Outer face (top plate)    Component I sandwich panel    Core    Component II metal or timber supporting structure

Inner face (bottom plate)

$d$      $L_{IN}$      $L_{OUT}$



**Loading conditions**

Shear    Tension

Head displacement  $u$  [mm] due to temperature change

Fastening screws for sandwich panels	Annex 1
Examples of screws Example of execution of a connection Loading conditions	



**Material:** stainless Steel (1.4301) - EN 10088  
**Fastener:** stainless Steel (1.4301) - EN 10088  
**Washer:** stainless Steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S235, S275, S355 - EN 10025-1  
S280GD, S320GD, S355GD - EN 10346

**Drilling capacity:** It ≤ 6,00 mm

**Timber substructures:**  
no performance determined

t <sub>min</sub> , t <sub>60</sub> , d, D [mm]	1.50	2.00	2.50	3.00	4.00	5.00	6.00	8.00	≥ 10.0
V <sub>k1</sub> [kN]	0.40	1.30	1.30	1.30	1.30	1.30	1.30	1.30	—
N <sub>k1x</sub> [kN]	0.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	—
N <sub>k2x</sub> [kN]	0.63	1.70	1.70	1.70	1.70	1.70	1.70	1.70	—
	0.75	2.00	2.00	2.00	2.00	2.00	2.00	2.00	—
	0.88	2.30	2.30	2.30	2.30	2.30	2.30	2.30	—
	1.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50	—
	0.40	—	—	—	—	—	—	—	—
	0.50	1.80	2.60	2.60	2.60	2.60	—	—	—
	0.55	1.80	3.00	3.00	3.00	3.00	—	—	—
	0.63	1.80	3.40	3.40	3.40	3.40	—	—	—
	0.75	1.80	3.80	4.20	4.20	4.20	—	—	—
	0.88	1.80	3.80	4.50	4.50	4.50	—	—	—
	1.00	1.80	3.80	4.50	4.50	4.50	—	—	—
	30	—	—	—	—	—	—	—	—
	40	18.0	7.0	6.0	5.0	3.0	—	—	—
	50	22.0	10.5	9.0	7.5	6.5	4.3	—	—
	60	26.0	13.0	11.0	9.0	8.0	5.5	—	—
	70	29.5	16.5	14.0	12.0	11.5	6.8	—	—
	80	33.0	20.0	17.5	15.0	14.0	8.0	—	—
	100	33.0	20.0	17.5	15.0	14.0	10.0	—	—
	120	33.0	20.0	17.5	15.0	14.0	12.0	—	—
	≥ 140	33.0	20.0	17.5	15.0	14.0	14.0	—	—

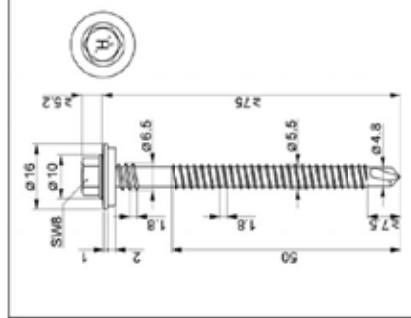
If component t<sub>60</sub> resp. t<sub>62</sub> is made of S320GD the grey highlighted values may be increased by 8,3%.  
If both components t<sub>61</sub> resp. t<sub>62</sub> and t<sub>63</sub> are made of S320GD all values V<sub>k1x</sub> and N<sub>k1x</sub> may be increased by 6,3%.

Self drilling screw

Hilti S-CD63S 5,5 x L  
Hilti S-CD73S 5,5 x L

with hexagon head and sealing washer ≥ Ø19 mm

Annex 2



**Material:** stainless Steel (1.4301) - EN 10088  
**Fastener:** stainless Steel (1.4301) - EN 10088  
**Washer:** stainless Steel (1.4301) - EN 10088  
**Component I:** S280GD, S320GD - EN 10346  
**Component II:** S235, S275, S355 - EN 10025-1  
S280GD, S320GD, S355GD - EN 10346

**Drilling capacity:** It ≤ 6,00 mm

**Timber substructures:**  
no performance determined

t <sub>min</sub> , t <sub>60</sub> , d, D [mm]	1.50	2.00	2.50	3.00	4.00	5.00	6.00	8.00	≥ 10.0
V <sub>k1</sub> [kN]	0.40	1.30	1.30	1.30	1.30	1.30	1.30	1.30	—
N <sub>k1x</sub> [kN]	0.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	—
N <sub>k2x</sub> [kN]	0.63	1.70	1.70	1.70	1.70	1.70	1.70	1.70	—
	0.75	2.00	2.00	2.00	2.00	2.00	2.00	2.00	—
	0.88	2.30	2.30	2.30	2.30	2.30	2.30	2.30	—
	1.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50	—
	0.40	—	—	—	—	—	—	—	—
	0.50	1.80	1.92	1.92	1.92	1.92	1.92	1.92	—
	0.55	1.80	2.19	2.19	2.19	2.19	2.19	2.19	—
	0.63	1.80	2.55	2.55	2.55	2.55	2.55	2.55	—
	0.75	1.80	2.80	3.57	3.57	3.57	3.57	3.57	—
	0.88	1.80	2.80	3.57	3.57	3.57	3.57	3.57	—
	1.00	1.80	2.80	3.57	3.57	3.57	3.57	3.57	—
	30	—	—	—	—	—	—	—	—
	40	18.0	8.0	7.0	6.0	5.0	3.0	—	—
	50	22.0	10.5	9.0	7.5	6.5	4.3	—	—
	60	26.0	13.0	11.0	9.0	8.0	5.5	—	—
	70	29.5	16.5	14.0	12.0	11.5	6.8	—	—
	80	33.0	20.0	17.5	15.0	14.0	8.0	—	—
	100	33.0	20.0	17.5	15.0	14.0	10.0	—	—
	120	33.0	20.0	17.5	15.0	14.0	12.0	—	—
	≥ 140	33.0	20.0	17.5	15.0	14.0	14.0	—	—

If component t<sub>61</sub> resp. t<sub>62</sub> is made of S320GD the grey highlighted values may be increased by 8,3%.  
If both components t<sub>61</sub> resp. t<sub>62</sub> and t<sub>63</sub> are made of S320GD all values V<sub>k1x</sub> and N<sub>k1x</sub> may be increased by 6,3%.

Self drilling screw

Hilti S-CD53S 5,5 x L

with hexagon head and sealing washer Ø16 mm

Annex 3

		<p><b>Material:</b> stainless Steel (1.4301) - EN 10088  <b>Fastener:</b> stainless Steel (1.4301) - EN 10088  <b>Washer:</b> stainless Steel (1.4301) - EN 10088  <b>Component I:</b> S280GD, S320GD - EN 10346  <b>Component II:</b> S235 - EN 10025-1, S280GD, S320GD - EN 10346</p> <p><b>Drilling capacity:</b> <math>Z_t \leq 12.00</math> mm</p> <p><b>Timber substructures:</b> no performance determined</p>								
		<p><b>Material:</b> stainless Steel (1.4301) - EN 10088  <b>Fastener:</b> stainless Steel (1.4301) - EN 10088  <b>Washer:</b> stainless Steel (1.4301) - EN 10088  <b>Component I:</b> S280GD, S320GD - EN 10346  <b>Component II:</b> S235 - EN 10025-1, S280GD, S320GD - EN 10346</p> <p><b>Drilling capacity:</b> <math>Z_t \leq 12.00</math> mm</p> <p><b>Timber substructures:</b> no performance determined</p>								
$t_{M1}, t_{M2}, d, D$ [mm]	3,00	4,00	5,00	6,00	8,00	9,00	10,0	11,0	11,0	≥ 12,0
$V_{Ed}$ [kN]	0,40	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30
$N_{Ed1}$ [kN]	0,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50
$N_{Ed2}$ [kN]	0,63	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80
	0,75	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
	0,88	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90	2,90
	1,00	3,50	3,50	3,50	3,50	3,50	3,50	3,50	3,50	3,50
	0,40	—	—	—	—	—	—	—	—	—
	0,50	1,96	1,96	1,96	1,96	1,96	1,96	1,96	1,96	1,96
	0,55	2,25	2,25	2,25	2,25	2,25	2,25	2,25	2,25	2,25
	0,63	2,76	2,76	2,76	2,76	2,76	2,76	2,76	2,76	2,76
	0,75	3,49	3,49	3,49	3,49	3,49	3,49	3,49	3,49	3,49
	0,88	3,49	3,49	3,49	3,49	3,49	3,49	3,49	3,49	3,49
	1,00	3,49	3,49	3,49	3,49	3,49	3,49	3,49	3,49	3,49
	30	—	—	—	—	—	—	—	—	—
	40	6,0	5,5	5,0	4,0	4,0	4,0	4,0	4,0	4,0
	50	8,0	7,5	7,0	6,0	6,0	6,0	6,0	6,0	6,0
	60	10,0	9,5	9,0	8,0	8,0	8,0	8,0	8,0	8,0
	70	12,5	11,5	11,0	9,5	9,5	9,5	9,5	9,5	9,5
	80	15,0	14,0	13,0	11,0	11,0	11,0	11,0	11,0	11,0
	100	15,0	14,0	13,0	11,0	11,0	11,0	11,0	11,0	11,0
	120	15,0	14,0	13,0	11,0	11,0	11,0	11,0	11,0	11,0
	≥ 140	15,0	14,0	13,0	11,0	11,0	11,0	11,0	11,0	11,0

If component  $t_{M1}$  resp.  $t_{M2}$  is made of S320GD the grey highlighted values may be increased by 8.3%.  
 If both components  $t_{M1}$  and  $t_{M2}$  are made of S320GD the values  $N_{Ed,1}$  and  $t_{M1}$  may be increased by 8.3%.

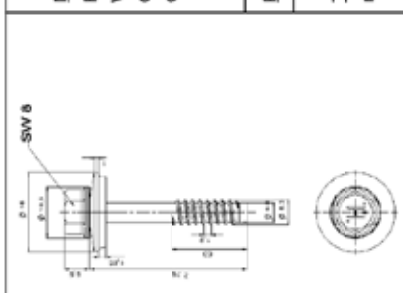
Self drilling screw

Hilti S-CD65S 5.5 x L  
 Hilti S-CD75S 5.5 x L  
 with hexagon head and sealing washer  $\geq \varnothing 19$  mm

Annex 4

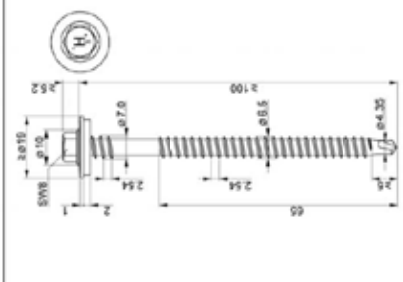
Annex 5



		<b>Material:</b> stainless Steel (1.4301) - EN 10088 <b>Fastener:</b> stainless Steel (1.4301) - EN 10088 <b>Washer:</b> Component I: S280GD, S320GD, S350GD - EN 10346 Component II: S235, S275, S355 - EN 10025-1 Component II: S280GD, S320GD, S350GD - EN 10346							
Presdrill diameter: see Table below									
<b>Timber substructures:</b> no performance determined									
$t_{0.05}, t_{0.2}, d$ [mm]	1,50	2,00	2,50	3,00	4,00	5,00	6,00	8,00	≥ 10,0
$V_{Rk}$ [kN]	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14
$N_{Rk}$ [kN]	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51
$u$ [mm]	20,0	12,0	4,0	4,0	3,0	3,0	3,0	3,0	3,0
$d_{per}$ [mm]	Ø5,0	Ø5,0	Ø5,3	Ø5,3	Ø5,5	Ø5,5	Ø5,7	Ø5,7	Ø5,7

<b>Self tapping screw</b>	
Hilti S-MIP54S 6,3 x L Hilti S-MIP64S 6,3 x L Hilti S-MIP74S 6,3 x L with hexagon head and sealing washer $\geq \varnothing 19$ mm	
Annex 6	

		<b>Material:</b> stainless Steel (1.4301) - EN 10088 <b>Fastener:</b> stainless Steel (1.4301) - EN 10088 <b>Washer:</b> Component I: S280GD, S320GD - EN 10346 Component II: Structural timber - EN 14081								
Drilling capacity: $\leq 2,00$ mm										
<b>Timber substructures:</b> performance determined with $M_{y,Rk} = 9,741$ Nm $t_{0,05} = 10,769$ N/mm <sup>2</sup> for $l_{02} \geq 50,0$ mm										
$t_{0.05}, t_{0.2}$ [mm]	0,40	—	—	—	—	—	—	—	—	—
$V_{Rk}$ [kN]	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90
$N_{Rk}$ [kN]	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20
$u$ [mm]	60	50	40	30	—	—	—	—	—	—

<b>Self drilling screw</b>	
Hilti S-CDW61S 6,5 x L Hilti S-CDW71S 6,5 x L with hexagon head and sealing washer $\geq \varnothing 19$ mm	
Annex 7	

If component  $t_{R1}$  resp.  $t_{R2}$  is made of S320GD the grey highlighted values may be increased by 8.3%.  
The values listed above in dependence on the screw-in length  $l_{in}$  are valid for  $k_{in,02} = 0,90$  and timber strength grade C24  
( $p_{0,2} = 350$  kg/m<sup>3</sup>). For other combinations of  $k_{in,02}$  and timber strength grades see section 4.2.

Page 18 of European technical approval  
ETA-13/0179 of 25 April 2013  
English translation prepared by DIBt

Deutsches Institut für Bautechnik  
**DIBt**

Page 17 of European technical approval  
ETA-13/0179 of 25 April 2013  
English translation prepared by DIBt

**Material:**  
 Fastener: stainless Steel (1.4301) - EN 10088  
 Washer: stainless Steel (1.4301) - EN 10088  
 Component I: S280GD, S320GD, S350GD - EN 10346  
 Component II: Structural timber - EN 14081

**Drilling capacity:**  $\Sigma t \leq 1,00$  mm

**Timber substructures:**  
 performance determined with  
 $M_{y,Rk} = 14,830$  Nm  
 $f_{axk} = 8,575$  N/mm<sup>2</sup> for  $l_{wp} \geq 35,0$  mm

$t_{hp}, t_{wz}$ [mm]	d, D [mm]											
	30	40	50	60	70	80	100	120	140	$\geq 140$		
$V_{b,Rk}$ [kN]	0,40	0,76	0,76	1,19	1,19	1,19	1,19	1,19	1,19	1,19	1,19	1,19
$V_{h,Rk}$ [kN]	0,50	1,19	1,19	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30
$N_{b,Rk}$ [kN]	0,83	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47	1,47
$N_{h,Rk}$ [kN]	0,75	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74
$N_{t,Rk}$ [kN]	0,88	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74
$N_{r,Rk}$ [kN]	1,00	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74
$n$ [mm]	4,0	6,0	8,0	10,0	10,0	10,0	10,0	10,0	10,0	10,0	10,0	10,0

If component  $t_{hp}$  is made of S320GD or S350GD the grey highlighted values may be increased by 8%.  
 The values listed above in dependence on the screw-in length  $l_{wp}$  are valid for  $k_{mod} = 0,90$  and timber strength grade C24  
 ( $p_a = 350$  kg/m<sup>3</sup>). For other combinations of  $k_{mod}$  and timber strength grades see section 4.2.2.

**Self drilling screw**

Hilti S-CDW50S 6,5 x L  
with hexagon head and sealing washer  $\phi 16$  mm

Annex 9

Z36257-13

8.06.02-208/10

**Material:**  
 Fastener: stainless Steel (1.4301) - EN 10088  
 Washer: stainless Steel (1.4301) - EN 10088  
 Component I: S280GD, S320GD - EN 10346  
 Component II: Structural timber - EN 14081

**Drilling capacity:**  $\Sigma t \leq 2,00$  mm

**Timber substructures:**  
 performance determined with  
 $M_{y,Rk} = 9,741$  Nm  
 $f_{axk} = 10,769$  N/mm<sup>2</sup> for  $l_{wp} \geq 50,0$  mm

$t_{hp}, t_{wz}$ [mm]	d, D [mm]										
	30	40	50	60	70	80	100	120	140	$\geq 140$	
$V_{b,Rk}$ [kN]	0,40	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90
$V_{h,Rk}$ [kN]	0,50	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20
$N_{b,Rk}$ [kN]	0,83	1,60	1,60	1,60	1,60	1,60	1,60	1,60	1,60	1,60	1,60
$N_{h,Rk}$ [kN]	0,75	2,10	2,10	2,10	2,10	2,10	2,10	2,10	2,10	2,10	2,10
$N_{t,Rk}$ [kN]	0,88	2,10	2,10	2,10	2,10	2,10	2,10	2,10	2,10	2,10	2,10
$N_{r,Rk}$ [kN]	1,00	2,10	2,10	2,10	2,10	2,10	2,10	2,10	2,10	2,10	2,10
$n$ [mm]	—	5,0	7,0	9,0	11,0	13,0	18,0	18,0	18,0	18,0	18,0

If component  $t_{hp}$  resp.  $t_{wz}$  is made of S320GD the grey highlighted values may be increased by 8,3%.  
 The values listed above in dependence on the screw-in length  $l_{wp}$  are valid for  $k_{mod} = 0,90$  and timber strength grade C24  
 ( $p_a = 350$  kg/m<sup>3</sup>). For other combinations of  $k_{mod}$  and timber strength grades see section 4.2.2.

**Self drilling screw**

Hilti S-CDW51S 6,5 x L  
with hexagon head and sealing washer  $\phi 16$  mm

Annex 8

Z36257-13

8.06.02-208/10



## European Technical Assessment

English translation prepared by CSTB – Original version in French language

**ETA-12/0057  
of 22/04/2015**

### GENERAL PART

**Technical Assessment Body issuing the European Technical Assessment:**

Centre Scientifique et Technique du Bâtiment (CSTB)

**Trade name of the construction product:**

**Fastener HILTI for systems of mechanically fastened flexible roof waterproofing membranes**

**Product family to which the construction product belongs:**

Product Area Code: 33  
Fasteners

**Manufacturer:**

**HILTI  
Feldkircherstrasse 100  
FL 9494 SCHAAN**

**Manufacturing plant(s):**

**PRINCIPALITY OF LIECHTENSTEIN**  
Hilti AG – Usine (Plant) 0246  
Hilti AG – Usine (Plant) 6522  
Hilti AG – Usine (Plant) 6103  
Hilti AG – Usine (Plant) 8263

28 pages including 21 Annex(es) which form an integral part of this assessment

**This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of:**

European Technical Approval Guideline No 006  
Annexe D (ETAG 006), edition march 2000  
amended November 2012, used as European Assessment Document (EAD)  
ETA-12/0057 issued on 26/07/2012

**This version replaces:**

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential Annex(es) referred to above). However, partial reproduction may be made, with the written consent of the CSTB. Any partial reproduction has to be identified as such.

## 16.5 ETA-12/0057 - Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

### SPECIFIC PART

#### 1. Technical description of the product

The fasteners for systems of mechanically fastened flexible roof waterproofing membrane (MEFAWAME), subject of this ETA, are fasteners composed of a fastening element (screw or nail) and a distribution washer. These fasteners mechanically fasten a waterproofing membrane to the bearing structure.

The different fasteners are :

Fastening element	Distribution washer	Substrate
S-IS 01C 4.8 x L	S-IW 5.6 AZ 40	
S-IS 01C 4.8 x L	S-IW 5.6 AZ 40 x 40	
S-IS 01C 4.8 x L	S-IW 5.6 AZ 64 x 64	
S-IS 01C 4.8 x L	S-IW 5.6 AZ 80 x 40	
S-IT 01C 4.8 x L	S-IW 4.9 AZ 40	
S-IT 01C 4.8 x L	S-IW 4.9 AZ 40 x 40	
S-IT 01C 4.8 x L	S-IW 4.9 AZ 64 x 64	
S-IT 01C 4.8 x L	S-IW 4.9 AZ 80 x 40	
S-ID 01C 4.8 x L	S-IP 40 x L	Profiled metal decking substrate (standard)
S-ID 01C 4.8 x L	S-IP 50 x L	
S-ID 01C 4.8 x L	S-IP 80x40 x L	
S-ID 01S 4.8 x L	S-IP 40 x L	
S-ID 01S 4.8 x L	S-IP 50 x L	
S-ID 01S 4.8 x L	S-IP 80x40 x L	
S-IT 01C 6.3 x L	S-IW 6.6 AZ 40	
S-IT 01C 6.3 x L	S-IW 6.6 AZ 40 x 40	
S-IT 01C 6.3 x L	S-IW 6.6 AZ 64 x 64	
S-IT 01C 6.3 x L	S-IW 6.6 AZ 80 x 40	
S-ID 01C 6.7 x L	S-IP 40 x L	Profiled metal decking substrate (acoustic)
S-ID 01C 6.7 x L	S-IP 50 x L	
S-ID 01C 6.7 x L	S-IP 80x40 x L	

#### Composition of the fasteners

##### Fastening elements

- S-IS 01C 4.8 x L : hardened carbon steel screw. Diameter of 4.8 mm, length L and with a 8.5 mm diameter head.
- S-IT 01C 4.8 x L : hardened carbon steel screw. Double thread, diameter of 4.8 mm, length L and with a 8.5 mm diameter head.
- S-IT 01C 6.3 x L : hardened carbon steel screw, double-thread, diameter of 6.3 mm, length L. Hexagonal head 8 mm with collar 12.5 mm diameter head.
- S-ID 01C 4.8 x L : hardened carbon steel screw. Diameter of 4.8 mm length L and head PH2 with a diameter of 9.6 mm.
- S-ID 01S 4.8 x L : stainless steel screw. Diameter of 4.8 mm, length L and head PH2 with a diameter of 9.6 mm.
- S-ID 01C 6.7 x L : hardened carbon steel screw. Diameter of 6.7 mm, length and head PH2 with a diameter of 9.7 mm.

##### Distribution washers

- S-IW 5.6 AZ 40 : steel plate ø 40 mm, thickness 0.8 mm. Hole ø 5.6 mm. Aluzinc protection
- S-IW 5.6 AZ 40 x 40 : steel plate 40x40 mm, thickness 0.8 mm. Hole ø 5.6 mm. Aluzinc protection

- S-IW 5.6 AZ 64 x 64 : steel plate 64x64 mm, thickness 0.8 mm, hole  $\varnothing$  5.6 mm, Aluzinc protection
- S-IW 5.6 AZ 80 x 40 : steel plate 80x40 mm, thickness 0.8 mm, hole  $\varnothing$  5.6 mm, Aluzinc protection
- S-IW 4.9 AZ 40 : steel plate  $\varnothing$  40 mm, thickness 0.8 mm, hole  $\varnothing$  4.9 mm, Aluzinc protection
- S-IW 4.9 AZ 40 x 40 : steel plate 40x40 mm, thickness 0.8 mm, hole  $\varnothing$  4.9 mm, Aluzinc protection
- S-IW 4.9 AZ 64 x 64 : steel plate 64x64 mm, thickness 0.8 mm, hole  $\varnothing$  4.9 mm, Aluzinc protection
- S-IW 4.9 AZ 80 x 40 : steel plate 80x40 mm, thickness 0.8 mm, hole  $\varnothing$  4.9 mm, Aluzinc protection
- S-IW 6.6 AZ 40 : steel plate  $\varnothing$  40 mm, thickness 0.8 mm, hole  $\varnothing$  6.6 mm, race  $\varnothing$  27 mm and height 6 mm to sunk the head, Aluzinc protection.
- S-IW 6.6 AZ 40 x 40 : steel plate 40x40 mm, thickness 0.8 mm, hole  $\varnothing$  6.6 mm, race  $\varnothing$  27 mm and height 6 mm to sunk the head, Aluzinc protection.
- S-IW 6.6 AZ 64 x 64 : steel plate 64x64 mm, thickness 0.8 mm, hole  $\varnothing$  6.6 mm, race  $\varnothing$  27 mm and height 6 mm to sunk the head, Aluzinc protection.
- S-IW 6.6 AZ 80 x 40 : steel plate 80x40 mm, thickness 0.8 mm, hole  $\varnothing$  6.6 mm, race  $\varnothing$  27 mm and height 6 mm to sunk the head, Aluzinc protection.
- S-IP 40 x L : plastic plug, head  $\varnothing$  40 mm, polyamide PA6  
d3 =  $\varnothing$  13.8 mm (shaft), d1 =  $\varnothing$  3.6 mm (hole)
- S-IP 50 x L : plastic plug, head  $\varnothing$  50 mm, polyamide PA6  
d3 =  $\varnothing$  13.8 mm (shaft), d1 =  $\varnothing$  3.6 mm (hole)
- S-IP 8040 x L : plastic plug, head 80 x 40 mm, polyamide PA6  
d3 =  $\varnothing$  13.8 mm (shaft), d1 =  $\varnothing$  3.6 mm (hole)

## 2. Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

The fasteners for systems of mechanically fastened flexible membranes are used to fasten waterproofing membranes which protect the roof surfaces against penetration of atmospheric water

The bearing elements are metallic.

In the manufacturer's technical dossier (MTD) to this European technical assessment (ETA) the manufacturer gave information concerning the substrate on which the fasteners can be used.

The verifications which are based on this ETA give reason for the assumption of an intended working life of the roof waterproofing of at least 10 years.

## 3. Performances of the product and references to the methods used for their assessment

Performances of the fasteners, related to the basic requirements for construction works (hereinafter BWR), were determined according to chapter 4 of the ETAG 006 edition march 2000 amended November 2012.

These performances, given in the following paragraphs, are valid as long as the components are the ones described in § 1 and Annexes 1 to 21 of this ETA.

### 3.1 Mechanical resistance and stability (BWR 1)

Not relevant.

### 3.2 Safety in case of fire (BWR 2)

Reaction to fire: No performance determined

External fire performance: No performance determined

### 3.3 Hygiene, health and the environment (BWR 3)

According to Technical Report EOTA n° 034, the product does not contain dangerous substance.

### 3.4 Safety and accessibility in use (BWR 4)

#### 3.4.1 Axial loading

Name of the fastener	Thickness of support [mm]	Characteristic axial load $N_{Rk}$ (1) [N]	Steel deck
<i>Profiled metal decking substrate (standard)</i>			
S-IS 01 C 4.8xL + S-IW 5.6 AZ 40	0.75	1460	S320GD
S-IS 01 C 4.8xL + S-IW 5.6 AZ 40x40	0.75	1550	S320GD
S-IS 01 C 4.8xL + S-IW 5.6 AZ 64x64	0.75	1460	S320GD
S-IS 01 C 4.8xL + S-IW 5.6 AZ 80x40	0.75	1420	S320GD
S-II 01 C 4.8 x L + S-IW 4.9 AZ 40	0.75	1390	S320GD
S-II 01 C 4.8 x L + S-IW 4.9 AZ 40x40	0.75	1450	S320GD
S-II 01 C 4.8 x L + S-IW 4.9 AZ 64x64	0.75	1450	S320GD
S-II 01 C 4.8 x L + S-IW 4.9 AZ 80x40	0.75	970	S320GD
S-ID 01 C 4.8 x L + S-IP 40 x L	1.00	1340	S320GD
S-ID 01 C 4.8 x L + S-IP 50 x L	0.75	1040	S320GD
S-ID 01 C 4.8 x L + S-IP 8040 x L	1.00	1190	S320GD
S-ID 01 C 4.8 x L + S-IP 8040 x L	0.75	1090	S320GD
S-ID 015 4.8 x L + S-IP 40 x L	1.00	1470	S320GD
S-ID 015 4.8 x L + S-IP 40 x L	0.75	970	S320GD
S-ID 015 4.8 x L + S-IP 50 x L	1.00	1340	S320GD
S-ID 015 4.8 x L + S-IP 50 x L	0.75	1020	S320GD
S-ID 015 4.8 x L + S-IP 8040 x L	1.00	1190	S320GD
S-ID 015 4.8 x L + S-IP 8040 x L	0.75	1020	S320GD
<i>Profiled metal decking substrate (acoustic)</i>			
S-II 01 C 6.3 x L + S-IW 6.6 AZ 40	0.75	1810	S320GD
S-II 01 C 6.3 x L + S-IW 6.6 AZ 40x40	0.75	1780	S320GD
S-II 01 C 6.3 x L + S-IW 6.6 AZ 64x64	0.75	1780	S320GD
S-II 01 C 6.3 x L + S-IW 6.6 AZ 80x40	0.75	1720	S320GD
S-ID 01 C 6.7 x L + S-IP 40 x L	1.00	1790	S320GD
S-ID 01 C 6.7 x L + S-IP 40 x L	0.75	1100	S320GD
S-ID 01 C 6.7 x L + S-IP 50 x L	1.00	1790	S320GD
S-ID 01 C 6.7 x L + S-IP 50 x L	0.75	1100	S320GD
S-ID 01 C 6.7 x L + S-IP 8040 x L	1.00	1790	S320GD

(1)  $N_{Rk}$  corresponds to the characteristic axial load named "R<sub>k</sub>" in Annex D (ETAG 006), edition march 2000 amended November 2012.

### 3.4.2 Resistance to unwinding

The fasteners are assessed as resistant to :

rotation of the fastener head  $\leq$  1/4 turn after 500 cycles

rotation of the fastener head  $\leq$  1/2 turn after 900 cycles

vertical movement  $\leq$  1 mm after 900 cycles

### 3.5 Protection against noise (BWR 5)

Not relevant.

### 3.6 Energy economy and heat retention (BWR 6)

Not relevant.

### 3.7 Sustainable use of natural resources (BWR 7)

No performance determined.

### 3.8 Aspects of durability and serviceability

#### 3.8.1 Corrosion resistance

Name of the fastener	Corrosion class <sup>(1)</sup>
<b>Profiled metal decking substrate (standard)</b>	
S-IS 01 C 4.8 x L + S-IW 5.6 AZ 40	C15
S-IS 01 C 4.8 x L + S-IW 5.6 AZ 40x40	C15
S-IS 01 C 4.8 x L + S-IW 5.6 AZ 64x64	C15
S-IS 01 C 4.8 x L + S-IW 5.6 AZ 80x40	C15
S-IT 01 C 4.8 x L + S-IW 4.9 AZ 40	C15
S-IT 01 C 4.8 x L + S-IW 4.9 AZ 40x40	C15
S-IT 01 C 4.8 x L + S-IW 4.9 AZ 64x64	C15
S-IT 01 C 4.8 x L + S-IW 4.9 AZ 80x40	C15
S-ID 01 C 4.8 x L + S-IP 40 x L	C15
S-ID 01 C 4.8 x L + S-IP 80x40 x L	C15
S-ID 01 C 4.8 x L + S-IP 80x40 x L	C15
S-ID 01 C 4.8 x L + S-IP 80x40 x L	C15
S-ID 01 C 4.8 x L + S-IP 80x40 x L	C15
S-ID 01 C 4.8 x L + S-IP 80x40 x L	C15
S-ID 01 S 4.8 x L + S-IP 40 x L	not relevant
S-ID 01 S 4.8 x L + S-IP 50 x L	not relevant
S-ID 01 S 4.8 x L + S-IP 80x40 x L	not relevant
<b>Profiled metal decking substrate (acoustic)</b>	
S-IT 01 C 6.3 x L + S-IW 6.6 AZ 40	C15
S-IT 01 C 6.3 x L + S-IW 6.6 AZ 40x40	C15
S-IT 01 C 6.3 x L + S-IW 6.6 AZ 64x64	C15
S-IT 01 C 6.3 x L + S-IW 6.6 AZ 80x40	C15
S-ID 01 C 6.7 x L + S-IP 40 x L	C15
S-ID 01 C 6.7 x L + S-IP 50 x L	C15
S-ID 01 C 6.7 x L + S-IP 80x40 x L	C15

<sup>(1)</sup> class C2 = surface corrosion = 0 % after 2 cycles

class C7 = surface corrosion ≤ 5 % after 7 cycles

class C15 = surface corrosion ≤ 15 % after 15 cycles

#### 3.8.2 Mechanical resistance/brittleness of the plastic fastener

Name of the fastener	Mechanical resistance before and after heat ageing: drop height [m] <sup>(1)</sup>
<b>Profiled metal decking substrate (standard)</b>	
S-IS 01 C 4.8 x L + S-IW 5.6 AZ 40	Not relevant
S-IS 01 C 4.8 x L + S-IW 5.6 AZ 40x40	Not relevant
S-IS 01 C 4.8 x L + S-IW 5.6 AZ 64x64	Not relevant
S-IS 01 C 4.8 x L + S-IW 5.6 AZ 80x40	Not relevant
S-IT 01 C 4.8 x L + S-IW 4.9 AZ 40	Not relevant
S-IT 01 C 4.8 x L + S-IW 4.9 AZ 40x40	Not relevant
S-IT 01 C 4.8 x L + S-IW 4.9 AZ 64x64	Not relevant
S-IT 01 C 4.8 x L + S-IW 4.9 AZ 80x40	Not relevant
S-ID 01 C 4.8 x L + S-IP 40 x L	OK
S-ID 01 C 4.8 x L + S-IP 50 x L	OK
S-ID 01 C 4.8 x L + S-IP 80x40 x L	OK
S-ID 01 S 4.8 x L + S-IP 40 x L	OK
S-ID 01 S 4.8 x L + S-IP 50 x L	OK
S-ID 01 S 4.8 x L + S-IP 80x40 x L	OK
<b>Profiled metal decking substrate (acoustic)</b>	
S-IT 01 C 6.3 x L + S-IW 6.6 AZ 40	Not relevant
S-IT 01 C 6.3 x L + S-IW 6.6 AZ 40x40	Not relevant
S-IT 01 C 6.3 x L + S-IW 6.6 AZ 64x64	Not relevant
S-IT 01 C 6.3 x L + S-IW 6.6 AZ 80x40	Not relevant
S-ID 01 C 6.7 x L + S-IP 40 x L	OK
S-ID 01 C 6.7 x L + S-IP 50 x L	OK
S-ID 01 C 6.7 x L + S-IP 80x40 x L	OK

<sup>(1)</sup> Heat ageing of the plastic part of the fastener for 28 days at 80 ± 2 °C.

Drop height ≥ 1.0 m is checked .

#### 3.8.3 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

According to Decision 97/223/EC <sup>1</sup>, the systems of AVCP given in the following table apply:

Product	Intended use	Levels or classes (Reaction to fire)	System
Fasteners for mechanically fastened flexible roof waterproofing membranes	For building works	-	2+

The systems of AVCP are described in Annex V of Regulation (EU) No 305/2011, as amended by Delegated Regulation (EU) No 568/2014.

<sup>1</sup> Decisions are published in the Official Journal of the European Union (OJEU), see [www.new.eu-lex.europa.eu/oj/direct-access.html](http://www.new.eu-lex.europa.eu/oj/direct-access.html).



Rules and conditions for affixing of CE marking conform to article 9 of Regulation (EU) No 305/2011.

**4. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD**

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at the CSTB.

The control plan is a confidential part of the manufacturer's technical dossier (MTD) and is deposited at the CSTB. The control plan isn't included in the published parts of this ETA.

The verifications underlying this ETA have been furnished on samples from the current production. These will replace the initial type-testing. After changing the production process or starting the production in another manufacturing plant the initial type-testing shall be repeated.

The manufacturers of fasteners shall, on the basis of a contract, involve a notified body approved in the field of fasteners for systems of mechanically fastened flexible roof waterproofing membranes for issuing the certificate of conformity CE based on the control plan.

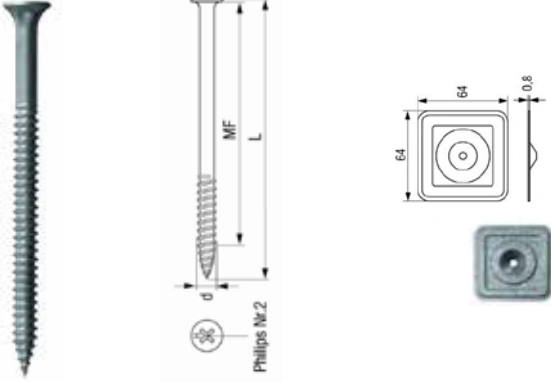
Issued in Marne-la-Vallée on 22/04/2015

by

Charles BALOCHE, Technical Manager of the CSTB

	<p><b>Annex 1</b></p> <p>of European Technical Assessment <b>ETA-12/0057</b></p>
	<p>Fasteners for systems of mechanically fastened flexible roof waterproofing membranes</p> <p><b>Sketch</b></p> <p><b>screw S-IS 01 C 4.8 x L and plate S-IW 5.6 AZ 40</b></p>

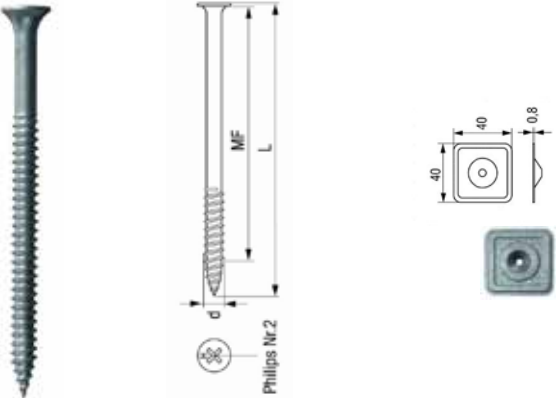
**CSTB**

	<b>Annex 3</b> of European Technical Assessment <b>ETA-12/0057</b>
	Fasteners for systems of mechanically fastened flexible roof waterproofing membranes  Sketch <b>screw S-IS 01 C 4.8 x L and plate S-IW 5.6 AZ 64x64</b>

ETA-12/0057 of 22/04/2015

page 10 of 28

**CSTB**


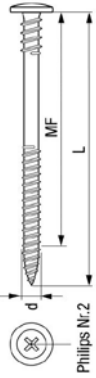
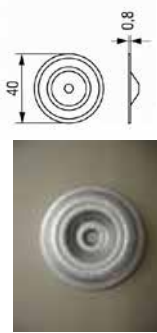
	<b>Annex 2</b> of European Technical Assessment <b>ETA-12/0057</b>
	Fasteners for systems of mechanically fastened flexible roof waterproofing membranes  Sketch <b>screw S-IS 01 C 4.8 x L and plate S-IW 5.6 AZ 40x40</b>

ETA-12/0057 of 22/04/2015

page 9 of 28




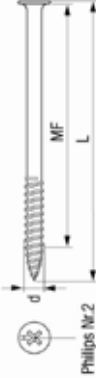
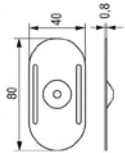


  	<b>Annex 5</b> of European Technical Assessment <b>ETA-12/0057</b>
	Fasteners for systems of mechanically fastened flexible roof waterproofing membranes  Sketch <b>screw S-IW 01 C 4.8 x L and plate S-IW 4.9 AZ 40</b>

ETA-12/0057 of 22/04/2015

page 12 of 28


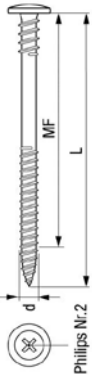
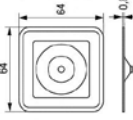



  	<b>Annex 4</b> of European Technical Assessment <b>ETA-12/0057</b>
	Fasteners for systems of mechanically fastened flexible roof waterproofing membranes  Sketch <b>screw S-IS 01 C 4.8 x L and plate S-IW 5.6 AZ 80x40</b>


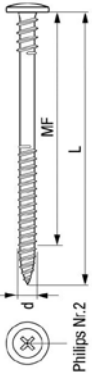
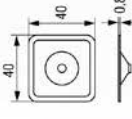

ETA-12/0057 of 22/04/2015

page 11 of 28



   	<p><b>Annex 7</b> of European Technical Assessment ETA-12/0057</p>
	<p><i>Fasteners for systems of mechanically fastened flexible roof waterproofing membranes</i></p> <p><b>screw S-IS 01 C 4.8 x L and plate S-IW 4.9 AZ 64x64</b></p> <p style="text-align: center;">Sketch</p>



   	<p><b>Annex 6</b> of European Technical Assessment ETA-12/0057</p>
	<p><i>Fasteners for systems of mechanically fastened flexible roof waterproofing membranes</i></p> <p><b>screw S-IT 01 C 4.8 x L and plate S-IW 4.9 AZ 40x40</b></p> <p style="text-align: center;">Sketch</p>



	<b>Annex 9</b>
	of European Technical Assessment <b>ETA-12/0057</b>
Fasteners for systems of mechanically fastened flexible roof waterproofing membranes  <b>screw S-IT 01 C 6.3 x L and plate S-IW 6.6 AZ 40</b>	

ETA-12/0057 of 22/04/2015

page 16 of 28



	<b>Annex 8</b>
	of European Technical Assessment <b>ETA-12/0057</b>
Fasteners for systems of mechanically fastened flexible roof waterproofing membranes  <b>screw S-IT 01 C 4.8 x L and plate S-IW 4.9 AZ 80x40</b>	

ETA-12/0057 of 22/04/2015

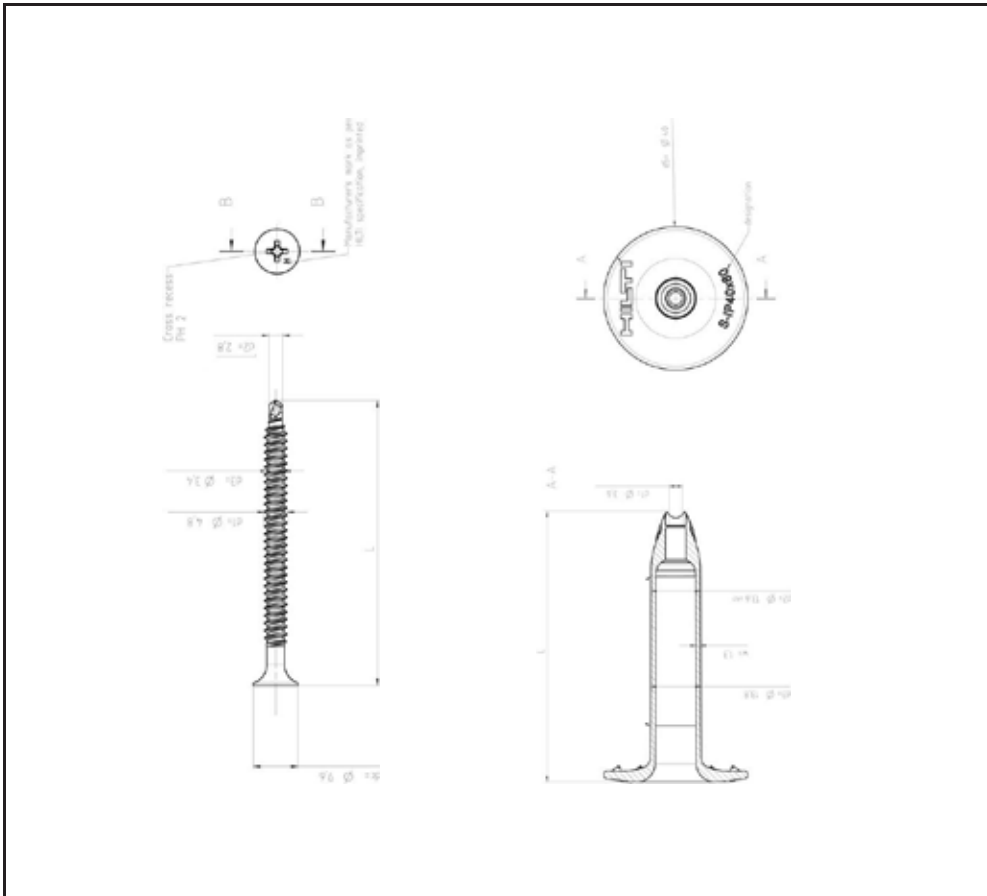
page 15 of 28



	<p><b>Annex 11</b></p> <p>of European Technical Assessment ETA-12/0057</p>
	<p><i>Fasteners for systems of mechanically fastened flexible roof waterproofing membranes</i></p> <p><b>Sketch</b></p> <p><b>screw S-IT 01 C 6.3 x L and plate S-IW 6.6 AZ 64x64</b></p>



	<p><b>Annex 10</b></p> <p>of European Technical Assessment ETA-12/0057</p>
	<p><i>Fasteners for systems of mechanically fastened flexible roof waterproofing membranes</i></p> <p><b>Sketch</b></p> <p><b>screw S-IT 01 C 6.3 x L and plate S-IW 6.6 AZ 40x40</b></p>

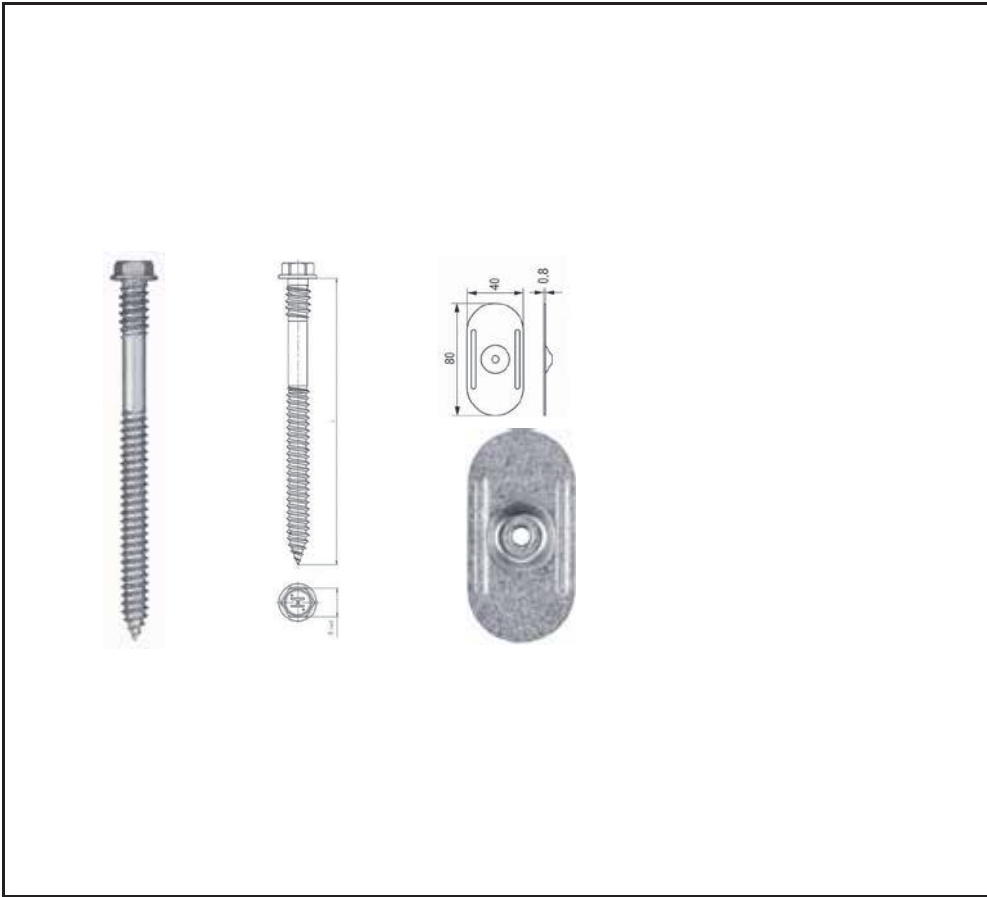


Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

**Annex 13**  
of European  
Technical  
Assessment  
**ETA-12/0057**

Sketch

**Screw S-ID 01 C 4.8 x L and plastic plug S-IP 40 x L**

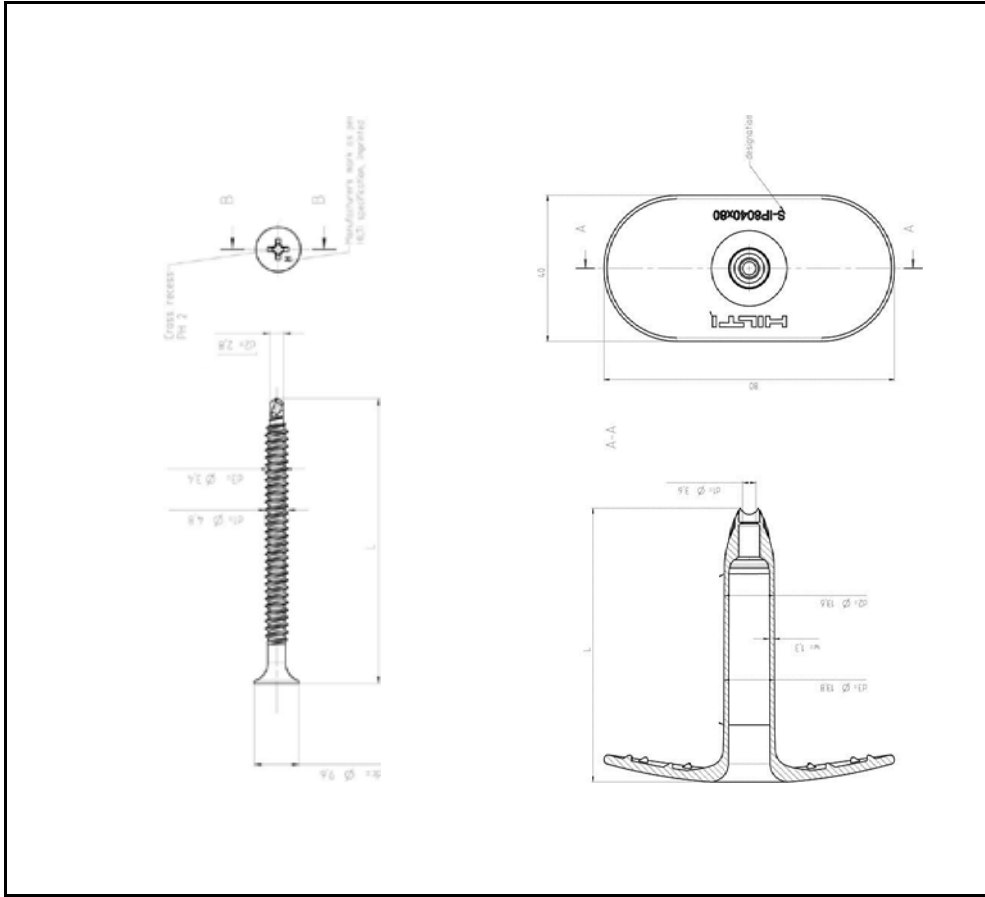


Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

**Annex 12**  
of European  
Technical  
Assessment  
**ETA-12/0057**

Sketch

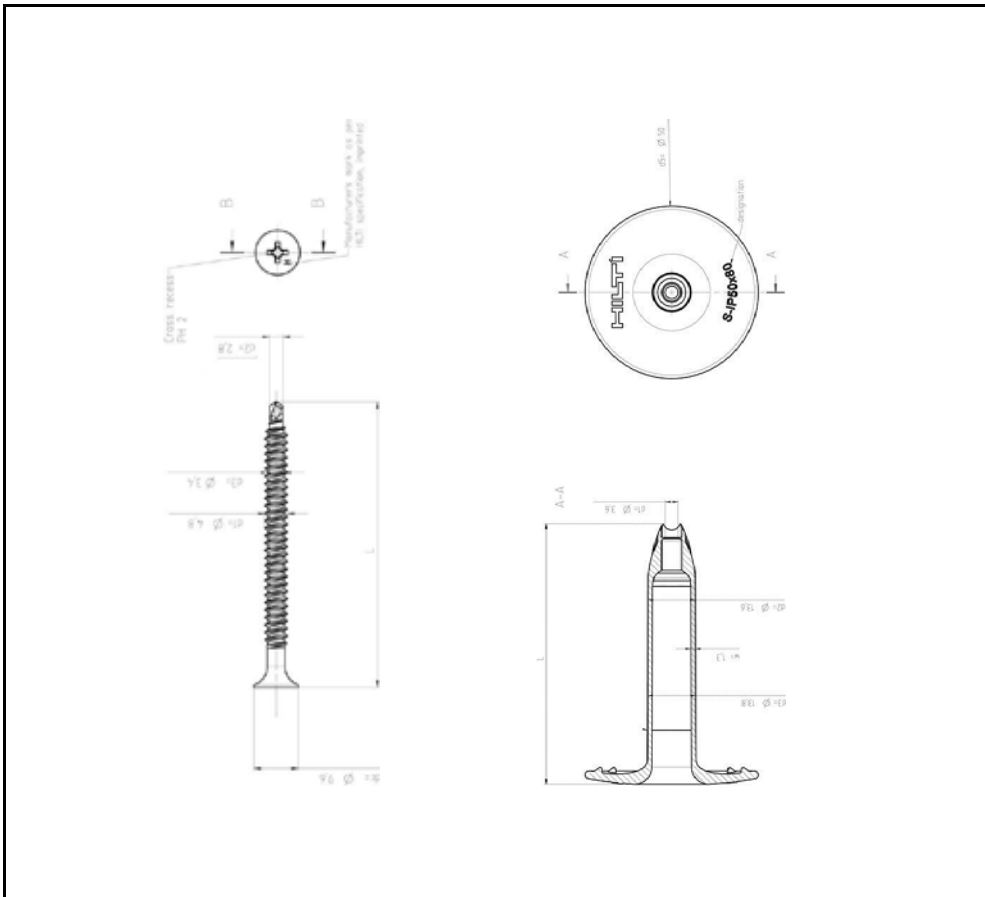
**Screw S-IT 01 C 6.3 x L and plate S-IW 6.6 AZ 80x40**



Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

**Annex 15**  
of European  
Technical  
Assessment  
ETA-12/0057

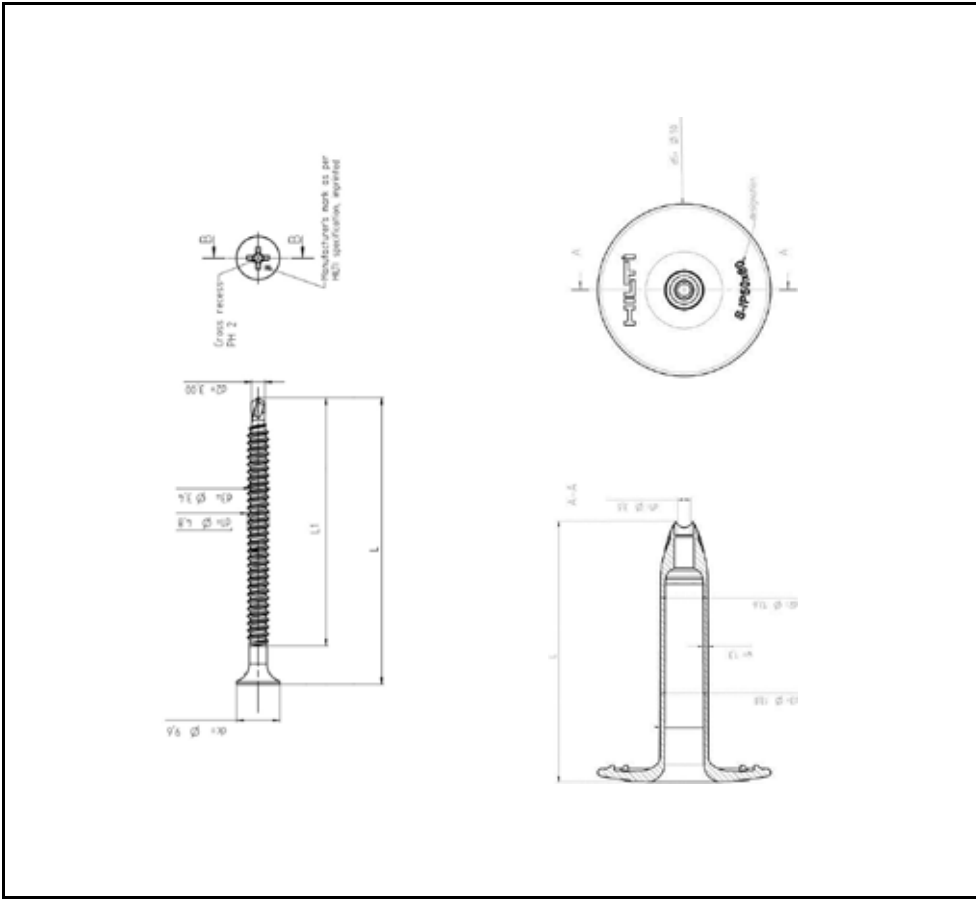
Sketch  
**Screw S-ID 01 C 4.8 x L and plastic plug S-IP 8040 x L**



Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

**Annex 14**  
of European  
Technical  
Assessment  
ETA-12/0057

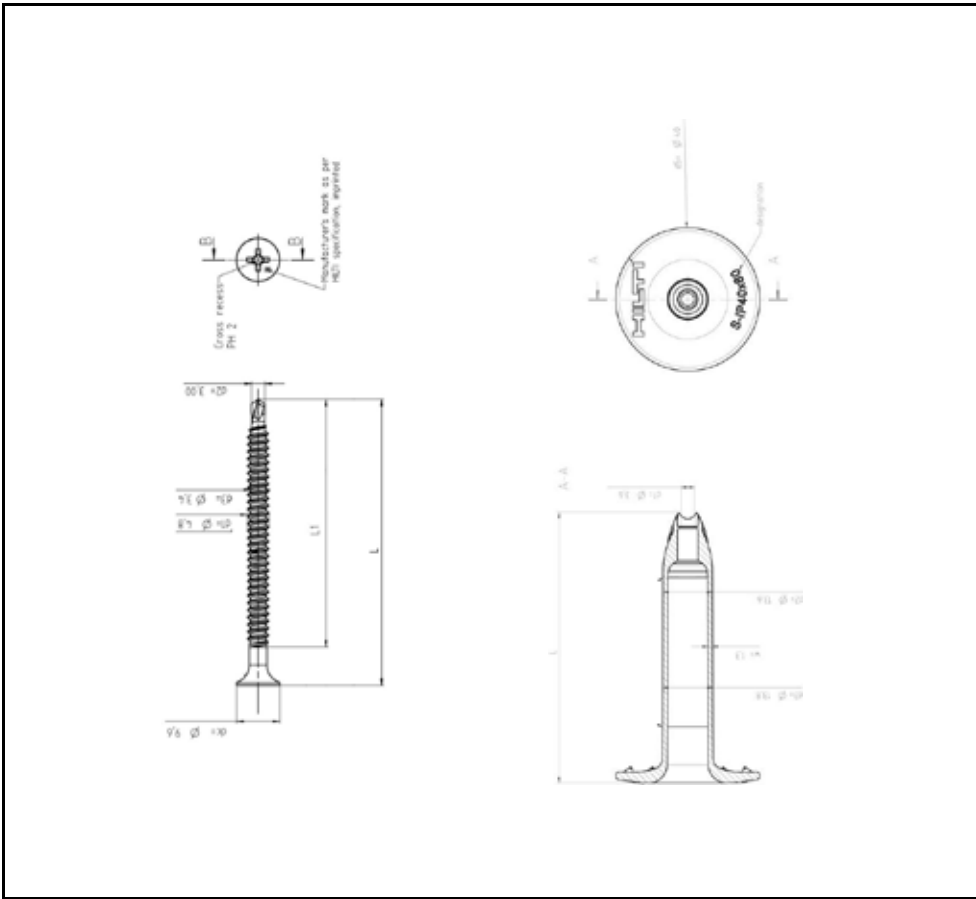
Sketch  
**Screw S-ID 01 C 4.8 x L and plastic plug S-IP 50 x L**



Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

Annex 17 of European Technical Assessment ETA-12/0057

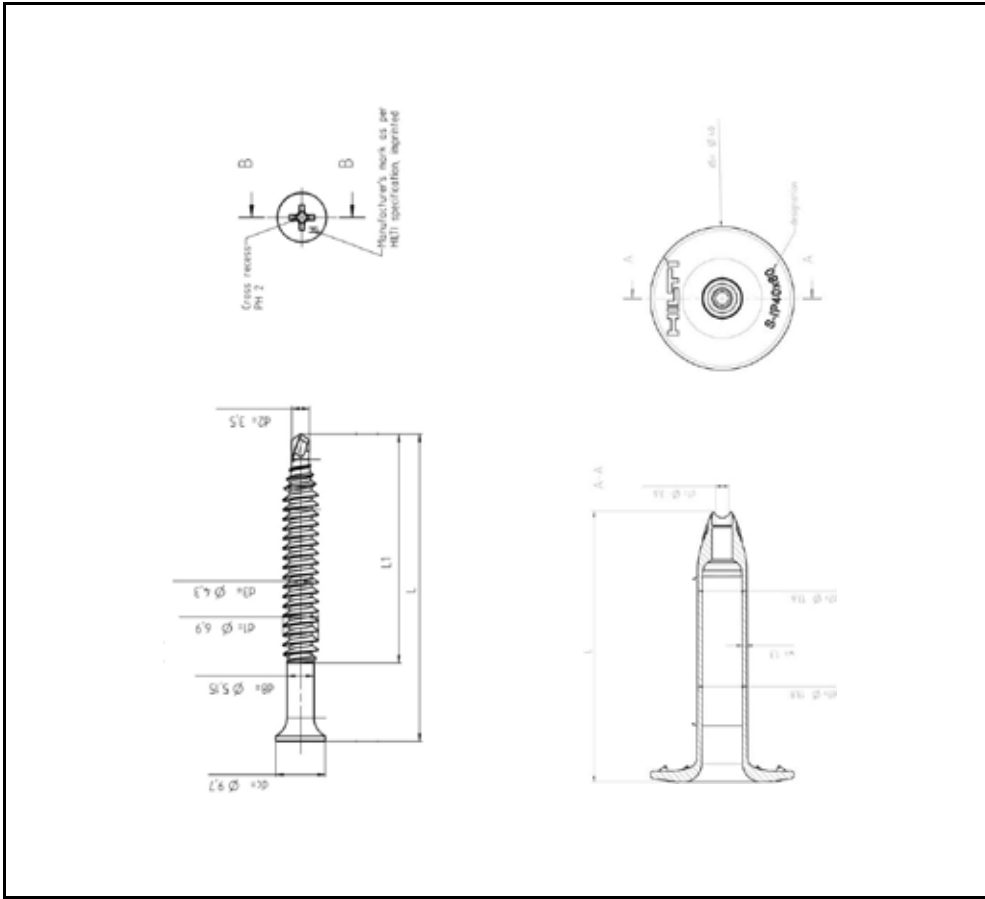
Sketch  
Screw S-ID 01 S 4.8 x L and plastic plug S-IP 50 x L



Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

Annex 16 of European Technical Assessment ETA-12/0057

Sketch  
Screw S-ID 01 S 4.8 x L and plastic plug S-IP 40 x L



Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

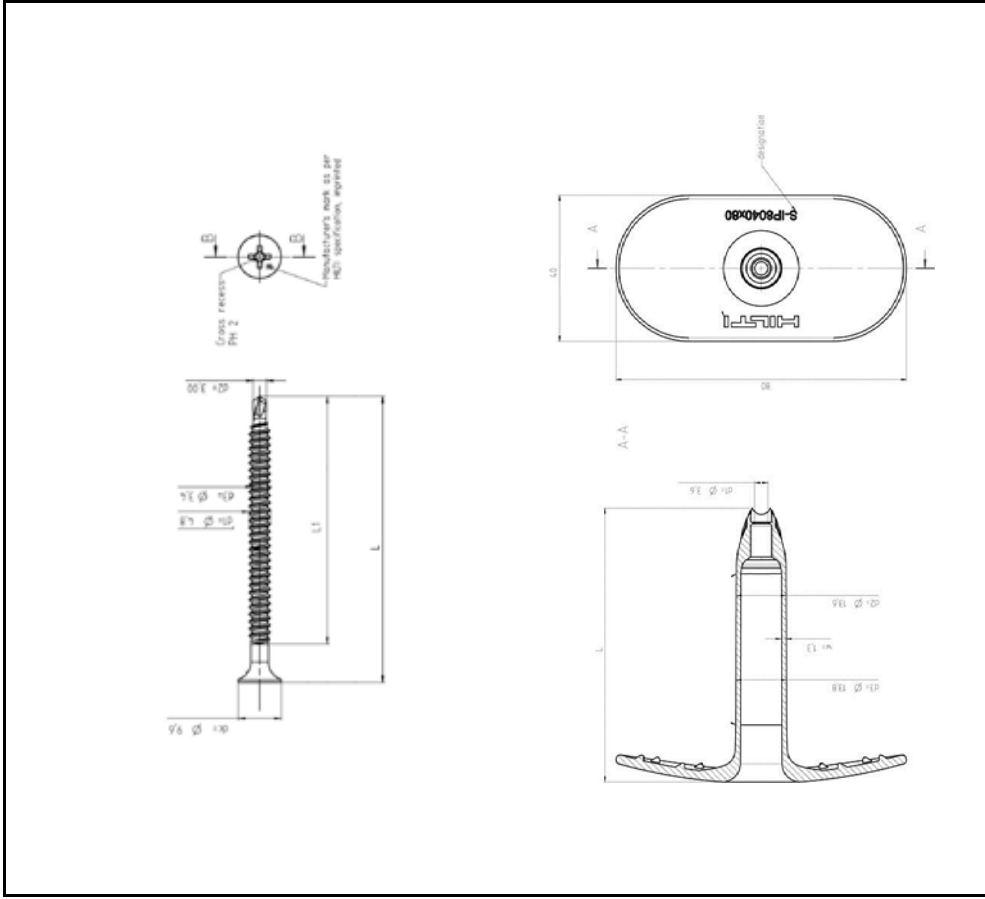
**Annex 19**  
of European  
Technical  
Assessment  
ETA-12/0057

Sketch

**Screw S-ID 01 C 6.7 x L and plastic plug S-IP 40 x L**

ETA-12/0057 of 22/04/2015

page 26 of 28



Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

**Annex 18**  
of European  
Technical  
Assessment  
ETA-12/0057

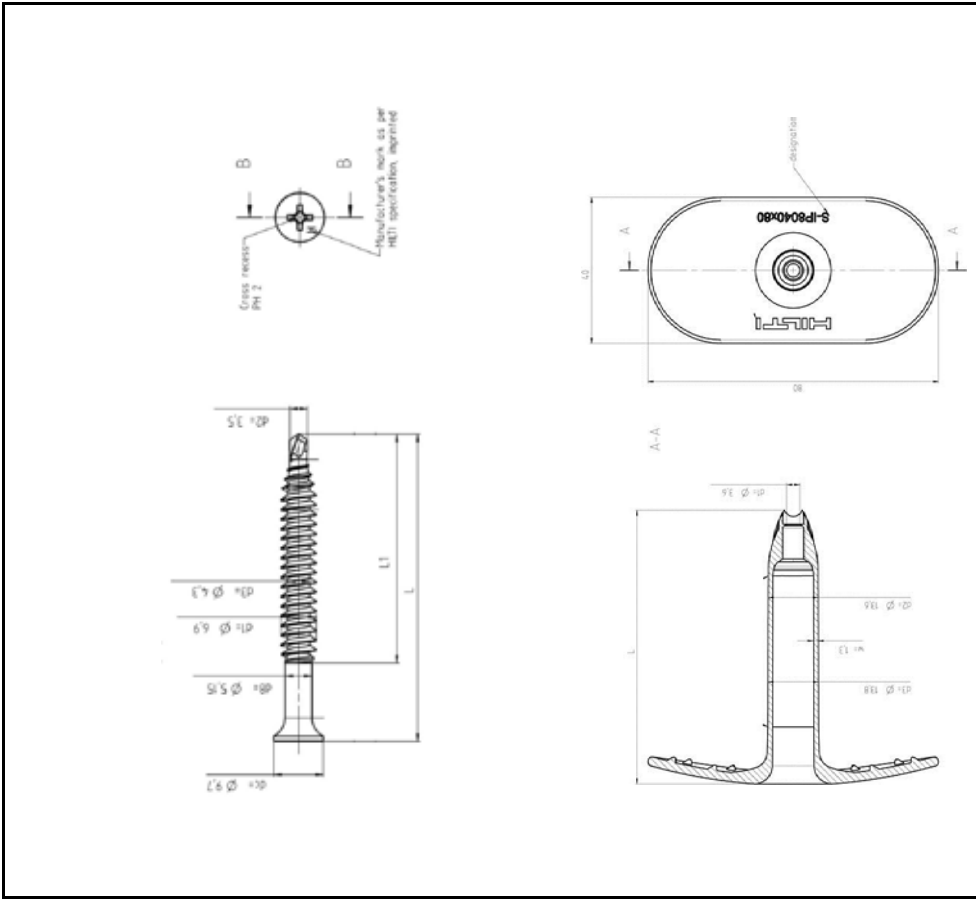
Sketch

**Screw S-ID 01 S 4.8 x L and plastic plug S-IP 8040 x L**

ETA-12/0057 of 22/04/2015

page 25 of 28





Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

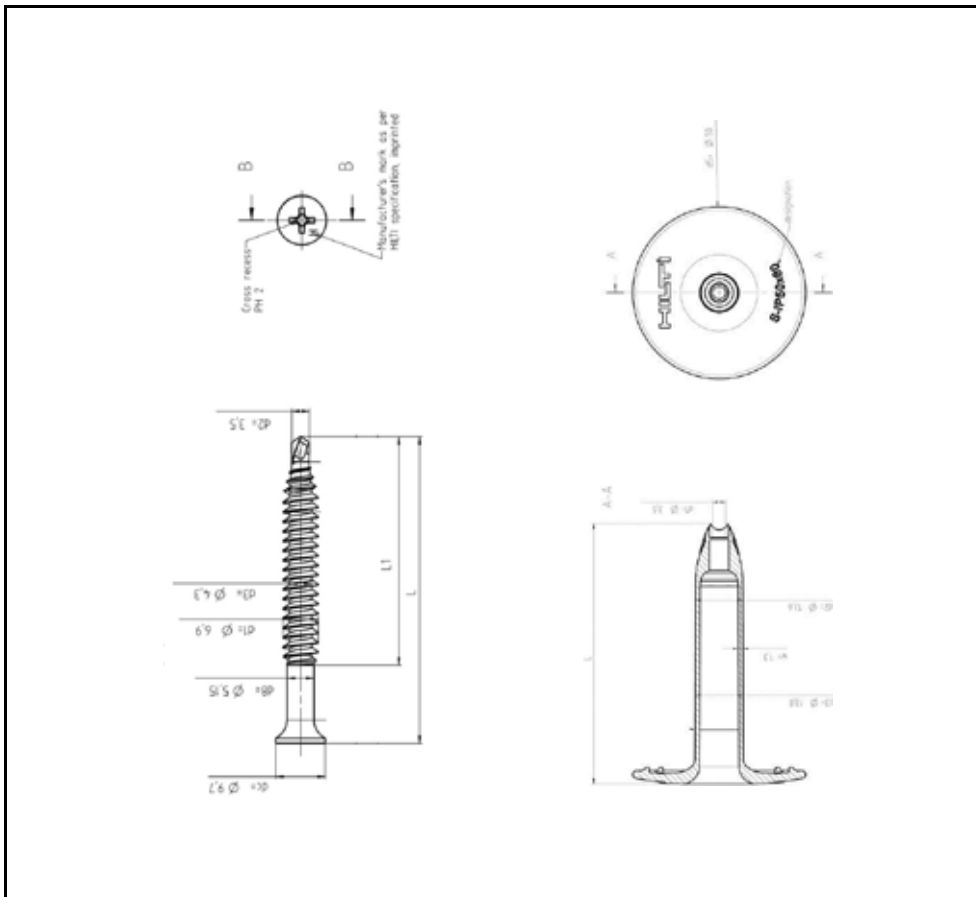
Sketch

**Screw S-ID 01 C 6.7 x L and plastic plug S-IP 8040 x L**

**Annex 21**  
of European  
Technical  
Assessment  
ETA-12/0057

ETA-12/0057 of 22/04/2015

page 28 of 28



Fasteners for systems of mechanically fastened flexible roof waterproofing membranes

Sketch

**Screw S-ID 01 C 6.7 x L and plastic plug S-IP 50 x L**

**Annex 20**  
of European  
Technical  
Assessment  
ETA-12/0057

ETA-12/0057 of 22/04/2015

page 27 of 28

# 16.6 Z-14.1-4 - German approval for fastening screws for steel members and sheeting



Bescheid über die Änderung und Ergänzung der allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-4

Seite 2 von 9 | 11. Juni 2014

## Bescheid

über die Änderung und Ergänzung der allgemeinen bauaufsichtlichen Zulassung vom 18. Januar 2011

Zulassungsnummer:  
**Z-14.1-4**

Antragsteller:  
**IFBS**  
Europark Fichtenhain A 13a  
47807 Krefeld

Zulassungsgegenstand:  
Verbindungselemente zur Verbindung von Bauteilen im Metallleichtbau

Dieser Bescheid ändert und ergänzt die allgemeine bauaufsichtliche Zulassung Nr. Z-14.1-4 vom 18. Januar 2011, geändert und ergänzt durch Bescheide vom 9. Mai 2011, 15. August 2011, 20. Juli 2012 und vom 8. April 2013.  
Dieser Bescheid umfasst neun Seiten und 41 Anlagen. Er gilt nur in Verbindung mit der oben genannten allgemeinen bauaufsichtlichen Zulassung und darf nur zusammen mit dieser verwendet werden.

Zulassungsstelle für Bauprodukte und Bauarten  
Bautechnisches Profamt  
Eine vom Bund und den Ländern  
gemeinsam getragene Anstalt des öffentlichen Rechts  
Mitglied der EOTA, der UEAc und der WFTAO

Datum: 11.06.2014  
Geschäftszeichen: I 36-1.14.1-45/14

Geltungsdauer  
vom: **11. Juni 2014**  
bis: **1. Februar 2016**

## ZU II BESONDERE BESTIMMUNGEN

Die Besonderen Bestimmungen der allgemeinen bauaufsichtlichen Zulassung werden wie folgt geändert und ergänzt:

1. Die Abschnitte 1 bis 4 erhalten folgende neue Fassung (kompletter Textteil):

### 1 Zulassungsgegenstand und Anwendungsbereich

Zulassungsgegenstand sind mechanische Verbindungselemente zur planmäßig kraftübertragenden Verbindung von Bauteilen aus Stahl miteinander oder mit Unterkonstruktionen aus Stahl oder Holz (gilt nur für Schrauben).

Die verschiedenen Arten dieser Verbindungselemente werden im Folgenden beschrieben (siehe auch Anlage 1):

- Blindniete
- Blindniete bestehen aus einer Nethülse und einem Nieldorn, der eine Sollbruchstelle haben kann. Beim Verriegeln der Bauteile muss die Schließkopffseite nicht zugänglich sein.
- Gewindeförmige Schrauben
  - Sie werden untergliedert in:
    - Gewindelochende Schrauben, die sich ihr Muttergewinde in ein vorhandenes, passendes Loch spanlos formen,
    - Bohrschrauben, die über eine Bohrspitze verfügen, sodass in einem Arbeitsgang das Bohren eines Loches, das Formen eines Muttergewindes und der Einschraubvorgang erfolgen,
    - Fließbohrschrauben, die über eine ballig ausgeführte Spitze mit Gewinde verfügen, so dass in einem Arbeitsgang das Loch durch Materialverdrängung (Fließbohren) erzeugt wird und das Formen des Muttergewindes sowie der Einschraubvorgang erfolgen.
- Setzbohlen

Setzbohlen werden mittels Bolzensetzwerkzeugen in einem Arbeitsgang bis zum Anlegen der Rondelle durch das zu befestigende Bauteil hindurch in die Unterkonstruktion hineingetrieben. Die Rondellen zentrieren den Setzbohlen beim Eintreiben und vergrößern die Hohlfläche des Bolzenkopfes.

Diese allgemeine bauaufsichtliche Zulassung regelt die mit den mechanischen Verbindungselementen hergestellten Verbindungen für den Fall statischer oder quasi-statischer Beanspruchungen.

Diese allgemeine bauaufsichtliche Zulassung regelt nicht die Verwendung der zu verbindenden Bauteile.



DIBt | Kolonnenstraße 30 | D-10829 Berlin | Tel.: +49 30 78735-0 | Fax: +49 30 78735-320 | E-Mail: dibt@dibt.de | www.dibt.de

Z3576\_14

1.14.1-4/14

Bescheid über die Änderung und Ergänzung der  
allgemeinen bauaufsichtlichen Zulassung

Nr. Z-14.1-4

Seite 3 von 9 | 11. Juni 2014

Bescheid über die Änderung und Ergänzung der  
allgemeinen bauaufsichtlichen Zulassung

Nr. Z-14.1-4

Seite 4 von 9 | 11. Juni 2014

## 2 Bestimmungen für das Bauprodukt

### 2.1 Eigenschaften und Zusammensetzung

#### 2.1.1 Abmessungen

Die Hauptabmessungen (Nennabmessungen) sind in den Anlagen aufgeführt. Weitere Angaben zu Abmessungen und Toleranzen sind beim Deutschen Institut für Bautechnik hinterlegt.

#### 2.1.2 Werkstoffe

##### 2.1.2.1 Allgemeines

Für die Werkstoffe der Verbindungselemente und der zu verbindenden Bauteile gelten die Angaben in den Anlagen, sofern nachfolgend keine anderen Festlegungen getroffen werden.

##### 2.1.2.2 Verbindungselemente

Schrauben oder Scheiben, die entsprechend der jeweiligen Anlagen zu dieser allgemeinen bauaufsichtlichen Zulassung aus nichtrostendem Stahl der Gruppe A2 nach allgemeiner bauaufsichtlicher Zulassung Z-30.3-6 bestehen (z.B. 1.4301 oder 1.4567) dürfen auch aus nichtrostendem Stahl der Gruppe A4 gefertigt sein (z.B. 1.4404 oder 1.4578).

#### 2.1.3 Korrosionsschutz

Bei Verbindungselementen, die nicht aus nichtrostendem Werkstoff bestehen, ist der Korrosionsschutz der Verbindungselemente durch Verzinkung und ggf. Beschichtung dem erforderlichen Korrosionsschutz der zu verbindenden Bauteile anzupassen. Die Festlegungen in DIN EN ISO 4042:2001-01 sind zu beachten. Die Schichtdicke der galvanischen Verzinkung muss mindestens 8µm betragen.

#### 2.2 Kennzeichnung

Die Verpackung der Verbindungselemente oder der Beipackzettel muss vom Hersteller mit dem Übereinstimmungszeichen (U-Zeichen) nach den Übereinstimmungszeichen-Verordnungen der Länder gekennzeichnet werden. Die Kennzeichnung darf nur erfolgen, wenn die Voraussetzungen nach Abschnitt 2.3 erfüllt sind.

Jede Verpackung muss zusätzlich mit einem Etikett versehen sein, das Angaben zum Hersteller (Werkkennzeichen), zur Bezeichnung, zur Geometrie und zum Werkstoff des Verbindungselementes enthält.

Schrauben und Setzbolzen sind zusätzlich mit einem Kopfzeichen (Herstellerkennzeichen) zu versehen.

### 2.3 Übereinstimmungsnachweis

#### 2.3.1 Allgemeines

Die Bestätigung der Übereinstimmung der Verbindungselemente mit den Bestimmungen dieser allgemeinen bauaufsichtlichen Zulassung muss für jedes Herstellwerk mit einem Übereinstimmungszertifikat auf der Grundlage einer werkseigenen Produktionskontrolle und einer regelmäßigen Fremdüberwachung einschließlich einer Erstrprüfung der Verbindungselemente nach Maßgabe der folgenden Bestimmungen erfolgen.

Für die Erteilung des Übereinstimmungszertifikats und die Fremdüberwachung einschließlich der dabei durchzuführenden Produktprüfungen hat der Hersteller der Verbindungselemente eine hierfür anerkannte Zertifizierungsstelle sowie eine hierfür anerkannte Überwachungsstelle einzuschalten.

Die Erklärung, dass ein Übereinstimmungszertifikat erteilt ist, hat der Hersteller durch Kennzeichnung der Bauprodukte mit dem Übereinstimmungszeichen (U-Zeichen) unter Hinweis auf den Verwendungszweck abzugeben.

Dem Deutschen Institut für Bautechnik ist von der Zertifizierungsstelle eine Kopie des von ihr erteilten Übereinstimmungszertifikats zur Kenntnis zu geben.

Z26579 14

1.14.1-45/14

Bescheid über die Änderung und Ergänzung der  
allgemeinen bauaufsichtlichen Zulassung

Nr. Z-14.1-4

Seite 3 von 9 | 11. Juni 2014

Für Umfang, Art und Häufigkeit der werkseigenen Produktionskontrolle und der Fremdüberwachung gelten die Zulassungsgrundsätze des Deutschen Instituts für Bautechnik für den "Übereinstimmungsnachweis für Verbindungselemente im Metalleichtbau" (siehe Heft 6/1989 der "DIBt Mitteilungen").

### 2.3.2 Werkseigene Produktionskontrolle

In jedem Herstellwerk ist eine werkseigene Produktionskontrolle einzurichten und durchzuführen. Unter werkseigener Produktionskontrolle wird die vom Hersteller vorzunehmende kontinuierliche Überwachung der Produktion verstanden, mit der dieser sicherstellt, dass die von ihm hergestellten Verbindungselemente den Bestimmungen dieser allgemeinen bauaufsichtlichen Zulassung entsprechen.

Die Ergebnisse der werkseigenen Produktionskontrolle sind aufzuzeichnen und auszuwerten. Die Aufzeichnungen müssen mindestens folgende Angaben enthalten:

- Bezeichnung der Verbindungselemente bzw. des Ausgangsmaterials und der Bestandteile
- Art der Kontrolle oder Prüfung
- Datum der Herstellung und der Prüfung der Verbindungselemente bzw. des Ausgangsmaterials oder der Bestandteile
- Ergebnis der Kontrollen und Prüfungen und Vergleich mit den beim Deutschen Institut für Bautechnik hinterlegten Anforderungen
- Unterschrift des für die werkseigene Produktionskontrolle Verantwortlichen.

Die Aufzeichnungen sind mindestens fünf Jahre aufzubewahren und der für die Fremdüberwachung eingeschalteten Überwachungsstelle vorzulegen. Sie sind dem Deutschen Institut für Bautechnik und der zuständigen obersten Bauaufsichtsbehörde auf Verlangen vorzulegen.

Bei ungenügendem Prüfergebnis sind vom Hersteller unverzüglich die erforderlichen Maßnahmen zur Abstellung des Mangels zu treffen. Verbindungselemente, die den Anforderungen nicht entsprechen, sind so zu handhaben, dass Verwechslungen mit solchen, die einwandfrei sind, ausgeschlossen werden. Nach Abstellung des Mangels ist - soweit technisch möglich und zum Nachweis der Mangelbeseitigung erforderlich - die betreffende Prüfung unverzüglich zu wiederholen.

### 2.3.3 Fremdüberwachung

In jedem Herstellwerk ist die werkseigene Produktionskontrolle durch eine Fremdüberwachung regelmäßig zu überprüfen, mindestens jedoch einmal jährlich.

Im Rahmen der Fremdüberwachung ist eine Erstrprüfung der Verbindungselemente durchzuführen und es sind stichprobenartige Prüfungen durchzuführen. Die Probenahme und Prüfungen obliegen jeweils der anerkannten Stelle.

Die Ergebnisse der Zertifizierung und Fremdüberwachung sind mindestens fünf Jahre aufzubewahren. Sie sind von der Zertifizierungsstelle bzw. der Überwachungsstelle dem Deutschen Institut für Bautechnik und der zuständigen obersten Bauaufsichtsbehörde auf Verlangen vorzulegen.

## 3 Bestimmungen für Entwurf und Bemessung

### 3.1 Entwurf

#### 3.1.1 Allgemeines

Sofern auf dem jeweiligen Anlageblatt nichts anderes angegeben ist, müssen Verbindungselemente, die vollständig oder teilweise der Bewitterung oder einer ähnlichen Feuchtebelastung ausgesetzt sind, aus nichtrostendem Werkstoff bestehen. Das gilt nicht für eventuell angeschweißte Bohrspitzen oder Nietdorne, die nach dem Setzen vollständig entfernt werden.

Z26579 14

1.14.1-45/14



Bescheid über die Änderung und Ergänzung der allgemeinen bauaufsichtlichen Zulassung

Nr. Z-14-1-4

Seite 5 von 9 | 11. Juni 2014

Die in dieser Zulassung genannten Verbindungselemente mit Korrosionsschutz (z. B. durch Verzinkung) dürfen nur dort verwendet werden, wo eine Befestigung des Verbindungselementes nicht zu erwarten ist (im Allgemeinen gilt dies für die Innenschalen mehrschaliger Dach- und Wandkonstruktionen bei trockenem überwiegend geschlossenen Räumen sowie für einschalige, unbelüftete Dachkonstruktionen mit oberseitiger Wärmedämmung bzw. Deckensysteme über trockenem, überwiegend geschlossenen Räumen).

### 3.1.2 Blindniete

Blindniete dürfen nur in Verbindungen verwendet werden, bei denen keine oder nur vernachlässigbar kleine temperaturbedingte Zwängungsbeanspruchungen auftreten.

### 3.1.3 Gewindeformende Schrauben

Gewindeformende Schrauben dürfen zur Verbindung von Bauteilen aus Stahl miteinander und zur Verbindung von Bauteilen aus Stahl mit Unterkonstruktionen aus Stahl und ggf. Holz verwendet werden.

### 3.1.4 Setzbolzen

Setzbolzen dürfen nur zur Verbindung von dünnwandigen Bauteilen aus Stahl mit Unterkonstruktionen aus Stahl verwendet werden, und zwar nur unter Einhaltung der Anwendungsrichtlinien in den Anlagen. Es sind die in dem Diagramm "Anwendungsgrenzen" eingetragenen Obergrenzen der Zugfestigkeiten der jeweiligen Stahlsorten zugrunde zu legen.

Von der Anwendung der in den Diagrammen angegebenen Obergrenzen der Zugfestigkeiten der jeweiligen Stahlsorten darf abgewichen werden, wenn die am Bauwerk tatsächlich vorhandenen Zugfestigkeiten bekannt sind oder durch Probessetzungen die Anwendbarkeit der Setzbolzenbefestigung festgelegt wird.

## 3.2 Bemessung

### 3.2.1 Allgemeines

Es gilt das in DIN EN 1990:2010-12 angegebene Nachweiskonzept in Verbindung mit dem Nationalen Anhang.

Für die Ermittlung der auf jedes Verbindungselement einwirkenden Zug- und Querkräfte gelten die einschlägigen Normen, wie z. B. die zutreffenden Normen des Eurocodes.

Im Folgenden und in den Anlagen werden die zu befestigenden Bauteile (Bauteile am Schrauben- bzw. Setzkopf) als Bauteil I und das Bauteil, an dem befestigt wird, als Bauteil II bezeichnet. Bei Befestigung an einer Unterkonstruktion ist diese das Bauteil II.

Für Verbindungen von Bauteilen aus Stahl mit Unterkonstruktionen aus Holz oder Holzwerkstoffen dürfen nur diejenigen Verbindungselemente verwendet werden, bei denen dazu in den Anlagen Tragfähigkeitswerte angegeben sind.

### Charakteristische Werte der Tragfähigkeit

Die charakteristischen Werte der Tragfähigkeit sind für die einzelnen Verbindungselemente in den Anlagen angegeben (siehe hierzu auch Abschnitte 3.2.6 und 3.2.8).

Dabei gilt:

$N_{R,k}$  - charakteristischer Wert der Zugtragfähigkeit

$V_{R,k}$  - charakteristischer Wert der Querkrafttragfähigkeit

Bei Zwischenwerten der Bauteildicken I oder II ist jeweils der charakteristische Wert der geringeren Bauteildicke zu wählen.

### 3.2.3 Zusätzliche Regeln für die Verbindung mit Unterkonstruktionen aus Holz oder Holzwerkstoffen

Unterkonstruktionen aus Holz müssen aus Nadelholz mindestens der Festigkeitsklasse C24 nach DIN EN 14081-1:2011-05 in Verbindung mit DIN 20000-5:2012-03 oder aus Brettschichtholz nach DIN 1052:2008-12 bestehen.

Z-0579.14

1.14-1-45/14

Bescheid über die Änderung und Ergänzung der allgemeinen bauaufsichtlichen Zulassung

Nr. Z-14-1-4

Seite 6 von 9 | 11. Juni 2014

Die in diesem Abschnitt festgelegten zusätzlichen Regeln für die Verbindung mit Unterkonstruktionen aus Holz gelten nur für die Schrauben, für die in den Anlagen auf diesen Abschnitt verwiesen wird.

Es gilt DIN EN 1995-1-1:2010-12 in Verbindung mit dem Nationalen Anhang DIN EN 1995-1-1/NA:2010-12, sofern nachfolgend keine anderen Festlegungen getroffen werden.

Es gilt:

$d$  - Gewindeaußendurchmesser (entspricht dem Schraubennennendurchmesser)

$l_b$  - Einschraubtiefe (Länge des in Bauteil II eingreifenden Gewindedetails einschließlich einer eventuell vorhandener Spitze oder Bohrspitze)

$$l_b = L - l_1 - s_M - s_K$$

mit:

$L$  - Schraubenlänge (teilweise auch mit I bezeichnet)

$l_1$  - Dicke Bauteil I (bei mehreren zu befestigenden Bauteilen gilt:  $l_1 = \sum t_{i,j}$ )

$s_M$  - Dicke des Metallrückens der Dichtscheibe

$s_K$  - Dicke des Dichtmaterials der Dichtscheibe

$l_d$  - effektive Einschraubtiefe (entspricht der Eindringtiefe des Gewindedetails)

$$l_d = l_b - l_b \text{ mit } l_d \geq 4d$$

mit:

$l_b$  - Länge des gewindefreien Teils der Bohrspitze (bei Schrauben ohne Bohrspitze ist  $l_b = 0$ , bei Fließbohrschrauben ist  $l_b = d$ )

$$N_{R,k} = F_{ax,Rk} \cdot k_{mod}$$

$$V_{R,k} = F_{v,Rk} \cdot k_{mod}$$

mit:

$$F_{ax,Rk} = F_{ax,\alpha,Rk} \text{ bei } \alpha = 90^\circ$$

$F_{ax,\alpha,Rk}$  nach DIN EN 1995-1-1:2010-12, Gleichung (8.40a)

$F_{v,Rk}$  nach DIN EN 1995-1-1:2010-12, Abschnitt 8.2.3, Gleichung (8.9)

$k_{mod}$  nach DIN EN 1995-1-1:2010-12, Tabelle 3.1, sofern für Balkenschichtholz, Brettspertholz und Massivholzplatten keine anderen Werte dafür in DIN EN 1995-1-1/NA:2010-12, Tabelle NA.4 angegeben sind

$f_{u,k}$  = nach DIN EN 1995-1-1:2010-12, Gleichung (8.16)

$M_{y,Rk}$  in Gleichung (8.9) ist den entsprechenden Anlagen zu dieser allgemeinen bauaufsichtlichen Zulassung zu entnehmen. Die zum Teil in den Anlagen ausgewiesenen Werte für das Fliebmoment  $M_{y,k}$  nach DIN 1052 dürfen ersatzweise für diese Berechnung verwendet werden. Sofern in den Anlagen keine Werte angegeben sind, darf  $M_{y,Rk}$  wie folgt berechnet werden:

$$M_{y,Rk} = 0,3 \cdot f_u \cdot (1 - d_u)^{2,6} \text{ [Nmm]}$$

$d_u$  - Gewindedurchmesser, darf, wenn keine Werte vorliegen, überschlägig

berechnet werden mit:

$$d_u = 0,7 \cdot d$$

$f_u$  - Zugfestigkeit des Drahtes, aus dem die Schrauben gefertigt sind. Es darf ohne weiteren Nachweis angenommen werden:

$$f_u = 500 \text{ N/mm}^2$$

Z-0579.14

1.14-1-45/14

1.14-1-45/14

Beschied über die Änderung und Ergänzung der allgemeinen bauaufsichtlichen Zulassung  
Nr. Z-14-14

Seite 8 von 9 | 11. Juni 2014

Beschied über die Änderung und Ergänzung der allgemeinen bauaufsichtlichen Zulassung  
Nr. Z-14-14

Seite 7 von 9 | 11. Juni 2014

$f_{a,k}$  in Gleichung (8.40a) ist den entsprechenden Anlagen zu dieser allgemeinen bauaufsichtlichen Zulassung zu entnehmen. Die zum Teil in den Anlagen ausgewiesenen Werte für den Ausleihrparameter  $f_{1,k}$  nach DIN 1052 dürfen ersatzweise für diese Berechnung verwendet werden. Sofern in den Anlagen keine Werte angegeben sind, darf  $f_{a,k}$  in Näherung berechnet werden mit:

$$f_{a,k} = 70 \cdot 10^{-9} \cdot \rho_k^2 \quad [\text{N/mm}^2]$$

mit:

$\rho_k$  - charakteristische Rohdichte der Holzunterkonstruktion in  $\text{kg/m}^3$ ,  $\rho_k \leq 500 \text{ kg/m}^3$

$\rho_k = 350 \text{ kg/m}^3$  für die Festigkeitsklasse C24

Die nach Abschnitt 3.2.3 für Bauteil II berechneten charakteristischen Werte für Zugtragfähigkeit  $N_{k,k}$  (Auszug aus Holzunterkonstruktion) und Querkrafttragfähigkeit  $V_{k,k}$  (Lochleibungstragfähigkeit in Holzunterkonstruktion) sind mit den in der entsprechenden Anlage für Bauteil I angegebenen charakteristischen Werten für Zugtragfähigkeit  $N_{k,k}$  (Durchknöpfen) und Querkrafttragfähigkeit  $V_{k,k}$  (Lochleibungstragfähigkeit) zu vergleichen. Der kleinere Wert ist für die weitere Berechnung zu verwenden.

#### 3.2.4 Bemessungswerte der Tragfähigkeit

Für die Berechnung der Bemessungswerte der Tragfähigkeit aus den charakteristischen Werten gilt:

$$N_{k,d} = \frac{N_{k,k}}{\gamma_M}$$

$$V_{k,d} = \frac{V_{k,k}}{\gamma_M}$$

$$\text{mit } \gamma_M = 1,33$$

#### 3.2.5 Kombinierte Beanspruchung aus Zug- und Querkraften

Bei kombinierter Beanspruchung durch die Bemessungswerte der einwirkenden Zugkräfte  $N$  und Querkräfte  $V$  ist folgender Interaktionsnachweis zu führen:

$$\frac{N}{N_{k,d}} + \frac{V}{V_{k,d}} \leq 1,0$$

#### 3.2.6 Querbeanspruchung infolge Temperaturänderung

In den Anlagen sind die ohne zusätzlichen rechnerischen Nachweis der Querbeanspruchung infolge Temperaturänderung zulässigen Befestigungstypen a, b, c, d (siehe Anlage 1.1) jeweils neben den charakteristischen Werten der Tragfähigkeit in der Tabelle angegeben.

Sofern neben den Tabellenwerten in den Anlagen ein Befestigungstyp nicht angegeben ist, ist die Verwendung der betreffenden Verbindungselemente für Verbindungen dieses Typs nur mit einem Nachweis der temperaturbedingten Zwängbeanspruchung (Querbeanspruchung) zulässig.

Ohne diesen Nachweis dürfen die betreffenden Verbindungselemente dann in der bezeichneten Bauteil-Kombination nur für zwängungsfreie Verbindungen verwendet werden.

Diese Einschränkung gilt jedoch nicht für Verbindungen von Profilaufeln mit in Tafelängsrichtung nachgiebigen Unterkonstruktionen (z.B. aus Stahlkassettensproffilaufeln oder dünnwandigen Platten- bzw. Riegelprofilen), bei denen aufgrund ihrer Nachgiebigkeit keine oder nur vernachlässigbar kleine temperaturbedingte Zwängbeanspruchungen entstehen können.

Sie gilt ebenfalls nicht für biegesteife Stöße in Wärmedächern.

#### 3.2.7 Besondere Anwendungsfälle

Bei besonderen Anwendungsfällen gemäß Anlage 1.2 sind die charakteristischen Werte der Zugtragfähigkeit mit dem in Spalte 2 der Tabelle in Anlage 1.2 angegebenen Abminderungsfaktor abzumindern. Liegt eine Kombination der Anwendungsfälle vor, so ist jeweils der kleinere der Werte anzunehmen.

#### 3.2.8 Zusätzliche Regeln für die Befestigung von gelochten Blechen

Für die Befestigung von gelochten Blechen (Bauteil I) dürfen nur Schrauben mit den in den Anlagen 5.1 bis 5.4 angegebenen Schraubendurchmessern von den dort aufgeführten Firmen verwendet werden, für die in den Anlagen zu dieser allgemeinen bauaufsichtlichen Zulassung charakteristische Werte für die Befestigung ungelochter Bleche mit gleicher Dicke und Festigkeit wie die gelochten Bleche angegeben sind.

Für die Bemessung der Verbindungen sind die charakteristischen Werte für die Verbindung von ungelochten Blechen nach der entsprechenden Anlage und die Befestigung von gelochten Blechen nach Anlage 5.1 bis 5.4 zu ermitteln. Die niedrigeren Werte sind für die weitere Berechnung zu verwenden.

Die Befestigung an gelochten Blechen (Bauteil II) ist in dieser allgemeinen bauaufsichtlichen Zulassung nicht geregelt.

#### 4 Bestimmungen für die Ausführung

Die nachfolgenden Regelungen gelten, sofern in den jeweiligen Anlagen nichts anderes angegeben ist.

Verbindungen entsprechend Abschnitt 1 dürfen nur von Firmen hergestellt werden, die die dazu erforderliche Erfahrung haben, es sei denn, es ist für eine Einweisung des Montagepersonals durch Fachkräfte gesorgt, die auf diesem Gebiet Erfahrungen besitzen.

Schrauben sind mit einem Schrauber mit entsprechend eingestelltem Tiefenanschlag einzuschrauben. Die Verwendung von Schlagschraubern ist unzulässig.

Bei Verbindungselementen, die der Witterung oder einer anderen Feuchtebelastung ausgesetzt sind, ist Abschnitt 3.1.1 zu beachten. Durch die Ausführung ist außerdem sicherzustellen, dass keine Kontaktkorrosion auftreten kann.

Bei planmäßiger Querkraftbeanspruchung müssen die zu verbindenden Bauteile unmittelbar aufeinanderliegen und die Scherfuge muss sich an der Kontaktstelle Bauteil I mit Bauteil II befinden, sodass das Verbindungselement keine zusätzliche Biegung erhält. Die Anordnung druckfester thermischer Trennstreifen mit einer komprimierten Dicke von maximal 3 mm ist zulässig.

Die Verbindungselemente sind rechtwinklig zur Bauteiloberfläche einzubringen, um eine einwandfrei tragende und erforderlichenfalls regensichere Verbindung sicherzustellen.

Beim Einbau der für die Anwendung auf Holzunterkonstruktionen zugelassenen Schrauben, ausgenommen Bohrschrauben, sind die zu verbindenden Bauteile I und II mit  $0,7 \cdot d$  vorzubohren, soweit in den Anlageblättern nichts anderes angegeben ist.

Bei der Verwendung von Bohrschrauben ist nur bei Unterkonstruktionen aus Bauholz mit einer charakteristischen Rohdichte von über  $500 \text{ kg/m}^3$  und bei Douglasenholz über die gesamte Einschraubtiefe  $l_b$  mit einem Bohrdurchmesser entsprechend dem Durchmesser der Bohrspitze vorzubohren.

Z-6079.14

Z-6079.14

1.14.1-45/14

1.14.1-45/14







# 16.7 Z-14.1-537 - German approval for fastening screws for steel members and sheeting



Seite 2 von 10 | 17. Februar 2014

Allgemeine bauaufsichtliche Zulassung  
Nr. Z-14.1-537



Zulassungsstelle für Bauprodukte und Bauarten  
Bautechnisches Profizent

Eine vom Bund und den Ländern  
gemeinsam getragene Anstalt des öffentlichen Rechts  
Mitglied der EOTA, der UEAtc und der WFTAO

Datum: 17.02.2014  
Geschäftszeichen: I 36-1.14.1-123713

Zulassungsnummer:  
**Z-14.1-537**

Antragsteller:  
IFBS  
Europark Fichtenhain A 13a  
47807 Krefeld

Zulassungsgegenstand:

**Mechanische Verbindungselemente zur Verbindung von Bauteilen aus Aluminium miteinander oder mit Unterkonstruktionen aus Aluminium, Stahl oder Holz**

Geltungsdauer  
vom: **1. Februar 2014**  
bis: **1. Februar 2019**

## Allgemeine bauaufsichtliche Zulassung

### I ALLGEMEINE BESTIMMUNGEN

- 1 Mit der allgemeinen bauaufsichtlichen Zulassung ist die Verwendbarkeit bzw. Anwendbarkeit des Zulassungsgegenstandes im Sinne der Landesbauordnungen nachgewiesen.
- 2 Sofern in der allgemeinen bauaufsichtlichen Zulassung Anforderungen an die besondere Sachkunde und Erfahrung der mit der Herstellung von Bauprodukten und Bauarten betrauten Personen nach den § 17 Abs. 5 Musterbauordnung entsprechenden Länderregelungen gestellt werden, ist zu beachten, dass diese Sachkunde und Erfahrung auch durch gleichwertige Nachweise anderer Mitgliedstaaten der Europäischen Union belegt werden kann. Dies gilt ggf. auch für im Rahmen des Abkommens über den Europäischen Wirtschaftsraum (EWR) oder anderer bilateraler Abkommen vorgelegte gleichwertige Nachweise.
- 3 Die allgemeine bauaufsichtliche Zulassung ersetzt nicht die für die Durchführung von Bauvorhaben gesetzlich vorgeschriebenen Genehmigungen, Zustimmungen und Bescheinigungen.
- 4 Die allgemeine bauaufsichtliche Zulassung wird unbeschadet der Rechte Dritter, insbesondere privater Schutzrechte, erteilt.
- 5 Hersteller und Vertreter des Zulassungsgegenstandes haben, unbeschadet weiter gehender Regelungen in den "Besonderen Bestimmungen", dem Verwender bzw. Anwender des Zulassungsgegenstandes Kopien der allgemeinen bauaufsichtlichen Zulassung zur Verfügung zu stellen und darauf hinzuweisen, dass die allgemeine bauaufsichtliche Zulassung an der Verwendungsstelle vorliegen muss. Auf Anforderung sind den beteiligten Behörden Kopien der allgemeinen bauaufsichtlichen Zulassung zur Verfügung zu stellen.
- 6 Die allgemeine bauaufsichtliche Zulassung darf nur vollständig vervielfältigt werden. Eine auszugsweise Veröffentlichung bedarf der Zustimmung des Deutschen Instituts für Bautechnik. Texte und Zeichnungen von Werbeschriften dürfen der allgemeinen bauaufsichtlichen Zulassung nicht widersprechen. Übersetzungen der allgemeinen bauaufsichtlichen Zulassung müssen den Hinweis "Vom Deutschen Institut für Bautechnik nicht geprüfte Übersetzung der deutschen Originalfassung" enthalten.
- 7 Die allgemeine bauaufsichtliche Zulassung wird widerrufen erteilt. Die Bestimmungen der allgemeinen bauaufsichtlichen Zulassung können nachträglich ergänzt und geändert werden, insbesondere, wenn neue technische Erkenntnisse dies erfordern.

Der oben genannte Zulassungsgegenstand wird hiernäher allgemein bauaufsichtlich zugelassen.  
Diese allgemeine bauaufsichtliche Zulassung umfasst zehn Seiten und 80 Anlagen.  
Diese allgemeine bauaufsichtliche Zulassung ersetzt die allgemeine bauaufsichtliche Zulassung Nr. Z-14.1-537 vom 15. September 2008, geändert und ergänzt durch Bescheide vom 12. Januar 2009, 17. Februar 2010, 12. August 2011, 25. November 2011 und vom 16. April 2013. Der Gegenstand ist erstmals am 15. September 2008 allgemein bauaufsichtlich zugelassen worden.



DIBt | Kolonnenstraße 30 6 | D-10629 Berlin | Tel.: +49 30 78730-0 | Fax: +49 30 78730-320 | E-Mail: dibt@dibt.de | www.dibt.de

Z 102765.13

1.14.1-123713



## II BESONDERE BESTIMMUNGEN

### 1 Zulassungsgegenstand und Anwendungsbereich

Zulassungsgegenstand sind mechanische Verbindungselemente zur planmäßig kraftübertragenden Verbindung von Bauteilen aus Aluminium miteinander oder mit Unterkonstruktionen aus Aluminium, Stahl oder Holz.

Die verschiedenen Arten dieser Verbindungselemente werden im Folgenden beschrieben (siehe auch Anlage 1.1):

- Blindniete
- Blindniete bestehen aus einer Niethülse und einem Nietdorn, der eine Sollbruchstelle haben kann. Sie dienen zum Vernieten von Bauteilen, wobei die Schließkopfseite nicht zugänglich sein muss.
- Gewindeförmende Schrauben
- Sie werden untergliedert in:
  - Gewindeförmende Schrauben, die sich ihr Muttergewinde in ein vorhandenes passendes Loch spanilos formen,
  - Bohrschrauben, die über eine Bohrspitze verfügen, sodass in einem Arbeitsgang das Bohren eines Loches, das Formen eines Muttergewindes und der Einschraubvorgang erfolgen,
  - Fließbohrschrauben, die in einem Arbeitsgang durch Materialverdrängung (Fließbohren) ein Loch erzeugen und das Muttergewinde formen.

Diese allgemeine bauaufsichtliche Zulassung regelt die mit den mechanischen Verbindungselementen hergestellten Verbindungen für den Fall vorwiegend ruhender Beanspruchung.

### 2 Bestimmungen für das Bauprodukt

#### 2.1 Eigenschaften und Zusammensetzung

##### 2.1.1 Abmessungen

Die wesentlichen Abmessungen (Nennabmessungen) sind in den Anlagen aufgeführt. Weitere Angaben zu Abmessungen und Toleranzen sind beim Deutschen Institut für Bautechnik hinterlegt.

##### 2.1.2 Werkstoffe

###### 2.1.2.1 Allgemeines

Für die Werkstoffe der Verbindungselemente und der zu verbindenden Bauteile gelten die Angaben in den Anlagen, sofern nachfolgend keine anderen Festlegungen getroffen werden.

###### 2.1.2.2 Verbindungselemente

Schrauben oder Scheiben, die entsprechend der jeweiligen Anlagen zu dieser allgemeinen bauaufsichtlichen Zulassung aus nichtrostendem Stahl der Gruppe A2 nach allgemeiner bauaufsichtlicher Zulassung Z-30.3-6 bestehen (z.B. 1.4301 oder 1.4567), dürfen auch aus nichtrostendem Stahl der Gruppe A4 gefertigt sein (z.B. 1.4404 oder 1.4578).

##### 2.1.3 Korrosionsschutz

Die Verbindungselemente sind korrosionsbeständig und bedürfen daher keines weiteren Korrosionsschutzes. Schrauben müssen aus nichtrostendem Stahl bestehen, der mindestens der Korrosionswiderstandsklasse II nach allgemeiner bauaufsichtlicher Zulassung Z-30.3-6 zugeordnet ist. Diese Forderung gilt nicht für angeschweißte Bohrspitzen sowie Fließbohrspitzen

### 2.2 Kennzeichnung

Die Verpackung der Verbindungselemente oder der Beipackzettel muss vom Hersteller mit dem Übereinstimmungszeichen (U-Zeichen) nach den Übereinstimmungszeichen-Verordnungen der Länder gekennzeichnet werden. Die Kennzeichnung darf nur erfolgen, wenn die Voraussetzungen nach Abschnitt 2.3 erfüllt sind.

Jede Verpackung muss zusätzlich mit einem Etikett versehen sein, das Angaben zum Herstellwerk (Werkkennzeichen), zur Bezeichnung, zur Geometrie und zum Werkstoff des Verbindungselementes enthält.

Schrauben sind zusätzlich mit einem Kopfzeichen (Herstellerkennzeichen) zu versehen.

### 2.3 Übereinstimmungsnachweis

#### 2.3.1 Allgemeines

Die Bestätigung der Übereinstimmung der Verbindungselemente mit den Bestimmungen dieser allgemeinen bauaufsichtlichen Zulassung muss für jedes Herstellwerk mit einem Übereinstimmungszertifikat auf der Grundlage einer werkseigenen Produktionskontrolle und einer regelmäßigen Fremdüberwachung, einschließlich einer Erstrüfung der Verbindungselemente nach Maßgabe der folgenden Bestimmungen erfolgen.

Für die Erteilung des Übereinstimmungszertifikats und die Fremdüberwachung einschließlich der dabei durchzuführenden Produktprüfungen hat der Hersteller der Verbindungselemente eine hierfür anerkannte Zertifizierungsstelle sowie eine hierfür anerkannte Überwachungsstelle einzuschalten.

Die Erklärung, dass ein Übereinstimmungszertifikat erteilt ist, hat der Hersteller durch Kennzeichnung der Bauprodukte mit dem Übereinstimmungszeichen (U-Zeichen) unter Hinweis auf den Verwendungszweck abzugeben.

Dem Deutschen Institut für Bautechnik ist von der Zertifizierungsstelle eine Kopie des von ihr erteilten Übereinstimmungszertifikats zur Kenntnis zu geben.

Für Umfang, Art und Häufigkeit der werkseigenen Produktionskontrolle und der Fremdüberwachung gelten die Zulassungsgrundsätze des Deutschen Instituts für Bautechnik für den "Übereinstimmungsnachweis für Verbindungselemente im Metallleichtbau" (siehe Heft 6/1999 der "DIBt Mitteilungen").

#### 2.3.2 Werkseigene Produktionskontrolle

In jedem Herstellwerk ist eine werkseigene Produktionskontrolle einzurichten und durchzuführen. Unter werkseigener Produktionskontrolle wird die vom Hersteller vorzunehmende kontinuierliche Überwachung der Produktion verstanden, mit der dieser sicherstellt, dass die von ihm hergestellten Verbindungselemente den Bestimmungen dieser allgemeinen bauaufsichtlichen Zulassung entsprechen.

Die Ergebnisse der werkseigenen Produktionskontrolle sind aufzuzeichnen und auszuwerten. Die Aufzeichnungen müssen mindestens folgende Angaben enthalten:

- Bezeichnung der Verbindungselemente bzw. des Ausgangsmaterials und der Bestandteile
- Art der Kontrolle oder Prüfung
- Datum der Herstellung und der Prüfung der Verbindungselemente bzw. des Ausgangsmaterials oder der Bestandteile
- Ergebnis der Kontrollen und Prüfungen und Vergleich mit den beim Deutschen Institut für Bautechnik hinterlegten Anforderungen
- Unterschrift des für die werkseigene Produktionskontrolle Verantwortlichen.

Die Aufzeichnungen sind mindestens fünf Jahre aufzubewahren und der für die Fremdüberwachung eingeschalteten Überwachungsstelle vorzulegen. Sie sind dem Deutschen Institut für Bautechnik und der zuständigen obersten Bauaufsichtsbehörde auf Verlangen vorzulegen.

Bei ungenügendem Prüfergebnis sind vom Hersteller unverzüglich die erforderlichen Maßnahmen zur Abstellung des Mangels zu treffen. Verbindungselemente, die den Anforderungen nicht entsprechen, sind so zu handhaben, dass Verwechslungen mit solchen, die einwandfrei sind, ausgeschlossen werden. Nach Abstellung des Mangels ist - soweit technisch möglich und zum Nachweis der Mängelbeseitigung erforderlich - die betreffende Prüfung unverzüglich zu wiederholen.

### 2.3.3 Fremdüberwachung

In jedem Herstellwerk ist die werkseigene Produktionskontrolle durch eine Fremdüberwachung regelmäßig zu überprüfen, mindestens jedoch einmal jährlich. Im Rahmen der Fremdüberwachung ist eine Erstprüfung der Verbindungselemente durchzuführen und es sind stichprobenartige Prüfungen durchzuführen. Die Probenahme und Prüfungen obliegen jeweils der anerkannten Stelle. Die Ergebnisse der Zertifizierung und Fremdüberwachung sind mindestens fünf Jahre aufzubewahren. Sie sind von der Zertifizierungsstelle bzw. der Überwachungsstelle dem Deutschen Institut für Bautechnik und der zuständigen obersten Bauaufsichtsbehörde auf Verlangen vorzulegen.

## 3 Bestimmungen für Entwurf und Bemessung

### 3.1 Entwurf

#### 3.1.1 Blindniete

Blindniete werden zur Verbindung von Bauteilen aus Aluminium miteinander und zur Verbindung von Bauteilen aus Aluminium mit Unterkonstruktionen aus Aluminium oder Stahl verwendet. Blindniete dürfen nur in Verbindungen verwendet werden, bei denen keine oder nur vernachlässigbar kleine temperaturbedingte Zwängungsbeanspruchungen auftreten.

#### 3.1.2 Gewindneformende Schrauben

Gewindneformende Schrauben werden zur Verbindung von Bauteilen aus Aluminium miteinander und zur Verbindung von Bauteilen aus Aluminium mit Unterkonstruktionen aus Aluminium, Stahl oder Holz verwendet.

### 3.2 Bemessung

#### 3.2.1 Allgemeines

Es gilt das in DIN EN 1990:2010-12 angegebene Nachweiskonzept in Verbindung mit dem Nationalen Anhang.

Für die Ermittlung der auf jedes Verbindungselement entfallenden Zug- und Querkraften gelten die einschlägigen Normen, wie z. B. die zutreffenden Normen des Eurocodes.

Im Folgenden und in den Anlagen werden die zu befestigenden Bauteile als Bauteil I bezeichnet. Das Bauteil, an dem befestigt wird, bzw. die Unterkonstruktion, wird als Bauteil II bezeichnet.

Für Verbindungen von Bauteilen aus Aluminium mit Holzunterkonstruktionen dürfen nur diejenigen Verbindungselemente verwendet werden, bei denen dazu in den Anlagen Tragfähigkeitswerte angegeben sind.

### 3.2.2 Charakteristische Werte der Tragfähigkeit

Es gilt:

$N_{k,xx}$  - charakteristischer Wert der Zugtragfähigkeit

$V_{k,xx}$  - charakteristischer Wert der Querkrafttragfähigkeit

Der charakteristische Wert der Zugtragfähigkeit  $N_{k,xx}$  einer Verbindung ergibt sich für Unterkonstruktionen aus Aluminium, Stahl oder Holz als Kleinwert aus der Auszugtragfähigkeit  $N_{k,xx}$  (Auszug des Verbindungselements aus Bauteil II) und der Durchknopftragfähigkeit  $N_{k,xx}$  (Durchknopfen durch Bauteil I). Die charakteristischen Werte der Auszugtragfähigkeit sind für die einzelnen Verbindungselemente und Unterkonstruktionen den jeweiligen Anlagen für die Verbindungselemente zu entnehmen. Bei Zwischenwerten der Bauteildicke II darf der charakteristische Wert durch Interpolation ermittelt werden. Bei Zwischenwerten der Zugfestigkeit  $R_m$  der Aluminiumbauteile darf der charakteristische Wert durch Interpolation zwischen den Werten der beiden Tabellen, die in den Anlagen angegeben sind, ermittelt werden. Bei Unterkonstruktionen aus Holz ist zusätzlich Abschnitt 3.2.3 zu beachten.

Die charakteristischen Werte der Durchknopftragfähigkeit sind Anlage 1.3 zu entnehmen. Alternativ darf der charakteristische Wert der Durchknopftragfähigkeit den allgemeinen bauaufsichtlichen Zulassungen, den allgemeinen bauaufsichtlichen Prüfzeugnissen oder Typenprüfungen der Aluminium-Profileisen entnommen werden. Bei besonderen Anwendungsfällen gemäß Anlage 1.3 sind die charakteristischen Werte der Durchknopftragfähigkeit mit dem Abminderungsfaktor  $\alpha_2$  abzumindern. Liegt eine Kombination der Anwendungsfälle vor, so ist jeweils der kleinere der Werte anzunehmen.

Der charakteristische Wert der Querkrafttragfähigkeit  $V_{k,xx}$  einer Verbindung ist für die einzelnen Verbindungselemente den jeweiligen Anlagen zu entnehmen. Bei Zwischenwerten der Bauteildicken I oder II darf der charakteristische Wert durch Interpolation ermittelt werden. Bei Zwischenwerten der Zugfestigkeit  $R_m$  der Aluminiumbauteile darf der charakteristische Wert durch Interpolation zwischen den Werten der beiden Tabellen, die in den Anlagen angegeben sind, ermittelt werden. Bei Unterkonstruktionen aus Holz ist zusätzlich Abschnitt 3.2.3 zu beachten.

### 3.2.3 Zusätzliche Regeln für die Verbindung mit Unterkonstruktionen aus Holz

Unterkonstruktionen aus Holz müssen aus Nadelholz mindestens der Festigkeitsklasse C24 nach DIN EN 14081-1:2011-05 in Verbindung mit DIN 20000-5:2012-03 oder aus Brettschichtholz nach DIN EN 14080:2013-09 bestehen.

Die in diesem Abschnitt festgelegten zusätzlichen Regeln für die Verbindung mit Unterkonstruktionen aus Holz gelten nur für die Schrauben, für die in den Anlagen auf diesen Abschnitt verwiesen wird.

Es gilt DIN EN 1995-1-1:2010-12 in Verbindung mit dem Nationalen Anhang DIN EN 1995-1-1/NA:2010-12, sofern nachfolgend keine anderen Festlegungen getroffen werden.

Es gilt:

- d - Gewindefußdurchmesser (entspricht dem Schraubenmündendurchmesser)
- $l_b$  - Einschraubtiefe (entspricht der Länge des in Bauteil II eingreifenden Gewindeteils einschließlich eventuell vorhandener Spitze oder Bohrspitze)

$$l_b = l - l_1 - s_{M1} - s_k$$

mit:

- l - Schraubenlänge
- $l_1$  - Dicke Bauteil I
- $s_{M1}$  - Dicke des Metallrückens der Dichtscheibe
- $s_k$  - Dicke des Dichtmaterials der Dichtscheibe
- $l_{ef}$  - effektive Einschraubtiefe (entspricht der Eindringtiefe des Gewindeteils)



Sofern neben den Tabellenwerten in den Anlagen ein Befestigungstyp nicht angegeben ist, ist die Verwendung der betreffenden Verbindungselemente für Verbindungen dieses Typs nur mit einem Nachweis der temperaturbedingten Zwängungsbeanspruchung (Querbeanspruchung) zulässig.

Ohne diesen Nachweis dürfen die betreffenden Verbindungselemente dann in der bezeichneten Bauteil-Kombination nur für zwängungsfreie Verbindungen verwendet werden. Diese Einschränkung gilt jedoch nicht für Verbindungen von Profiltafeln mit in Tafellängsrichtung nachgiebigen Unterkonstruktionen (z. B. aus Stahlkassettenprofilen oder dünnwandigen Pletten- bzw. Riegeprofilen), bei denen aufgrund ihrer Nachgiebigkeit keine oder nur vernachlässigbar kleine temperaturbedingte Zwängungsbeanspruchungen entstehen können.

### 3.2.5 Bemessungswerte der Tragfähigkeit

Für die Berechnung der Bemessungswerte der Tragfähigkeit aus den charakteristischen Werten gilt:

$$N_{k,d} = \frac{N_{k,k}}{\gamma_M}$$

$$V_{k,d} = \frac{V_{k,k}}{\gamma_M}$$

$$\text{mit } \gamma_M = 1,33$$

### 3.2.6 Kombinierte Beanspruchung aus Zug- und Querkraften

Bei kombinierter Beanspruchung durch die Bemessungswerte der einwirkenden Zugkräfte  $N$  und Querkraft  $V$  ist folgender Interaktionsnachweis zu führen:

$$\frac{N}{N_{k,d}} + \frac{V}{V_{k,d}} \leq 1,0$$

## 4 Bestimmungen für die Ausführung

Es gilt DIN 18807-9:1998-06, Abschnitt 7.3 und 7.4, sofern nachfolgend keine anderen Festlegungen getroffen werden.

Verbindungen entsprechend Abschnitt 1 dürfen nur von Firmen hergestellt werden, die die dazu erforderliche Erfahrung haben, es sei denn, es ist für eine Einweisung des Montagepersonals durch Fachkräfte gesorgt, die auf diesem Gebiet Erfahrungen besitzen.

Schrauben sind mit einem Schrauber mit entsprechend eingestelltem Tiefenanschlag einzuschrauben. Die Verwendung von Schlagschraubern ist unzulässig.

Bei der Ausführung von Verbindungen ist sicherzustellen, dass keine Kontaktkorrosion auftreten kann.

Bei planmäßiger Querkräftbeanspruchung müssen die zu verbindenden Bauteile unmittelbar aufeinanderliegen und die Scherfuge muss sich an der Kontaktstelle Bauteil I mit Bauteil II befinden, sodass das Verbindungselement keine zusätzliche Biegung erhält. Die Anordnung druckrester thermischer Trennstreifen mit einer komprimierten Dicke von maximal 3 mm ist zulässig.

Die Verbindungselemente sind rechtwinklig zur Bauteiloberfläche einzubringen, um eine einwandfrei tragende und erforderlichenfalls regenerische Verbindung sicherzustellen.

Beim Einbau der für die Anwendung auf Holzunterkonstruktionen zugelassenen Schrauben, ausgenommen Bohrschrauben, sind die zu verbindenden Bauteile I und II mit 0,7 d vorzubohren, soweit in den Anlagelättern nichts anderes angegeben ist.

$$l_r = l_b - l_0 \text{ mit } l_0 \geq 4d$$

mit:

$l_b$  - Länge des gewindereifen Teils der Bohrspitze (bei Schrauben ohne Bohrspitze ist  $l_b = 0$ , bei Fließbohrschrauben ist  $l_b = d$ )

$$N_{R,k} = F_{ax,Rk} \cdot k_{mod}$$

$$V_{R,k} = F_{v,Rk} \cdot k_{mod}$$

mit:

$$F_{ax,Rk} = F_{ax,\alpha,Rk} \text{ bei } \alpha = 90^\circ$$

$F_{ax,\alpha,Rk}$  nach DIN EN 1995-1-1:2010-12, Gleichung (8.40a)

$F_{v,Rk}$  nach DIN EN 1995-1-1:2010-12, Abschnitt 8.2.3, Gleichung (8.9)

$k_{mod}$  nach DIN EN 1995-1-1:2010-12, Tabelle 3.1, sofern für Balkenschichtholz, Brettspertholz und Massivholzplatten keine anderen Werte dafür in DIN EN 1995-1-1/NA:2010-12, Tabelle NA.4 angegeben sind

$$f_{h,0,k} = f_{h,k} \text{ bei } \alpha = 0^\circ$$

$f_{h,0,k}$  nach DIN EN 1995-1-1:2010-12, Gleichung (8.15)

$M_{y,Rk}$  in Gleichung (8.9) ist den entsprechenden Anlagen zu dieser allgemeinen bauaufsichtlichen Zulassung zu entnehmen. Sofern dort keine Werte angegeben sind, darf  $M_{y,Rk}$  wie folgt berechnet werden:

$$M_{y,Rk} = 0,3 \cdot f_u \cdot (1,1 \cdot d_k)^{2,5}$$

$d_k$  - Gewindedurchmesser, darf, wenn keine Werte vorliegen, überschlägig berechnet werden mit:

$$d_k = 0,7 \cdot d$$

$f_u$  - Zugfestigkeit des Drahtes, aus dem die Schrauben gefertigt sind. Es darf ohne weiteren Nachweis angenommen werden:

$$f_u = 500 \text{ N/mm}^2$$

$f_{ax,k}$  in Gleichung (8.40a) ist den entsprechenden Anlagen zu dieser allgemeinen bauaufsichtlichen Zulassung zu entnehmen. Sofern dort keine Werte angegeben sind, darf  $f_{ax,k}$  in Näherung berechnet werden mit:

$$f_{ax,k} = 70 \cdot 10^{-6} \cdot p_k^2 \text{ [N/mm}^2\text{]}$$

mit:

$p_k$  - charakteristische Rohdichte der Holzunterkonstruktion in  $\text{kg/m}^3$ ,  $p_k \leq 500 \text{ kg/m}^3$

$p_k = 350 \text{ kg/m}^3$  für die Festigkeitsklasse C24

Die nach Abschnitt 3.2.3 für Bauteil II berechneten charakteristischen Werte für Zugtragfähigkeit  $N_{R,k}$  (Auszug aus Holzunterkonstruktion) und Querkrafttragfähigkeit  $V_{R,k}$  (Lochleibungstragfähigkeit in Holzunterkonstruktion) sind mit den in der entsprechenden Anlage für Bauteil I angegebenen charakteristischen Werten für Zugtragfähigkeit  $N_{R,k}$  (Durchknöpfen) und Querkrafttragfähigkeit  $V_{R,k}$  (Lochleibungstragfähigkeit) zu vergleichen.

Der kleinere Wert ist für die weitere Berechnung zu verwenden.

**Querbeanspruchung infolge Temperaturänderung**

In den Anlagen sind die ohne zusätzlichen rechnerischen Nachweis der Querbeanspruchung infolge Temperaturänderung zulässigen Befestigungstypen a, b, c, d (siehe Anlage 1.2) jeweils neben den charakteristischen Werten der Tragfähigkeit in der Tabelle angegeben.

### 3.2.4

Schrauben sind bei Aluminium- oder Stahlunterkonstruktionen mit ihrem zylindrischen Gewindeteil

- bei Dicken des Bauteils II bis zu 6 mm voll,
- bei größeren Dicken des Bauteils II mindestens mit 6 mm Länge einzuschrauben. Angeschweißte Bohrspitzen, Fließbohrspitzen oder gehärtete Spitzen dürfen dabei nicht mitgerechnet werden.

Die Angaben der Hersteller zu den Klemmdicken sind zu beachten. Schrauben in planmäßig kraftübertragenden Verbindungen, die bereits belastet worden sind, dürfen nur gegen gewindelomene Schrauben mit größerem Durchmesser ausgetauscht werden, wobei das Loch für die dickere Schraube passend aufzubohren ist.



Andreas Schult  
 Referatsleiter

Bei der Verwendung von Bohrschrauben ist nur bei Unterkonstruktionen aus Bauholz mit einer charakteristischen Rohdichte von über 500 kg/m<sup>3</sup> und bei Douglasienholz über die gesamte Einschraubtiefe  $l_e$  mit einem Bohrdurchmesser entsprechend dem Durchmesser der Bohrspitze vorzubohren.

Die effektive Einschraubtiefe in Unterkonstruktionen aus Holz muss mindestens 4 d betragen, sofern in den Anlagelättern oder in den Ausführungsunterlagen (Verlegeplänen) nicht höhere Werte gefordert sind.

Die Randabstände  $e_1$  und  $e_2$  müssen bei Bauteil II aus Aluminium oder Stahl mindestens betragen:

$$e_1 \geq \begin{cases} 20 \text{ mm} \\ 2 \cdot d \end{cases} \text{ am Querrand}$$

$$\text{am Längsrand}$$

$$e_2 \geq \begin{cases} 10 \text{ mm} \\ 15 \cdot d \end{cases}$$

Die Abstände  $P_1$  und  $P_2$  der Verbindungselemente untereinander müssen bei Bauteilen aus Aluminium oder Stahl mindestens betragen:

in Profilängsrichtung

$$P_1 \geq \begin{cases} 30 \text{ mm} \\ 4 \cdot d \end{cases}$$

in Profiquerrichtung

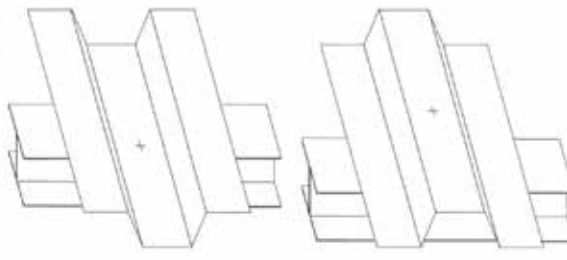
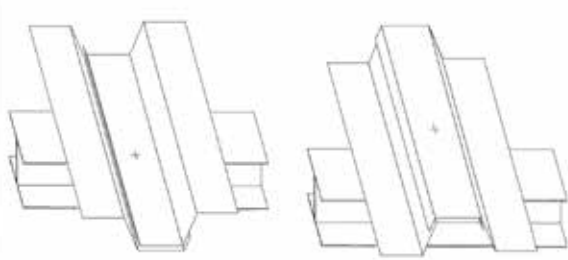
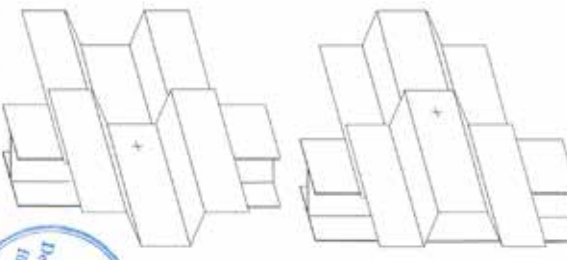
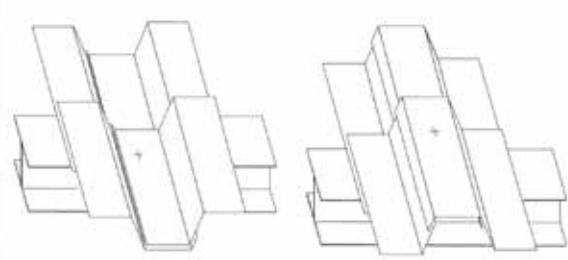
$$P_2 \geq \begin{cases} 20 \text{ mm} \\ 2 \cdot d \end{cases}$$

Bei Unterkonstruktionen aus Holz gelten für die Randabstände und für die Abstände der Schrauben untereinander die Angaben in Tabelle 2.

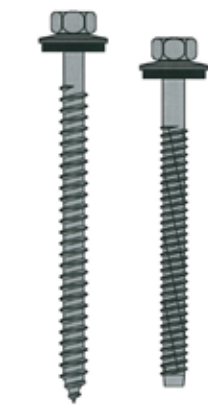

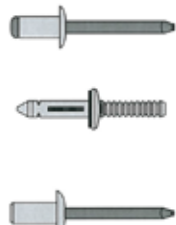
Tabelle 2

Bezeichnung	Abstände						rechtwinklig zur Kraftrichtung
	untereinander		beanspruchter Rand		unbeanspruchter Rand		
	$a_1$	$a_2$	$a_{1,c}$	$a_{2,c}$	$a_{1,c}$	$a_{2,c}$	
Fasserrichtung		⊥		⊥		⊥	
d [mm]	Abstände [mm]						
5,5	28	17	66	39	39	17	39
6,0	30	18	72	42	42	18	42
6,3	32	19	76	44	44	19	44
6,5	33	20	78	45	45	20	46

Bezeichnungen nach DIN EN 1995-1-1:2010-12, Bild 8.7, siehe auch Anlage 1.4 dieser Zulassung.  
 Bei Bauholz mit einem charakteristischen Wert der Rohdichte von über 500 kg/m<sup>3</sup> und bei Douglasienholz sind die Werte ⊥ zur Fasserrichtung um 50 % zu vergrößern.

<p><b>IFBS</b> Europapark Fichtenhain A 13a 47807 Krefeld</p>	<p><b>Typ a - Verbindung mit einer Einzelprofiltafel</b></p> 	<p><b>Typ b - Verbindung mit einem Längstoß</b></p> 
<p>Verbindungstypen</p>	<p><b>Typ c - Verbindung mit einem Querstoß</b></p> 	<p><b>Typ d - Verbindung mit einem Längs- und Querstoß</b></p> 
<p>Anlage 1.2 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014</p>	<p>Die Einteilung der Verbindungstypen gilt sinngemäß auch für Wellprofile.</p>	



<p><b>IFBS</b> Europapark Fichtenhain A 13a 47807 Krefeld</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><b>Gewindefurchende Schrauben</b></p>  </div> <div style="text-align: center;"> <p><b>Bohrschrauben</b></p>  </div> <div style="text-align: center;"> <p><b>Blindniete</b></p>  </div> </div> <div style="text-align: center; margin-top: 20px;"> <p><b>Gewindeformende Schrauben</b></p> </div>
<p>Beispiele für Verbindungselemente</p>	<p>Anlage 1.1 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014</p>



<b>IFBS</b> Europapark Fichtenhain A 13a 47807 Krefeld	<b>Abstände der Verbindungselemente untereinander</b> 	<b>Randabstände rechtwinklig zur Krafrichtung</b> 
	<b>Abstände in Krafrichtung – beanspruchter Rand</b> 	<b>Abstände in Krafrichtung – unbeanspruchter Rand</b> 
Abstände der Verbindungselemente untereinander und Randabstände bei Bauteil II aus Holz	Für eine genauere Ermittlung der erforderlichen Randabstände siehe DIN 1052:2004-08, Tabelle 10, Spalte 4.	
Anlage 1.4 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14-1-537 vom 17. Februar 2014		

<b>IFBS</b> Europapark Fichtenhain A 13a 47807 Krefeld	<b>Besondere Anwendungsfälle</b> Bei den unten dargestellten besonderen Anwendungsfällen sind die charakteristischen Werte der Durchknöpffähigkeit mit dem darunter angegebenen Faktor $\alpha_k$ abzumindern. Liegt eine Kombination der Anwendungsfälle vor, so ist jeweils der kleinere Wert anzusetzen.	<b>Schrauben</b> Durchknöpffkraft $N_{k,ex}$ in [kN] Bauteil I: $t$ in [mm], Aluminium mit Zugfestigkeit $R_m \geq 165$ N/mm <sup>2</sup>	<b>Kopf- oder Scheibendurchmesser <math>d_0</math> in [mm]:</b> 14    16    19    22    29
		1,0 $b_v \leq 150:0,9$ $b_v > 150:0,7$ 0,7    0,9    0,7    0,7    1,0    0,9	0,5    0,6    0,7    0,8    0,9    1,0    1,2    1,5    2,0 0,43    0,51    0,60    0,68    0,77    0,86    1,03    1,28    1,28 0,46    0,55    0,64    0,73    0,82    0,91    1,10    1,37    1,37 0,50    0,60    0,70    0,80    0,90    1,00    1,20    1,50    1,50 0,54    0,64    0,75    0,86    0,97    1,07    1,29    1,61    1,61 0,62    0,74    0,86    0,99    1,11    1,23    1,48    1,85    1,85
Charakteristische Tragfähigkeitswerte der Verbindungselemente <b>Durchknöpffähigkeit</b>	<b>Biegezugspannungen im angeschlossenen Profilgurt</b> Zur Berücksichtigung der Biegezugspannungen im angeschlossenen Profilgurt sind die charakteristischen Werte der Durchknöpffähigkeit in Abhängigkeit von der Zugfestigkeit $R_m$ des Aluminiumprofils sowie der Stützweite $L$ mit dem unten angegebenen Faktor $\alpha_k$ abzumindern.	<b>Schrauben</b> Durchknöpffkraft $N_{k,ex}$ in [kN] Bauteil I: $t$ in [mm], Aluminium mit Zugfestigkeit $R_m \geq 215$ N/mm <sup>2</sup>	<b>Kopf- oder Scheibendurchmesser <math>d_0</math> in [mm]:</b> 14    16    19    22    29
Zugfestigkeit $R_m$ < 215 ≥ 215	L < 1,5 m    1,5 ≤ L ≤ 4,5 m    L > 4,5 m 1    1    1 1    1,25 - L / 6    0,5	0,5    0,6    0,7    0,8    0,9    1,0    1,2    1,5    2,0 0,56    0,67    0,78    0,88    1,00    1,11    1,34    1,67    1,67 0,60    0,72    0,83    0,95    1,07    1,19    1,43    1,79    1,79 0,65    0,78    0,91    1,04    1,17    1,30    1,56    1,95    1,95 0,70    0,84    0,98    1,12    1,26    1,40    1,68    2,10    2,10 0,80    0,96    1,12    1,28    1,44    1,60    1,93    2,41    2,41	
Anlage 1.3 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14-1-537 vom 17. Februar 2014	Bei Profilhöhen kleiner 25 mm sind die Durchknöpffähigkeiten um 30% abzumindern. Bei Dichtscheiben aus Aluminium sind die Durchknöpffähigkeiten um 20% abzumindern.	Blindniete mit Kopfdurchmesser ≥ 9,5 mm $N_{k,ex} = 2,5 t f_t \leq 50 d^2$ mit $t$ : Nennstärke des Bauteils $t$ in mm ( $t \leq 1,5$ mm) $f_t$ : Dehngrenze in N/mm <sup>2</sup> ( $f_t \leq 220$ N/mm <sup>2</sup> ) $d$ : Durchmesser in mm ( $2,6$ mm ≤ $d$ ≤ $6,4$ mm)	



**Verbindungselement**

HILTI S-MS 41 S 4,8 x L  
HILTI S-MS 41 S-A 4,8 x L  
HILTI S-MS 51 S 4,8 x L  
HILTI S-MS 51 S-A 4,8 x L

**Werkstoffe**

Schraube: nichtrostender Stahl (1.4301) – DIN EN 10088  
Scheibe: Aluminiumlegierung AW-AMg3 – DIN EN 485, nichtrostender Stahl (1.4301) – DIN EN 10088 mit aufvulkanisiertem EPDM

**Hersteller**

Hilti AG  
Feldkircherstrasse 100  
FL - 9494 Schaan  
Hilti Deutschland GmbH  
Hiltistraße 2  
D - 86916 Kaufering  
Tel.: +49 (0) 800 888 5522  
Fax: +49 (0) 800 888 5523  
Internet: www.hilti.de

**Vertrieb**

Hilti AG  
Feldkircherstrasse 100  
FL - 9494 Schaan  
Hilti Deutschland GmbH  
Hiltistraße 2  
D - 86916 Kaufering  
Tel.: +49 (0) 800 888 5522  
Fax: +49 (0) 800 888 5523  
Internet: www.hilti.de

Maximale Bohrleistung $\Sigma t$ 2,50 mm	Bauteil $t_1$ in [mm]: Aluminium mit Zugfestigkeit $R_m \geq 215$ N/mm <sup>2</sup> nach DIN EN 573					
	0,50	0,60	0,70	0,80	1,00	1,20
Zugkraft $N_{k,s}$ in [kN]	0,50	0,71	0,71	0,71	0,71	0,71
	0,60	0,71	0,92	0,92	0,92	0,92
	0,70	0,71	0,92	1,14	1,14	1,14
	0,80	0,71	0,92	1,14	1,35	1,35
	1,00	0,71	0,92	1,14	1,35	1,88
	1,20	0,71	0,92	1,14	1,35	2,28
Zugkraft $N_{k,s}$ in [kN]	0,50	0,35	0,42 <sup>a)</sup>	0,42 <sup>a)</sup>	0,42 <sup>a)</sup>	0,42 <sup>a)</sup>
	0,60	0,35	0,49	0,50 <sup>a)</sup>	0,50 <sup>a)</sup>	0,50 <sup>a)</sup>
	0,70	0,35	0,49	0,59 <sup>a)</sup>	0,59 <sup>a)</sup>	0,59 <sup>a)</sup>
	0,80	0,35	0,49	0,67 <sup>a)</sup>	0,67 <sup>a)</sup>	0,67 <sup>a)</sup>
	1,00	0,35	0,49	0,77	0,84	0,84 <sup>a)</sup>
	1,20	0,35	0,49	0,63	0,77	1,00 <sup>a)</sup>



Die mit <sup>a)</sup> indizierten Werte  $N_{k,s}$  wurden nach EN 1999-1-4:2007 Abschnitt 8.3.3.1 unter der Annahme  $\alpha_s = \alpha_t = 1,0$  bestimmt. Abhängig von der Schraubenanordnung sind die Werte nach EN 1999-1-4:2007 Tabelle 8.3 abzumindern.

Die grau unterlegten Werte  $N_{k,s}$  dürfen bei Verwendung der Typen „S-MS 51 S“ und „S-MS 51 S-A“ um 6,9% erhöht werden.

Fließbohrschraube	Charakteristische Tragfähigkeitswerte für das Verbindungselement	
	HILTI S-MS 41 S 4,8 x L, HILTI S-MS 41 S-A 4,8 x L HILTI S-MS 51 S 4,8 x L, HILTI S-MS 51 S-A 4,8 x L mit Sechskantkopf und Dichtscheibe $\geq \varnothing 14$ mm	Anlage 3.1.41 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014

**Verbindungselement**

HILTI S-MS 41 S 4,8 x L  
HILTI S-MS 41 S-A 4,8 x L  
HILTI S-MS 51 S 4,8 x L  
HILTI S-MS 51 S-A 4,8 x L

**Werkstoffe**

Schraube: nichtrostender Stahl (1.4301) – DIN EN 10088  
Scheibe: Aluminiumlegierung AW-AMg3 – DIN EN 485, nichtrostender Stahl (1.4301) – DIN EN 10088 mit aufvulkanisiertem EPDM

**Hersteller**

Hilti AG  
Feldkircherstrasse 100  
FL - 9494 Schaan  
Hilti Deutschland GmbH  
Hiltistraße 2  
D - 86916 Kaufering  
Tel.: +49 (0) 800 888 5522  
Fax: +49 (0) 800 888 5523  
Internet: www.hilti.de

**Vertrieb**

Hilti AG  
Feldkircherstrasse 100  
FL - 9494 Schaan  
Hilti Deutschland GmbH  
Hiltistraße 2  
D - 86916 Kaufering  
Tel.: +49 (0) 800 888 5522  
Fax: +49 (0) 800 888 5523  
Internet: www.hilti.de

Maximale Bohrleistung $\Sigma t$ 2,50 mm	Bauteil $t_1$ in [mm]: Aluminium mit Zugfestigkeit $R_m \geq 165$ N/mm <sup>2</sup> nach DIN EN 573					
	0,50	0,60	0,70	0,80	1,00	1,20
Zugkraft $N_{k,s}$ in [kN]	0,50	0,55	0,55	0,55	0,55	0,55
	0,60	0,55	0,71	0,71	0,71	0,71
	0,70	0,55	0,71	0,88	0,88	0,88
	0,80	0,55	0,71	0,88	1,04	1,04
	1,00	0,55	0,71	0,88	1,04	1,44
	1,20	0,55	0,71	0,88	1,04	1,83
Zugkraft $N_{k,s}$ in [kN]	0,50	0,27	0,32 <sup>a)</sup>	0,32 <sup>a)</sup>	0,32 <sup>a)</sup>	0,32 <sup>a)</sup>
	0,60	0,27	0,38	0,39 <sup>a)</sup>	0,39 <sup>a)</sup>	0,39 <sup>a)</sup>
	0,70	0,27	0,38	0,45 <sup>a)</sup>	0,45 <sup>a)</sup>	0,45 <sup>a)</sup>
	0,80	0,27	0,38	0,48	0,51 <sup>a)</sup>	0,51 <sup>a)</sup>
	1,00	0,27	0,38	0,48	0,59	0,64 <sup>a)</sup>
	1,20	0,27	0,38	0,48	0,59	0,77 <sup>a)</sup>



Die mit <sup>a)</sup> indizierten Werte  $N_{k,s}$  wurden nach EN 1999-1-4:2007 Abschnitt 8.3.3.1 unter der Annahme  $\alpha_s = \alpha_t = 1,0$  bestimmt. Abhängig von der Schraubenanordnung sind die Werte nach EN 1999-1-4:2007 Tabelle 8.3 abzumindern.

Die grau unterlegten Werte  $N_{k,s}$  dürfen bei Verwendung der Typen „S-MS 51 S“ und „S-MS 51 S-A“ um 6,9% erhöht werden.

Fließbohrschraube	Charakteristische Tragfähigkeitswerte für das Verbindungselement	
	HILTI S-MS 41 S 4,8 x L, HILTI S-MS 41 S-A 4,8 x L HILTI S-MS 51 S 4,8 x L, HILTI S-MS 51 S-A 4,8 x L mit Sechskantkopf und Dichtscheibe $\geq \varnothing 14$ mm	Anlage 3.1.42 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014

		<b>Verbindungs- element</b> HILTI S-MS 41 Z 4,8 x L HILTI S-MS 51 Z 4,8 x L		<b>Werkstoffe</b> Schraube: Kohlenstoffstahl, einseitiggehärtet und verzinkt Scheibe Aluminiumlegierung AW-AMg3 – DIN EN 485, nichtrostender Stahl (1.4301) – DIN EN 10088 mit aufvulkanisiertem EPDM		<b>Hersteller</b> Hilti AG Feldkircherstrasse 100 FL - 9494 Schaan		<b>Vertrieb</b> Hilti Deutschland GmbH Hiltistraße 2 D - 86916 Kaufering Tel.: +49 (0) 800 888 5522 Fax: +49 (0) 800 888 5523 Internet: www.hilti.de	
<b>Maximale Bohrleistung Zt</b> 2,50 mm	<b>Bauteil II: t<sub>h</sub> in [mm]:</b> Aluminium mit Zugfestigkeit R <sub>m</sub> ≥ 215 N/mm <sup>2</sup> nach DIN EN 573		0,50	0,60	0,70	0,80	1,00	1,20	
	0,50 0,60 0,70 0,80 1,00 1,20	0,71 0,92 0,92 0,92 0,92 0,92	0,71 0,92 1,14 1,14 1,14 1,14	0,71 0,92 1,14 1,35 1,35 1,35	0,71 0,92 1,14 1,35 1,88 1,88	0,71 0,92 1,14 1,35 1,88 1,88	0,71 0,92 1,14 1,35 1,88 1,88	0,71 0,92 1,14 1,35 1,88 2,28	
<b>Bauteil I: t<sub>h</sub> in [mm]:</b> Aluminium mit Zugfestigkeit R <sub>m</sub> ≥ 215 N/mm <sup>2</sup>	<b>Zugkraft N<sub>ex</sub> in [kN]</b>		0,35 0,35 0,35 0,35 0,35 0,35	0,42 <sup>a)</sup> 0,49 0,49 0,49 0,49 0,49	0,42 <sup>a)</sup> 0,50 <sup>a)</sup> 0,59 <sup>a)</sup> 0,63 0,63 0,63	0,42 <sup>a)</sup> 0,50 <sup>a)</sup> 0,59 <sup>a)</sup> 0,67 <sup>a)</sup> 0,77 0,77	0,42 <sup>a)</sup> 0,50 <sup>a)</sup> 0,59 <sup>a)</sup> 0,67 <sup>a)</sup> 0,84 1,00	0,42 <sup>a)</sup> 0,50 <sup>a)</sup> 0,59 <sup>a)</sup> 0,67 <sup>a)</sup> 0,84 <sup>a)</sup> 1,00 <sup>a)</sup>	
	0,50 0,60 0,70 0,80 1,00 1,20	0,35 0,35 0,35 0,35 0,35 0,35	0,42 <sup>a)</sup> 0,49 0,49 0,49 0,49 0,49	0,42 <sup>a)</sup> 0,50 <sup>a)</sup> 0,59 <sup>a)</sup> 0,63 0,63 0,63	0,42 <sup>a)</sup> 0,50 <sup>a)</sup> 0,59 <sup>a)</sup> 0,67 <sup>a)</sup> 0,77 0,77	0,42 <sup>a)</sup> 0,50 <sup>a)</sup> 0,59 <sup>a)</sup> 0,67 <sup>a)</sup> 0,84 1,00			



Die mit <sup>a)</sup> indizierten Werte N<sub>ex</sub> wurden nach EN 1999-1-4:2007 Abschnitt 8.3.3.1 unter der Annahme α<sub>s</sub> = α<sub>c</sub> = 1,0 bestimmt. Abhängig von der Schraubenanordnung sind die Werte nach EN 1999-1-4:2007 Tabelle 8.3 abzumindern.  
 Die grau unterlegten Werte N<sub>ex</sub> dürfen bei Verwendung des Typen „S-MS 51 Z“ um 6,9% erhöht werden.

<b>Fließbohrschraube</b> HILTI S-MS 41 Z 4,8 x L, HILTI S-MS 51 Z 4,8 x L mit Sechskantkopf und Dichtscheibe ≥ Ø 14 mm	Charakteristische Tragfähigkeitswerte für das Verbindungselement HILTI S-MS 41 Z 4,8 x L, HILTI S-MS 51 Z 4,8 x L mit Sechskantkopf und Dichtscheibe ≥ Ø 14 mm	Anlage 3.1.43 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014
--	--	---

		<b>Verbindungs- element</b> HILTI S-MS 41 Z 4,8 x L HILTI S-MS 51 Z 4,8 x L		<b>Werkstoffe</b> Schraube: Kohlenstoffstahl, einseitiggehärtet und verzinkt Scheibe Aluminiumlegierung AW-AMg3 – DIN EN 485, nichtrostender Stahl (1.4301) – DIN EN 10088 mit aufvulkanisiertem EPDM		<b>Hersteller</b> Hilti AG Feldkircherstrasse 100 FL - 9494 Schaan		<b>Vertrieb</b> Hilti Deutschland GmbH Hiltistraße 2 D - 86916 Kaufering Tel.: +49 (0) 800 888 5522 Fax: +49 (0) 800 888 5523 Internet: www.hilti.de	
<b>Maximale Bohrleistung Zt</b> 2,50 mm	<b>Bauteil II: t<sub>h</sub> in [mm]:</b> Aluminium mit Zugfestigkeit R <sub>m</sub> ≥ 165 N/mm <sup>2</sup> nach DIN EN 573		0,50	0,60	0,70	0,80	1,00	1,20	
	0,50 0,60 0,70 0,80 1,00 1,20	0,55 0,55 0,55 0,55 0,55 0,55	0,55 0,71 0,71 0,71 0,71 0,71	0,55 0,71 0,88 1,04 1,04 1,04	0,55 0,71 0,88 1,04 1,04 1,04	0,55 0,71 0,88 1,04 1,44 1,44	0,55 0,71 0,88 1,04 1,44 1,83		
<b>Bauteil I: t<sub>h</sub> in [mm]:</b> Aluminium mit Zugfestigkeit R <sub>m</sub> ≥ 165 N/mm <sup>2</sup>	<b>Zugkraft N<sub>ex</sub> in [kN]</b>		0,27 0,27 0,27 0,27 0,27 0,27	0,32 <sup>a)</sup> 0,38 0,38 0,38 0,38 0,38	0,32 <sup>a)</sup> 0,39 <sup>a)</sup> 0,45 <sup>a)</sup> 0,48 0,48 0,48	0,32 <sup>a)</sup> 0,39 <sup>a)</sup> 0,45 <sup>a)</sup> 0,51 <sup>a)</sup> 0,59 0,59	0,32 <sup>a)</sup> 0,39 <sup>a)</sup> 0,45 <sup>a)</sup> 0,51 <sup>a)</sup> 0,64 <sup>a)</sup> 0,77 <sup>a)</sup>		
	0,27 0,27 0,27 0,27 0,27 0,27	0,32 <sup>a)</sup> 0,38 0,38 0,38 0,38 0,38	0,32 <sup>a)</sup> 0,39 <sup>a)</sup> 0,45 <sup>a)</sup> 0,48 0,48 0,48	0,32 <sup>a)</sup> 0,39 <sup>a)</sup> 0,45 <sup>a)</sup> 0,51 <sup>a)</sup> 0,59 0,59	0,32 <sup>a)</sup> 0,39 <sup>a)</sup> 0,45 <sup>a)</sup> 0,51 <sup>a)</sup> 0,64 <sup>a)</sup> 0,77 <sup>a)</sup>				



Die mit <sup>a)</sup> indizierten Werte N<sub>ex</sub> wurden nach EN 1999-1-4:2007 Abschnitt 8.3.3.1 unter der Annahme α<sub>s</sub> = α<sub>c</sub> = 1,0 bestimmt. Abhängig von der Schraubenanordnung sind die Werte nach EN 1999-1-4:2007 Tabelle 8.3 abzumindern.  
 Die grau unterlegten Werte N<sub>ex</sub> dürfen bei Verwendung des Typen „S-MS 51 Z“ um 6,9% erhöht werden.

<b>Fließbohrschraube</b> HILTI S-MS 41 Z 4,8 x L, HILTI S-MS 51 Z 4,8 x L mit Sechskantkopf und Dichtscheibe ≥ Ø 14 mm	Charakteristische Tragfähigkeitswerte für das Verbindungselement HILTI S-MS 41 Z 4,8 x L, HILTI S-MS 51 Z 4,8 x L mit Sechskantkopf und Dichtscheibe ≥ Ø 14 mm	Anlage 3.1.44 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014
--	--	---



**Verbindungs-  
element**      HILTI S-MS 01 S 4,8 x L

**Werkstoffe**:  
Schraube: nichtrostender Stahl (1.4301) – DIN EN 10088  
Scheibe: keine

**Hersteller**:  
Hilti AG  
Feldkircherstrasse 100  
FL - 9494 Schaan  
Hilti Deutschland GmbH  
Hiltistraße 2  
D - 86916 Kaufering  
Tel.: +49 (0) 800 888 5522  
Fax: +49 (0) 800 888 5523  
Internet: www.hilti.de

Maximale Bohrleistung $\Sigma t$ 2,50 mm	Bauteil lt: $t_e$ in [mm]: Aluminium mit Zugfestigkeit $R_m \geq 165$ N/mm <sup>2</sup> nach DIN EN 573								
	0,50	0,60	0,70	0,80	1,00	1,20	1,01	1,01	
Zugfestigkeit $R_m \geq 165$ N/mm <sup>2</sup> nach DIN EN 573 Zugkraft $N_{Ax,lt}$ in [kN]	0,50	1,01	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	1,05	
	0,70	1,01	1,05	1,08	1,08	1,08	1,08	1,08	
Zugfestigkeit $R_m \geq 165$ N/mm <sup>2</sup> nach DIN EN 573 Zugkraft $N_{Ax,lt}$ in [kN]	0,80	1,01	1,05	1,08	1,12	1,12	1,12	1,12	
	1,00	1,01	1,05	1,08	1,12	1,12	1,12	1,12	
	1,20	1,01	1,05	1,08	1,12	1,12	1,12	1,12	
Zugkraft $N_{Ax,II}$ in [kN]	0,27								
(Auszug aus Bauteil II)		0,38							
(Auszug aus Bauteil II)		0,48							
(Auszug aus Bauteil II)		0,59							
(Auszug aus Bauteil II)		0,76							
(Auszug aus Bauteil II)		1,03							

**Durchknöpfragfähigkeit von Bauteil I** nach Angabe des Herstellers vom Aluminiumprofil.

**Fließbohrschraube**

Charakteristische Tragfähigkeitswerte für das Verbindungselement  
**HILTI S-MS 01 S 4,8 x L**  
mit Sechskantkopf

Anlage 3.1.46  
zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014

**Verbindungs-  
element**      HILTI S-MS 01 S 4,8 x L

**Werkstoffe**:  
Schraube: nichtrostender Stahl (1.4301) – DIN EN 10088  
Scheibe: keine

**Hersteller**:  
Hilti AG  
Feldkircherstrasse 100  
FL - 9494 Schaan  
Hilti Deutschland GmbH  
Hiltistraße 2  
D - 86916 Kaufering  
Tel.: +49 (0) 800 888 5522  
Fax: +49 (0) 800 888 5523  
Internet: www.hilti.de

Maximale Bohrleistung $\Sigma t$ 2,50 mm	Bauteil lt: $t_e$ in [mm]: Aluminium mit Zugfestigkeit $R_m \geq 215$ N/mm <sup>2</sup> nach DIN EN 573								
	0,50	0,60	0,70	0,80	1,00	1,20	1,01	1,01	
Zugfestigkeit $R_m \geq 215$ N/mm <sup>2</sup> nach DIN EN 573 Zugkraft $N_{Ax,lt}$ in [kN]	0,50	1,32	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	1,37	
	0,70	1,32	1,37	1,41	1,41	1,41	1,41	1,41	
Zugfestigkeit $R_m \geq 215$ N/mm <sup>2</sup> nach DIN EN 573 Zugkraft $N_{Ax,lt}$ in [kN]	0,80	1,32	1,37	1,46	1,46	1,46	1,46	1,46	
	1,00	1,32	1,37	1,46	2,25	2,25	2,25	2,25	
	1,20	1,32	1,37	1,46	2,25	2,25	2,25	2,53	
Zugkraft $N_{Ax,II}$ in [kN]	0,35								
(Auszug aus Bauteil II)		0,49							
(Auszug aus Bauteil II)		0,63							
(Auszug aus Bauteil II)		0,77							
(Auszug aus Bauteil II)		1,00							
(Auszug aus Bauteil II)		1,29							

**Durchknöpfragfähigkeit von Bauteil I** nach Angabe des Herstellers vom Aluminiumprofil.

**Fließbohrschraube**

Charakteristische Tragfähigkeitswerte für das Verbindungselement  
**HILTI S-MS 01 S 4,8 x L**  
mit Sechskantkopf

Anlage 3.1.45  
zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014

**Verbindungs-  
element**

HILTI S-MS 41 S 4,8 x L  
HILTI S-MS 41 S-A 4,8 x L  
HILTI S-MS 51 S 4,8 x L  
HILTI S-MS 51 S-A 4,8 x L

**Werkstoffe**

Schraube:  
nichtrostender Stahl (1.4301) – DIN EN 10088  
Scheibe  
Aluminiumlegierung AW-AMg3 – DIN EN 485,  
nichtrostender Stahl (1.4301) – DIN EN 10088  
mit aufvulkanisiertem EPDM

**Hersteller**

Hilti AG  
Feldkircherstrasse 100  
FL - 9494 Schaan

**Vertrieb**

Hilti Deutschland GmbH  
Hiltistraße 2  
D - 86916 Kaufering  
Tel.: +49 (0) 800 888 5522  
Fax: +49 (0) 800 888 5523  
Internet: www.hilti.de

**Verbindungs-  
element**

HILTI S-MS 41 S 4,8 x L  
HILTI S-MS 41 S-A 4,8 x L  
HILTI S-MS 51 S 4,8 x L  
HILTI S-MS 51 S-A 4,8 x L

**Werkstoffe**

Schraube:  
nichtrostender Stahl (1.4301) – DIN EN 10088  
Scheibe  
Aluminiumlegierung AW-AMg3 – DIN EN 485,  
nichtrostender Stahl (1.4301) – DIN EN 10088  
mit aufvulkanisiertem EPDM

**Hersteller**

Hilti AG  
Feldkircherstrasse 100  
FL - 9494 Schaan

**Vertrieb**

Hilti Deutschland GmbH  
Hiltistraße 2  
D - 86916 Kaufering  
Tel.: +49 (0) 800 888 5522  
Fax: +49 (0) 800 888 5523  
Internet: www.hilti.de

Maximale Bohrleistung $\Sigma$ 2,50 mm	Bauteil lt. $l_0$ in [mm]: Stahl S235, S355 - DIN EN 10025, S280GD, S320GD, S350GD nach DIN EN 10346											
	0,50	0,55	0,63	0,75	0,88	1,00	1,25					
Zugfestigkeit $R_m \approx 215$ N/mm <sup>2</sup> nach DIN EN 573	0,50	0,60	0,70	0,80	1,00	1,20	0,42 <sup>a)</sup>	0,50 <sup>a)</sup>	0,59 <sup>a)</sup>	0,67 <sup>a)</sup>	0,84 <sup>a)</sup>	1,00 <sup>a)</sup>
Querkraft $V_{k,0}$ in [kN]	0,71	0,71	0,92	0,92	1,14	1,14	0,42 <sup>a)</sup>	0,50 <sup>a)</sup>	0,59 <sup>a)</sup>	0,67 <sup>a)</sup>	0,84 <sup>a)</sup>	1,00 <sup>a)</sup>
Zugkraft $N_{k,0}$ in [kN]	0,71	0,71	0,92	0,92	1,14	1,14	0,42 <sup>a)</sup>	0,50 <sup>a)</sup>	0,59 <sup>a)</sup>	0,67 <sup>a)</sup>	0,84 <sup>a)</sup>	1,00 <sup>a)</sup>
Bauteil $l_0$ in [mm]: Aluminium mit Zugfestigkeit $R_m \approx 165$ N/mm <sup>2</sup> nach DIN EN 573	0,50	0,60	0,70	0,80	1,00	1,20	0,32 <sup>a)</sup>	0,39 <sup>a)</sup>	0,45 <sup>a)</sup>	0,51 <sup>a)</sup>	0,64 <sup>a)</sup>	0,77 <sup>a)</sup>
Querkraft $V_{k,0}$ in [kN]	0,55	0,55	0,71	0,71	0,88	0,88	0,32 <sup>a)</sup>	0,39 <sup>a)</sup>	0,45 <sup>a)</sup>	0,51 <sup>a)</sup>	0,64 <sup>a)</sup>	0,77 <sup>a)</sup>
Zugkraft $N_{k,0}$ in [kN]	0,55	0,55	0,71	0,71	0,88	0,88	0,32 <sup>a)</sup>	0,39 <sup>a)</sup>	0,45 <sup>a)</sup>	0,51 <sup>a)</sup>	0,64 <sup>a)</sup>	0,77 <sup>a)</sup>



- Die mit <sup>a)</sup> indizierten Werte  $N_{k,0}$  wurden nach EN 1999-1-4:2007 Abschnitt 8.3.3.1 unter der Annahme  $\alpha_s = \alpha_c = 1,0$  bestimmt. Abhängig von der Schraubenanordnung sind die Werte nach EN 1999-1-4:2007 Tabelle 8.3 abzumindern.
- Die grau unterlegten Werte  $N_{k,0}$  dürfen bei Verwendung der Typen „S-MS 51 S“ und „S-MS 51 S-A“ um 6,9% erhöht werden.

<b>Fließbohrschraube</b>	Charakteristische Tragfähigkeitswerte für das Verbindungselement	Anlage 3.2.31 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014
	HILTI S-MS 41 S 4,8 x L, HILTI S-MS 41 S-A 4,8 x L HILTI S-MS 51 S 4,8 x L, HILTI S-MS 51 S-A 4,8 x L mit Sechskantkopf und Dichtscheibe $\geq \varnothing 14$ mm	

Maximale Bohrleistung $\Sigma$ 2,50 mm	Bauteil lt. $l_0$ in [mm]: Stahl S235, S355 - DIN EN 10025, S280GD, S320GD, S350GD nach DIN EN 10346											
	0,50	0,55	0,63	0,75	0,88	1,00	1,25					
Zugfestigkeit $R_m \approx 215$ N/mm <sup>2</sup> nach DIN EN 573	0,50	0,60	0,70	0,80	1,00	1,20	0,42 <sup>a)</sup>	0,50 <sup>a)</sup>	0,59 <sup>a)</sup>	0,67 <sup>a)</sup>	0,84 <sup>a)</sup>	1,00 <sup>a)</sup>
Querkraft $V_{k,0}$ in [kN]	0,71	0,71	0,92	0,92	1,14	1,14	0,42 <sup>a)</sup>	0,50 <sup>a)</sup>	0,59 <sup>a)</sup>	0,67 <sup>a)</sup>	0,84 <sup>a)</sup>	1,00 <sup>a)</sup>
Zugkraft $N_{k,0}$ in [kN]	0,71	0,71	0,92	0,92	1,14	1,14	0,42 <sup>a)</sup>	0,50 <sup>a)</sup>	0,59 <sup>a)</sup>	0,67 <sup>a)</sup>	0,84 <sup>a)</sup>	1,00 <sup>a)</sup>
Bauteil $l_0$ in [mm]: Aluminium mit Zugfestigkeit $R_m \approx 165$ N/mm <sup>2</sup> nach DIN EN 573	0,50	0,60	0,70	0,80	1,00	1,20	0,32 <sup>a)</sup>	0,39 <sup>a)</sup>	0,45 <sup>a)</sup>	0,51 <sup>a)</sup>	0,64 <sup>a)</sup>	0,77 <sup>a)</sup>
Querkraft $V_{k,0}$ in [kN]	0,55	0,55	0,71	0,71	0,88	0,88	0,32 <sup>a)</sup>	0,39 <sup>a)</sup>	0,45 <sup>a)</sup>	0,51 <sup>a)</sup>	0,64 <sup>a)</sup>	0,77 <sup>a)</sup>
Zugkraft $N_{k,0}$ in [kN]	0,55	0,55	0,71	0,71	0,88	0,88	0,32 <sup>a)</sup>	0,39 <sup>a)</sup>	0,45 <sup>a)</sup>	0,51 <sup>a)</sup>	0,64 <sup>a)</sup>	0,77 <sup>a)</sup>

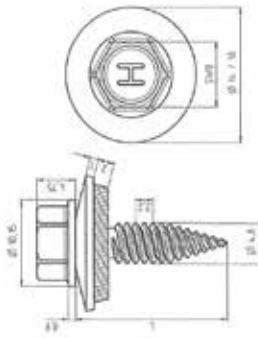


- Die mit <sup>a)</sup> indizierten Werte  $N_{k,0}$  wurden nach EN 1999-1-4:2007 Abschnitt 8.3.3.1 unter der Annahme  $\alpha_s = \alpha_c = 1,0$  bestimmt. Abhängig von der Schraubenanordnung sind die Werte nach EN 1999-1-4:2007 Tabelle 8.3 abzumindern.
- Die grau unterlegten Werte  $N_{k,0}$  dürfen bei Verwendung der Typen „S-MS 51 S“ und „S-MS 51 S-A“ um 6,9% erhöht werden.

<b>Fließbohrschraube</b>	Charakteristische Tragfähigkeitswerte für das Verbindungselement	Anlage 3.2.32 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014
	HILTI S-MS 41 S 4,8 x L, HILTI S-MS 41 S-A 4,8 x L HILTI S-MS 51 S 4,8 x L, HILTI S-MS 51 S-A 4,8 x L mit Sechskantkopf und Dichtscheibe $\geq \varnothing 14$ mm	



<p><b>Verbindungselement</b></p> <p>HILTI S-MS 41 Z 4,8 x L HILTI S-MS 51 Z 4,8 x L</p>	<p><b>Werkstoffe</b></p> <p>Schraube: Kohlenstoffstahl, einseitgehärtet und verzinkt Scheibe: Aluminiumlegierung AW-AMg3 – DIN EN 485, nichtrostender Stahl (1.4301) – DIN EN 10088 mit aufvulkanisiertem EPDM</p>
<p><b>Hersteller</b></p> <p>Hilti AG Feldkircherstrasse 100 FL - 9494 Schaan</p>	<p><b>Vertrieb</b></p> <p>Hilti Deutschland GmbH Hiltistraße 2 D - 86916 Kauferring Tel.: +49 (0) 800 888 5522 Fax: +49 (0) 800 888 5523 Internet: www.hilti.de</p>



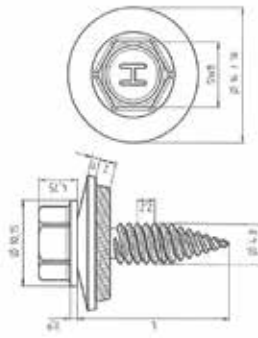
Maximale Bohrleistung $\Sigma t$ 2,50 mm	Bauteil lt. 1 in [mm]: Stahl S235, S355 - DIN EN 10025, S280GD, S320GD, S350GD nach DIN EN 10346													
	0,50	0,55	0,63	0,75	0,88	1,00	1,25	0,50	0,55	0,63	0,75	0,88	1,00	1,25
Zugfestigkeit $R_m \geq 215 \text{ N/mm}^2$ Aluminium mit DIN EN 573	0,50	0,55	0,63	0,71	0,71	0,71	0,71	0,50	0,55	0,63	0,71	0,71	0,71	0,71
Querkraft $V_{k,0}$ [kN]	0,60	0,70	0,80	0,92	0,92	0,92	0,92	0,60	0,70	0,80	0,92	0,92	0,92	0,92
Zugkraft $N_{k,0}$ [kN]	0,70	0,80	0,92	1,04	1,04	1,04	1,04	0,70	0,80	0,92	1,04	1,04	1,04	1,04
Zugkraft $N_{k,1}$ [kN]	0,80	0,92	1,04	1,16	1,16	1,16	1,16	0,80	0,92	1,04	1,16	1,16	1,16	1,16
Zugkraft $N_{k,2}$ [kN]	1,00	1,12	1,24	1,36	1,36	1,36	1,36	1,00	1,12	1,24	1,36	1,36	1,36	1,36
Zugkraft $N_{k,3}$ [kN]	1,20	1,32	1,44	1,56	1,56	1,56	1,56	1,20	1,32	1,44	1,56	1,56	1,56	1,56



- Die mit <sup>H</sup> indizierten Werte  $N_{k,0}$  wurden nach EN 1999-1-4:2007 Abschnitt 8.3.3.1 unter der Annahme  $\alpha_s = \alpha_c = 1,0$  bestimmt. Abhängig von der Schraubenanordnung sind die Werte nach EN 1999-1-4:2007 Tabelle 8.3 abzumindern.
- Die grau unterlegten Werte  $N_{k,0}$  dürfen bei Verwendung des Typen „S-MS 51 Z“ um 6,9% erhöht werden.

<p><b>Fließbohrschraube</b></p>	<p>Charakteristische Tragfähigkeitswerte für das Verbindungselement</p> <p>HILTI S-MS 41 Z 4,8 x L, HILTI S-MS 51 Z 4,8 x L mit Sechskantkopf und Dichtscheibe <math>\geq \varnothing 14 \text{ mm}</math></p>	<p>Anlage 3.2.34 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014</p>
---------------------------------	--	--

<p><b>Verbindungselement</b></p> <p>HILTI S-MS 41 Z 4,8 x L HILTI S-MS 51 Z 4,8 x L</p>	<p><b>Werkstoffe</b></p> <p>Schraube: Kohlenstoffstahl, einseitgehärtet und verzinkt Scheibe: Aluminiumlegierung AW-AMg3 – DIN EN 485, nichtrostender Stahl (1.4301) – DIN EN 10088 mit aufvulkanisiertem EPDM</p>
<p><b>Hersteller</b></p> <p>Hilti AG Feldkircherstrasse 100 FL - 9494 Schaan</p>	<p><b>Vertrieb</b></p> <p>Hilti Deutschland GmbH Hiltistraße 2 D - 86916 Kauferring Tel.: +49 (0) 800 888 5522 Fax: +49 (0) 800 888 5523 Internet: www.hilti.de</p>



Maximale Bohrleistung $\Sigma t$ 2,50 mm	Bauteil lt. 1 in [mm]: Stahl S235, S355 - DIN EN 10025, S280GD, S320GD, S350GD nach DIN EN 10346													
	0,50	0,55	0,63	0,75	0,88	1,00	1,25	0,50	0,55	0,63	0,75	0,88	1,00	1,25
Zugfestigkeit $R_m \geq 215 \text{ N/mm}^2$ Aluminium mit DIN EN 573	0,50	0,55	0,63	0,71	0,71	0,71	0,71	0,50	0,55	0,63	0,71	0,71	0,71	0,71
Querkraft $V_{k,0}$ [kN]	0,60	0,70	0,80	0,92	0,92	0,92	0,92	0,60	0,70	0,80	0,92	0,92	0,92	0,92
Zugkraft $N_{k,0}$ [kN]	0,70	0,80	0,92	1,04	1,04	1,04	1,04	0,70	0,80	0,92	1,04	1,04	1,04	1,04
Zugkraft $N_{k,1}$ [kN]	0,80	0,92	1,04	1,16	1,16	1,16	1,16	0,80	0,92	1,04	1,16	1,16	1,16	1,16
Zugkraft $N_{k,2}$ [kN]	1,00	1,12	1,24	1,36	1,36	1,36	1,36	1,00	1,12	1,24	1,36	1,36	1,36	1,36
Zugkraft $N_{k,3}$ [kN]	1,20	1,32	1,44	1,56	1,56	1,56	1,56	1,20	1,32	1,44	1,56	1,56	1,56	1,56



- Die mit <sup>H</sup> indizierten Werte  $N_{k,0}$  wurden nach EN 1999-1-4:2007 Abschnitt 8.3.3.1 unter der Annahme  $\alpha_s = \alpha_c = 1,0$  bestimmt. Abhängig von der Schraubenanordnung sind die Werte nach EN 1999-1-4:2007 Tabelle 8.3 abzumindern.
- Die grau unterlegten Werte  $N_{k,0}$  dürfen bei Verwendung des Typen „S-MS 51 Z“ um 6,9% erhöht werden.

<p><b>Fließbohrschraube</b></p>	<p>Charakteristische Tragfähigkeitswerte für das Verbindungselement</p> <p>HILTI S-MS 41 Z 4,8 x L, HILTI S-MS 51 Z 4,8 x L mit Sechskantkopf und Dichtscheibe <math>\geq \varnothing 14 \text{ mm}</math></p>	<p>Anlage 3.2.33 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014</p>
---------------------------------	--	--

**Verbindungselement** HILTI S-MS 01 S 4,8 x L

**Werkstoffe**  
Schraube: nichtrostender Stahl (1.4301) – DIN EN 10088  
Scheibe: keine

**Hersteller**  
Hilti AG  
Feldkircherstrasse 100  
FL - 9494 Schaan

**Vertrieb**  
Hilti Deutschland GmbH  
Hillistraße 2  
D - 86916 Kaufering  
Tel.: +49 (0) 800 888 5522  
Fax: +49 (0) 800 888 5523  
Internet: www.hilti.de

**Bauteil II:  $t_2$  in [mm]:**  
Stahl S235, S355 - DIN EN 10025, S280GD, S320GD, S350GD nach DIN EN 10346

Maximale Bohrleistung Zt	0,50	0,55	0,63	0,75	0,88	1,00	1,25
2,50 mm	1,01	1,01	1,01	1,01	1,01	1,01	1,01
Querkraft $V_{Rk}$ in [kN]	0,50	0,60	0,70	0,80	1,00	1,20	1,25
	1,01	1,01	1,01	1,01	1,01	1,01	1,01
	1,05	1,05	1,05	1,08	1,08	1,12	1,12
	1,05	1,05	1,05	1,08	1,08	1,12	1,12
Zugkraft $N_{Rk}$ in [kN]	0,76	0,86	1,03	1,27	1,60	1,90	2,49
	(Auszug aus Bauteil II)						

**Bauteil I:  $t_1$  in [mm]:** Aluminium mit Zugfestigkeit  $R_m \geq 165 \text{ N/mm}^2$  nach DIN EN 573



Durchknopffähigkeit von Bauteil I nach Angabe des Herstellers vom Aluminiumprofil.

**Fließbohrschraube**

Charakteristische Tragfähigkeitswerte für das Verbindungselement  
**HILTI S-MS 01 S 4,8 x L**  
mit Sechskantkopf

Anlage 3.2.36 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014

**Verbindungselement** HILTI S-MS 01 S 4,8 x L

**Werkstoffe**  
Schraube: nichtrostender Stahl (1.4301) – DIN EN 10088  
Scheibe: keine

**Hersteller**  
Hilti AG  
Feldkircherstrasse 100  
FL - 9494 Schaan

**Vertrieb**  
Hilti Deutschland GmbH  
Hillistraße 2  
D - 86916 Kaufering  
Tel.: +49 (0) 800 888 5522  
Fax: +49 (0) 800 888 5523  
Internet: www.hilti.de

**Bauteil II:  $t_2$  in [mm]:**  
Stahl S235, S355 - DIN EN 10025, S280GD, S320GD, S350GD nach DIN EN 10346

Maximale Bohrleistung Zt	0,50	0,55	0,63	0,75	0,88	1,00	1,25
2,50 mm	1,32	1,32	1,32	1,32	1,32	1,32	1,32
Querkraft $V_{Rk}$ in [kN]	0,50	0,60	0,70	0,80	1,00	1,20	1,25
	1,32	1,32	1,32	1,32	1,32	1,32	1,32
	1,37	1,37	1,37	1,41	1,41	1,46	1,46
	1,37	1,37	1,37	1,41	1,41	1,46	1,46
Zugkraft $N_{Rk}$ in [kN]	0,76	0,86	1,03	1,27	1,60	1,90	2,49
	(Auszug aus Bauteil II)						

**Bauteil I:  $t_1$  in [mm]:** Aluminium mit Zugfestigkeit  $R_m \geq 215 \text{ N/mm}^2$  nach DIN EN 573



Durchknopffähigkeit von Bauteil I nach Angabe des Herstellers vom Aluminiumprofil.

**Fließbohrschraube**

Charakteristische Tragfähigkeitswerte für das Verbindungselement  
**HILTI S-MS 01 S 4,8 x L**  
mit Sechskantkopf

Anlage 3.2.35 zur allgemeinen bauaufsichtlichen Zulassung Nr. Z-14.1-537 vom 17. Februar 2014

## Allgemeines bauaufsichtliches Prüfzeugnis

### - informative translation -

**No.: P-BWU02-128002-a**

Object:	Self-drilling screws Hilti S-AD 01 S 5,5xL Hilti S-AD 01 SS 5,5xL
Intended use:	external wall cladding made of aluminium according to DIN 18516-1
Customer:	Hilti AG Feldkircherstraße 100 9494 Schaan Principality of Liechtenstein
Date of issue:	February 28, 2012
Period of validity until:	February 28, 2017

Based on this „Allgemeines bauaufsichtliches Prüfzeugnis, the above object can be used according to the „Landesbauordnungen“.

This „Allgemeines bauaufsichtliches Prüfzeugnis“ includes 8 pages and 4 annexes.

This „Allgemeines bauaufsichtliches Prüfzeugnis“ replaces the „Allgemeines bauaufsichtliches Prüfzeugnis“ issued on February 20, 2012.

KIT Stahl- und Leichtbau, Versuchsanstalt für Stahl, Holz und Steine,  
 Karlsruher Institut für Technologie (KIT), D-76128 Karlsruhe, Deutschland

Tel.: +49 (0)721 608 42205  
 Fax: +49 (0)721 608 44078

This „Allgemeines bauaufsichtliches Prüfzeugnis“ may only be reproduced in an unabridged version.  
 A publication in extracts needs our written approval.

This „Allgemeines bauaufsichtliches Prüfzeugnis“ may only be reproduced in an unabridged version.  
 A publication in extracts needs our written approval.

## 16.8 Certification report P-BWU02-148009 - Fastening screws for external ventilated facade cladding according to DIN 18516-1

<b>Table of contents</b>	
I. General regulations	3
II. Special regulations	4
1 Object and range of application	4
1.1 Object	4
1.2 Range of application	4
2 Requirements on the building product	4
2.1 Properties and configuration	4
2.2 Regulations for design and dimensioning	4
2.3 Requirements for the design	7
3 Verification of compliance	7
3.1 General	7
3.2 Factory production control	7
4 Ü-mark	8
5 Legal basis	8
Annexes 1 and 2	allowable values
Annexes 3 and 4:	characteristic values

## I. General regulations

1. The „Allgemeines bauaufsichtliches Prüfzeugnis“ does not substitute approvals, acceptances and attestations required by law for performing building projects
2. The „Allgemeines bauaufsichtliches Prüfzeugnis“ is issued notwithstanding the rights of any third party, especially of private property rights
3. The contractor must keep the „Allgemeines bauaufsichtliches Prüfzeugnis“ available on the building site.
4. The „Allgemeines bauaufsichtliches Prüfzeugnis“ may only be reproduced in a complete version. A publication in extracts needs the written approval of the Versuchsanstalt für Stahl, Holz und Steine. Words and drawings of advertising brochures may not be contrary to the „allgemeines bauaufsichtliches Prüfzeugnis“. Translations of the „allgemeines bauaufsichtliches Prüfzeugnis“ must include the note „translation of the German original version not verified by the Versuchsanstalt für Stahl, Holz und Steine“.
5. The „Allgemeines bauaufsichtliches Prüfzeugnis“ is issued revocably. The „allgemeines bauaufsichtliches Prüfzeugnis“ can be additionally supplemented and modified, especially if new technical findings necessitate this.
6. There is the right of appeal against this decision. It must be entered within one after receipt of this decision in written form or for record at the Versuchsanstalt für Stahl, Holz und Steine, Kaiserstraße 12, 76128 Karlsruhe. The date of receipt of the appeal at the Versuchsanstalt für Stahl, Holz und Steine is decisive for the timeliness of the appeal.

## II. Specific regulations

### 1 Object and range of application

#### 1.1 Object

Object of the „Allgemeines bauaufsichtliches Prüfzeugnis“ are the self-drilling screws Hilti S-AD S 5.5xL and Hilti S-AD 01 SS 5.5xL produced and marketed by Hilti AG.  
 This „Allgemeines bauaufsichtliches Prüfzeugnis“ replaces the „Allgemeines bauaufsichtliches Prüfzeugnis“ issued on February 20, 2012.

#### 1.2 Range of application

The above mentioned object is intended for the use according to DIN 18516-1:1999-12.

### 2 Requirements on the building product

#### 2.1 Properties and configuration

The indications in the annexes apply with regard to dimensions, materials and corrosion protection.

#### 2.2 Regulations for design and dimensioning

##### 2.2.1 Allowable forces

The verification concept given in DIN 18516-1:1999-12 applies. The characteristic values  $F_{Rk}$  and the allowable values of forces  $F$  for the connections resulting from this with  $\gamma = 3.0$  according to DIN 18516-1:1999-12, section 6.3.2, are given in the attachments. Where:

zul  $F_Q$  allowable shear force (load direction rectangular to the axis of the fasteners)

zul  $F_Z$  allowable tensile force (load direction parallel to the axis of the fasteners)

For a combined loading by shear forces  $F_Q$  from dead load and wind suction, the proof is to be furnished for each screw of the connection with the resulting effect:

$$\frac{F_Z}{zulF_Z} + \frac{F_Q}{zulF_Q} \leq 1.0.$$

The allowable values apply for components I made of aluminium alloys with a minimum tensile strength  $R_m$  of 165 N/mm<sup>2</sup> or 245 N/mm<sup>2</sup> on components II made of aluminium alloys with a minimum tensile strength  $R_m$  of 165 N/mm<sup>2</sup> or 245 N/mm<sup>2</sup>.

For aluminium alloys with a minimum tensile strength  $R_m$  of 165 N/mm<sup>2</sup> ≤  $R_m$  ≤ 245 N/mm<sup>2</sup> linear interpolation is allowed between the values of the corresponding annexes. For intermediate values of the component thicknesses I or II, the allowable value of the smaller component thickness is to be chosen.



For tensile-loaded connections with the drilling screws Hilti S-AD 01 S 5.5xL and Hilti S-AD 01 SS 5.5xL, the undercut must be considered. This may result in reduced effective plate thicknesses of the substructure causing a reduction of the load-bearing capacity subjected to pull-out. For connections with the drilling screws Hilti S-AD 01 S 5.5xL and Hilti S-AD 01 SS 5.5xL loaded with shear forces, the length X of the undercut must be adapted to the clamping thickness of both components to be connected so that

$$X \leq t_1 + t_{II}$$

applies.

#### 2.2.2 Edge distances

For connections with the self-drilling screws Hilti S-AD 01 S 5.5xL and Hilti S-AD 01 SS 5.5xL, the allowable values given in the annexes are valid for the following minimum values of the distances of the fasteners:

- edge distance: 10mm
- intermediate distance of the fasteners: 25 mm

#### 2.2.3 Eccentric tensile load

When contact forces occur between single components from eccentrically applied tensile forces, the longitudinal tensile forces are to be reduced as follows:

$$zulF_{Z, ecc} = \alpha \cdot zulF_Z$$

with  $\alpha$  according to the following table.

application	sheet thickness ratio
	$0 \leq \frac{t_1}{t_{II}} \leq 1,0$
	$\alpha = \max \left( \frac{1}{3}, \frac{t_1}{2}, \frac{t_1}{t_{II}} - \frac{1}{2} \right)$
	$\alpha = \max \left( \frac{1}{4}, 2 \cdot \frac{t_1}{t_{II}} - 1 \right)$
	$\alpha = \frac{3}{2} - \frac{1}{2} \cdot \frac{t_1}{t_{II}}$

#### 2.2.4 Predrilled connections and slotted holes

In case of an exceeded maximum drilling capacity preset by the drill bit, component I may be predrilled with  $\varnothing$  5.2 mm $\pm$ 0.2 mm. For predrilled connections, the tabulated values of the allowable tensile forces are to be reduced as follows:

$$zulF_{Q, vorgab.} = 0,90 \cdot zulF_Q$$

For connections with the self-drilling screws Hilti S-AD 01 S 5.5xL and Hilti S-AD 01 SS 5.5xL, slotted holes are allowable. For connections loaded with tensile forces, slotted holes are not allowed. If a connection with a slotted hole is designed for temperature-related expansions, the thread may not extend into component I.

The following limit dimensions apply:

- Width of the slotted hole: 5.2 mm $\pm$ 0.2 mm
- Length of the slotted hole: max. 25 mm
- Edge distance in direction of force: min. 10mm
- Edge distance rectangular to the direction of force: min. 10mm

#### 2.2.5 Temperature-related constraint force

The use of the fasteners for connections not free of constraint forces is only allowable with a verification of the temperature-related constraint force (shear force), cf. DIN 18516-1:1999-12.

**Versuchsanstalt für Stahl, Holz und Steine**  
 Karlsruher Institut für Technologie (KIT)  
 of „Allgemeines bauaufsichtliches Prüfzeugnis“  
 No.: P--BWU02-128002-a  
 page 7

section 5.2.2. Without this verification, the fasteners may only be used for connections free of constraint forces.

### 2.3 Requirements for the design

Connections corresponding to section 1 may only be produced by firms having the necessary experience unless specialists of firms being experienced in this field are available for the instruction of the assembly personnel.

For shear-loaded connections, the components to be connected must directly lie adjacent to each other and the shear gap must be located at the contact point of component I with component II so that the fastener does not experience any additional bending.

The fasteners are to be attached rectangular to the component surface to secure a perfect load-bearing connection.

In case of substructures made of aluminium, fasteners are to be screwed in over-tightened. Both components lay in the recess. For all fasteners, screwing is realized by means of a screw drill. The application of impact drivers is not allowed.

Drilling capacities and clamping thicknesses indicated in the attachments are to be observed.

Screws in load transferring connections that had been already loaded may only be exchanged with self-tapping screws with bigger diameter where the hole for the larger screw must be drilled appropriately.

For shear-loaded connections, the components to be connected must directly lie adjacent to each other.

## 3 Verification of compliance

### 3.1 General

The confirmation regarding the compliance of the building products with the regulations of this "Allgemeines bauaufsichtliches Prüfzeugnis" must be effected with a declaration of compliance of the producer for each production plant on the basis of a factory production control according to the following regulations.

### 3.2 Factory production control

In each production plant, a factory production control must be organized and performed according to the principles of the "Deutsches Institut für Bautechnik (DIBt) for the "Übereinstimmungsnachweis für Verbindungselemente im Metallleichtbau" (see issue 6/1999 of "DIBt Mitteilungen"). Factory production control is understood as continuous monitoring of the production to be performed by the producer with which he ensures that the building products manufactured by him correspond to this "Allgemeines bauaufsichtliches Prüfzeugnis". Within the scope of the factory production control

**Versuchsanstalt für Stahl, Holz und Steine**  
 Karlsruher Institut für Technologie (KIT)  
 of „Allgemeines bauaufsichtliches Prüfzeugnis“  
 No.: P--BWU02-128002-a  
 page 8

- the form and dimensions of the fasteners
- their mechanical properties and
- the original material used

are to be checked.

The results of the factory production control are to be recorded and evaluated. The records should include the following indications at least:

- name of the building product, original material and the component parts
- type of control or test
- date of production and control / test of the building product or the original material or the component parts
- result of the tests / controls and comparison with the requirements
- signature of the person responsible for the factory production control

The records must be kept for at least five year and submitted to the supervisory board engaged for the external control. They must be submitted to the "Deutsches Institut für Bautechnik", the responsible "Oberste Bauaufsichtsbehörde" and the issuing body on demand.

In case of test results not corresponding to the requirements of the standard technical specifications, the producer must immediately take the necessary measures to remedy the defect. After removal of the defect, the test in question must be immediately repeated for proving the elimination of defects. Products that are not according to specifications must be sorted and marked correspondingly. The measures taken must be documented.

## 4 Ü-mark

The producer must mark the building product with the sign of conformity according to the "Übereinstimmungszeichen-Verordnungen (ÜZVO)" of the states.

The Ü-mark must be attached to the building product, to an instruction leaflet to its package if this causes difficulties, to the delivery note or to an attachment of the delivery note with the prescribed indications according to the "Landesbauordnung" of the states.

Marking with the Ü-mark considering the number of this "Allgemeines bauaufsichtliches Prüfzeugnis" may only be done if the prerequisites according to paragraph 3 are fulfilled.

## 5 Legal basis

This "Allgemeines bauaufsichtliches Prüfzeugnis" is issued on the basis of §19 and §22 of the "Landesbauordnung für Baden-Württemberg (LBO)" as amended on August 8, 1005, last amended through the law of December 17, 2009, in connection with Bauregelliste A, Teil 2, lfd. Nr. 2.17, edition 2011/1.

According to §19, paragraph 2 in connection with §18 paragraph 7 of the "Musterbauordnung" (MBO) and the corresponding regulations of the respective "Landesbauordnungen" an issued



„Allgemeines bauaufsichtliches Prüfzeugnis“ applies in all states of the Federal Republic of Germany.

The definition of the allowable forces indicated in the attachments is based upon test results that are documented in test report no. 074006 of the Versuchsanstalt für Stahl, Holz und Steine. The dissipation of allowable forces from the test results was effected according to DIN 18516-1:1999-12, and is documented in the expert report no. 074030 of the Versuchsanstalt für Stahl, Holz und Steine dokumentiert.

Karlsruhe, February 28, 2012

mi/pc

Official in charge

Head of the Prüfstelle

Dr.-Ing. Th. Misiak

Dipl.-Ing. J. Schmied

		<b>Fastener</b> Hilti S-AD 01 S 5.5xL Hilti S-AD 01 SS 5.5xL  <b>material</b> screw: stainless steel similar DIN EN 10088 Hilti S-AD 01 S 5.5xL: material No. 1.4567 Hilti S-AD 01 SS 5.5xL: material No. 1.4578  <b>producer</b> Hilti AG Werk 6103		
<b>Max. drilling capacity</b> $t_d$ 4,00 mm	<b>component II</b> made of aluminium $R_m \geq 165N/mm^2$ , $t_d$ in [mm]:			<b>component II</b> made of timber $\geq$ S10
Tightening moment (guidance level)	To be screwed with depth stop			
	Allowable tensile force $F_t$ in [kN]	1,50 2,00 3,00 4,00	1,50 2,00 3,00 4,00	1,50 2,00 3,00 4,00
Allowable shear force $F_v$ in [kN]	0,54 0,56 0,61 0,61	0,54 0,76 0,79 0,79	0,54 0,76 1,17 1,17	0,54 0,76 1,17 1,17
Allowable tensile force $F_z$ in [kN] predrill-diameter 5,2mm +/-0,2mm	1,50 2,00 3,00 4,00	0,30 0,30 0,30 0,30	0,30 0,30 0,30 0,30	0,86 0,86 0,86 0,86
Further provisions:				
<b>Self-drilling screws</b>		Allowable values of forces for fasteners Hilti S-AD 01 S 5.5xL Hilti S-AD 01 SS 5.5xL		Annex 1 to „Allgemeines bauaufsichtliches Prüfzeugnis“ Nr. P-BWU02-128002-a of 28.02.2012

Fastener		component II made of aluminium $R_m \geq 165 \text{ N/mm}^2$ , $t_d$ in [mm]:		component II made of timber $\geq \text{S10}$	
material		1,50	2,00	3,00	4,00
Hilti S-AD 01 S 5,5xL Hilti S-AD 01 SS 5,5xL  screw: stainless steel similar DIN EN 10088 Hilti S-AD 01 S 5,5xL: material No. 1.4567 Hilti S-AD 01 SS 5,5xL: material No. 1.4578		To be screwed with depth stop			
Hilti AG Werk 6103					
Max. drilling capacity $t_d$ 4,00 mm		1,50	2,00	3,00	4,00
Tightening moment (guidance level)		To be screwed with depth stop			
Forces $F_{tRk}$ in [kN]		1,61	1,61	1,61	1,61
Characteristic values of shear		1,68	2,29	2,29	2,29
		1,82	2,38	3,51	3,51
		1,82	2,38	3,51	3,51
Characteristic values of tensile		0,90	1,45	2,58	2,58
		0,90	1,45	2,58	2,58
		0,90	1,45	2,58	2,58
		0,90	1,45	2,58	2,58
Further provisions:					
Self-drilling screws		Characteristic values of forces for fasteners		Annex 3	
		Hilti S-AD 01 S 5,5xL Hilti S-AD 01 SS 5,5xL		to „Allgemeines bauaufsichtliches Prüfzeugnis“ Nr. P-BWU02-128002-a of 28.02.2012	

Fastener		component II made of aluminium $R_m \geq 245 \text{ N/mm}^2$ , $t_d$ in [mm]:		component II made of timber $\geq \text{S10}$	
material		1,50	2,00	3,00	4,00
Hilti S-AD 01 S 5,5xL Hilti S-AD 01 SS 5,5xL  screw: stainless steel similar DIN EN 10088 Hilti S-AD 01 S 5,5xL: material No. 1.4567 Hilti S-AD 01 SS 5,5xL: material No. 1.4578		To be screwed with depth stop			
Hilti AG Werk 6103					
Max. drilling capacity $t_d$ 4,00 mm		1,50	2,00	3,00	4,00
Tightening moment (guidance level)		To be screwed with depth stop			
Allowable shear force $F_{sR}$ in [kN]		0,80	0,80	0,80	0,80
		0,83	1,13	1,13	1,13
		0,90	1,18	1,74	1,74
		0,90	1,18	1,74	1,74
Allowable tensile force $F_{tR}$ in [kN]		0,44	0,72	1,28	1,28
		0,44	0,72	1,28	1,28
		0,44	0,72	1,28	1,28
		0,44	0,72	1,28	1,28
Further provisions:					
Self-drilling screws		Allowable forces for fasteners		Annex 2	
		Hilti S-AD 01 S 5,5xL Hilti S-AD 01 SS 5,5xL		to „Allgemeines bauaufsichtliches Prüfzeugnis“ Nr. P-BWU02-128002-a of 28.02.2012	

	<p><b>Fastener</b> Hilti S-AD 01 S 5,5xL Hilti S-AD 01 SS 5,5xL</p> <p><b>material</b> screw: stainless steel similar DIN EN 10088 Hilti S-AD 01 S 5,5xL: material No. 1.4567 Hilti S-AD 01 SS 5,5xL: material No. 1.4578</p> <p><b>producer</b> Hilti AG Werk 6103</p>	<p><b>component II</b> made of timber ≥ S10</p>																																
<p><b>Max. drilling capacity</b> <math>t_{di}</math> 4,00 mm</p>	<p><b>component II</b> made of aluminium <math>R_{m} \geq 245N/mm^2</math>, <math>t_{di}</math> in [mm]:</p> <table border="1"> <tr> <td>1,50</td> <td>2,00</td> <td>3,00</td> <td>4,00</td> </tr> </table> <p>To be screwed with depth stop</p>	1,50	2,00	3,00	4,00	<p><b>component II</b> made of timber ≥ S10</p>																												
1,50	2,00	3,00	4,00																															
<p><b>Tightening moment</b> (guidance level)</p>	<p>To be screwed with depth stop</p> <table border="1"> <tr> <td>1,50</td> <td>2,39</td> <td>2,39</td> <td>2,39</td> </tr> <tr> <td>2,00</td> <td>2,49</td> <td>3,40</td> <td>3,40</td> </tr> <tr> <td>3,00</td> <td>2,70</td> <td>3,54</td> <td>5,21</td> </tr> <tr> <td>4,00</td> <td>2,70</td> <td>3,54</td> <td>5,21</td> </tr> </table>	1,50	2,39	2,39	2,39	2,00	2,49	3,40	3,40	3,00	2,70	3,54	5,21	4,00	2,70	3,54	5,21	<table border="1"> <tr> <td>1,50</td> <td>2,16</td> <td>3,83</td> <td>3,83</td> </tr> <tr> <td>2,00</td> <td>2,16</td> <td>3,83</td> <td>3,83</td> </tr> <tr> <td>3,00</td> <td>2,16</td> <td>3,83</td> <td>3,83</td> </tr> <tr> <td>4,00</td> <td>2,16</td> <td>3,83</td> <td>3,83</td> </tr> </table>	1,50	2,16	3,83	3,83	2,00	2,16	3,83	3,83	3,00	2,16	3,83	3,83	4,00	2,16	3,83	3,83
1,50	2,39	2,39	2,39																															
2,00	2,49	3,40	3,40																															
3,00	2,70	3,54	5,21																															
4,00	2,70	3,54	5,21																															
1,50	2,16	3,83	3,83																															
2,00	2,16	3,83	3,83																															
3,00	2,16	3,83	3,83																															
4,00	2,16	3,83	3,83																															
<p><b>Component I</b> made of aluminium <math>R_{m} \geq 245N/mm^2</math>, <math>t</math> in [mm]: mt in [mm]:</p> <p><b>Characteristic values of tensile forces</b> <math>F_{t,Rk}</math> in [kN]</p>	<p><b>Characteristic values of shear forces</b> <math>F_{o,Rk}</math> in [kN]</p>	<p><b>Further provisions:</b></p>																																
<p>Self-drilling screws</p>	<p>Characteristic values of forces for fasteners Hilti S-AD 01 S 5,5xL Hilti S-AD 01 SS 5,5xL</p>	<p>Annex 4 to „Allgemeines bauaufsichtliches Prüfzeugnis“ Nr. P-BWU02-128002-a of 28.02.2012</p>																																

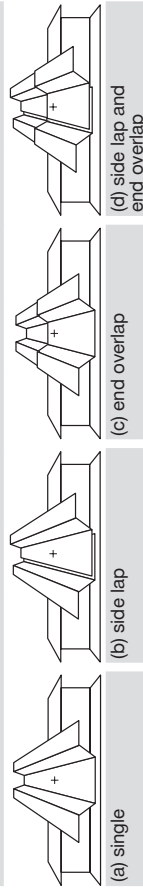
16

## 16.9 Technical data for screws without approval

### S-MD 25Z 5.5xL carbon steel self-drilling screw

<b>Load data</b>	
<b>Design data</b>	
Drilling capacity $\Sigma t$ max. 15.0 mm	
<b>Tightening torque (recommendation)</b> Screw in end-stop oriented Tightening torque: 5 Nm	
<b>Component II</b> steel with $t_i$ [mm] S235J according to DIN EN 10025-2 S280GD or S320GD (DIN EN 10326)	
4.00	5.00
6.00	>6.00

<b>Component I</b> steel with $t_i$ [mm] S280GD or S320GD (DIN EN 10326)	
<b>0.63</b>	2.70 abcd
<b>0.75</b>	3.40 abcd
<b>0.88</b>	4.20 ac
<b>1.00</b>	4.90 ac
<b>1.13</b>	5.70 ac
<b>1.25</b>	6.50
<b>1.50</b>	7.60
<b>1.75</b>	7.60
<b>2.00</b>	7.60
<b>Tensile force <math>N_{R,k}</math> [kN]</b>	
<b>0.63</b>	1.50 abcd
<b>0.75</b>	1.80 abcd
<b>0.88</b>	2.10 ac
<b>1.00</b>	2.40 ac
<b>1.13</b>	2.70 ac
<b>1.25</b>	3.00
<b>1.50</b>	3.60
<b>1.75</b>	3.60
<b>2.00</b>	4.80



<b>Safety factors according to EN 1993-1-3 and CUAP 06.02/07</b>	
<b>Partial safety concept</b>	
Partial safety factor	$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$
<b>Global safety concept</b>	
Global safety factor *	$\gamma_{GLOB} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$
* Note: The global safety factor of 2.0 includes a partial safety factor of $\gamma_F = 1.5$ for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.	

### S-MD 21Z 5.5xL carbon steel self-drilling screw

<b>Load data</b>	
<b>Design data</b>	
Drilling capacity $\Sigma t$ max. 3.0 mm	
<b>Tightening torque (recommendation)</b> Screw in end-stop oriented Total thickness $\Sigma t_i$ : up to 1.25 mm Tightening torque: 4 Nm	
<b>Component II</b> steel with $t_i$ [mm] S280GD or S320GD (DIN EN 10326)	
1.50	2.00

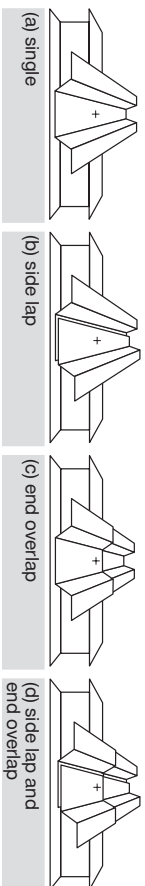
<b>Component I</b> steel with $t_i$ [mm] S280GD or S320GD (DIN EN 10326)	
<b>0.63</b>	2.20
<b>0.75</b>	3.80
<b>0.88</b>	4.20
<b>1.00</b>	4.20
<b>1.13</b>	4.20
<b>1.25</b>	4.20
<b>Tensile force <math>N_{R,k}</math> [kN]</b>	
<b>0.63</b>	1.50
<b>0.75</b>	2.20
<b>0.88</b>	2.80
<b>1.00</b>	3.60
<b>1.13</b>	3.60
<b>1.25</b>	3.60

<b>Safety factors according to EN 1993-1-3 and CUAP 06.02/07</b>	
<b>Partial safety concept</b>	
Partial safety factor	$\gamma_M = 1.33$
Influence of cyclic loading	- / -
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$
<b>Global safety concept</b>	
Global safety factor *	$\gamma_{GLOB} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$
* Note: The global safety factor of 2.0 includes a partial safety factor of $\gamma_F = 1.5$ for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.	

## S-MD 51LZ 4.8xL carbon steel self-drilling screw

Load data	
Design data	
Drilling capacity $\Sigma t$ max. 2.75 mm	
Tightening torque (recommendation)	
Screw in end-stop oriented	up to 1.25 mm
Total thickness $\Sigma t$ :	up to 3.00 mm
Tightening torque:	4 Nm
	8 Nm
Component II steel with $t_{II}$ [mm] S280GD or S320GD (DIN EN 10326)	
0.63	0.75 0.88 1.00 1.13 1.25 1.50

Component I steel with $t_I$ [mm] S280GD or S320GD (DIN EN 10326)		Shear force $V_{Rk}$ [kN]					
0.63	1.40	1.40	1.90	2.40	2.70	3.00	3.00
0.75	1.40	1.70	1.90	2.40	2.70	3.00	3.30
0.88	1.40	1.70	1.90	2.40	2.70	3.30	3.30
1.00	1.40	1.70	1.90	2.40	2.70	3.30	3.30
1.13	1.40	1.70	1.90	2.40	2.70	3.30	3.30
1.25	1.40	1.70	1.90	2.40	2.70	3.30	3.30
1.50	1.40	1.70	1.90	2.40	2.70	3.30	3.30
		Tensile force $N_{Rk}$ [kN]					
0.63	0.60	0.90	1.10	1.30	1.60	1.80	2.50
0.75	0.60	0.90	1.10	1.30	1.60	1.80	2.50
0.88	0.60	0.90	1.10	1.30	1.60	1.80	2.50
1.00	0.60	0.90	1.10	1.30	1.60	1.80	2.50
1.13	0.60	0.90	1.10	1.30	1.60	1.80	2.50
1.25	0.60	0.90	1.10	1.30	1.60	1.80	2.50
1.50	0.60	0.90	1.10	1.30	1.60	1.80	2.50



Safety factors according to EN 1993-1-3 and CUPA 06.02/07	
	Tension
Partial safety concept	$\gamma_{M1} = 1.33$
Partial safety factor	$\gamma_{M1} = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$
	Shear
Global safety concept	$\gamma_{GLOB} = 2.0$
Global safety factor *	$N_{sac} = 1.0 \cdot N_{Rk} / 2.0$
Recommended load	$V_{sac} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-MD 01ZW 5.5xL carbon steel self-drilling screw

Load data	
Design data	
Drilling capacity $\Sigma t$ max. 3.0 mm	
Component II steel with $t_{II}$ [mm] S 280GD S320GD or S350GD (DIN EN 10326)	
0.63	0.75 0.88 1.00 1.13 1.25 1.50 2.00

Component I steel with $t_I$ [mm] S280GD S320GD or S350GD (DIN EN 10326)		Shear force $V_{Rk}$ [kN]									
0.63	1.50	1.80	2.00	2.10	2.30	2.40	2.60	2.60	2.60	2.60	2.60
0.75	1.60	2.00	2.50	2.90	3.40	3.80	3.80	3.80	3.80	3.80	3.80
0.88	1.70	2.10	2.60	3.00	3.50	4.00	4.00	4.50	5.10	5.10	5.10
1.00	1.90	2.30	2.80	3.20	3.70	4.20	4.20	5.20	5.20	5.20	5.20
1.13	2.10	2.70	3.10	3.60	3.90	4.40	5.10	5.90	5.90	5.90	5.90
1.25	3.50	3.90	4.30	4.60	4.60	5.00	6.00	6.60	6.60	6.60	6.60
1.50	3.50	3.90	4.30	4.60	4.60	5.00	6.00	6.60	6.60	6.60	6.60
2.00	3.50	3.90	4.30	4.60	4.60	5.00	6.00	6.60	6.60	6.60	6.60
		Tensile force $N_{Rk}$ [kN]									
0.63	0.90	1.20	1.50	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
0.75	0.90	1.20	1.50	1.80	2.10	2.30	2.30	2.30	2.30	2.30	2.30
0.88	0.90	1.20	1.50	1.80	2.10	2.40	2.40	2.90	2.90	2.90	2.90
1.00	0.90	1.20	1.50	1.80	2.10	2.40	2.40	3.10	3.50	3.50	3.50
1.13	0.90	1.20	1.50	1.80	2.10	2.40	2.40	3.10	3.10	3.10	3.10
1.25	0.90	1.20	1.50	1.80	2.10	2.40	2.40	3.10	3.10	3.10	3.10
1.50	0.90	1.20	1.50	1.80	2.10	2.40	2.40	3.10	3.10	3.10	3.10
2.00	0.90	1.20	1.50	1.80	2.10	2.40	2.40	3.10	3.10	3.10	3.10

Important: It must be ensured that the screws are not overtightened.

Safety factors according to EN 1993-1-3 and CUPA 06.02/07	
	Tension
Partial safety concept	$\gamma_{M1} = 1.33$
Partial safety factor	$\gamma_{M1} = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$
	Shear
Global safety concept	$\gamma_{GLOB} = 2.0$
Global safety factor *	$N_{sac} = 1.0 \cdot N_{Rk} / 2.0$
Recommended load	$V_{sac} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-MD 03ZW 5.5xL carbon steel self-drilling screw

<b>Load data</b>	
<b>Design data</b>	
<b>Drilling capacity <math>\Sigma t</math></b> max. 6.0 mm	4.00

<b>Component II steel with <math>t_{II}</math> [mm]</b>	
S 280GD	3.00
S 320GD or S350GD (DIN EN 10326)	2.50
2.00	2.60

<b>Component I steel with <math>t_I</math> [mm]</b>	
S280GD	2.60
S320GD or S350GD (DIN EN 10326)	2.60
0.63	2.60
0.75	3.70
0.88	4.50
1.00	4.50
1.13	5.30
1.25	5.30
1.50	6.20
1.75	6.20
2.00	7.80

<b>Shear force <math>V_{R,k}</math> [kN]</b>	
2.60	2.60
3.70	3.70
4.50	5.00
4.50	6.50
5.30	6.20
5.30	7.40
6.20	8.10
6.20	8.10
7.80	8.10

<b>Tensile force <math>N_{R,k}</math> [kN]</b>	
1.70	1.70
2.20	2.20
2.80	2.90
2.80	3.50
2.80	4.90
2.80	4.90
2.80	6.90
2.80	6.90

Important: It must be ensured that the screws are not overtightened.

<b>Safety factors according to EN 1993-1-3 and CUPAP 06.02/07</b>	
<b>Partial safety concept</b>	<b>Tension</b>
Partial safety factor	$Y_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$
<b>Global safety concept</b>	<b>Shear</b>
Global safety factor *	$Y_{GLOB} = 2.0$
Recommended load	$N_{res} = 1.0 \cdot N_{Rk} / 2.0$
	$V_{res} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

<b>Load data</b>	
<b>Design data</b>	
<b>Drilling capacity <math>\Sigma t</math></b> max. 12.0 mm	6.00

<b>Component II steel with <math>t_{II}</math> [mm]</b>	
S 280GD	5.00
S 320GD or S350GD (DIN EN 10326)	4.00
4.00	5.00
6.00	6.00
>6.00	>6.00

<b>Component I steel with <math>t_I</math> [mm]</b>	
S280GD	2.70
S320GD or S350GD (DIN EN 10326)	2.70
0.63	2.70
0.75	3.40
0.88	4.20
1.00	4.90
1.25	6.50
1.50	7.60
1.75	7.60
2.00	7.60

<b>Shear force <math>V_{R,k}</math> [kN]</b>	
2.70	2.70
3.40	3.40
4.20	4.20
4.90	4.90
6.50	6.50
7.60	7.60
7.60	7.60
7.60	7.60

<b>Tensile force <math>N_{R,k}</math> [kN]</b>	
1.50	1.50
1.80	1.80
2.10	2.10
2.40	2.40
3.00	3.00
3.60	3.60
3.60	3.60
3.60	3.60

Important: It must be ensured that the screws are not overtightened.

<b>Safety factors according to EN 1993-1-3 and CUPAP 06.02/07</b>	
<b>Partial safety concept</b>	<b>Tension</b>
Partial safety factor	$Y_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$
<b>Global safety concept</b>	<b>Shear</b>
Global safety factor *	$Y_{GLOB} = 2.0$
Recommended load	$N_{res} = 1.0 \cdot N_{Rk} / 2.0$
	$V_{res} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-MD 01S 4.8xL stainless steel self-drilling screw

Load data					
Design data					
Drilling capacity $\Sigma t$ max. 2.0 mm					
		Component II steel with $t_{II}$ [mm] S280GD or S320GD (DIN EN 10326)			
	0.63	0.75	0.88	1.00	1.13
Component I steel with $t_I$ [mm] S280GD or S320GD (DIN EN 10326)					
	0.63	0.90	0.90	0.90	0.90
	0.75	0.90	1.60	1.60	1.60
	0.88	0.90	1.60	2.20	2.20
	1.00	0.90	1.60	2.20	2.80
	1.13	0.90	1.60	2.20	2.80
	1.25	0.90	1.60	-	-
		Tensile force NR <sub>k</sub> [kN]			
	0.63	0.80	0.80	0.80	0.80
	0.75	1.00	1.00	1.00	1.00
	0.88	1.00	1.00	1.00	1.00
	1.00	1.10	1.40	1.40	1.40
	1.13	1.10	1.40	1.40	1.40
	1.25	1.10	1.80	2.00	2.00

Safety factors according to EN 1993-1-3 and CUAP 06.02/07					
			Tension		
Partial safety concept			$\gamma_M = 1.33$	$\gamma_M = 1.33$	
Partial safety factor			$\gamma_{M,cyclic} = 1.0$	- / -	
Influence of cyclic loading			$\gamma_{Rd} = 1.0 \cdot NR_k / 1.33$	$V_{Rd} = V_{Rk} / 1.33$	
Design load					
<b>Global safety concept</b>					
Global safety factor *			$\gamma_{LOB} = 2.0$	$\gamma_{LOB} = 2.0$	
Recommended load			$N_{rec} = 1.0 \cdot NR_k / 2.0$	$V_{rec} = V_{Rk} / 2.0$	
* Note: The global safety factor of 2.0 includes a partial safety factor of $\gamma_M = 1.5$ for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.					

## S-MD 01LS 5.5xL stainless steel self-drilling screw

Load data					
Design data					
Drilling capacity $\Sigma t$ max. 4.0 mm					
		Component III steel with $t_{III}$ [mm] S 280GD S320GD or S350GD (DIN EN 10326)			
	2x0.63	2x0.75	2x0.88	2x1.00	2x1.13
				2x1.25	2x1.50
Component I steel with $t_I$ [mm] S320GD or S350GD (DIN EN 10326)					
	0.63	2.10	2.10	2.10	-
	0.75	2.10	3.00	3.00	-
	0.88	2.10	3.00	3.10	-
	1.00	2.10	3.00	3.10	3.20
	1.13	2.10	3.00	3.10	-
	1.25	2.10	3.00	-	-
	1.50	2.10	-	-	-
		Tensile force NR <sub>k</sub> [kN]			
	0.63	1.60	1.60	1.60	1.60
	0.75	2.00	2.00	2.00	2.00
	0.88	2.00	2.00	2.00	2.00
	1.00	2.00	2.20	3.10	3.10
	1.13	2.00	2.20	3.10	3.10
	1.25	2.00	2.20	3.10	3.10
	1.50	2.00	2.20	3.10	4.30

Safety factors according to EN 1993-1-3 and CUAP 06.02/07					
			Tension		
Partial safety concept			$\gamma_M = 1.33$	$\gamma_M = 1.33$	
Partial safety factor			$\gamma_{M,cyclic} = 1.0$	- / -	
Influence of cyclic loading			$\gamma_{Rd} = 1.0 \cdot NR_k / 1.33$	$V_{Rd} = V_{Rk} / 1.33$	
Design load					
<b>Global safety concept</b>					
Global safety factor *			$\gamma_{LOB} = 2.0$	$\gamma_{LOB} = 2.0$	
Recommended load			$N_{rec} = 1.0 \cdot NR_k / 2.0$	$V_{rec} = V_{Rk} / 2.0$	
* Note: The global safety factor of 2.0 includes a partial safety factor of $\gamma_M = 1.5$ for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.					



## S-MD 03S 5.5xL stainless steel self-drilling screw

Load data		
Design data		
Drilling capacity $\Sigma t$ max. 6.0 mm		
Component II steel with $t_1$ [mm]		
S280GD or S320GD (DIN EN 10326)	2.00	3.00
1.50		

Component I steel with $t_1$ [mm]		
S280GD or S320GD (DIN EN 10326)		
<b>0.63</b>	-	2.30
<b>0.75</b>	-	3.00
<b>0.88</b>	-	3.00
<b>1.00</b>	-	4.80
Tensile force $N_{R,k}$ [kN]		
<b>0.63</b>	1.50	1.50
<b>0.75</b>	1.70	2.00
<b>0.88</b>	1.70	2.00
<b>1.00</b>	1.70	2.60
<b>1.13</b>	1.70	3.20
<b>1.25</b>	1.70	2.60
<b>1.50</b>	1.70	2.60
<b>2.00</b>	1.70	2.60

Safety factors according to EN 1993-1-3 and CUAP 06.02/07		
Tension		
Shear		
<b>Partial safety concept</b>		
Partial safety factor	$\gamma_M = 1.33$	$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$	- / -
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$	$V_{Rd} = V_{Rk} / 1.33$
<b>Global safety concept</b>		
Global safety factor *	$\gamma_{GLOB} = 2.0$	$\gamma_{GLOB} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$	$V_{rec} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-MD 03S 6.3xL stainless steel self-drilling screw

Load data		
Design data		
Drilling capacity $\Sigma t$ max. 6.0 mm		
Component II steel with $t_1$ [mm]		
S280GD or S320GD (DIN EN 10326)	2.00	3.00
1.50		

Component I steel with $t_1$ [mm]		
S280GD or S320GD (DIN EN 10326)		
<b>0.63</b>	-	2.40
<b>0.75</b>	-	3.50
<b>0.88</b>	-	3.50
<b>1.00</b>	-	3.90
Tensile force $N_{R,k}$ [kN]		
<b>0.63</b>	1.40	1.70
<b>0.75</b>	1.40	2.20
<b>0.88</b>	1.40	2.20
<b>1.00</b>	1.40	2.70
<b>1.13</b>	1.40	2.70
<b>1.25</b>	1.40	2.70
<b>1.50</b>	1.40	2.70
<b>2.00</b>	1.40	2.70

Safety factors according to EN 1993-1-3 and CUAP 06.02/07		
Tension		
Shear		
<b>Partial safety concept</b>		
Partial safety factor	$\gamma_M = 1.33$	$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$	- / -
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$	$V_{Rd} = V_{Rk} / 1.33$
<b>Global safety concept</b>		
Global safety factor *	$\gamma_{GLOB} = 2.0$	$\gamma_{GLOB} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$	$V_{rec} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-MD 05SXL stainless steel self-drilling screw

Load data			
Design data			
Drilling capacity Zt max. 12.0 mm	Component II steel with t <sub>l</sub> [mm] S280GD or S320GD (DIN EN 10326)	6.00	8.00
Component I steel with t <sub>l</sub> [mm] S280GD or S320GD (DIN EN 10326)			
0.75	4.10	4.10	4.10
0.88	4.80	4.80	4.80
1.00	5.40	5.40	5.40
1.13	5.40	5.40	5.40
1.25	6.70	6.70	6.70
Tensile force N <sub>Rk</sub> [kN]			
0.63	1.40	1.40	1.40
0.75	1.60	1.60	1.60
0.88	1.60	1.60	1.60
1.00	2.20	2.20	2.20
1.13	2.20	2.20	2.20
1.25	2.70	2.70	2.70
1.50	3.30	3.30	3.30
2.00	4.30	4.30	4.30

Safety factors according to EN 1993-1-3 and CUPAP 06.02/07			
Tension		Shear	
Partial safety concept			
Partial safety factor	Y <sub>M</sub> = 1.33	Y <sub>M</sub> = 1.33	
Influence of cyclic loading	α <sub>cyclic</sub> = 1.0	- / -	
Design load	N <sub>Rd</sub> = 1.0 · N <sub>Rk</sub> / 1.33	V <sub>Rd</sub> = V <sub>Rk</sub> / 1.33	
Global safety concept			
Global safety factor *	Y <sub>GLOB</sub> = 2.0	Y <sub>GLOB</sub> = 2.0	
Recommended load	N <sub>rec</sub> = 1.0 · N <sub>Rk</sub> / 2.0	V <sub>rec</sub> = V <sub>Rk</sub> / 2.0	

\* Note: The global safety factor of 2.0 includes a partial safety factor of Y<sub>F</sub> = 1.5 for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-CDW 61C 6.5XL carbon steel self-drilling screw

Load data										
Design data										
Screw-in depth l <sub>ef</sub> ≥ 50.00 mm	Component II solid timber C24 (S10 according to DIN 4074-1)									
	30	40	50	69	70	80	100	120	120	≥140

Component I sheathing with t <sub>N1</sub> or t <sub>N2</sub> [mm] S280GD or S320GD (DIN EN 10326)										
0.50	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
0.55	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
0.63	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
0.75	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
0.88	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
1.00	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
Tensile force N <sub>Rk</sub> [kN]										
0.50	2.50 <sup>(a)</sup>	2.50 <sup>(a)</sup>	2.50 <sup>(a)</sup>	2.50 <sup>(a)</sup>	2.50 <sup>(a)</sup>	2.50 <sup>(a)</sup>	2.50 <sup>(a)</sup>	2.50 <sup>(a)</sup>	2.50 <sup>(a)</sup>	2.50 <sup>(a)</sup>
0.55	2.90 <sup>(a)</sup>	2.90 <sup>(a)</sup>	2.90 <sup>(a)</sup>	2.90 <sup>(a)</sup>	2.90 <sup>(a)</sup>	2.90 <sup>(a)</sup>	2.90 <sup>(a)</sup>	2.90 <sup>(a)</sup>	2.90 <sup>(a)</sup>	2.90 <sup>(a)</sup>
0.63	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
0.75	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.88	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.00	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

For N<sub>R2</sub> made of S320GD all V<sub>Rk</sub> values can be increased by 8.3%.  
For N<sub>R1</sub> made of S320GD all N<sub>Rk</sub> values, marked with <sup>(a)</sup>, can be increased by 8.3%.  
Screw resistance in timber (Component II) calculated according to timber standards.

Safety factors according to EN 1993-1-3 and CUPAP 06.02/07			
Tension		Shear	
Partial safety concept			
Partial safety factor	Y <sub>M</sub> = 1.33	Y <sub>M</sub> = 1.33	
Influence of cyclic loading	α <sub>cyclic</sub> = 1.0	- / -	
Design load	N <sub>Rd</sub> = 1.0 · N <sub>Rk</sub> / 1.33	V <sub>Rd</sub> = V <sub>Rk</sub> / 1.33	
Global safety concept			
Global safety factor *	Y <sub>GLOB</sub> = 2.0	Y <sub>GLOB</sub> = 2.0	
Recommended load	N <sub>rec</sub> = 1.0 · N <sub>Rk</sub> / 2.0	V <sub>rec</sub> = V <sub>Rk</sub> / 2.0	

\* Note: The global safety factor of 2.0 includes a partial safety factor of Y<sub>F</sub> = 1.5 for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-CD 63C 5.5xL carbon steel self-drilling screw

Load data	
Design data	
Drilling capacity $\Sigma t$ max. 5.5 mm	
<b>Component II</b> steel with $t_{II}$ [mm] S280GD or S320GD (DIN EN 10326)	<b>4.00</b>
<b>2.00</b>	

<b>Component I</b> steel with $t_I$ [mm] S280GD or S320GD (DIN EN 10326)	
<b>0.50</b>	1.30
<b>0.63</b>	1.70
<b>0.75</b>	2.00
<b>1.00</b>	2.60
<b>Tensile force <math>N_{R,k}</math> [kN]</b>	
<b>0.50</b>	2.60
<b>0.63</b>	2.72
<b>0.75</b>	2.72
<b>1.00</b>	2.72

<b>Safety factors according to EN 1993-1-3 and CUAP 06.02/07</b>	
<b>Partial safety concept</b>	<b>Tension</b>
Partial safety factor	$\gamma_M = 1.33$
Influence of cyclic loading	- / -
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$
<b>Global safety concept</b>	
Global safety factor *	$\gamma_{GLOB} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$
	$V_{rec} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-CD 65C 5.5xL carbon steel self-drilling screw

Load data	
Design data	
Drilling capacity $\Sigma t$ max. 12.00 mm	
<b>Component II</b> steel with $t_{II}$ [mm] S280GD or S320GD (DIN EN 10326)	<b>4.00</b>
<b>3.00</b>	<b>&gt; 6.00</b>

<b>Component I</b> steel with $t_I$ [mm] S280GD or S320GD (DIN EN 10326)	
<b>0.50</b>	1.30
<b>0.63</b>	1.80
<b>0.75</b>	2.30
<b>1.00</b>	3.50
<b>Shear force <math>V_{R,k}</math> [kN]</b>	
<b>0.50</b>	1.30
<b>0.63</b>	1.80
<b>0.75</b>	2.30
<b>1.00</b>	3.50
<b>Tensile force <math>N_{R,k}</math> [kN]</b>	
<b>0.50</b>	2.50
<b>0.63</b>	3.30
<b>0.75</b>	4.10
<b>1.00</b>	5.10

<b>Safety factors according to EN 1993-1-3 and CUAP 06.02/07</b>	
<b>Partial safety concept</b>	<b>Tension</b>
Partial safety factor	$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$
<b>Global safety concept</b>	
Global safety factor *	$\gamma_{GLOB} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$
	$V_{rec} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-CD 63S 5.5xL/S-CD 73S 5.5xL stainless steel self-drilling screw

<b>Load data</b>			
<b>Design data</b>			
Drilling capacity $\Sigma t$ ( $t_{N1} + t_{N2}$ ) max. $\leq 5.5$ mm			
		<b>Component II steel with <math>t_{II}</math> [mm]</b>	
		S235J according to DIN EN 10025-2	
		S280GD or S320GD (DIN EN 10326)	
<b>1.50</b>	<b>2.00</b>	<b>2.50</b>	<b>3.00</b>
<b>4.00</b>			

<b>Component I sheeting <math>t_{N1}</math> or <math>t_{N2}</math> [mm]</b>			
S280GD or S320GD (DIN EN 10326)			
<b>Shear force <math>V_{Rk}</math> [kN]</b>			
<b>0.50</b>	<b>1.30</b>	<b>1.30</b>	<b>1.30</b>
<b>0.55</b>	<b>1.50</b>	<b>1.50</b>	<b>1.50</b>
<b>0.63</b>	<b>1.70</b>	<b>1.70</b>	<b>1.70</b>
<b>0.75</b>	<b>2.00<sup>9)</sup></b>	<b>2.00</b>	<b>2.00</b>
<b>0.88</b>	<b>2.30<sup>9)</sup></b>	<b>2.30</b>	<b>2.30</b>
<b>1.00</b>	<b>2.50<sup>9)</sup></b>	<b>2.60</b>	<b>2.60</b>
<b>Tensile force <math>N_{Rk}</math> [kN]</b>			
<b>0.50</b>	<b>1.80</b>	<b>2.60<sup>9)</sup></b>	<b>2.60<sup>9)</sup></b>
<b>0.55</b>	<b>1.80</b>	<b>3.00<sup>9)</sup></b>	<b>3.00<sup>9)</sup></b>
<b>0.63</b>	<b>1.80</b>	<b>3.40<sup>9)</sup></b>	<b>3.40<sup>9)</sup></b>
<b>0.75</b>	<b>1.80</b>	<b>3.80</b>	<b>4.20<sup>9)</sup></b>
<b>0.88</b>	<b>1.80</b>	<b>3.80</b>	<b>4.50</b>
<b>1.00</b>	<b>1.80</b>	<b>2.80</b>	<b>3.80</b>

For  $t_{N2}$  made of S320GD all  $V_{Rk}$  values, except those marked with <sup>9)</sup>, can be increased by 8.3%.  
For  $t_{N2}$  and  $t_{II}$  made of S220GD all  $V_{Rk}$  values can be increased by 8.3%.  
For  $t_{N1}$  made of S320GD all  $N_{Rk}$  values, except those marked with <sup>9)</sup>, can be increased by 8.3%.  
For  $t_{N1}$  and  $t_{II}$  made of S320GD all  $V_{Rk}$  values can be increased by 8.3%.

<b>Safety factors according to EN 1993-1-3 and CUPAP 06.02/07</b>			
		<b>Tension</b>	<b>Shear</b>
<b>Partial safety concept</b>			
Partial safety factor	$\gamma_M = 1.33$		$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$		- / -
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$		$V_{Rd} = V_{Rk} / 1.33$
<b>Global safety concept</b>			
Global safety factor *	$\gamma_{Glob} = 2.0$		$\gamma_{Glob} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$		$V_{rec} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-CD 65S 5.5xL/S-CD 75S 5.5xL stainless steel self-drilling screw

<b>Load data</b>			
<b>Design data</b>			
Drilling capacity $\Sigma t$ ( $t_{N1} + t_{II}$ ) max. $\leq 12.0$ mm			
		<b>Component II steel with <math>t_{II}</math> [mm]</b>	
		S235J according to DIN EN 10025-2	
		S280GD or S320GD (DIN EN 10326)	
<b>3.00</b>	<b>4.00</b>	<b>5.00</b>	<b>6.00</b>

<b>Component I sheeting <math>t_{N1}</math> or <math>t_{N2}</math> [mm]</b>			
S280GD or S320GD (DIN EN 10326)			
<b>Shear force <math>V_{Rk}</math> [kN]</b>			
<b>0.50</b>	<b>1.30</b>	<b>1.30</b>	<b>1.30</b>
<b>0.55</b>	<b>1.50</b>	<b>1.50</b>	<b>1.50</b>
<b>0.63</b>	<b>1.80</b>	<b>1.80</b>	<b>1.80</b>
<b>0.75</b>	<b>2.30</b>	<b>2.30</b>	<b>2.30</b>
<b>0.88</b>	<b>2.90</b>	<b>2.90</b>	<b>2.90</b>
<b>1.00</b>	<b>3.50</b>	<b>3.50</b>	<b>3.50</b>
<b>Tensile force <math>N_{Rk}</math> [kN]</b>			
<b>0.50</b>	<b>2.10</b>	<b>2.10</b>	<b>2.10</b>
<b>0.55</b>	<b>2.50</b>	<b>2.50</b>	<b>2.50</b>
<b>0.63</b>	<b>2.90</b>	<b>2.90</b>	<b>2.90</b>
<b>0.75</b>	<b>3.70</b>	<b>3.70</b>	<b>3.70</b>
<b>0.88</b>	<b>4.50<sup>9)</sup></b>	<b>4.60</b>	<b>4.60</b>
<b>1.00</b>	<b>4.50<sup>9)</sup></b>	<b>5.20</b>	<b>5.20</b>

For  $t_{N2}$  made of S320GD all  $V_{Rk}$  values can be increased by 8.3%.  
For  $t_{N2}$  and  $t_{II}$  made of S220GD all  $V_{Rk}$  values, except those marked with <sup>9)</sup>, can be increased by 8.3%.  
For  $t_{N1}$  and  $t_{II}$  made of S320GD all  $N_{Rk}$  values can be increased by 8.3%.

<b>Safety factors according to EN 1993-1-3 and CUPAP 06.02/07</b>			
		<b>Tension</b>	<b>Shear</b>
<b>Partial safety concept</b>			
Partial safety factor	$\gamma_M = 1.33$		$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$		- / -
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$		$V_{Rd} = V_{Rk} / 1.33$
<b>Global safety concept</b>			
Global safety factor *	$\gamma_{Glob} = 2.0$		$\gamma_{Glob} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$		$V_{rec} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

# S-CDW 61S 6.5xL/S-CDW 71S 6.5xL stainless steel self-drilling screw

## Load data

### Design data

#### Screw-in depth $l_{ef}$

≥ 50 mm

Component II		solid timber C24 (S10 according to DIN 4074-1)												
		30	40	50	69	70	80	100	120	140	≥140			
<b>Component I</b> S280GD or S320GD (DIN EN 10326)	<b>Shear force <math>V_{R,k}</math> [kN]</b>	0.50	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
		0.55	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	
		0.63	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	
		0.75	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	
		0.88	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	
		1.00	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	
		<b>Tensile force <math>N_{R,k}</math> [kN]</b>	0.50	2.60 <sup>a)</sup>	2.60 <sup>a)</sup>	2.60 <sup>a)</sup>	2.60 <sup>a)</sup>	2.60 <sup>a)</sup>	2.60 <sup>a)</sup>	2.60 <sup>a)</sup>	2.60 <sup>a)</sup>	2.60 <sup>a)</sup>	2.60 <sup>a)</sup>	2.60 <sup>a)</sup>
			0.55	3.10 <sup>a)</sup>	3.10 <sup>a)</sup>	3.10 <sup>a)</sup>	3.10 <sup>a)</sup>	3.10 <sup>a)</sup>	3.10 <sup>a)</sup>	3.10 <sup>a)</sup>	3.10 <sup>a)</sup>	3.10 <sup>a)</sup>	3.10 <sup>a)</sup>	3.10 <sup>a)</sup>
			0.63	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
			0.75	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.88	3.50		3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50		
1.00	3.50		3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50		

For  $t_{N2}$  made of S320GD all  $V_{R,k}$  values can be increased by 8.3%.

For  $t_{N1}$  made of S320GD all  $N_{R,k}$  values, marked with <sup>a)</sup>, can be increased by 8.3%.

Screw resistance in timber (Component II) calculated according to timber standards.

## Safety factors according to EN 1993-1-3 and CUAP 06.02/07

	Tension	Shear
<b>Partial safety concept</b>		
Partial safety factor	$Y_M = 1.33$	$Y_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$	- / -
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$	$V_{Rd} = V_{Rk} / 1.33$
<b>Global safety concept</b>		
Global safety factor*	$Y_{GLOB} = 2.0$	$Y_{GLOB} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$	$V_{rec} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-MP 53Z 6.5xL carbon steel self-tapping screw

Load data			
Design data			
		Component II steel with $t_1$ [mm]	
S280GD or S320GD (DIN EN 10326)		1.50	2.00
1.00		3.00	
Component I steel with $t_1$ [mm]			
S280GD or S320GD (DIN EN 10326)		Shear force $V_{Rk}$ [kN]	
0.63	2.20	2.70	2.70
0.75	2.30	3.20	3.20
0.88	2.30	3.20	3.20
1.00	2.40	3.40	3.60
		Tensile force $N_{Rk}$ [kN]	
0.63	1.40	2.20	3.20
0.75	1.40	2.20	3.50
0.88	1.40	2.20	3.50
1.00	1.40	2.20	3.50

### Safety factors according to EN 1993-1-3 and CUPAP 06.02/07

	Tension		Shear
	<b>Partial safety concept</b>	$\gamma_M = 1.33$	$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$	- / -	
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$	$V_{Rd} = V_{Rk} / 1.33$	
<b>Global safety concept</b>	$\gamma_{a,OB} = 2.0$	$\gamma_{a,OB} = 2.0$	
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$	$V_{rec} = V_{Rk} / 2.0$	

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-MP 52Z 6.3xL carbon steel self-tapping screw

Load data			
Design data			
		Component II steel with $t_1$ [mm]	
S280GD or S320GD (DIN EN 10326)		3.00	4.00
1.00		6.00	
Component I steel with $t_1$ [mm]			
S280GD or S320GD (DIN EN 10326)		Shear force $V_{Rk}$ [kN]	
0.63	2.80	2.80	2.80
0.75	2.80	3.60	3.60
0.88	2.80	3.60	4.60
1.00	2.80	3.60	4.60
		Tensile force $N_{Rk}$ [kN]	
0.63	3.20	3.20	3.20
0.75	3.80	3.80	3.80
0.88	3.80	3.80	3.80
1.00	4.80	4.80	4.80

### Safety factors according to EN 1993-1-3 and CUPAP 06.02/07

	Tension		Shear
	<b>Partial safety concept</b>	$\gamma_M = 1.33$	$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$	- / -	
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$	$V_{Rd} = V_{Rk} / 1.33$	
<b>Global safety concept</b>	$\gamma_{a,OB} = 2.0$	$\gamma_{a,OB} = 2.0$	
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$	$V_{rec} = V_{Rk} / 2.0$	

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-WD 11C 3.8xL; 4.2xL carbon steel self-drilling wing screw

Load data	
Drilling capacity $\Sigma t$ S-WD 11C 3.8xL max. 1.5 mm	
Component II steel with $t_{II}$ [mm]	
S 280GD	1.25
S 320GD or S350GD (DIN EN 10326)	1.50
	2.00
	2.50

Component I solid timber S10/C24 $t_I$ [mm]	
Shear force $V_{R,k}$ [kN]	
10	0.80
15	0.80
20	0.80
(25)	0.80
Tensile force $N_{R,k}$ [kN]	
10	0.79
15	0.79
20	0.79
(25)	0.79

Drilling capacity  $\Sigma t$  S-WD 11C 4.2xL max. 3.5 mm

Component II steel with $t_{II}$ [mm]	
S 280GD	1.25
S 320GD or S350GD (DIN EN 10326)	1.50
	2.00
	2.50

Component I solid timber S10/C24 $t_I$ [mm]	
Shear force $V_{R,k}$ [kN]	
10	0.85
15	0.85
20	0.85
(25)	0.85
Tensile force $N_{R,k}$ [kN]	
10	0.79
15	0.79
20	0.79
(25)	0.79

Safety factors according to EN 1993-1-3 and CUAP 06.02/07		
	Tension	Shear
<b>Partial safety concept</b>		
Partial safety factor	$\gamma_M = 1.33$	$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$	- / -
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$	$V_{Rd} = V_{Rk} / 1.33$
<b>Global safety concept</b>		
Global safety factor *	$\gamma_{GLOB} = 2.0$	$\gamma_{GLOB} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$	$V_{rec} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-WD 13C 4.8xL; 5.5xL carbon steel self-drilling wing screw

Load data	
Drilling capacity $\Sigma t$ St S-WD 13C 4.8xL max. 4.5mm	
Component II steel with $t_{II}$ [mm]	
S 280GD	2.00
S 320GD or S350GD (DIN EN 10326)	3.00
	4.00

Component I solid timber S10/C24 $t_I$ [mm]	
Shear force $V_{R,k}$ [kN]	
20	0.84
30	0.84
40	0.84
50	0.84
60	0.84
Tensile force $N_{R,k}$ [kN]	
20	0.81
30	0.81
40	0.81
50	0.81
60	0.81

Drilling capacity  $\Sigma t$  S-WD 13C 5.5xL max. 5.5mm

Component I solid timber S10/C24 $t_I$ [mm]	
Shear force $V_{R,k}$ [kN]	
20	1.40
30	1.40
40	1.40
50	1.40
60	1.40
Tensile force $N_{R,k}$ [kN]	
20	1.00
30	1.00
40	1.00
50	1.00
60	1.00

Safety factors according to EN 1993-1-3 and CUAP 06.02/07		
	Tension	Shear
<b>Partial safety concept</b>		
Partial safety factor	$\gamma_M = 1.33$	$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$	- / -
Design load	$N_{Rd} = 1.0 \cdot N_{Rk} / 1.33$	$V_{Rd} = V_{Rk} / 1.33$
<b>Global safety concept</b>		
Global safety factor *	$\gamma_{GLOB} = 2.0$	$\gamma_{GLOB} = 2.0$
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$	$V_{rec} = V_{Rk} / 2.0$

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.



## S-WD 130C 6.3xL carbon steel self-drilling wing screw

### Load data

Drilling capacity  $\Sigma$  S-WD 130C 6.3xL max. 6.5mm

Component II steel with $t_R$ [mm]		
S 280GD		
S 320GD or S350GD (DIN EN 10326)		
2.00	3.00	4.00

### Component I solid timber S10/C24 $t_R$ [mm]

	Shear force $V_{Rk}$ [kN]		
20	1.36	1.36	1.36
30	1.36	1.36	1.36
40	1.36	1.36	1.36
50	1.36	1.36	1.36
60	1.36	1.36	1.36
	Tensile force $N_{Rk}$ [kN]		
20	1.21	1.21	1.21
30	1.21	1.21	1.21
40	1.21	1.21	1.21
50	1.21	1.21	1.21
60	1.21	1.21	1.21

### Safety factors according to EN 1993-1-3 and CUAP 06.02/07

Partial safety concept	Tension		Shear
	Partial safety factor	$\gamma_M = 1.33$	$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$	- / -	
Design load	$N_{Ed} = 1.0 \cdot N_{Rk} / 1.33$	$V_{Ed} = V_{Rk} / 1.33$	
Global safety concept			
Global safety factor *	$\gamma_{LOB} = 2.0$	$\gamma_{LOB} = 2.0$	
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$	$V_{rec} = V_{Rk} / 2.0$	

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

## S-WD 150C 5.5xL carbon steel self-drilling wing screw

### Load data

Drilling capacity  $\Sigma$  S-WD 150C 5.5xL max. 12mm

Component II steel with $t_R$ [mm]		
S 280GD		
S 320GD or S350GD (DIN EN 10326)		
4.00	5.00	6.00
		> 6.00

### Component I solid timber S10/C24 $t_R$ [mm]

	Shear force $V_{Rk}$ [kN]		
20	1.85	1.85	1.85
30	1.85	1.85	1.85
40	1.85	1.85	1.85
50	1.85	1.85	1.85
60	1.85	1.85	1.85
	Tensile force $N_{Rk}$ [kN]		
20	1.00	1.00	1.00
30	1.00	1.00	1.00
40	1.00	1.00	1.00
50	1.00	1.00	1.00
60	1.00	1.00	1.00

### Safety factors according to EN 1993-1-3 and CUAP 06.02/07

Partial safety concept	Tension		Shear
	Partial safety factor	$\gamma_M = 1.33$	$\gamma_M = 1.33$
Influence of cyclic loading	$\alpha_{cyclic} = 1.0$	- / -	
Design load	$N_{Ed} = 1.0 \cdot N_{Rk} / 1.33$	$V_{Ed} = V_{Rk} / 1.33$	
Global safety concept			
Global safety factor *	$\gamma_{LOB} = 2.0$	$\gamma_{LOB} = 2.0$	
Recommended load	$N_{rec} = 1.0 \cdot N_{Rk} / 2.0$	$V_{rec} = V_{Rk} / 2.0$	

\* Note: The global safety factor of 2.0 includes a partial safety factor of  $\gamma_F = 1.5$  for wind load. For other loads safety factors should be applied in accordance with the appropriate standards.

**16.10 ETA-04-0101 X-ENP-19L15 vom 01.03.2013**

Deutsches Institut für Bautechnik  
**Zulassungsstelle für Bauprodukte und Bauart**  
 Bautechnisches Prüfamt

Eine vom Bund und den Ländern  
 gemeinsam getragene Anstalt des  
 öffentlichen Rechts

Kolonnenstraße 30 B  
 D-10823 Berlin  
 Tel.: +49 30 70730-0  
 Fax: +49 30 70730-320  
 E-Mail: [dibt@diht.de](mailto:dibt@diht.de)  
[www.diht.de](http://www.diht.de)

EMsichtig  
 und notifiziert  
 gemäß Artikel 10 der  
 Richtlinie des Rates vom  
 21. Dezember 1988 zur An-  
 näherung der Rechts- und  
 Verwaltungsvorschriften  
 der Mitgliedstaaten  
 über Bauprodukte  
 (89/106/EWG)

Mitglied der EOTA  
 Member of EOTA

**Europäische Technische Zulassung ETA-04/0101**

Handelsbezeichnung <i>Trade name</i>	X-ENP-19 L15, X-ENP-19 L15 MX, X-ENP-19 L15 MXR
Zulassungsinhaber <i>Holder of approval</i>	Hiiti AG Feldkircherstraße 100 9494 Scharn FÜRSTENTUM LIECHTENSTEIN
Zulassungsgegenstand und Verwendungszweck	Hiiti Setbolzen X-ENP-19 L15, X-ENP-19 L15 MX, X-ENP-19 L15 MXR in Kombination mit den Hiiti Setgeräten DX 76, DX 76 MX, DX 76 PTR, DX 860-ENP, DX 750, DX 750 MX, DX A70 R für die Befestigung von Stahlblech an Stahlunterkonstruktionen.
Generic type and use of construction product	<i>Hiiti powder actuated fasteners X-ENP-19 L15, X-ENP-19 L15 MX, X-ENP-19 L15 MXR in combination with Hiiti fastening tools DX 76, DX 76 MX, DX 76 PTR, DX 860-ENP, DX 750, DX 750 MX, DX A70 R for fastening of steel sheeting to steel members.</i>
Geltungsdauer: <i>Validity:</i>	vom from bis to 10. November 2009 9. November 2014
verlängert <i>extended</i>	vom from bis to 1. März 2013 1. März 2018
Herstellwerk <i>Manufacturing plant</i>	Hiiti AG Feldkircherstraße 100 9494 Scharn FÜRSTENTUM LIECHTENSTEIN

Diese Zulassung umfasst  
*This Approval contains*  
 14 Seiten einschließlich 7 Anhänge  
*14 pages including 7 annexes*



Europäische Organisation für Technische Zulassungen  
 European Organisation for Technical Approvals

Z16784.13

8.06.02-346/11



Verlängerung der Geltungsdauer der  
 europäischen technischen Zulassung ETA-04/0101  
 Seite 2 von 14 | 1. März 2013

**I RECHTSGRUNDLAGEN UND ALLGEMEINE BESTIMMUNGEN**

1 Diese europäische technische Zulassung wird vom Deutschen Institut für Bautechnik erteilt in  
 Übereinstimmung mit:

- der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts-  
 und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte<sup>1</sup>, geändert durch die  
 Richtlinie 93/68/EWG des Rates<sup>2</sup> und durch die Verordnung (EG) Nr. 1862/2003 des  
 Europäischen Parlaments und des Rates<sup>3</sup>;
- dem Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit  
 Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom  
 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der  
 Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen  
 Gemeinschaften (Bauproduktengesetz-BaupG) vom 28. April 1998<sup>4</sup>, zuletzt geändert durch  
 Art. 2 des Gesetzes vom 8. November 2011<sup>5</sup>;
- den Gemeinsamen Verfahrensregeln für die Beantragung, Vorbereitung und Erteilung von  
 europäischen technischen Zulassungen gemäß dem Anhang zur Entscheidung 94/23/EG der  
 Kommission<sup>6</sup>.

2 Das Deutsche Institut für Bautechnik ist berechtigt zu prüfen, ob die Bestimmungen dieser  
 europäischen technischen Zulassung erfüllt werden. Diese Prüfung kann im Herstellwerk  
 erfolgen. Der Inhaber der europäischen technischen Zulassung bleibt jedoch für die Konformität  
 der Produkte mit der europäischen technischen Zulassung und deren Brauchbarkeit für den  
 vorgesehenen Verwendungszweck verantwortlich.

3 Diese europäische technische Zulassung darf nicht auf andere als die auf Seite 1 aufgeführten  
 Hersteller oder Vertreter von Herstellern oder auf andere als die auf Seite 1 dieser europäischen  
 technischen Zulassung genannten Herstellwerke übertragen werden.

4 Das Deutsche Institut für Bautechnik kann diese europäische technische Zulassung widerrufen,  
 insbesondere nach einer Mitteilung der Kommission aufgrund von Art. 5 Abs. 1 der Richtlinie  
 89/106/EWG.

5 Diese europäische technische Zulassung darf - auch bei elektronischer Übermittlung - nur  
 ungekürzt wiedergegeben werden. Mit schriftlicher Zustimmung des Deutschen Instituts für  
 Bautechnik kann jedoch eine teilweise Wiedergabe erfolgen. Eine teilweise Wiedergabe ist als  
 solche zu kennzeichnen. Texte und Zeichnungen von Werbrotschüren dürfen weder im  
 Widerspruch zu der europäischen technischen Zulassung stehen noch diese missbräuchlich  
 verwenden.

6 Die europäische technische Zulassung wird von der Zulassungsstelle in ihrer Amtssprache  
 erteilt. Diese Fassung entspricht der in der EOTA verteilten Fassung. Übersetzungen in andere  
 Sprachen sind als solche zu kennzeichnen.

1 Amtsblatt der Europäischen Gemeinschaften L 40 vom 11. Februar 1989, S. 12  
 2 Amtsblatt der Europäischen Gemeinschaften L 220 vom 30. August 1993, S. 1  
 3 Bundesgesetzblatt Teil I 1998, S. 812  
 4 Bundesgesetzblatt Teil I 1998, S. 812  
 5 Bundesgesetzblatt Teil I 2011, S. 2178  
 6 Amtsblatt der Europäischen Gemeinschaften L 17 vom 20. Januar 1994, S. 34

Z16784.13

8.06.02-346/11

Eine Zinkschicht bis ca. 150µm bei feuerverzinkten bzw. eine Trockenschichtdicke bis ca. 160µm bei pulver- oder naslackbeschichteten Stahlunterkonstruktionen ist zulässig. Die Setzbolzen können auch zur Befestigung anderer dünnwandiger Bauteile eingesetzt werden. Die Verwendung ist nur für Verbindungen vorgesehen, die nicht direkt der äußeren Bewitterung bzw. feuchter Atmosphäre ausgesetzt sind. Die Bestimmungen dieser europäischen technischen Zulassung beruhen auf einer angemessenen Nutzungsdauer der Setzbolzen von 25 Jahren. Die Angaben über die Nutzungsdauer können nicht als Garantie des Herstellers ausgelegt werden, sondern sind lediglich als Hilfsmittel für die Auswahl der richtigen Produkte im Hinblick auf die erwartete wirtschaftlich angemessene Nutzungsdauer des Bauwerks zu betrachten.

## 2 Merkmale des Produkts und Nachweisverfahren

### 2.1 Merkmale des Produkts

Der Setzbolzen muss mit den Angaben in der Zeichnung in Anhang 1 übereinstimmen. Charakteristische Materialkennwerte, Abmessungen und Toleranzen des Setzbolzens, die weder in diesem Abschnitt, noch in Anhang 1 angegeben sind, müssen mit den Angaben in der Technischen Dokumentation<sup>7</sup> dieser europäischen technischen Zulassung übereinstimmen. Die charakteristischen Tragfähigkeiten und die Bemessungswerte für Querkraft und Zugkraft der mit den Setzbolzen hergestellten Verbindungen sowie die Anwendungsgrenzen sind in Anhang 4, Anhang 5 und Anhang 6 angegeben. Bei den Setzbolzen wird davon ausgegangen, dass sie bezüglich des Brandverhaltens die Anforderungen der Klasse A1 erfüllen.

### 2.2 Nachweisverfahren

Die Beurteilung der Brauchbarkeit des Setzbolzens für den vorgesehenen Verwendungszweck (siehe Anhang 1) hinsichtlich der Anforderungen an die mechanische Festigkeit und Standsicherheit, den Brandschutz und die Nutzungssicherheit im Sinne der wesentlichen Anforderungen 1, 2 und 4 erfolgte in Übereinstimmung mit den gemeinsamen Verfahrensregeln für die Beantragung, Vorbereitung und Erteilung von europäischen technischen Zulassungen gemäß dem Anhang zur Entscheidung 94/23/EG der Kommission<sup>6</sup>. Bezüglich der wesentlichen Anforderung Nr. 2 (Brandschutz) gilt das Folgende: Die Beurteilung des Feuerwiderstandes ist nur für das montierte System (Setzbolzen, Kaltprofile, Unterkonstruktion), das nicht Gegenstand dieser europäischen technischen Zulassung ist, relevant.

Bei den Setzbolzen wird davon ausgegangen, dass sie bezüglich des Brandverhaltens die Anforderungen der Klasse A1 erfüllen und in Übereinstimmung mit der Kommissionsentscheidung 96/603/EC (einschließlich Änderungen) auf Grund der Auflistung in dieser Entscheidung nicht geprüft werden müssen. Bezüglich der wesentlichen Anforderung Nr. 1 (Mechanische Festigkeit und Standsicherheit) und Nr. 4 (Nutzungssicherheit) gilt das Folgende:

Die in Anhang 4, Anhang 5 und Anhang 6 angegebenen charakteristischen Tragfähigkeiten wurden durch Versuche mit allen Setzgeräten (soweit erforderlich) ermittelt. Der in Anhang 4, Anhang 5 und Anhang 6 angegebene Faktor  $\alpha_{c,0y}$  berücksichtigt in Übereinstimmung mit EN 1993-1-3 die Wirkung der sich wiederholenden Windbelastung für den Bemessungswert der Zugkraft. Der Bemessungswert der Zugkraft basiert sowohl auf statischen

Die technische Dokumentation dieser europäischen technischen Zulassung ist beim Deutschen Institut für Bautechnik hinterlegt und, soweit diese für die Aufgaben der in das Verfahren der Konformitätsbescheinigung eingeschalteten zugelassenen Stellen bedeutsam ist, den zugelassenen Stellen auszuhandigen.

6.06.02-346/11

## II BESONDERE BESTIMMUNGEN DER EUROPÄISCHEN TECHNISCHEN ZULASSUNG

### 1 Beschreibung des Produkts/der Produkte und des Verwendungszwecks

#### 1.1 Beschreibung des Bauprodukts

Das Produkt ist ein mechanisches Verbindungselement aus Stahl (Setzbolzen). Die Verbindungselemente bestehen aus einem Nagel (Durchmesser 4,5 mm), welcher mit zwei Rondellen bestückt ist. Die Rondelle dienen der Führung des Nagels beim Setzvorgang und stützen das befestigte Blech. Zum Setzen sind spezielle Setzgeräte erforderlich. Die Setzenergie wird über eine Kartusche bereitgestellt (Kartuschen mit unterschiedlicher Stärke stehen zur Verfügung) und kann zusätzlich in Grenzen am Setzgerät eingestellt werden. Die Anwendungsgrenze ist abhängig von der Festigkeit und der Dicke des Grundmaterials.

Die Abmessungen und die Materialangaben der Setzbolzen sind in Anhang 1 aufgeführt. Der Unterschied bei den Befestigungssystemen besteht in der Art der Setzbolzenzuführung zum Setzgerät: einzeln oder magaziniert. Tabelle 1 gibt einen Überblick über die 8 zugelassenen Befestigungssysteme.

Tabelle 1 Überblick der Befestigungssysteme

Setzbolzen	Setzgerät	Beschreibung
X-ENP-19 L 15	DX 750 DX 76 DX 76 PTR	Diese Geräte dienen zum Setzen einzelner Setzbolzen. <sup>7</sup>
X-ENP-19 L 15 MX	DX 750 MX DX 76 MX DX 76 PTR	Das DX 750 MX basiert auf dem DX 750 und das DX 76 MX basiert auf dem DX 76. Anstelle der Stanzplatte für Einzelbolzen sind die Geräte mit dem Bolzenmagazin 75/MX bzw. MX 76 ausgestattet. <sup>8</sup> Die Setzbolzen sind in MX-Magazinstreifen angeordnet, wie in der Setzbolzenbezeichnung angegeben ist.
X-ENP-19 L 15 MXR	DX A70 R DX 860-ENP	Das DX A70 R und das DX 860-ENP sind Stanzgeräte, welche ebenfalls magazinierte Setzbolzen verwenden. Die Setzbolzen sind in MXR-Magazinstreifen angeordnet, wie in der Setzbolzenbezeichnung angegeben ist.

Setzbolzen, Setzgeräte und Kartuschen sind in Anhang 1 und in Anhang 2 dargestellt. Die Setzbolzen und die dazugehörigen Verbindungen werden durch Längs- und/oder Querkräfte beansprucht (siehe Anhang 3).

#### 1.2 Verwendungszweck

Die Setzbolzen sind für die Befestigung von Kaltprofilen aus Stahlblech in den Festigkeitsklassen  $\geq$  S280 und einer Dicke von  $t_f = 0,63$  mm - 2,5 mm (max. 4 mm für 2 - 4 Lagen) an Stahlkonstruktionen der Festigkeitsklassen  $\geq$  S235 und einer Dicke von  $t_s \geq 6$  mm vorgesehen, vorausgesetzt, die Anwendungsgrenzen werden beachtet. Die Kaltprofile können dabei sowohl für Wand- oder Dachbekleidungen als auch für tragende Wand- oder Dachelemente verwendet werden.

<sup>7</sup> Das Setzgerät DX 76 PTR ist mit der Stanzplatte X-76-F-15-PTR zu verwenden.  
<sup>8</sup> Das Setzgerät DX 76 PTR ist mit dem Bolzenmagazin MX 76-PTR zu verwenden.

Z 16794\_13

6.06.02-346/11

Z 16794\_13

Versuchen als auch auf Versuchen mit wiederholten Belastungen, woraus sich der Faktor  $\alpha_{cycl} = 1,0$  ergibt.  
Die Gleichungen zur Berechnung der Bemessungswerte sind in Anhang 4, Anhang 5 und Anhang 6 angegeben.

### 3 Bewertung und Bescheinigung der Konformität und CE-Kennzeichnung

#### 3.1 System der Konformitätsbescheinigung

Gemäß Entscheidung 99/92/EC der Europäischen Kommission<sup>10</sup> ist das System 2+ der Konformitätsbescheinigung anzuwenden.

Dieses System der Konformitätsbescheinigung ist im Folgenden beschrieben:

System 2+: Konformitätserklärung des Herstellers für das Produkt aufgrund von:

- (a) Aufgaben des Herstellers:
  - (1) Erstprüfung des Produkts;
  - (2) werkseigener Produktionskontrolle;
  - (3) Prüfung von im Werk entnommenen Proben nach festgelegtem Prüfplan.
- (b) Aufgaben der zugelassenen Stelle:
  - (4) Zertifizierung der werkseigenen Produktionskontrolle aufgrund von:
    - Erstinspektion des Werkes und der werkseigenen Produktionskontrolle;
    - laufender Überwachung, Beurteilung und Anerkennung der werkseigenen Produktionskontrolle.

Anmerkung: Zugelassene Stellen werden auch "notifizierte Stellen" genannt.

### 3.2 Zuständigkeiten

#### 3.2.1 Aufgaben des Herstellers

##### 3.2.1.1 Werkseigene Produktionskontrolle

Der Hersteller muss eine ständige Eigenüberwachung der Produktion durchführen. Alle vom Hersteller vorgegebenen Daten, Anforderungen und Vorschriften sind systematisch in Form schriftlicher Betriebs- und Verfahrensweisungen festzuhalten, einschließlich der Aufzeichnungen der erzielten Ergebnisse. Die werkseigene Produktionskontrolle hat sicherzustellen, dass das Produkt mit dieser europäischen technischen Zulassung übereinstimmt.

Der Hersteller darf nur Ausgangsstoffe verwenden, die in der technischen Dokumentation dieser europäischen technischen Zulassung aufgeführt sind.

Die werkseigene Produktionskontrolle muss mit dem Prüf- und Überwachungsplan für diese europäische technische Zulassung, der Teil der technischen Dokumentation dieser europäischen technischen Zulassung ist, übereinstimmen. Der Prüf- und Überwachungsplan ist im Zusammenhang mit dem vom Hersteller betriebenen werkseigenen Produktionskontrollsystem festgelegt und beim Deutschen Institut für Bautechnik hinterlegt.<sup>11</sup>

Die Ergebnisse der werkseigenen Produktionskontrolle sind festzuhalten und in Übereinstimmung mit den Bestimmungen des Prüf- und Überwachungsplans auszuwerten.

<sup>10</sup> Amtsblatt der Europäischen Gemeinschaften L 80 vom 18.03.1998

<sup>11</sup> Der Prüf- und Überwachungsplan ist ein vertraulicher Bestandteil der Dokumentation dieser europäischen technischen Zulassung und wird nur, der die das Konformitätsbescheinigungsverfahren eingeschalteten, zugelassenen Stelle ausgenommen. Siehe Abschnitt 3.2.2.

### 3.2.1.2 Sonstige Aufgaben des Herstellers

Der Hersteller hat auf der Grundlage eines Vertrags eine Stelle, die für die Aufgaben nach Abschnitt 3.1 für den Bereich der Setzboizen zugelassen ist, zur Durchführung der Maßnahmen nach Abschnitt 3.2.2 einzuschalten. Hierfür ist der Prüf- und Überwachungsplan nach den Abschnitten 3.2.1.1 und 3.2.2 vom Hersteller der zugelassenen Stelle vorzulegen.

Der Hersteller hat eine Konformitätserklärung abzugeben mit der Aussage, dass das Bauprodukt mit den Bestimmungen dieser europäischen technischen Zulassung übereinstimmt.

### 3.2.2 Aufgaben der zugelassenen Stellen

Die zugelassene Stelle hat die folgenden Aufgaben in Übereinstimmung mit den Bestimmungen des Prüf- und Überwachungsplans durchzuführen:

- Erstinspektion des Werks und der werkseigenen Produktionskontrolle,
- laufende Überwachung, Beurteilung und Anerkennung der werkseigenen Produktionskontrolle

Die zugelassene Stelle hat die wesentlichen Punkte ihrer oben angeführten Maßnahmen festzuhalten und die erzielten Ergebnisse und die Schlussfolgerungen in einem schriftlichen Bericht zu dokumentieren.

Die vom Hersteller eingeschaltete zugelassene Zertifizierungsstelle hat ein EG-Konformitätszertifikat mit der Aussage zu erteilen, dass die werkseigene Produktionskontrolle mit den Bestimmungen dieser europäischen technischen Zulassung übereinstimmt.

Wenn die Bestimmungen der europäischen technischen Zulassung und des zugehörigen Prüf- und Überwachungsplans nicht mehr erfüllt sind, hat die Zertifizierungsstelle das Konformitätszertifikat zurückzuziehen und unverzüglich das Deutsche Institut für Bautechnik zu informieren.

### 3.3 CE-Kennzeichnung

Die CE-Kennzeichnung ist auf jeder Verpackung der Setzboizen anzubringen. Hinter den Buchstaben "CE" sind ggf. die Kennnummer der zugelassenen Zertifizierungsstelle anzugeben sowie die folgenden zusätzlichen Angaben zu machen:

- Name und Anschrift des Herstellers (für die Hersteller verantwortliche juristische Person),
- die letzten beiden Ziffern des Jahres, in dem die CE-Kennzeichnung angebracht wurde,
- Nummer des EG-Konformitätszertifikats für die werkseigene Produktionskontrolle,
- Nummer der europäischen technischen Zulassung,
- Bezeichnung des Produkts.

### 4 Annahmen, unter denen die Brauchbarkeit des Produkts für den vorgesehenen Verwendungszweck positiv beurteilt wurde

#### 4.1 Herstellung

Der Setzboizen wird entsprechend den Bestimmungen der europäischen technischen Zulassung nach dem Herstellungsverfahren hergestellt, welches in der technischen Dokumentation festgelegt ist.

Die europäische technische Zulassung wurde für das Produkt auf der Grundlage abgestimmter Daten und Informationen erteilt, die beim Deutschen Institut für Bautechnik hinterlegt sind und der Identifizierung des beurteilten und bewerteten Produkts dienen. Änderungen am Produkt oder am Herstellungsverfahren, die dazu führen könnten, dass die hinterlegten Daten und Informationen nicht mehr korrekt sind, sind vor ihrer Einführung dem Deutschen Institut für Bautechnik mitzuteilen. Das Deutsche Institut für Bautechnik wird darüber entscheiden, ob sich solche Änderungen auf die Zulassung und folglich auf die Gültigkeit der CE-Kennzeichnung auf Grund der Zulassung auswirken oder nicht, und ggf. feststellen, ob eine zusätzliche Beurteilung oder eine Änderung der Zulassung erforderlich ist.



4.2 Bemessung

Für die Verbindungstypen (a, b, c, d) entsprechend Anhang 4, Anhang 5 und Anhang 6 ist es für die Stahlsorten S280 und S320 nach EN 10346:2009 nicht erforderlich, die Querkräfte auf Grund von Wärmedehnungen zu berücksichtigen. Für die Stahlsorte S350 nach EN 10346:2009 sind diese beim Tragsicherheitsnachweis zu beachten.

Die Beanspruchung ist vorwiegend ruhend (Bemerkung: Windlast gilt als vorwiegend ruhend). Die in der ETA angegebenen Abmessungen, Materialeigenschaften, Anwendungsgrenzen und Nagelvorstände (NVS) werden eingehalten.

Das in EN 1990:2002 + A1:2005 + A1:2005/AC:2010 festgelegte Nachweis-konzept wird für die Bemessung der Verbindungen mit Setzbolzen angewandt. Die charakteristischen Werte (Quer- und Zugtragfähigkeit), die in Anhang 4, Anhang 5 und Anhang 6 angegeben sind, werden für die Bemessung der kompletten Verbindungen verwendet.

Der Teilsicherheitsbeiwert  $\gamma_M = 1,25$  wird zur Ermittlung der Bemessungswerte der Tragfähigkeit herangezogen, wenn hierfür keine Werte in den nationalen Vorschriften bzw. in den nationalen Anhängen zum Eurocode 3 des Mitgliedstaates, in denen die Setzbolzen verwendet werden, angegeben sind.

Bei kombinierter Beanspruchung durch Quer- und Zugkräfte erfolgt der Interaktionsnachweis nach EN 1993-1-3:2006 + AC:2009, Abschnitt 8.3 (8).

Eine eventuelle Abminderung der Zugtragfähigkeit auf Grund der Anordnung der Setzbolzen wird entsprechend EN 1993-1-3:2006 + AC:2009, Abschnitt 8.3 (7) und Bild 8.2 berücksichtigt.

4.3 Einbau

Der Einbau wird so ausgeführt, dass der Setzbolzen erforderlichenfalls ersetzt werden kann.

Der Einbau erfolgt ausschließlich nach Angaben des Herstellers (s. Anhang 7) Die zu befestigenden Profile liegen im Bereich der Verbindung unmittelbar auf der Stahlunterkonstruktion auf. Der Hersteller übergibt die Montageanweisung an die ausführende Firma.

Die Wahl der Kartuschen und die Einstellung der Energie am Setzgerät zur Einhaltung der Anwendungsgrenzen erfolgt entsprechend den Angaben in Anhang 4, Anhang 5 und Anhang 6. Probesezungen werden ausgeführt, falls die Brauchbarkeit der empfohlenen Kartusche nicht anderweitig überprüft werden kann (z. B. am Nagelvorstand).

Der Nagelvorstand entspricht den in Anhang 4, Anhang 5 und Anhang 6 vorgegebenen Werten. Die Übereinstimmung des eingebauten Setzbolzens mit den Bestimmungen der ETA wird durch die ausführende Firma bestätigt.

5 Vorgaben für den Hersteller

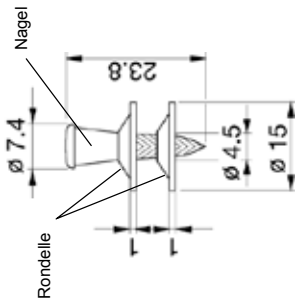
Der Hersteller hat sicherzustellen, dass die Anforderungen entsprechend den Abschnitten 1, 2, 4.2 und 4.3 (einschließlich den Anhängen, auf die Bezug genommen wird) den betroffenen Kreisen bekannt gemacht werden. Das kann z. B. durch Übergabe von Kopien der entsprechenden Abschnitte der europäischen technischen Zulassung erfolgen.

Zusätzlich sind alle für den Einbau relevanten Angaben (minimaler/maximaler Nagelvorstand, Anwendungsgrenzen in Übereinstimmung mit Anhang 4, Anhang 5 und Anhang 6) eindeutig auf der Verpackung oder auf einer beigefügten Beschreibung anzugeben. Vorzugsweise sollten dafür Abbildungen verwendet werden.

Georg Feistel  
Abteilungsleiter

Beglaubigt

Setzbolzen



Material:

- Nagel: Stahl Ck67 wärmebehandelt und verzinkt
- Rondelle: Stahl DC01 verzinkt
- Korrosionswiderstand der Verzinkung: 2 Zyklen Kesternich-Test mit 2 l SO<sub>2</sub> nach EN 3231 ohne Rotrost

Beispiel für ein Bolzensetzgerät und Kartuschen



Rad für Einstellung der Setzenergie:  
Einstellung 1: Minimale Energie  
Einstellung 4: Maximale Energie



Beispiel für die Verwendung

- Kartuschen 6,8/18 M(40):
- Blau: Starke Ladung (Ladungsstärke 5)
  - Rot: Sehr starke Ladung (Ladungsstärke 6)
  - Schwarz: Stärkste Ladung (Ladungsstärke 7)

X-ENP-19 L15, X-ENP-19 L15 MX, X-ENP-19 L15 MXR

Setzbolzen, Setzgerät, Kartusche, Beispiel für Verwendung

Anhang 1

Einzelne Setzbohlen: <b>X-ENP-19 L15</b>				
Magazinierte Setzbohlen für Magazingeräte: <b>X-ENP-19 L15 MX</b>				
Magazinierte Setzbohlen für Standgeräte: <b>X-ENP-19 L15 MXR</b>				
X-ENP-19 L15, X-ENP-19 L15 MX, X-ENP-19 L15 MXR				Anhang 2
Setzbohlen und zugehörige Setzgeräte				Anhang 3

<b>Verbindungstypen und Belastungsarten</b>				
	Verbindungstypen			
	Typ a	Typ b	Typ c	Typ d
Belastungsart				
Querbelastung	einfache Verbindung	Längsstoß	Querstoß	Längs- und Querstoß
Zugbelastung				
X-ENP-19 L15, X-ENP-19 L15 MX, X-ENP-19 L15 MXR				
Verbindungstypen				
Anhang 3				

**Setzkontrolle:**

**NVS = 8,2 bis 9,8 mm**  
Ein Kolbenabdruck auf der oberen  
Rondelle ist klar erkennbar.

Setzbolzen und Bolzensetzgeräte:  
**X-ENP-19 L15 mit DX 76**  
**X-ENP-19 L15 MX mit DX 76 MX**  
**X-ENP-19 L15 MXR mit DX 860-ENP**

Schubkolben: **X-76-P-ENP**

Kartuschen: **6.8 / 18M (DX 76, DX 76 MX)**  
**6.8 / 18M40 (DX 860 ENP)**

Charakteristische Quer- und Zugtragfähigkeit $V_{Rk}$ und $N_{Rk}$		Bemessungswerte der Quer- und Zugtragfähigkeit $V_{Rd}$ und $N_{Rd}$	
Bleichte	Quertragfähigkeit $V_{Rk}$ [kN]	Zugtragfähigkeit $N_{Rk}$ [kN]	Befestigungstypen
0,63	4,0	4,1	a,b,c,d
0,75	4,7	6,3	a,b,c,d
0,88	5,4	7,2	a,b,c,d
1,00	6,0	8,0	a,b,c,d
1,13	7,0	8,4	a,c
1,25	8,0	8,8	a,c
1,50	8,6	8,8	a
1,75	8,6	8,8	a
2,00	8,6	8,8	a
2,50	8,6	8,8	a

$N_{Rd} = \alpha_{cycl} N_{Rk} / \gamma_M$

$V_{Rd} = V_{Rk} / \gamma_M$

$\gamma_M = 1,25$  bei Fehlen nationaler Regelungen

$\alpha_{cycl}$  berücksichtigt den Einfluss wiederholter Windlasten

$\alpha_{cycl} = 1,0$  für alle Bleichdicken  $t_i$

$\gamma_M = 1,25$  bei Fehlen nationaler Regelungen

**Anwendungsgrenzen**

**Anwendungsbereich**

**Untergrenzfähigkeit  $R_m$  [N/mm<sup>2</sup>]**

350 400 450 500 550 600 650 700 750

**Kartuschenwahl und Setzenergieeinstellung**

**Anwendungsbereich**

**Untergrenzfähigkeit  $R_m$  [N/mm<sup>2</sup>]**

350 400 450 500 550 600 650 700 750

Untergrund: Baustahl S235, S275 und S355 in den Güten JR, J0, J2 und K2 nach EN 10025-2:2004, Mindestdicke = 6 mm

Hinweis für S 275: Beginnen mit Wehl für S 355. Im Falle von zu viel Energie: Reduktion der Energieeinstellung oder Kartuschenwechsel bis korrekte Nagelvorstände NVS erzielt werden.

X-ENP-19 L15, X-ENP-19 L15 MX, X-ENP-19 L15 MXR

X-ENP-19 L15 mit Geräten DX 76, DX 76 MX und DX 860-ENP:  
Charakteristische Tragfähigkeit, Bemessungswerte der Tragfähigkeit, Anwendungsgrenzen, Kartuschenwahl und Setzkontrolle

Anhang 4

**Setzkontrolle:**

**NVS = 8,2 bis 9,8 mm**  
Ein Kolbenabdruck auf der oberen  
Rondelle ist klar erkennbar.

Setzbolzen und Bolzensetzgeräte:  
**X-ENP-19 L15 mit DX 750**  
**X-ENP-19 L15 MX mit DX 750 MX**  
**X-ENP-19 L15 MXR mit DX A70 R**

Schubkolben: **75 / ENP2-L**

Kartuschen: **6.8 / 18M (DX 750, DX 750 MX)**  
**6.8 / 18M40 (DX A70 R)**

Charakteristische Quer- und Zugtragfähigkeit $V_{Rk}$ und $N_{Rk}$		Bemessungswerte der Quer- und Zugtragfähigkeit $V_{Rd}$ und $N_{Rd}$	
Bleichte	Quertragfähigkeit $V_{Rk}$ [kN]	Zugtragfähigkeit $N_{Rk}$ [kN]	Befestigungstypen
0,63	4,0	4,1	a,b,c,d
0,75	4,7	6,3	a,b,c,d
0,88	5,4	7,2	a,b,c,d
1,00	6,0	8,0	a,b,c,d
1,13	7,0	8,4	a,c
1,25	8,0	8,8	a,c
1,50	8,6	8,8	a
1,75	8,6	8,8	a
2,00	8,6	8,8	a
2,50	8,6	8,8	a

$N_{Rd} = \alpha_{cycl} N_{Rk} / \gamma_M$

$V_{Rd} = V_{Rk} / \gamma_M$

$\gamma_M = 1,25$  bei Fehlen nationaler Regelungen

$\alpha_{cycl}$  berücksichtigt den Einfluss wiederholter Windlasten

$\alpha_{cycl} = 1,0$  für alle Bleichdicken  $t_i$

$\gamma_M = 1,25$  bei Fehlen nationaler Regelungen

**Anwendungsgrenzen**

**Anwendungsbereich**

**Untergrenzfähigkeit  $R_m$  [N/mm<sup>2</sup>]**

350 400 450 500 550 600 650 700 750

**Kartuschenwahl und Setzenergieeinstellung**

**Anwendungsbereich**

**Untergrenzfähigkeit  $R_m$  [N/mm<sup>2</sup>]**

350 400 450 500 550 600 650 700 750

Untergrund: Baustahl S235, S275 und S355 in den Güten JR, J0, J2 und K2 nach EN 10025-2:2004, Mindestdicke = 6 mm

Hinweis für S 275: Beginnen mit Wehl für S 355. Im Falle von zu viel Energie: Reduktion der Energieeinstellung oder Kartuschenwechsel bis korrekte Nagelvorstände NVS erzielt werden.

X-ENP-19 L15, X-ENP-19 L15 MX, X-ENP-19 L15 MXR

X-ENP-19 L15 mit Geräten DX 750, DX 750 MX und DX A70 R:  
Charakteristische Tragfähigkeit, Bemessungswerte der Tragfähigkeit, Anwendungsgrenzen, Kartuschenwahl und Setzkontrolle

Anhang 5



	Setbolzen und Bolzensetzergeräte: <b>X-ENP-19 L15 mit DX 76 PTR</b> und Standplatte für Einzelbolzen <b>X-76-F-15-PTR</b> <b>X-ENP-19 L15 MX mit DX 76 PTR</b> und Magazin <b>MX 76-PTR</b>  Schubkolben: <b>X-76-P-ENP-PTR</b>  Kartuschen: <b>6.8 / 18M</b>	Setzkontrolle:   <b>NVS = 8,2 bis 9,8 mm</b> Ein Kolbenabdruck auf der oberen Rondelle ist klar erkennbar.																																																
<table border="1"> <thead> <tr> <th colspan="2">Charakteristische Quer- und Zugtragfähigkeit <math>V_{Rk}</math> und <math>N_{Rk}</math></th> <th colspan="2">Bemessungswerte der Quer- und Zugtragfähigkeit <math>V_{Rd}</math> und <math>N_{Rd}</math></th> </tr> <tr> <th>Blechedicke <math>t_1</math> [mm]</th> <th>Querkraft <math>V_{Rk}</math> [kN]</th> <th>Zugkraft <math>N_{Rk}</math> [kN]</th> <th>Befestigungstypen</th> </tr> </thead> <tbody> <tr> <td>0,75</td> <td>4,7</td> <td>6,3</td> <td>a,b,c,d</td> </tr> <tr> <td>0,88</td> <td>5,4</td> <td>7,2</td> <td>a,b,c,d</td> </tr> <tr> <td>1,00</td> <td>6,0</td> <td>8,0</td> <td>a,b,c,d</td> </tr> <tr> <td>1,13</td> <td>7,0</td> <td>8,4</td> <td>a,c</td> </tr> <tr> <td>1,25</td> <td>8,0</td> <td>8,8</td> <td>a</td> </tr> <tr> <td>1,50</td> <td>8,6</td> <td>8,8</td> <td>a</td> </tr> <tr> <td>1,75</td> <td>8,6</td> <td>8,8</td> <td>a</td> </tr> <tr> <td>2,00</td> <td>8,6</td> <td>8,8</td> <td>a</td> </tr> <tr> <td>2,50</td> <td>8,6</td> <td>8,8</td> <td>a</td> </tr> </tbody> </table>		Charakteristische Quer- und Zugtragfähigkeit $V_{Rk}$ und $N_{Rk}$		Bemessungswerte der Quer- und Zugtragfähigkeit $V_{Rd}$ und $N_{Rd}$		Blechedicke $t_1$ [mm]	Querkraft $V_{Rk}$ [kN]	Zugkraft $N_{Rk}$ [kN]	Befestigungstypen	0,75	4,7	6,3	a,b,c,d	0,88	5,4	7,2	a,b,c,d	1,00	6,0	8,0	a,b,c,d	1,13	7,0	8,4	a,c	1,25	8,0	8,8	a	1,50	8,6	8,8	a	1,75	8,6	8,8	a	2,00	8,6	8,8	a	2,50	8,6	8,8	a	$V_{Rd} = V_{Rk} / \gamma_M$  $N_{Rd} = \alpha_{cycl} N_{Rk} / \gamma_M$ berücksichtigt den Einfluss wiederholter Windlasten $\alpha_{cycl} = 1,0$ für alle Blechedicken $t_1$ $\gamma_M = 1,25$ bei Fehlen nationaler Regelungen $\gamma_M = 1,25$ bei Fehlen nationaler Regelungen				
Charakteristische Quer- und Zugtragfähigkeit $V_{Rk}$ und $N_{Rk}$		Bemessungswerte der Quer- und Zugtragfähigkeit $V_{Rd}$ und $N_{Rd}$																																																
Blechedicke $t_1$ [mm]	Querkraft $V_{Rk}$ [kN]	Zugkraft $N_{Rk}$ [kN]	Befestigungstypen																																															
0,75	4,7	6,3	a,b,c,d																																															
0,88	5,4	7,2	a,b,c,d																																															
1,00	6,0	8,0	a,b,c,d																																															
1,13	7,0	8,4	a,c																																															
1,25	8,0	8,8	a																																															
1,50	8,6	8,8	a																																															
1,75	8,6	8,8	a																																															
2,00	8,6	8,8	a																																															
2,50	8,6	8,8	a																																															
<table border="1"> <thead> <tr> <th>Untergrunddicke <math>t_2</math> [mm]</th> <th>Untergrundfestigkeit <math>R_{m}</math> [N/mm<sup>2</sup>]</th> <th>Anwendungsbereich</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>S 235</td> <td>Rot 1 oder Blau 3</td> </tr> <tr> <td>7</td> <td>S 275</td> <td>Rot 1 oder Blau 3</td> </tr> <tr> <td>8</td> <td>S 235</td> <td>Rot 1 oder Blau 3</td> </tr> <tr> <td>9</td> <td>S 235</td> <td>Rot 2 oder Blau 4</td> </tr> <tr> <td>10</td> <td>S 235</td> <td>Rot 2 oder Blau 4</td> </tr> <tr> <td>11</td> <td>S 235</td> <td>Rot 4 oder Schwarz 2</td> </tr> <tr> <td>12</td> <td>S 235</td> <td>Rot 4 oder Schwarz 2</td> </tr> <tr> <td>13</td> <td>S 235</td> <td>Rot 4 oder Schwarz 2</td> </tr> <tr> <td>14</td> <td>S 235</td> <td>Rot 4 oder Schwarz 2</td> </tr> <tr> <td>15</td> <td>S 235</td> <td>Rot 4 oder Schwarz 2</td> </tr> <tr> <td>16</td> <td>S 235</td> <td>Rot 4 oder Schwarz 2</td> </tr> <tr> <td>17</td> <td>S 235</td> <td>Rot 4 oder Schwarz 2</td> </tr> <tr> <td>18</td> <td>S 235</td> <td>Rot 4 oder Schwarz 2</td> </tr> <tr> <td>19</td> <td>S 235</td> <td>Rot 4 oder Schwarz 2</td> </tr> <tr> <td>&gt; 20</td> <td>S 235</td> <td>Rot 4 oder Schwarz 2</td> </tr> </tbody> </table>		Untergrunddicke $t_2$ [mm]	Untergrundfestigkeit $R_{m}$ [N/mm <sup>2</sup> ]	Anwendungsbereich	6	S 235	Rot 1 oder Blau 3	7	S 275	Rot 1 oder Blau 3	8	S 235	Rot 1 oder Blau 3	9	S 235	Rot 2 oder Blau 4	10	S 235	Rot 2 oder Blau 4	11	S 235	Rot 4 oder Schwarz 2	12	S 235	Rot 4 oder Schwarz 2	13	S 235	Rot 4 oder Schwarz 2	14	S 235	Rot 4 oder Schwarz 2	15	S 235	Rot 4 oder Schwarz 2	16	S 235	Rot 4 oder Schwarz 2	17	S 235	Rot 4 oder Schwarz 2	18	S 235	Rot 4 oder Schwarz 2	19	S 235	Rot 4 oder Schwarz 2	> 20	S 235	Rot 4 oder Schwarz 2	Kartuschenwahl und Setzenergieeinsteilung 
Untergrunddicke $t_2$ [mm]	Untergrundfestigkeit $R_{m}$ [N/mm <sup>2</sup> ]	Anwendungsbereich																																																
6	S 235	Rot 1 oder Blau 3																																																
7	S 275	Rot 1 oder Blau 3																																																
8	S 235	Rot 1 oder Blau 3																																																
9	S 235	Rot 2 oder Blau 4																																																
10	S 235	Rot 2 oder Blau 4																																																
11	S 235	Rot 4 oder Schwarz 2																																																
12	S 235	Rot 4 oder Schwarz 2																																																
13	S 235	Rot 4 oder Schwarz 2																																																
14	S 235	Rot 4 oder Schwarz 2																																																
15	S 235	Rot 4 oder Schwarz 2																																																
16	S 235	Rot 4 oder Schwarz 2																																																
17	S 235	Rot 4 oder Schwarz 2																																																
18	S 235	Rot 4 oder Schwarz 2																																																
19	S 235	Rot 4 oder Schwarz 2																																																
> 20	S 235	Rot 4 oder Schwarz 2																																																
Untergrund: Baustahl S235, S275 und S355 in den Güten JR, JO, J2 und K2 nach EN 10025-2:2004, Mindestdicke = 6 mm		Anwendungsbereich: Baustahl S235, S275 und S355 in den Güten JR, JO, J2 und K2 nach EN 10025-2:2004, Mindestdicke = 6 mm																																																

X-ENP-19 L15, X-ENP-19 L15 MX, X-ENP-19 L15 MXR

X-ENP-19 L15 mit Geräten DX 76 PTR:  
 Charakteristische Tragfähigkeit, Bemessungswerte der Tragfähigkeit, Anwendungsgrenzen, Kartuschenwahl und Setzkontrolle

Anhang 6

<b>Gebrauchsanleitung</b> 		

X-ENP-19 L15, X-ENP-19 L15 MX, X-ENP-19 L15 MXR

Gebrauchsanleitung

Anhang 7

Zeichen / Ref. DDDep / Pierre Hohmeier  
 Abt. / dep. DDX  
 Dok. / File Anwendungsempfehlung\_zum\_Einsatz\_von\_X-ENP-Setzbolzen\_10-2011.doc  
 T +423-234 3055  
 F +423-234 7055  
 E mail pierre.hohmeier@hilti.com  
 D 14.10.2011

An alle Anwender des Hilti X-ENP-19  
 Setzbolzens

### Anwendungsempfehlung zum Einsatz des X-ENP-19 Setzbolzens

Sehr geehrte Damen und Herren,

der Hilti X-ENP-19 ist ein galvanisch verzinkter, hochfester Setzbolzen zur Befestigung von Stahlblech an Stahlunterstrukturen.

Sämtliche Aspekte der Befestigung des X-ENP-19 Setzbolzens mit Hilti Setzgeräten sind in der Europäischen Technischen Zulassung ETA-04/0101 sowie im Hilti Handbuch der Direktbefestigung definiert.

In dieser Anwendungsempfehlung wird auf einige Besonderheiten bei der Befestigung von Stahlblechen in Dach- und Fassadenanwendungen explizit eingegangen. Grundsätzliche Hinweise zu Lastwerten, Randsabständen, Kartuschenauswahl, Nagekorrosion (NVS), etc. sind den oben genannten Dokumenten zu entnehmen und entsprechend einzuhalten.

#### Zu beachtende Besonderheiten bei der Befestigung von Stahlblechen:

- Verwendung von Dichtband als Dampfsperre (z.B. bei Kassettendecken): Setzungen durch bzw. in unmittelbarer Nähe eines Abdichtbandes können zur Bildung von Hohlräumen führen und sind daher nicht zugelassen. Hohlräume zwischen Untergrundmaterial und Blech bieten Angriffsflächen für Feuchtigkeit speziell im hochstbelasteten Bereich des Setzbolzens, was in der Folge zu sekundärer Wasserstoffversprödung führen kann.

Wir empfehlen daher für ein max. 3 mm dickes Abdichtband und ein zu befestigendes Blech der Stärke von max. 1,5 mm einen minimalen Abstand von 30 mm von der Aussenkante des Abdichtbandes bis zur Setzbolzenschewe einzuhalten (s. Bild 1), um eine saubere Auflage der Bleche auf dem Untergrundmaterial zu ermöglichen (s. Bild 2) und so das Eindringen von Feuchtigkeit zu verhindern.

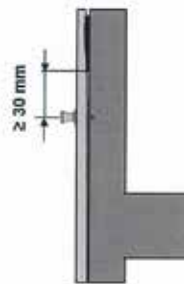


Bild 1: Mindestabstand bei der Verwendung von Dichtband

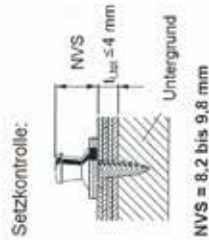


Bild 2: Nach Spezifikation befestigter Setzbolzen

- **Setzgeräteeinstellung:**  
Bei dicken Einzelblechen  $\geq 1,5$  mm und mehrlagigen Blechverbunden (gilt auch für Dichtband als Zwischenlage) wird die Verwendung des DX 76 Bolzensetzgeräts empfohlen, da der grössere Kolbenvortief im Vergleich zum DX 76 PTR ein stärkeres Anpressen/Niederdrücken der steifen Bleche ermöglicht.

- **Bewitterung während der Montage:**  
ETA-04/0101 führt für Hilti Setzbolzen X-ENP-19 in Abschnitt 1.2 aus: "Die Verwendung ist nur für Verbindungen vorgesehen, die nicht direkt der äußeren Bewitterung bzw. feuchter Atmosphäre ausgesetzt sind." Während des Montageprozesses wirkt häufig eine temporäre Bewitterung auf den Befestigungspunkt. Diese temporäre Bewitterung ist aus technischer Sicht unbedenklich, wenn der Einwirkungszeitraum maximal 180 Tage (= 6 Monate) beträgt. Diese Aussage gilt für Befestigungen, die gemäss der Spezifikation der ETA-04/0101 und des Handbuchs der Direktbefestigung ausgeführt wurden.

Wird der Setzbolzen während der Montagezeit einer maritimen Atmosphäre ausgesetzt, so sind die mittleren Oberflächenabtragraten für Zinkbeschichtungen zu beachten. Gemäss Hilti Handbuch der Direktbefestigung (S. 4.25) beträgt die mittlere Abtragrate in maritimer Umgebung 5-9  $\mu\text{m}$  pro Jahr. Für den X-ENP-19 Setzbolzen ist eine Zinkschichtdicke von 8-16  $\mu\text{m}$  spezifiziert. Wird die maximale Bewitterungsdauer von 6 Monaten zugrunde gelegt, ergibt sich ein maximaler mittlerer Abtrag von 4,5  $\mu\text{m}$ . Da dieser Wert unterhalb der minimalen Zinkschichtdicke des X-ENP-19 liegt, verfügt der Setzbolzen über einen ausreichenden temporären Korrosionsschutz.

Wenn vor Beginn der Setzungen Unklarheit besteht, ob die maximale temporäre Bewitterungszeit von 180 Tagen eingehalten werden kann, wird der Einsatz von Hilti Dichtklappen PDK2 (Art# 52709) oder SDK2 (Art# 52708) empfohlen. Diese sind nicht in ETA-04/0101 spezifiziert. Diese Dichtklappen sind unmittelbar nach der Befestigung des Setzbolzens mit dem Hilti Setzwerkzeug für Dichtklappen PDK2 (Art# 59301) bzw. SDK2 (Art# 59300) zu befestigen. Ein nachträglicher Einsatz der Dichtklappen, z.B. nach zwei Monaten, ist nicht zulässig. Beim Anbringen der Dichtklappen müssen Setzbolzenkopf und Rondellen trocken sein.

Der Einsatz der Kunststoffdichtklappen PDK2 ist auf eine maximale Bewitterungszeit von 12 Monaten limitiert. Sollte diese Zeit überschritten werden, so müssen zwingend Edelstahl-dichtklappen SDK2 eingesetzt werden. Die Befestigung der Edelstahl-dichtklappen SDK2 mit Hilti Setzwerkzeug für Dichtklappen SDK 2 muss gemäss der Spezifikation im Hilti Handbuch der Direktbefestigung erfolgen.

Handlungsempfehlung zum Einsatz des X-ENP-19 bei temporärer Bewitterung	
Bewitterungszeit bis 6 Monate:	Keine zusätzliche Maßnahme
Bewitterungszeit 6 - 12 Monate	PDK 2 oder SDK 2
Bewitterungszeit länger als 12 Monate	SDK 2

Mit freundlichen Grüßen

Pierre Hohmeier  
 Quality Manager BU Direct Fastening

Norbert Wohlwend  
 Head of Quality BU Direct Fastening

Anlagen  
 Europäisch Technische Zulassung ETA-04/0101  
 Hilti Handbuch der Direktbefestigung (Kapitel X-ENP, Kapitel SDK2)

**Hilti Aktiengesellschaft**  
 9434 Schaan  
 Liechtenstein  
 Fachelephantrasse 100 | Postfach 333  
 T +423-234 2111 | F +423-234 2005  
 www.hilti.com

Bundesregisteramt  
 CH-1300 St. Gallen  
 CHE-1300 St. Gallen

**Hilti. Outperform. Outlast.**

Hilti Corporation | 9494 Schaan | Liechtenstein | P +423-234 2111 | F +423-234 2965 | [www.hilti.com](http://www.hilti.com)