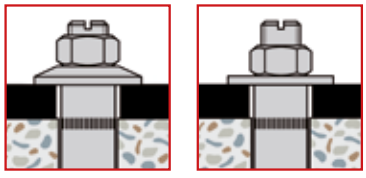
SAFETY BOLT M6-M20

Double expansion, heavy duty anchor for increased security.

FUNCTION

Application of the installation torque causes the anchor's two opposing cones to be drawn into the expansion sleeve. This causes the sleeve to be pressed against the sidewalls of the hole over its entire length and results in optimum frictional resistance and high load capacity in cracked and non-cracked concrete.

Type B Type S Type SK

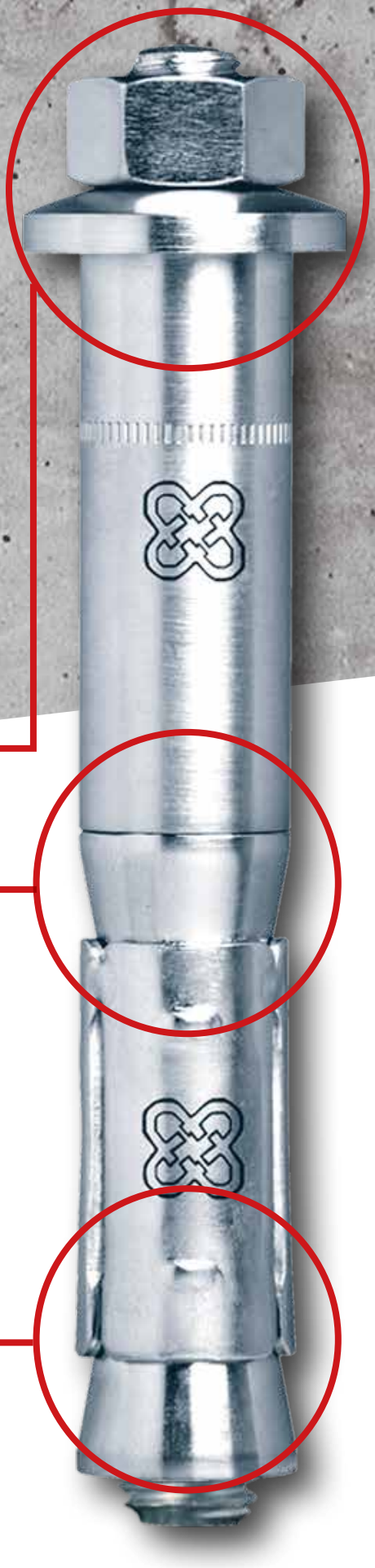


Uninstalled Installed

European technical approval option1

BENEFITS

- High capacity anchor for use in cracked and non-cracked concrete
- Uniformed expansion of sleeve over entire length
- Solid all-steel construction
- Torque indication from domed washer
- Custom lengths available on request



CONSTRUCTION

B With hex nut, domed washer and threaded stud

S With hex head screw and domed washer

SK With countersunk headed screw

MATERIAL

Grade 8.8 carbon steel, zinc plated

A4-80 stainless steel (Type B), A4-70 stainless steel (Type S, SK)

BASE MATERIAL

Cracked and non-cracked concrete: C20/25 to C50/60

APPROVAL

ETA-06/0108 – Option 1 – Carbon steel, zinc plated

LOAD RANGE

Tension: N_{perm} = 2.4 - 48.9 [kN]

Shear: V_{perm} = 5.2 - 80.6 [kN]

PRODUCT RANGE

B: M6 – M20, carbon steel, zinc plated / A4 stainless steel

S: M6 – M20, carbon steel, zinc plated / M6 – M12, A4 stainless steel

SK: M6 – M16, carbon steel, zinc plated / M6 – M12, A4 stainless steel

APPLICATIONS

- Steel construction
- Cable trays
- Railing
- Machines
- Gates
- Façades
- Lifting systems
- Base plates

BENEFITS

- Cylindrical expansion with optimal friction resistance
- Higher anchoring intensity from twin-cone design
- Torque indication from domed washer

PRODUCT DESCRIPTION

- Twin-cone sleeve anchor for high loads
- Torque-controlled mechanical anchor
- Solid, all-steel construction

European technical approval option1

SAFETY BOLT M6-M20

Custom lengths available on request.

SAFETY BOLT B Carbon Steel Zinc Plated

Threaded stud with hex nut and domed washer
Material: Grade 8.8 carbon steel, zinc plated
Approvals: ETA-06/0108 – Option 1

New Type	Old Type	Order Code	Thread Size	Diameter x Depth of drilled hole	Max Fixture Thickness	Fixture Hole Diameter	Eff. Embedment Depth	Total Length	Weight (kg/100pcs)	Box Quantity
B M6-10/45/5	B 10/20	LB0610045005	M6	10 x 60	5	12	45	70	2.7	50
B M6-10/45/15	B 10/35	LB0610045015	M6	10 x 60	15	12	45	80	3.4	50
B M6-10/45/40	B 10/60	LB0610045040	M6	10 x 60	40	12	45	105	4.6	50
B M8-12/55/5	B 12/25	LB0812055005	M8	12 x 70	5	14	55	85	5.8	25
B M8-12/55/15	B 12/40	LB0812055015	M8	12 x 70	15	14	55	95	7.0	25
B M8-12/55/40	B 12/65	LB0812055040	M8	12 x 70	40	14	55	120	9.0	25
B M8-12/55/65	B 12/90	LB0812055065	M8	12 x 70	65	14	55	145	10.6	25
B M8-12/55/100	B 12/125	LB0812055100	M8	12 x 70	100	14	55	180	12.7	25
B M10-15/70/5	B 15/30	LB1015070005	M10	15 x 85	5	17	70	100	11.0	25
B M10-15/70/15	B 15/45	LB1015070015	M10	15 x 85	15	17	70	110	12.8	25
B M10-15/70/40	B 15/70	LB1015070040	M10	15 x 85	40	17	70	135	16.0	10
B M10-15/70/65	B 15/95	LB1015070065	M10	15 x 85	65	17	70	160	18.5	10
B M10-15/70/100	B 15/120	LB1015070100	M10	15 x 85	100	17	70	195	22.0	10
B M12-20/80/5	B 20/35	LB1220080005	M12	20 x 100	5	21	80	120	20.8	10
B M12-20/80/15	B 20/50	LB1220080015	M12	20 x 100	15	21	80	130	24.8	10
B M12-20/80/40	B 20/75	LB1220080040	M12	20 x 100	40	21	80	155	29.0	10
B M12-20/80/65	B 20/100	LB1220080065	M12	20 x 100	65	21	80	180	33.5	10
B M12-20/80/100	B 20/135	LB1220080100	M12	20 x 100	100	21	80	215	39.8	20
B M16-25/100/5	B 25/40	LB1625100005	M16	25 x 125	5	26	100	150	43.4	5
B M16-25/100/15	B 25/55	LB1625100015	M16	25 x 125	15	26	100	160	48.4	5
B M16-25/100/40	B 25/80	LB1625100040	M16	25 x 125	40	26	100	185	56.7	5
B M16-25/100/65	B 25/105	LB1625100065	M16	25 x 125	65	26	100	210	63.6	10
B M16-25/100/100	B 25/130	LB1625100100	M16	25 x 125	100	26	100	245	75.0	10
B M20-30/125/15*	B 30/65	B2030125015	M20	30 x 150	15	32	125	180	85.9	5
B M20-30/125/40*	B 30/90	B2030125040	M20	30 x 150	40	32	125	205	96.7	5
B M20-30/125/65*	B 30/115	B2030125065	M20	30 x 150	65	32	125	230	107.6	5
B M20-30/125/100*	B 30/150	B2030125100	M20	30 x 150	100	32	125	265	122.0	5

*Not included in approval.

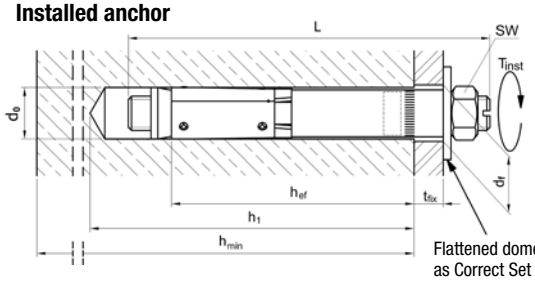
TECHNICAL DATA Carbon Steel Zinc Plated

Permissible loads for single anchors with no influencing edge distances or spacings. Loads are calculated using partial safety factors from ETAG 001 and the characteristic anchor and installation data from this catalogue. Design calculations shall follow the requirements of ETA-06/0108.

Material: Carbon steel, Grade 8.8, zinc plated

Thread Size				M6	M8	M10	M12	M16	M20[7]
Effective embedment depth (h_{ef}) (mm)				45	55	70	80	100	125
Type B...				M6-10/45/…	M8-12/55/…	M10-15/70/…	M12-20/80/…	M16-25/100/…	M20-30/125/…
Permissible tension loads[1]									
N_{perm}	Cracked Concrete	C20/25	[kN]	2.4	3.6	7.6	12.3	17.1	18.6
		C30/37	[kN]	2.9	4.4	9.3	15.0	20.9	22.7
		C40/50	[kN]	3.4	5.0	10.7	17.3	24.2	26.2
		C50/60	[kN]	3.7	5.5	11.8	19.0	26.2	28.8
	Non-Cracked Concrete[3]	C20/25	[kN]	3.0	4.8	9.5	17.2	24.0	31.6
		C30/37	[kN]	3.6	5.8	11.6	21.0	29.3	38.5
		C40/50	[kN]	4.2	6.7	13.4	24.2	33.8	44.5
		C50/60	[kN]	4.6	7.4	14.8	26.2	37.2	48.9
Permissible shear loads[1] [2]									
V_{perm}	Cracked Concrete	C20/25	[kN]	5.2	7.0	20.1	24.5	34.3	49.2
		C30/37	[kN]	6.3	8.5	22.3	29.8	41.7	59.8
		C40/50	[kN]	7.3	9.9	22.3	34.3	48.5	61.6
		C50/60	[kN]	8.0	10.8	22.3	34.3	53.1	76.3
	Non-Cracked Concrete[3]	C20/25	[kN]	7.2	9.8	22.3	34.3	48.0	68.9
		C30/37	[kN]	8.6	11.9	22.3	34.3	54.9	80.6
		C40/50	[kN]	8.6	13.8	22.3	34.3	54.9	80.6
		C50/60	[kN]	8.6	14.3	22.3	34.3	54.9	80.6
Permissible bending moments[1] [4]									
M_{perm}			[Nm]	6.9	17.1	34.3	60.0	152.0	296.6
Spacings, edge distances and member thicknesses									
Effective embedment depth		h_{ef}	[mm]	45	55	70	80	100	125
Characteristic spacing[5]		$s_{cr,N}$	[mm]	135	165	210	240	300	375
Minimum spacing		s_{min}	[mm]	60	100	150	200	250	195
Characteristic edge distance		$c_{cr,N}$	[mm]	67.5	82.5	105	120	150	185
Minimum edge distance[6]		c_{min}	[mm]	80	100	150	200	250	350
Minimum member thickness		h_{min}	[mm]	100	110	140	160	200	250
Installation data									
Drill hole diameter		d_0	[mm]	10	12	25	20	25	30
Drill hole depth		h_1	[mm]	60	70	85	100	125	150
Clearance hole in the fixture	Through-fix anchorage	d_f	[mm]	60	100	150	200	250	195
	Installation on threaded stud	d_f	[mm]	67.5	82.5	105	120	150	185
Width across flats		sw	[mm]	80	100	150	200	250	350
Installation torque		T_{inst}	[Nm]	100	1110	140	160	200	250

Installed anchor



Flattened domed washer serves as Correct Set indicator

1) The permissible loads have been calculated using the partial safety factors for resistances stated in the ETA-approval and a partial safety factor for actions of $\gamma_F = 1.4$. The permissible loads are valid for unreinforced concrete and reinforced concrete with a rebar spacing $s \geq 15$ cm and reinforced concrete with a rebar spacing $s \geq 10$ cm if the rebar is 10 mm or smaller.

2) The permissible shear loads are based on a single anchor without influencing concrete edges. For shear loads applied close to an edge ($c \leq 10\ h_{ef}$ or 60 d) concrete edge failure must be checked per ETAG 001, Annex C, design method A.

3) Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification $\sigma_R = 3$ N/mm² can be assumed (σ_L equals the tensile stress within the concrete as a result of external loads, forces on anchors included).

4) The permissible bending moments are only valid for the threaded stud (e.g. in case of a distance mounting).

5) For spacings smaller than the characteristic values (i.e. $s \leq s_{cr,N}$) a calculation per ETAG 001, Annex C, design method A shall be performed. For details, see ETA-06/0108.

6) The actual edge distance shall not be less than the value of c_{min} shown in the table.

7) Size M20 is not included in the approval.

Custom lengths available on request.

SAFETY BOLT S Carbon Steel Zinc Plated

Hex head screw and domed washer
Material: Grade 8.8 carbon steel, zinc plated
Approvals: ETA-06/0108 – Option 1

New Type	Old Type	Order Code	Thread Size	Diameter x Depth of drilled hole	Max Fixture Thickness	Fixture Hole Diameter	Eff. Embedment Depth	Total Length	Weight (kg/100pcs)	Box Quantity
S M6-10/45/5	S 10/20	LS0610045005	M6	10 x 60	5	12	45	70	2.7	50
S M6-10/45/15	S 10/35	LS0610045015	M6	10 x 60	15	12	45	80	3.4	50
S M6-10/45/40	S 10/60	LS0610045040	M6	10 x 60	40	12	45	105	4.6	50
S M8-12/55/5	S 12/25	LS0812055005	M8	12 x 70	5	14	55	80	5.8	25
S M8-12/55/15	S 12/40	LS0812055015	M8	12 x 70	15	14	55	90	7.0	25
S M8-12/55/40	S 12/65	LS0812055040	M8	12 x 70	40	14	55	115	9.0	25
S M10-15/70/5	S 15/30	LS1015070005	M8	12 x 70	5	17	70	95	11.0	25
S M10-15/70/15	S 15/45	LS1015070015	M10	15 x 85	15	17	70	105	12.8	25
S M10-15/70/40	S 15/70	LS1015070040	M12	20 x 100	40	17	70	130	16.0	10
S M12-20/80/5	S 20/35	LS1220080005	M16	25 x 125	5	21	80	113	20.8	10
S M12-20/80/15	S 20/50	LS1220080015	M16	25 x 125	15	21	80	123	24.8	10
S M12-20/80/40	S 20/75	LS1220080040	M16	25 x 125	40	21	80	148	29.0	10
S M16-25/100/5	B 25/40	LS1625100005	M16	25 x 125	5	26	100	145	43.4	5
S M16-25/100/15	S 25/55	LS1625100015	M16	25 x 125	15	26	100	155	48.4	5
S M16-25/100/40	S 25/80	LS1625100040	M20	30 x 150	40	26	105	180	56.7	5
S M20-30/125/15*	S 30/65	S2030125015	M20	30 x 150	15	32	125	180	85.9	5
S M20-30/125/40*	S 30/90	S2030125040	M20	30 x 150	40	32	125	205	96.7	5

*Not included in approval.

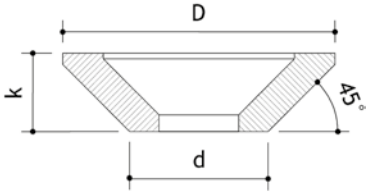
SAFETY BOLT SK Carbon Steel Zinc Plated

Countersunk head screw
Grade 8.8 carbon steel, zinc plated
Approvals: ETA-06/0108 – Option 1

New Type	Old Type	Order Code	Thread Size	Diameter x Depth of drilled hole	Max Fixture Thickness	Fixture Hole Diameter	Eff. Embedment Depth	Total Length	Weight (kg/100pcs)	Box Quantity
SK M6-10/45/6	SK 10/20	LSK0610045006	M6	10 x 60	6	12	45	70	2.7	50
SK M6-10/45/15	SK 10/35	LSK0610045015	M6	10 x 60	15	12	45	70	3.4	50
SK M6-10/45/40	SK 10/60	LSK0610045040	M6	10 x 60	40	12	45	95	4.6	50
SK M8-12/55/10	SK 12/25	LSK0812055010	M8	12 x 70	10	14	55	75	5.8	25
SK M8-12/55/15	SK 12/40	LSK0812055015	M8	12 x 70	15	14	55	85	7.0	25
SK M8-12/55/40	SK 12/65	LSK0812055040	M8	12 x 70	40	14	55	110	9.0	25
SK M10-15/70/10	SK 15/30	LSK1015070010	M10	15 x 85	10	17	70	90	11.0	25
SK M10-15/70/15	SK 15/45	LSK1015070015	M10	15 x 85	15	17	70	100	12.8	25
SK M10-15/70/40	SK 15/70	LSK1015070040	M10	15 x 85	40	17	70	120	26.0	25
SK M12-20/80/15	SK 20/50	LSK1220080015	M12	20 x 100	15	21	80	110	24.8	10
SK M12-20/80/40	SK 20/75	LSK1220080040	M10	20 x 100	40	21	80	135	29.0	10
SK M16-25/100/15	SK 25/55	LSK1625100015	M16	25 x 125	15	26	100	135	48.4	5
SK M16-25/100/40	SK 25/80	LSK1625100040	M16	25 x 125	40	26	100	160	56.7	5

*Not included in approval.

Countersunk washer



Size	D (mm)	d (mm)	k (mm)
M6	20	10	5,5
M8	24	12	6,5
M10	27	15	7
M12	33	19	8
M16	50	24	14

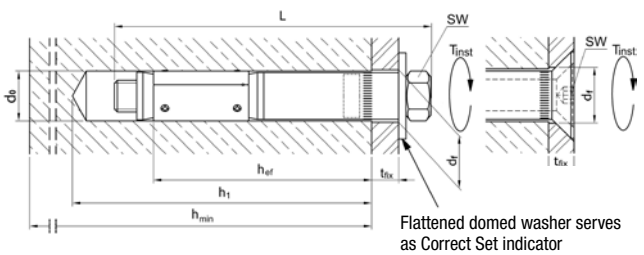
TECHNICAL DATA Carbon Steel Zinc Plated

Permissible loads for single anchors with no influencing edge distances or spacings. Loads are calculated using partial safety factors from ETAG 001 and the characteristic anchor and installation data from this catalogue. Design calculations shall follow the requirements of ETA-06/0108.

Material: Carbon steel, Grade 8.8, zinc plated

Thread Size				M6	M8	M10	M12	M16	M20[6]
Effective embedment depth (h_{ef}) (mm)				45	55	70	80	100	125
Type S..., SK...				M6-10/45/…	M8-12/55/…	M10-15/70/…	M12-20/80/…	M16-25/100/…	M20-30/125/…
Permissible tension loads[1]									
N_{perm}	Cracked Concrete	C20/25	[kN]	2.4	3.6	7.6	12.3	17.1	18.6
		C30/37	[kN]	2.9	4.4	9.3	15.0	20.9	22.7
		C40/50	[kN]	3.4	5.0	10.7	17.3	24.2	26.2
		C50/60	[kN]	3.7	5.5	11.8	19.0	26.2	28.8
	Non-Cracked Concrete[3]	C20/25	[kN]	3.0	4.8	9.5	17.2	24.0	31.6
		C30/37	[kN]	3.6	5.8	11.6	21.0	29.3	38.5
		C40/50	[kN]	4.2	6.7	13.4	24.2	33.8	44.5
		C50/60	[kN]	4.6	7.4	14.8	26.2	37.2	48.9
Permissible shear loads[1] [2]									
V_{perm}	Cracked Concrete	C20/25	[kN]	5.2	7.0	20.1	24.5	34.3	49.2
		C30/37	[kN]	6.3	8.5	22.3	29.8	41.7	59.8
		C40/50	[kN]	7.3	9.9	22.3	34.3	48.5	69.6
		C50/60	[kN]	8.0	10.8	22.3	34.3	53.1	76.3
	Non-Cracked Concrete[3]	C20/25	[kN]	7.2	9.8	22.3	34.3	48.0	68.9
		C30/37	[kN]	8.6	11.9	22.3	34.3	54.9	80.6
		C40/50	[kN]	8.6	13.8	22.3	34.3	54.9	80.6
		C50/60	[kN]	8.6	14.3	22.3	34.3	54.9	80.6
Spacings, edge distances and member thicknesses									
Effective embedment depth		h_{ef}	[mm]	45	55	70	80	100	125
Characteristic spacing[4]		$s_{cr,N}$	[mm]	135	165	210	240	300	375
Minimum spacing		s_{min}	[mm]	60	100	150	200	250	195
Characteristic edge distance		$c_{cr,N}$	[mm]	67.5	82.5	105	120	150	185
Minimum edge distance[5]		c_{min}	[mm]	80	100	150	200	250	350
Minimum member thickness		h_{min}	[mm]	100	110	140	160	200	250
Installation data									
Drill hole diameter		d_0	[mm]	10	12	15	20	25	30
Drill hole depth		h_1	[mm]	60	70	85	100	125	150
Clearance hole in the fixture	Through-fix anchorage	d_f	[mm]	12	14	17	21	26	32
Width across flat	S	sw	[mm]	10	13	17	19	24	32
	SK	sw	[mm]	4	5	6	8	10	-
Installation torque	S	T_{inst}	[Nm]	8	20	60	90	170	300
	SK	T_{inst}	[Nm]	12	20	60	90	190	-

Installed anchor



Flattened domed washer serves as Correct Set indicator

1) The permissible loads have been calculated using the partial safety factors for resistances stated in the ETA-approval and a partial safety factor for actions of $\gamma_F = 1.4$. The permissible loads are valid for unreinforced concrete and reinforced concrete with a rebar spacing $s \geq 15$ cm and reinforced concrete with a rebar spacing $s \geq 10$ cm if the rebar is 10 mm or smaller.

2) The permissible shear loads are based on a single anchor without influencing concrete edges. For shear loads applied close to an edge ($c \leq 10\ h_{ef}$ or 60d) concrete edge failure must be checked per ETAG 001, Annex C, design method A.

3) Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification $\sigma_R = 3$ N/mm² can be assumed (σ_L equals the tensile stress within the concrete as a result of external loads, forces on anchors included).

4) For spacings smaller than the characteristic values (i.e. $s \leq s_{cr,N}$) a calculation per ETAG 001, Annex C, design method A shall be performed. For details, see ETA-06/0108.

5) The actual edge distance shall not be less than the value of c_{min} shown in the table.

6) Size M20 is not included in the approval.

SAFETY BOLT B A4 stainless steel

Threaded stud with hex nut and domed washer

Material: A4-80 stainless steel

New Type	Old Type	Order Code	Thread Size	Diameter x Depth of drilled hole	Max Fixture Thickness	Fixture Hole Diameter	Eff. Embedment Depth	Total Length	Weight (kg/100pcs)	Box Quantity
B M6-10/45/5 A4	B 10/20 A4	B0610045005A4	M6	10 x 60	5	12	45	70	2.7	50
B M6-10/45/15 A4	B 10/35 A4	B0610045015A4	M6	10 x 60	15	12	45	80	3.4	50
B M6-10/45/40 A4	B 10/60 A4	B0610045040A4	M6	10 x 60	40	12	45	105	4.6	50
B M8-12/55/5 A4	B 12/25 A4	B0812055005A4	M8	12 x 70	5	14	55	85	5.8	25
B M8-12/55/15 A4	B 12/40 A4	B0812055005A4	M8	12 x 70	15	14	55	95	7.0	25
B M8-12/55/40 A4	B 12/65 A4	B0812055040A4	M8	12 x 70	40	14	55	120	9.0	25
B M10-15/70/5 A4	B 15/30 A4	B1015070005A4	M10	15 x 85	5	17	70	100	11.0	25
B M10-15/70/15 A4	B 15/45 A4	B1015070015A4	M10	15 x 85	15	17	70	110	12.8	25
B M10-15/70/40 A4	B 15/70 A4	B1015070040A4	M10	15 x 85	40	17	70	135	16.0	10
B M12-20/80/5 A4	B 20/35 A4	B1220080005A4	M12	20 x 95	5	21	80	120	20.8	10
B M12-20/80/15 A4	B 20/50 A4	B1220080015A4	M12	20 x 95	15	21	80	130	24.8	10
B M12-20/80/40 A4	B 20/75 A4	B1220080040A4	M12	20 x 95	40	21	80	155	29.0	10
B M16-25/100/5 A4	B 25/55 A4	B1625100015A4	M16	25 x 125	15	26	100	160	48.4	5
B M16-25/100/15 A4	B 25/80 A4	B1625100040A4	M16	25 x 125	40	26	100	185	56.7	5
B M20-30/125/40 A4	B 30/90 A4	B2030125040A4	M20	30 x 150	40	32	125	205	96.7	5

SAFETY BOLT S A4 stainless steel

Hex head screw and domed washer

Material: A4-70 stainless steel

New Type	Old Type	Order Code	Thread Size	Diameter x Depth of drilled hole	Max Fixture Thickness	Fixture Hole Diameter	Eff. Embedment Depth	Total Length	Weight (kg/100pcs)	Box Quantity
S M6-10/45/15 A4	S 10/35 A4	S0610045015A4	M6	10 x 60	15	12	45	80	3.4	50
S M6-10/45/40 A4	S 10/60 A4	S0610045040A4	M6	10 x 60	40	12	45	105	4.6	50
S M8-12/55/15 A4	S 12/40 A4	S0812055015A4	M8	12 x 70	15	14	55	90	7.0	25
S M8-12/55/40 A4	S 12/65 A4	S0812055040A4	M8	12 x 70	40	14	55	115	9.0	25
S M10-15/70/15 A4	S 15/45 A4	S1015070015A4	M10	15 x 85	15	17	70	105	12.8	25
S M10-15/70/40 A4	S 15/70 A4	S1015070040A4	M10	10 x 60	40	17	70	130	16.0	10
S M12-20/80/15 A4	S 20/50 A4	S1220080015A4	M12	20 x 95	15	21	80	123	24.8	10
S M12-20/80/40 A4	S 20/75 A4	S1220080040A4	M12	20 x 95	40	21	80	148	29.0	10

SAFETY BOLT SK A4 stainless steel

Hex head screw and domed washer

Material: A4-70 stainless steel

New Type	Old Type	Order Code	Thread Size	Diameter x Depth of drilled hole	Max Fixture Thickness	Fixture Hole Diameter	Eff. Embedment Depth	Total Length	Weight (kg/100pcs)	Box Quantity
SK M6-10/45/15 A4	SK 10/35 A4	SK0610045015A4	M6	10 x 60	15	12	45	70	3.4	50
SK M6-10/45/40 A4	SK 10/60 A4	SK0610045040A4	M6	10 x 60	40	12	45	95	4.6	50
SK M8-12/55/15 A4	SK 12/40 A4	SK0812055015A4	M8	12 x 70	15	14	55	85	7.0	25
SK M8-12/55/40 A4	SK 12/65 A4	SK0812055040A4	M8	12 x 70	40	14	55	110	9.0	25
SK M10-15/70/15 A4	SK 15/45 A4	SK1015070015A4	M10	15 x 85	15	17	70	100	12.8	25
SK M10-15/70/40 A4	SK 15/70 A4	SK1015070040A4	M10	10 x 60	40	17	70	125	16.0	25
SK M12-20/80/15 A4	SK 20/50 A4	SK1220080015A4	M12	20 x 95	15	21	80	110	24.8	10
SK M12-20/80/40 A4	SK 20/75 A4	SK1220080040A4	M12	20 x 95	40	21	80	135	29.0	10

TECHNICAL DATA A4 stainless steel

Permissible loads for single anchors with no influencing edge distances or spacings. Loads are calculated using partial safety factors from ETAG 001 and the characteristic anchor and installation data from this catalogue.

Material: A4-80 stainless steel (Type B), A4-70 stainless steel (Type S, SK)

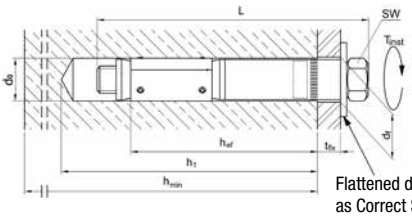
Thread Size				M6	M8	M10	M12	M16	M20
Effective embedment depth (h_{ef}) (mm)				45	55	70	80	100	125
Type B.... S.... SK...				M6-10/45/...	M8-12/55/...	M10-15/70/...	M12-20/80/...	M16-25/100/...	M20-30/125/...
Permissible tension loads[1)]									
N_{perm}	Cracked Concrete	C20/25	[kN]	-	-	-	7.1	10.7	15.5
		C30/37	[kN]	-	-	-	8.4	12.6	18.3
		C40/50	[kN]	-	-	-	9.5	14.3	20.8
		C50/60	[kN]	-	-	-	10.5	15.8	22.9
	Non-Cracked Concrete[3)]	C20/25	[kN]	3.2	4.3	7.1	10.7	16.0	23.2
		C30/37	[kN]	3.9	5.2	8.6	12.6	18.8	27.4
		C40/50	[kN]	4.5	6.1	10.0	14.3	21.4	31.1
		C50/60	[kN]	5.0	6.7	11.0	15.8	23.7	34.3

Permissible shear loads[1) 2)]							B	S/SK	B	S/SK	B	S/SK
V_{perm}	Cracked Concrete	C20/25	[kN]	-	-	-	20.5	20.5	28.6	28.6	39.9	39.9
		C30/37	[kN]	-	-	-	24.2	24.2	33.7	33.7	47.1	47.1
		C40/50	[kN]	-	-	-	27.5	24.6	38.3	38.3	53.5	53.5
		C50/60	[kN]	-	-	-	28.9	24.6	42.3	41.5	59.1	59.1
	Non-Cracked Concrete[3)]	C20/25	[kN]	3.2	4.3	7.1	28.7	24.6	40.0	40.0	55.9	55.9
		C30/37	[kN]	3.9	5.2	8.6	28.9	24.6	47.2	41.5	66.0	61.6
		C40/50	[kN]	4.5	6.1	10.0	28.9	24.6	49.5	41.5	67.4	61.6
		C50/60	[kN]	5.0	6.7	11.0	28.9	24.6	49.5	41.5	67.4	61.6

Permissible bending moments[1) 4)]									
M_{perm}			[Nm]	6.5	16.1	32.1	56.1	142.7	278.1

Spacings, edge distances and member thicknesses									
Effective embedment depth		h_{ef}	[mm]	45	55	70	80	100	125
Characteristic spacing[5)]		$s_{cr,N}$	[mm]	140	165	235	240	300	375
Minimum spacing		s_{min}	[mm]	140	165	235	120	150	195
Characteristic edge distance		$c_{cr,N}$	[mm]	80	120	165	120	150	195
Minimum edge distance[6)]		c_{min}	[mm]	80	120	165	210	270	350
Minimum member thickness		h_{min}	[mm]	100	110	140	150	200	250
Installation data									
Drill hole diameter		d_0	[mm]	10	12	15	20	25	30
Drill hole depth		h_1	[mm]	60	70	85	95	125	150
Clearance hole in the fixture	Through-fix anchorage	d_f	[mm]	12	14	17	21	26	32
	Installation on threaded stud	d_f	[mm]	7	9	12	14	18	22
Width across flat	B	sw	[mm]	10	13	17	19	24	30
	S	sw	[mm]	10	13	17	19	-	-
	SK	sw	[mm]	4	5	6	8	-	-
Installation torque	B	T_{inst}	[Nm]	10	25	50	80	180	300
	S	T_{inst}	[Nm]	10	25	50	80	-	-
	SK	T_{inst}	[Nm]	10	25	50	80	-	-

Installed anchor



Flattened domed washer serves as Correct Set indicator

1) The permissible loads have been calculated using partial safety factors for resistances and a partial safety factor for actions of γ_F = 1.4. The permissible loads are valid for unreinforced concrete and reinforced concrete with a rebar spacing s ≥ 15 cm and reinforced concrete with a rebar spacing s ≥ 10 cm if the rebar is 10 mm or smaller.

2) The permissible shear loads are based on a single anchor without influencing concrete edges. For shear loads applied close to an edge (c ≤ 10 h_{ef} or 60d) concrete edge failure must be checked per ETAG 001, Annex C, design method A.

3) Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification σ_R = 3 N/mm² can be assumed (σ_L equals the tensile stress within the concrete as a result of external loads, forces on anchors included).

4) The permissible bending moments are only valid for the threaded stud (e.g. in case of a distance mounting).

5) For spacings smaller than the characteristic values (i.e. s ≤ $s_{cr,N}$) a calculation per ETAG 001, Annex C, design method A shall be performed.

6) The actual edge distance shall not be less than the value of c_{min} shown in the table.

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