

SAFETY BOLT

Twin-cone heavy duty bolt with cylindrical expansion for increased anchoring security.



Type B

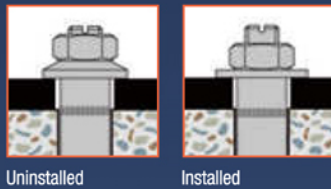
Type S

Type SK

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.

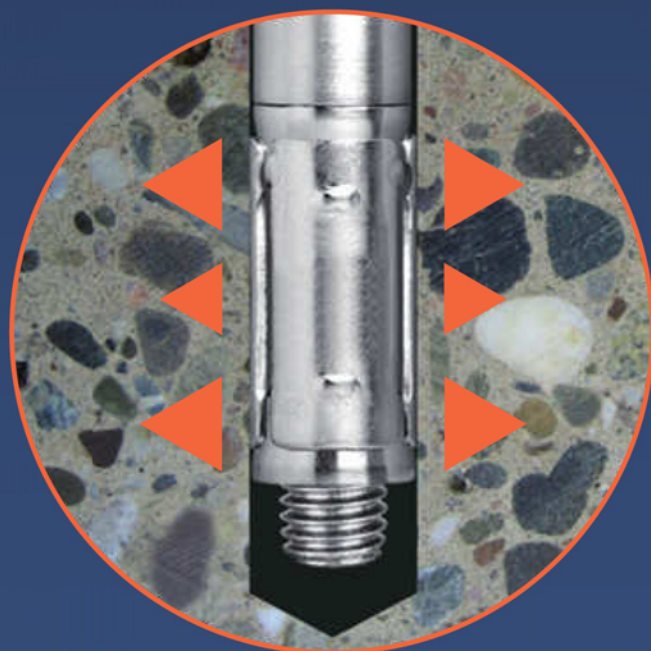
Benefits:

- High capacity in cracked and non-cracked concrete
- Cylindrical expansion of sleeve over entire length
- Solid all-steel construction
- Torque indication from domed washer



Uninstalled

Installed



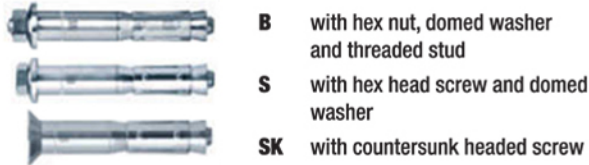
SIMPSON
Strong-Tie

LEBIC



B.S.N. the professional fastener

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SAFETY BOLT**CONSTRUCTION:****MATERIAL:**

- Grade 8.8 carbon steel, zinc plated and blue passivated
- 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 and blue passivated / A4 stainless steel
 S: M6 – M20, carbon steel, zinc plated and blue passivated / M6 – M12, A4 stainless steel
 SK: M6 – M16, carbon steel, zinc plated and blue passivated / M6 – M12, A4 stainless steel

APPLICATIONS:

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

BENEFITS:

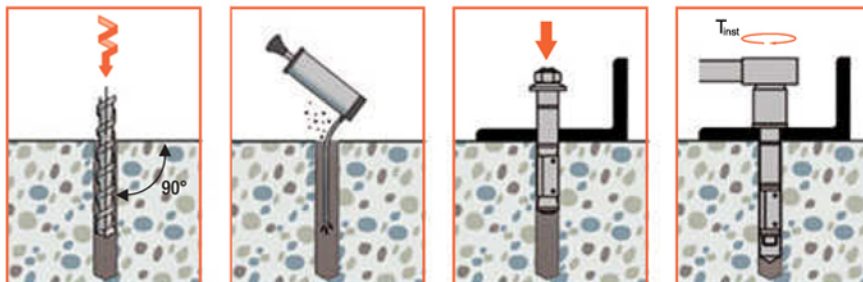
- Cylindrical expansion with optimal friction resistance
- Higher anchoring intensity from twin-cone design
- Torque indication from domed washer

PRODUCT DESCRIPTION:

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

INSTALLATION:

Through-fix installation



Drill hole

Clean hole (blowing)

Insert anchor through fixture

Apply recommended fastening torque with a calibrated torque-wrench



Carbon steel, zinc plated**SAFETY BOLT B**

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

New Type	Old Type	Order Code	Thread Size	Ø x Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Total Length	Weight [kg/100 pcs]	Box Quantity [pcs]
				$d_o \times h_1$	t_{fix}	d_f	h_{ef}	L		
				[mm]	[mm]	[mm]	[mm]	[mm]		
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

Custom lengths available on request.

*Not included in approval.

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 and blue passivated

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 loads¹⁾

N_{perm}	Cracked concrete	Anchor	[kN]	M6	M8	M10	M12	M16	M20 ⁷⁾
		C20/25	2.4	3.6	7.6	12.3	17.1	18.6	
		C30/37	2.9	4.4	9.3	15.0	20.9	22.7	
		C40/50	3.4	5.0	10.7	17.3	24.2	26.2	
		C50/60	3.7	5.5	11.8	19.0	26.6	28.8	
Non-cracked concrete ³⁾	C20/25	3.0	4.8	9.5	17.2	24.0	31.6		
	C30/37	3.6	5.8	11.6	21.0	29.3	38.5		
	C40/50	4.2	6.7	13.4	24.2	33.8	44.5		
	C50/60	4.6	7.4	14.8	26.6	37.2	48.9		

Permissible shear loads¹⁾²⁾

V_{perm}	Cracked concrete	Anchor	[kN]	M6	M8	M10	M12	M16	M20 ⁷⁾
		C20/25	5.2	7.0	20.1	24.5	34.3	49.2	
		C30/37	6.3	8.5	22.3	29.8	41.7	59.8	
		C40/50	7.3	9.9	22.3	34.3	48.5	61.6	
		C50/60	8.0	10.8	22.3	34.3	53.1	76.3	
Non-cracked concrete ³⁾	C20/25	7.2	9.8	22.3	34.3	48.0	68.9		
	C30/37	8.6	11.9	22.3	34.3	54.9	80.6		
	C40/50	8.6	13.8	22.3	34.3	54.9	80.6		
	C50/60	8.6	14.3	22.3	34.3	54.9	80.6		

Permissible bending moments¹⁾⁴⁾

M_{perm}	[Nm]	M6	M8	M10	M12	M16	M20 ⁷⁾
		6.9	17.1	34.3	60.0	152.0	296.6

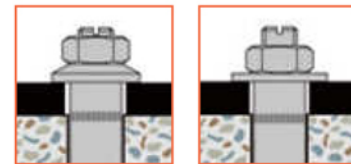
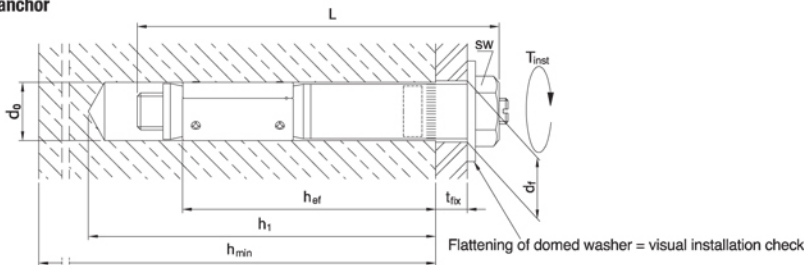
Spacings, edge distances and member thicknesses

Parameter	Symbol	[mm]	M6	M8	M10	M12	M16	M20 ⁷⁾
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

Parameter	Symbol	[mm]	M6	M8	M10	M12	M16	M20 ⁷⁾
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	12	14	17	21	26	32
	Installation on threaded stud	d_f	7	9	12	14	18	22
Width across flats	sw	[mm]	10	13	17	19	24	32
Installation torque	T_{inst}	[Nm]	8	15	40	70	115	300

Installed anchor



Untorqued

Torqued

- 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.
- 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.
- Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_1 + \sigma_n \leq 0$. In the absence of detailed verification $\sigma_n = 3 \text{ N/mm}^2$ can be assumed (σ_1 equals the tensile stress within the concrete as a result of external loads, forces on anchors included).
- The permissible bending moments are only valid for the threaded stud (e.g. in case of a distance mounting).
- 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.
- The actual edge distance shall not be less than the value of c_{min} shown in the table.
- Size M20 is not included in the approval.

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Carbon steel, zinc plated**SAFETY BOLT S**

Hex head screw and domed washer

Ausführung: Grade 8.8 carbon steel, zinc plated and blue passivated

Approvals: ETA-06/0108 – Option 1

New Type	Old Type	Order Code	Thread Size	Ø x Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Total Length	Weight [kg/100 pcs]	Box Quantity [pcs]
				$d_o \times h_1$	t_{fix}	d_f	h_{ef}	L		
				[mm]	[mm]	[mm]	[mm]	[mm]		
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	M10	15 x 85	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	M10	15 x 85	40	17	70	130	16.0	10
S M12-20/80/5	S 20/35	LS1220080005	M12	20 x 100	5	21	80	113	20.8	10
S M12-20/80/15	S 20/50	LS1220080015	M12	20 x 100	15	21	80	123	24.8	10
S M12-20/80/40	S 20/75	LS1220080040	M12	20 x 100	40	21	80	148	29.0	10
S M16-25/100/5	S 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	M16	25 x 125	40	26	100	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

Custom lengths available on request.

*Not included in approval.

SAFETY BOLT SK

Countersunk head screw

Grade 8.8 carbon steel, zinc plated and blue passivated

Approvals: ETA-06/0108 – Option 1

New Type	Old Type	Order Code	Thread Size	Ø x Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Total Length	Weight [kg/100 pcs]	Box Quantity [pcs]
				$d_o \times h_1$	t_{fix}	d_f	h_{ef}	L		
				[mm]	[mm]	[mm]	[mm]	[mm]		
SK M6-10/45/6	SK 10/20	LSK0610045006	M6	10 x 60	6	12	45	60	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	16.0	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	M12	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

Custom lengths available on request.

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 and blue passivated

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 loads¹⁾

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
Non-cracked concrete ²⁾	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	26.6	28.8	
	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	26.6	37.2	48.9	

Permissible shear loads¹⁾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
Non-cracked concrete ³⁾	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	
	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	

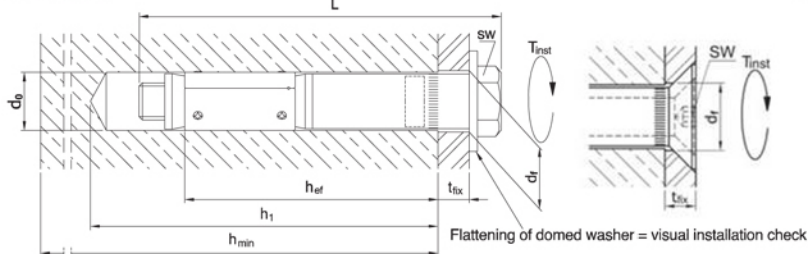
Spacings, edge distances and member thicknesses

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

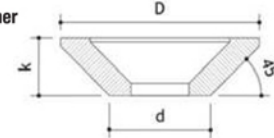
Installation data

Drill hole diameter	d_n	[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	32	
		d_f	[mm]	12	14	17	21	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



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

- 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.
- The permissible shear loads are based on a single anchor without influencing concrete edges. For shear loads applied close to an edge ($c \leq 10 h_w$ or $60d$) concrete edge failure must be checked per ETAG 001, Annex C, design method A.
- Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_t + \sigma_r \leq 0$. In the absence of detailed verification $\sigma_r = 3$ N/mm² can be assumed (σ_t equals the tensile stress within the concrete as a result of external loads, forces on anchors included).
- 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.
- The actual edge distance shall not be less than the value of c_{min} shown in the table.
- Size M20 is not included in the approval.

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