

HL Heavy Duty Anchor

**Mechanical anchor for use in
cracked and non-cracked concrete
made of galvanized steel**



1 SPECIFICATIONS OF INTENDED USE

Anchorage subject to:

- Static and quasi-static loading
- Seismic load, category C1 and C2 loads
- Resistance to fire (F120)

Base materials:

- Cracked and non-cracked concrete
- Reinforced or unreinforced normal weight concrete of strength classes C20/25 to C50/60 according to EN 206-1:2000

Approvals:

- European Technical Approval Option 1 for cracked and non cracked concrete
- Fire resistance test certification for F30 to F120
- Seismic performance category C1 and C2

Reaction to fire:

- Anchorage satisfy requirements for Class A1

Resistance to fire:

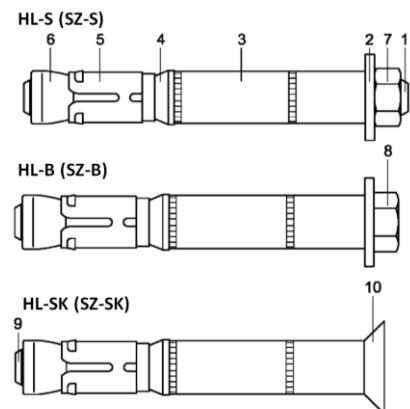
- For fire design see ETA-12/0030, Annex C 8

Installation:

- Hole drilling by hammer drilling only
- Cleaning the holes (use of vacuum drill bits is admissible)
- The fastener may only be set once
- For further information see ETA-12/0030, Annex B1

1.2 DESIGNATION OF ANCHOR PARTS AND MATERIALS

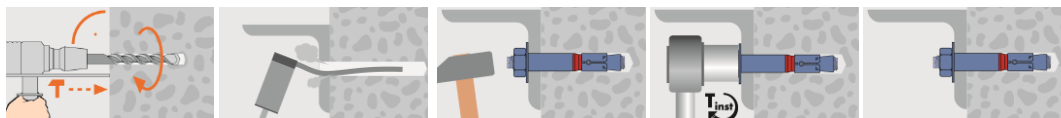
Part	Designation	Material
1	Threaded bolt	Steel, Strength class 8.8, EN ISO 898-1:2013
2	Washer	Steel, EN 10139:2016
3	Distance sleeve	Steel TUBE en 10305-2:2016, EN 10305-3:2016;
4	Ring	Polyethylene
5	Expansion sleeve	Steel, EN 10139:2016
6	Threaded cone	Steel EN 10083-2:2006
7	Hexagon nut	Steel, Strength class 8, EN ISO 898-2:2012
8	Hexagon head screw	Steel, Strength class 8.8, EN ISO 898-1:2013
9	Countersung screw	Steel, Strength class 8.8, EN ISO 898-1:2013
10	Countersung washer	Steel, EN 10083-2:2016



1.3 INSTALATION INSTRUCTIONS

- Drilling the hole
- Cleaning the hole
- Fixing plug and building material
- Tightening with the torque wrench and predetermined value of Tinst
- Tightened fixation

Graphic installation instruction for HL-S (SZ-S), HL-B (SZ-B) and HL-SK (SZ-SK)



2 PRODUCT INFORMATION

HL-S (SZ-S) Heavy Duty Anchor with hexagon screw



Article code	Dimensions [mm]	Size of thread [mm] d	Nominal anchor diameter [mm] d _{nom}	Length [mm] L	Usable length [mm] t _{fix}	Effective anchorage depth [mm] h _{ef}
1221000	10 x 60 / 2	6	10	60	2	50
1221001	10 x 70 / 10	6	10	70	10	50
1221003	10 x 90 / 30	6	10	90	30	50
1221005	10 x 110 / 50	6	10	110	50	50
1221200	12 x 70 / 2	8	12	70	2	60
1221201	12 x 80 / 10	8	12	80	10	60
1221203	12 x 100 / 30	8	12	100	30	60
1221205	12 x 120 / 50	8	12	120	50	60
1221500	15 x 85 / 2	10	15	85	2	71
1221501	15 x 100 / 15	10	15	100	15	71
1221502	15 x 110 / 25	10	15	110	25	71
1221504	15 x 130 / 45	10	15	130	45	71
1221509	15 x 180 / 95	10	15	180	95	71
1221800	18 x 100 / 2	12	18	100	2	80
1221801	18 x 110 / 10	12	18	110	10	80
1221802	18 x 120 / 20	12	18	120	20	80
1221804	18 x 140 / 40	12	18	140	40	80
1221807	18 x 170 / 70	12	18	170	70	80
1222400	24 x 120 / 2	16	24	120	2	100
1222402	24 x 140 / 20	16	24	140	20	100
1222405	24 x 170 / 50	16	28	170	50	100
1222801	28 x 170 / 10	20	28	170	10	125
1222803	28 x 190 / 30	20	28	190	30	125
1222806	28 x 220 / 60	20	28	220	60	125
1222810	28 x 260 / 100	20	28	260	100	125

HL-B (SZ-B) Heavy Duty Anchor with threaded bolt and nut



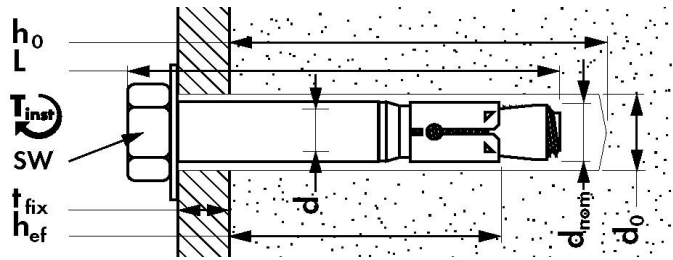
Article code	Dimensions [mm]	Size of thread [mm] d	Nominal anchor diameter [mm] d _{nom}	Length [mm] L	Usable length [mm] t _{fix}	Effective anchorage depth [mm] h _{ef}
1231000	10 x 70 / 2	6	10	70	2	50
1231001	10 x 80 / 10	6	10	80	10	50
1231003	10 x 100 / 30	6	10	100	30	50
1231005	10 x 120 / 50	6	10	120	50	50
1231010	10 x 170 / 100	6	10	170	100	50
1231200	12 x 80 / 2	8	12	80	2	60
1231201	12 x 90 / 10	8	12	90	10	60
1231203	12 x 110 / 30	8	12	110	30	60
1231205	12 x 130 / 50	8	12	130	50	60
1231210	12 x 180 / 100	8	12	180	100	60
1231500	15 x 100 / 2	10	15	100	2	70
1231501	15 x 115 / 15	10	15	115	15	70
1231502	15 x 125 / 25	10	15	125	25	70
1231504	15 x 145 / 45	10	15	145	45	70
1231509	15 x 195 / 95	10	15	195	95	70
1231800	18 x 115 / 2	12	18	115	2	80
1231801	18 x 125 / 10	12	18	125	10	80
1231802	18 x 135 / 20	12	18	135	20	80
1231804	18 x 155 / 40	12	18	155	40	80
1231807	18 x 185 / 70	12	18	185	70	80
1231810	18 x 215 / 100	12	18	215	100	80
1232400	24 x 140 / 2	16	24	140	2	100
1232402	24 x 160 / 20	16	24	160	20	100
1232405	24 x 190 / 50	16	24	190	50	100
1232410	24 x 240 / 100	16	24	240	100	100
1232801	28 x 180 / 10	20	28	180	10	125
1232803	28 x 200 / 30	20	28	200	30	125
1232806	28 x 230 / 60	20	28	230	60	125
1232810	28 x 270 / 100	20	28	270	100	125

HL-SK (SZ-SK) Heavy Duty Anchor with countersunk head



Article code	Dimensions [mm]	Size of thread [mm] d	Nominal anchor diameter [mm] d _{nom}	Length [mm] L	Usable length [mm] t _{fix}	Effective anchorage depth [mm] h _{ef}
1271502	15 x 110/25	10	15	110	25	70
1271503	15 x 120/35	10	15	120	35	70
1271802	18 x 115/20	12	18	115	20	80
1271804	18 x 135/40	12	18	135	40	80

3 INSTALLATION DATA HL-S (SZ-S), HL-B (SZ-B) and HL-SK (SZ-SK)



FASTENER SIZE			M6	M8	M10	M12	M16	M20
Anchor/Thread diameter	d	[mm]	6	8	10	12	16	20
Diameter of clearance hole in the fixture	d _f	[mm]	12	14	17	20	26	31
Spanner	SW (HL-S, HL-B)	[mm]	10	13	17	19	24	30
INSTALLATION PARAMETERS								
Drill hole diameter in substrate	d ₀	[mm]	10	12	15	18	24	28
Max. cutting diameter (max. drill diameter)	d _{cut,max}	[mm]	10.45	12.5	15.5	18.5	24.55	28.55
Dept of drill hole in substrate	h ₁ ≥	[mm]	65	80	95	105	130	160
Effective anchorage depth	h _{ef}	[mm]	50	60	71	80	100	125
Installation torque	T _{inst} (HL-S, HL-B)	[Nm]	15	30	50	80	160	280
	T _{inst} (HL-SK)	[Nm]	10	25	55	70	130*	210*
Minimum thickness of concrete member	h _{min}	[mm]	100	120	140	160	200	250
CRACKED CONCRETE								
Minimum edge distance	c _{min}	[mm]	50	55	60	70	100	180
Corresponding spacing	s ≥	[mm]	50	100	120	160	220	540
Minimum spacing	s _{min}	[mm]	50	50	60	70	100	125
Corresponding edge distance	c ≥	[mm]	50	80	120	140	180	300
NON-CRACKED CONCRETE								
Minimum edge distance	c _{min}	[mm]	50	60	60	70	100	180
Corresponding spacing	s ≥	[mm]	100	120	120	160	220	540
Minimum spacing	s _{min}	[mm]	50	60	60	70	100	125
Corresponding edge distance	c ≥	[mm]	80	100	120	140	180	300

*Not decisive in ETA

3.1 BASIC PERFORMANCE DATA

Basic performance data for HL-S (SZ-S), HL-B (SZ-B) and HL-SK (SZ-SK) in cracked and non-cracked concrete C20/25 without influence of edge distance, spacing and splitting failure due to dimensions of concrete member

FASTENER SIZE			M6	M8	M10	M12	M16	M20
Effective anchorage depth	h _{ef}	[mm]	50	60	71	80	100	125
CHARACTERISTIC RESISTANCE								
Tension load	non-cracked	N _{Rk,ucr}	[kN]	16.00 ¹⁾	20.00	30.21 ²⁾	36.14 ²⁾	50.50 ²⁾
	cracked	N _{Rk,cr}	[kN]	5.00	12.00	16.00	25.76 ²⁾	36.00 ²⁾
Shear load HL-S and HL-SK	non-cracked	V _{Rk,ucr}	[kN]	18.00 ¹⁾	30.00 ¹⁾	48.00 ¹⁾	72.27 ³⁾	101.00 ³⁾
	cracked	V _{Rk,cr}	[kN]	18.00 ¹⁾	30.00 ¹⁾	43.07 ³⁾	51.52 ³⁾	72.00 ³⁾
Shear load HL-B	non-cracked	V _{Rk,ucr}	[kN]	16.00 ¹⁾	25.00 ¹⁾	36.00 ¹⁾	63.00 ¹⁾	91.00 ¹⁾
	cracked	V _{Rk,cr}	[kN]	16.00 ¹⁾	25.00 ¹⁾	36.00 ¹⁾	51.52 ³⁾	72.00 ³⁾
DESIGN RESISTANCE								
Tension load	non-cracked	N _{Rd,ucr}	[kN]	10.67 ²⁾	13.33	20.10 ²⁾	24.09 ²⁾	33.67 ²⁾
	cracked	N _{Rd,cr}	[kN]	3.33	8.00	10.67	17.17 ²⁾	24.00 ²⁾
Shear load HL-S and HL-SK	non-cracked	V _{Rd,ucr}	[kN]	14.40 ¹⁾	24.00 ¹⁾	38.40 ¹⁾	48.18 ³⁾	67.33 ³⁾
	cracked	V _{Rd,cr}	[kN]	14.40 ¹⁾	22.31 ³⁾	28.72 ³⁾	34.35 ³⁾	48.00 ³⁾
Shear load HL-B	non-cracked	V _{Rd,ucr}	[kN]	12.80 ¹⁾	20.00 ¹⁾	28.80 ¹⁾	48.18 ³⁾	67.33 ³⁾
	cracked	V _{Rd,cr}	[kN]	12.80 ¹⁾	20.00 ¹⁾	28.72 ³⁾	34.35 ³⁾	48.00 ³⁾
RECOMMENDED RESISTANCE (Partial safety factor 1,4)								
Tension load	non-cracked	N _{rec,ucr}	[kN]	7.62 ¹⁾	9.52	14.36 ²⁾	17.21 ²⁾	24.05 ²⁾
	cracked	N _{rec,cr}	[kN]	2.38	5.71	7.62	12.27 ²⁾	17.14 ²⁾
Shear load HL-S and HL-SK	non-cracked	V _{rec,ucr}	[kN]	10.29 ¹⁾	17.14 ¹⁾	27.43 ¹⁾	34.41 ³⁾	48.09 ³⁾
	cracked	V _{rec,cr}	[kN]	10.29 ¹⁾	15.94 ³⁾	20.51 ³⁾	24.54 ³⁾	34.29 ³⁾
Shear load HL-B	non-cracked	V _{rec,ucr}	[kN]	9.14 ¹⁾	14.29 ¹⁾	20.57 ¹⁾	34.41 ³⁾	48.09 ³⁾
	cracked	V _{rec,cr}	[kN]	9.14 ¹⁾	14.29 ¹⁾	20.51 ³⁾	24.54 ³⁾	34.29 ³⁾

- 1) Steel failure
- 2) Concrete cone failure
- 3) Pry-out failure

4 IMPORTANT NOTICE

Values given above are valid under the assumptions of sufficient cleaning of the drill hole and anchoring in non-cracked concrete. For the design the complete European Technical Assessment has to be considered. In recommended resistance the partial safety factor for material as regulated in the ETA, as well as a partial safety factor for load action $\gamma_L = 1.4$ are considered. For combination of tensile loads, shear loads, bending moments as well as reduced edge distances or spacing's (anchor groups) see ETA or Mungo design software. The data must be checked by the user under the responsibility of an engineer experienced in anchorage and concrete work. This is to ensure there are no errors and all data is complete and accurate and complies with all rules and regulations for the actual conditions and application. Anchor design is performed according to the ETAG 001, Annex C in combination with European Technical Assessment.