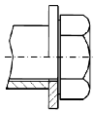
HSL4 Expansion anchor

Product Technical Datasheet
Steel-to-concrete
Update: June 24

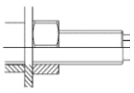
HSL4 expansion anchor

High-performance heavy-duty expansion anchor

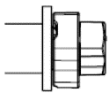
Anchor versions

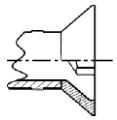
HSL4
Bolt version
(M8-M24)

HSL4-G
Threaded rod version
(M8-M24)

HSL4-B
Safety cap version
(M12-M24)

HSL4-SK
Countersunk version
(M8-M12)

Benefits

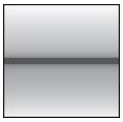
- Suitable for cracked concrete C20/25 to C50/60
- Suitable for seismic C1 and C2, shock, fire and fatigue
- Installation with hammer drilling, diamond drilling and hollow drill bit available for same performance
- Top shear performance due to high strength expansion and shear sleeves
- HSL4-B special safety cap ensures proper installation torque even without calibrated torque wrench

Base material

Concrete (uncracked)

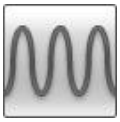
Concrete (cracked)

Load conditions



Static/ quasi-static

Seismic, C1, C2



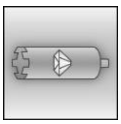
Fatigue

Shock BZS-CH

Fire Resistance

Drilling, cleaning, setting

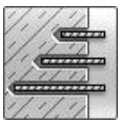
Hammer drilled holes



Diamond cored holes

Hollow drill bit drilling

Impact wrench with adaptative torque module



Variable embedment depth

Other information

Nuclear power plant approval

Tracefast

PROFIS Engineering Software

Steel to concrete Handbook

Linked Approvals/Certificates and Instructions for use

Approvals/certificates

Approval no	Application / loading condition	Authority / Laboratory	Date of issue	Date of expiry
ETA-19/0556	Static and quasi-static / Seismic / Fire	CSTB, Marne-la-Vallèe	02-08-2023	-
ETA-19/0858	Fatigue	CSTB, Marne-la-Vallèe	17-02-2020	-
BZS D 19-601	Shock	FOCP, Federal Office for Civil Protection. Spiez	31-10-2020	31-10-2030

ETA-19/0858 can be found in PROFIS Engineering

Link to Instructions for use manual setting

Anchor size	M8	M10	M12	M16	M20	M24
HSL4	HSL4					
HSL4-G	HSL4-G-M8/M10/M12			HSL4-G-M16/M20/M24		
HSL4-B	-	-	HSL4-B-M12	HSL4-B-M16	HSL4-B-M20	HSL4-B-M24
HSL4-SK	HSL4-SK-M8/M10/M12			-	-	-

Link to Instructions for use adaptive torque tool

Anchor size	M8	M10	M12	M16	M20	M24
HSL4	HSL4-AT MODULE					
HSL4-G	HSL4-G-AT MODULE					

Link to Instructions for use filling set

Anchor size	M8	M10	M12	M16	M20	M24
HSL4-G	Filling set					

Link to Hilti Webpage (QR codes)

HSL4	HSL4-G	HSL4-B	HSL4-SK

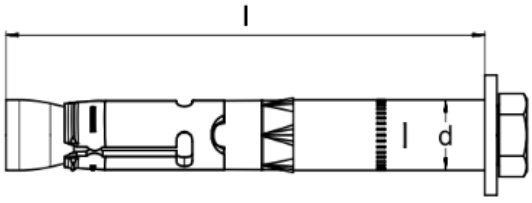
Fastener special dimensions

Anchor version	Thread size	t_{fix} [mm]		d [mm]	ℓ [mm]
		min	max		
HSL4 Bolt 	M8	5	40	12	82 / 97 / 117
	M10	5	40	15	94 / 109/ 129
	M12	5	50	18	111 / 131 / 156
	M16	10	50	24	138 / 153 / 178
	M20	10	60	28	163 / 183 / 213
	M24	10	60	32	185 / 205 / 235

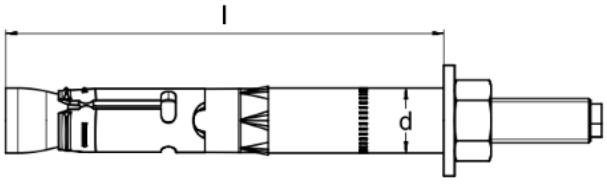
Anchor version	Thread size	t_{fix} [mm]		d [mm]	ℓ [mm]
		min	max		
HSL4-G Threaded rod 	M8	5	100	12	92 / 107 / 127 / 147 / 187
	M10	5	100	15	106 / 121 / 141 / 161 / 201
	M12	5	100	18	127 / 147 / 172 / 192 / 222
	M16	10	180	24	160 / 175 / 200 / 230 / 260 / 330
	M20	10	100	28	185 / 205 / 235 / 275
	M24	10	60	32	210 / 230 / 260

Anchor version	Thread size	t_{fix} [mm]		d [mm]	ℓ [mm]
		min	max		
HSL4-B Safety cap 	M12	5	50	18	121 / 131 / 141 / 166
	M16	10	50	24	151 / 166 / 191
	M20	10	50	28	178 / 198 / 228
	M24	10	50	32	203 / 223 / 231

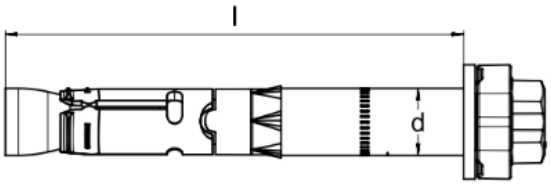
Anchor version	Thread size	t_{fix} [mm]		d [mm]	ℓ [mm]
		min	max		
HSL4-SK Countersunk 	M8	6	20	12	80 / 90
	M10	6	20	15	100
	M12	8	25	18	120



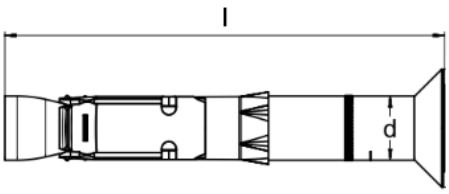
HSL4



HSL4-G



HSL4-B

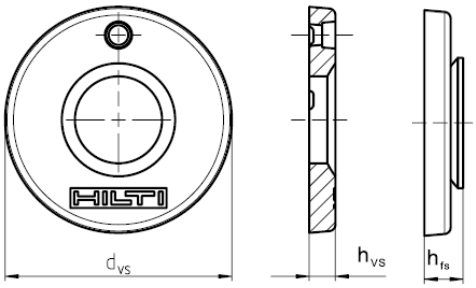


HSL4-SK

Hilti filling set :

Dimensions filling washer

Anchor size			M8	M10	M12	M16	M20	M24
Diameter	d_{vs}	[mm]	38	42	44	52	60	70
Height of filling washer	h_{vs}	[mm]	5	5	5	6	6	6
Height of filling and spherical washer	h_{fs}	[mm]	8	9	10	11	13	15



Static and quasi-static loading based on ETA-19/0556. Design according to EN 1992-4

All data in this section applies to:

- Correct setting (See setting instruction)
- For a single anchor
- No edge distance and spacing influence (see table with characteristic distances)
- Characteristic spacing and edge distance for splitting failure apply only for uncracked concrete.
- For cracked concrete only the characteristic spacing and edge distance for concrete cone failure are decisive
- Minimum base material thickness (see table)
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C20/25
- Hammer drilled holes
- Recommended loads: With overall partial safety factor for action γ = 1,4.

For specific design cases refer to PROFIS Engineering.

Design resistance

Anchor size				M8			M10			M12		
Effective anchorage depth		h_{ef}	[mm]	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$
				60	80	100	70	90	110	80	105	130
Uncracked concrete												
Tension	HSL4/HSL4-B/HSL4-G/HSL4-SK	N_{Rd}	[kN]	15,2	19,5	19,5	19,2	28,0	30,9	23,5	35,3	45,0
Shear	HSL4/HSL4-B	V_{Rd}	[kN]	24,9	24,9	24,9	48,4	48,4	48,4	63,4	71,7	71,7
	HSL4-G			20,9	20,9	20,9	33,4	33,4	33,4	47,4	47,4	47,4
	HSL4-SK	t_{fix}	[mm]	≥ 11	-	-	≥ 11	-	-	≥ 13	-	-
		V_{Rd}	[kN]	24,9	-	-	48,4	-	-	63,4	-	-
		t_{fix}	[mm]	< 11	-	-	< 11	-	-	< 13	-	-
		V_{Rd}	[kN]	11,7	-	-	18,6	-	-	27,0	-	-
Cracked concrete												
Tension	HSL4/HSL4-B/HSL4-G/HSL4-SK	N_{Rd}	[kN]	8,0	8,0	8,0	10,7	10,7	10,7	16,4	16,0	16,0
Shear	HSL4/HSL4-B	V_{Rd}	[kN]	20,1	24,9	24,9	35,0	48,4	48,4	44,4	66,7	71,7
	HSL4-G			20,9	20,9	20,9	33,4	33,4	33,4	44,4	47,4	47,4
	HSL4-SK	t_{fix}	[mm]	≥ 11	-	-	≥ 11	-	-	≥ 13	-	-
		V_{Rd}	[kN]	20,1	-	-	35,0	-	-	44,4	-	-
		t_{fix}	[mm]	< 11	-	-	< 11	-	-	< 13	-	-
		V_{Rd}	[kN]	11,7	-	-	18,6	-	-	27,0	-	-

Anchor size				M16			M20			M24		
Effective anchorage depth		h_{ef}	[mm]	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$
				100	125	150	125	155	185	150	180	210
Uncracked concrete												
Tension	HSL4/HSL4-B/HSL4-G	N_{Rd}	[kN]	32,8	43,3	43,3	45,8	63,3	63,3	60,2	66,7	66,7
Shear	HSL4/HSL4-B	V_{Rd}	[kN]	91,8	126,8	126,8	148,8	148,8	148,8	163,6	163,6	163,6
	HSL4-G			91,8	96,5	96,5	124,2	124,2	124,2	163,6	163,6	163,6
Cracked concrete												
Tension	HSL4/HSL4-B HSL4-G	N_{Rd}	[kN]	23,0	24,0	24,0	32,1	33,3	33,3	42,2	43,3	43,3
Shear	HSL4/HSL4-B	V_{Rd}	[kN]	64,3	89,8	118,1	121,9	148,8	148,8	135,0	163,6	163,6
	HSL4-G			64,3	89,8	96,5	121,9	124,2	124,2	135,0	163,6	163,6

Recommended loads

Anchor size				M8			M10			M12		
Effective anchorage depth		h_{ef}	[mm]	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$
				60	80	100	70	90	110	80	105	130
Uncracked concrete												
Tension	HSL4/HSL4-B/ HSL4-G/HSL4-SK	N_{rec}	[kN]	10,9	13,9	13,9	13,7	20,0	22,1	16,8	25,2	32,1
Shear	HSL4/HSL4-B	V_{rec}	[kN]	17,8	17,8	17,8	34,6	34,6	34,6	45,3	51,2	51,2
	HSL4-G			14,9	14,9	14,9	23,9	23,9	23,9	33,9	33,9	33,9
	HSL4-SK	t_{fix}	[mm]	≥ 11	-	-	≥ 11	-	-	≥ 13	-	-
		V_{rec}	[kN]	17,8	-	-	34,6	-	-	45,3	-	-
		t_{fix}	[mm]	< 11	-	-	< 11	-	-	< 13	-	-
		V_{rec}	[kN]	8,3	-	-	13,3	-	-	19,3	-	-
Cracked concrete												
Tension	HSL4/HSL4-B/ HSL4-G/HSL4-SK	N_{rec}	[kN]	5,7	5,7	5,7	7,6	7,6	7,6	11,7	11,4	11,4
Shear	HSL4/HSL4-B	V_{rec}	[kN]	17,8	17,8	17,8	25,0	34,6	34,6	31,7	47,6	51,2
	HSL4-G			14,9	14,9	14,9	23,9	23,9	23,9	31,7	33,9	33,9
	HSL4-SK	t_{fix}	[mm]	≥ 11	-	-	≥ 11	-	-	≥ 13	-	-
		V_{rec}	[kN]	17,8	-	-	25,0	-	-	31,7	-	-
		t_{fix}	[mm]	< 11	-	-	< 11	-	-	< 13	-	-
		V_{rec}	[kN]	8,3	-	-	13,3	-	-	19,3	-	-

Anchor size				M16			M20			M24		
Effective anchorage depth		h_{ef}	[mm]	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$
				100	125	150	125	155	185	150	180	210
Uncracked concrete												
Tension	HSL4/HSL4-B HSL4-G	N_{rec}	[kN]	23,4	31,0	31,0	32,7	45,2	45,2	43,0	47,6	47,6
Shear	HSL4/HSL4-B	V_{rec}	[kN]	65,6	90,6	90,6	106,3	106,3	106,3	116,9	116,9	116,9
	HSL4-G			65,6	68,9	68,9	88,7	88,7	88,7	116,9	116,9	116,9
Cracked concrete												
Tension	HSL4/HSL4-B HSL4-G	N_{rec}	[kN]	16,4	17,1	17,1	22,9	23,8	23,8	30,1	31,0	31,0
Shear	HSL4/HSL4-B	V_{rec}	[kN]	45,9	64,2	84,3	87,1	106,3	106,3	96,4	116,9	116,9
	HSL4-G			45,9	64,2	68,9	87,1	88,7	88,7	96,4	116,9	116,9

Seismic loading based on ETA-19/0556. Design according to EN 1992-4

All data in this section applies to:

- Correct setting (See setting instruction)
- For a single anchor
- No edge distance and spacing influence (see table with characteristic distances)
- Characteristic spacing and edge distance for splitting failure apply only for uncracked concrete.
- For cracked concrete only the characteristic spacing and edge distance for concrete cone failure are decisive
- Minimum base material thickness (see table)
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C20/25
- α_{gap} = 0,5 without using Hilti filling set and α_{gap} = 1,0 using Hilti filling set (only for HSL4-G)
- Hammer drilled holes

For specific design cases refer to PROFIS Engineering.

Design resistance in case of seismic category C2

Anchor size				M10			M12		
Effective anchorage depth		h_{ef}	[mm]	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$
				70	90	110	80	105	130
Tension	HSL4/HSL4-B/HSL4-G	$N_{Rd,seis}$	[kN]	8,1	8,1	8,1	14,0	17,2	17,2
	HSL4-SK			8,1	-	-	14,0	-	-
Shear	HSL4/HSL4-B	$V_{Rd,seis}$	[kN]	10,2	10,2	10,2	12,2	12,2	12,2
	HSL4-G (without filling set)			9,0	9,0	9,0	9,0	9,0	9,0
	HSL4-G (with filling set)			18,0	18,0	18,0	18,0	18,0	18,0
	HSL4-SK	t_{fix}	[mm]	≥ 11	-	-	≥ 13	-	-
		$V_{Rd,seis}$	[kN]	10,2	-	-	12,2	-	-

Anchor size				M16			M20			M24		
Effective anchorage depth		h_{ef}	[mm]	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$
				100	125	150	125	155	185	150	180	210
Tension	HSL4/HSL4-B/HSL4-G	$N_{Rd,seis}$	[kN]	19,5	22,8	22,8	26,7	26,7	26,7	30,6	30,6	30,6
Shear	HSL4/HSL4-B	$V_{Rd,seis}$	[kN]	24,7	24,7	24,7	31,2	31,2	31,2	35,2	35,2	35,2
	HSL4-G (without filling set)			17,8	17,8	17,8	20,1	20,1	20,1	31,1	31,1	31,1
	HSL4-G (with filling set)			35,6	35,6	35,6	40,2	40,2	40,2	62,2	62,2	62,2

Design resistance in case of seismic category C1

Anchor size				M8			M10			M12		
Effective anchorage depth		h_{ef}	[mm]	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$
				60	80	100	70	90	110	80	105	130
Tension	HSL4/HSL4-B/HSL4-G	$N_{Rd,seis}$	[kN]	8,0	8,0	8,0	10,7	10,7	10,7	14,0	16,0	16,0
	HSL4-SK			8,0	-	-	10,7	-	-	14,0	-	-
Shear	HSL4/HSL4-B	$V_{Rd,seis}$	[kN]	7,1	7,1	7,1	14,9	17,7	17,7	18,8	23,3	23,3
	HSL4-G (without filling set)			6,0	6,0	6,0	12,2	12,2	12,2	15,4	15,4	15,4
	HSL4-G (with filling set)			12,0	12,0	12,0	24,4	24,4	24,4	30,8	30,8	30,8
	HSL4-SK	t_{fix}	[mm]	≥ 11	-	-	≥ 11	-	-	≥ 13	-	-
		$V_{Rd,seis}$	[kN]	7,1	-	-	14,9	-	-	18,8	-	-

Anchor size				M16			M20			M24		
Effective anchorage depth		h_{ef}	[mm]	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$
				100	125	150	125	155	185	150	180	210
Tension	HSL4/HSL4-B/HSL4-G	$N_{Rd,seis}$	[kN]	19,5	24,0	24,0	27,3	33,3	33,3	35,8	43,3	43,3
Shear	HSL4/HSL4-B	$V_{Rd,seis}$	[kN]	27,3	38,2	45,6	43,9	43,9	43,9	57,4	65,4	65,4
	HSL4-G (without filling set)			27,3	34,7	34,7	36,6	36,6	36,6	-	-	-
	HSL4-G (with filling set)			54,6	69,4	69,4	73,2	73,2	73,2			

Fatigue loading based on ETA-19/0858. Design according to EOTA TR 061, design method II.

All data in this section applies to:

- Correct setting using Hilti filling set (See setting instruction)
- For a single anchor
- No edge distance and spacing influence (see table with characteristic distances)
- Characteristic spacing and edge distance for splitting failure apply only for uncracked concrete.
- For cracked concrete only the characteristic spacing and edge distance for concrete cone failure are decisive
- Minimum base material thickness (see table)
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C20/25
- Hammer drilled holes

For specific design cases refer to PROFIS Engineering.

Design resistance

Anchor size				**M16**			**M20**		
Uncracked & Cracked concrete									
Effective anchorage depth		h_{ef}	[mm]	**$h_{ef,1}$**	**$h_{ef,2}$**	**$h_{ef,3}$**	**$h_{ef,1}$**	**$h_{ef,2}$**	**$h_{ef,3}$**
				100	125	150	125	155	185
Tension	HSL4-G	$\Delta N_{Rd,0,\infty}$	[mm]	6,1	6,1	6,1	8,9	8,9	8,9
Shear	HSL4-G	$\Delta V_{Rd,0,\infty}$	[mm]	5,9	5,9	5,9	7,4	7,4	7,4

Fire loading based on ETA-19/0556. Design according to EN 1992-4

All data in this section applies to:

- Correct setting (See setting instruction)
- For a single anchor
- No edge distance and spacing influence (see table with characteristic distances)
- Characteristic spacing and edge distance for splitting failure apply only for uncracked concrete.
- For cracked concrete only the characteristic spacing and edge distance for concrete cone failure are decisive
- Minimum base material thickness (see table)
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C20/25
- Hammer drilled holes
- Partial safety factor for resistance under fire exposure $\gamma_{M,fi} = 1{,}0$

For specific design cases refer to PROFIS Engineering.

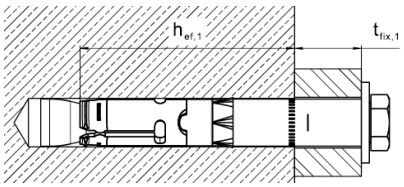
Design resistance

Anchor size (HSL4/HSL4-B/HSL4-G/HSL4-SK)			**M8**			**M10**			**M12**		
Effective anchorage depth	h_{ef}	[mm]	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$
			60	80	100	70	90	110	80	105	130
Fire Exposure R30											
Tension	$N_{Rd,fi}$	[kN]	2,7	2,7	2,7	4,0	4,0	4,0	6,0	6,0	6,0
Shear	$V_{Rd,fi}$	[kN]	2,7	2,7	2,7	4,2	4,2	4,2	6,0	6,0	6,0
Fire Exposure R60											
Tension	$N_{Rd,fi}$	[kN]	2,1	2,1	2,1	3,5	3,5	3,5	5,3	5,3	5,3
Shear	$V_{Rd,fi}$	[kN]	2,1	2,1	2,1	3,5	3,5	3,5	5,3	5,3	5,3
Fire Exposure R90											
Tension	$N_{Rd,fi}$	[kN]	1,5	1,5	1,5	2,8	2,8	2,8	4,6	4,6	4,6
Shear	$V_{Rd,fi}$	[kN]	1,5	1,5	1,5	2,8	2,8	2,8	4,6	4,6	4,6
Fire Exposure R120											
Tension	$N_{Rd,fi}$	[kN]	1,2	1,2	1,2	2,4	2,4	2,4	4,3	4,3	4,3
Shear	$V_{Rd,fi}$	[kN]	1,2	1,2	1,2	2,4	2,4	2,4	4,3	4,3	4,3

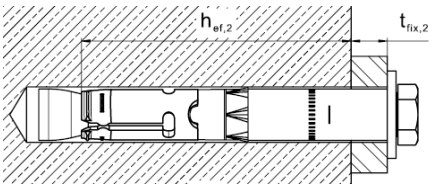
Anchor size (HSL4/HSL4-B/HSL4-G/HSL4-SK)			**M16**			**M20**			**M24**		
Effective anchorage depth	h_{ef}	[mm]	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}$	$h_{ef,2}$	$h_{ef,3}$
			100	125	150	125	155	185	150	180	210
Fire Exposure R30											
Tension	$N_{Rd,fi}$	[kN]	9,0	9,0	9,0	12,5	12,5	12,5	16,3	16,3	16,3
Shear	$V_{Rd,fi}$	[kN]	11,1	11,1	11,1	17,4	17,4	17,4	25,0	25,0	25,0
Fire Exposure R60											
Tension	$N_{Rd,fi}$	[kN]	9,0	9,0	9,0	12,5	12,5	12,5	16,3	16,3	16,3
Shear	$V_{Rd,fi}$	[kN]	9,9	9,9	9,9	15,4	15,4	15,4	22,2	22,2	22,2
Fire Exposure R90											
Tension	$N_{Rd,fi}$	[kN]	8,6	8,6	8,6	12,5	12,5	12,5	16,3	16,3	16,3
Shear	$V_{Rd,fi}$	[kN]	8,6	8,6	8,6	13,4	13,4	13,4	19,3	19,3	19,3
Fire Exposure R120											
Tension	$N_{Rd,fi}$	[kN]	7,2	7,2	7,2	12,4	12,4	12,4	13,0	13,0	13,0
Shear	$V_{Rd,fi}$	[kN]	8,0	8,0	8,0	12,4	12,4	12,4	17,9	17,9	17,9

Setting information

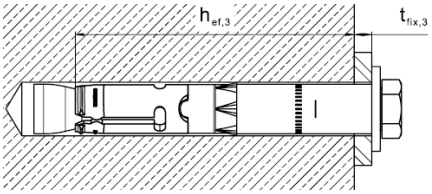
Setting positions



Setting position ①



Setting position ②



Setting position ③

HSL4-SK can only be set in position ①

Anchor size			**M8**			**M10**			**M12**		
Nominal diameter of drill bit	d_0	[mm]	12			15			18		
Max. diameter of clearance hole	d_f	[mm]	14			17			20		
Fixture thickness	t_{fix}	[mm]	5-200			5-200			5-200		
Setting position			①	②	③	①	②	③	①	②	③
Effective anchorage depth	h_{ef}	[mm]	60	80	100	70	90	110	80	105	130
Min. depth of drill hole	h_1	[mm]	80	100	120	90	110	130	105	130	155
Min. thickness of concrete	h_{min}	[mm]	120	170	190	140	195	215	160	225	250
Minimum distances											
Spacing for uncracked concrete	s_{min}	[mm]	60			70			80		
	for c_{min}	[mm]	100			100			160		
Edge distance for uncracked concrete	c_{min}	[mm]	60			70			80		
	for s_{min}	[mm]	100			160			240		
Spacing for cracked concrete	s_{min}	[mm]	50			70			70		
	for c_{min}	[mm]	80			100			140		
Edge distance for cracked concrete	c_{min}	[mm]	60			70			70		
	for s_{min}	[mm]	80			120			160		
Characteristic distances											
Spacing for splitting failure and concrete cone failure	$s_{cr,sp}$	[mm]	230	320	400	270	360	550	300	420	520
	$s_{cr,N}$	[mm]	180	240	300	210	270	330	240	315	390
Edge distance for splitting failure and concrete cone failure	$c_{cr,sp}$	[mm]	115	160	200	135	180	275	150	210	260
	$c_{cr,N}$	[mm]	90	120	150	105	135	165	120	108	195

Anchor size			M16			M20			M24		
Nominal diameter of drill bit	d_0	[mm]	24			28			32		
Max. diameter of clearance hole	d_f	[mm]	26			31			35		
Fixture thickness	t_{fix1}	[mm]	10-200			10-200			10-200		
Setting position			①	②	③	①	②	③	①	②	③
Effective anchorage depth	$h_{ef,i}$	[mm]	100	125	150	125	155	185	150	180	210
Min. depth of drill hole	$h_{1,i}$	[mm]	125	150	175	155	185	215	180	210	240
Min. thickness of concrete	$h_{min,i}$	[mm]	200	275	300	250	380	410	300	405	435
Minimum distances											
Spacing for uncracked concrete	s_{min}	[mm]	100			125			150		
	for c_{min}	[mm]	240			300			300		
Edge distance for uncracked concrete	c_{min}	[mm]	100			150			150		
	for s_{min}	[mm]	240			300			300		
Spacing for cracked concrete	s_{min}	[mm]	80			120			120		
	for c_{min}	[mm]	180			220			260		
Edge distance for cracked concrete	c_{min}	[mm]	100			120			120		
	for s_{min}	[mm]	200			220			280		
Characteristic distances											
Spacing for splitting failure and concrete cone failure	$s_{cr,sp}$	[mm]	380	570	680	480	710	850	570	900	1050
	$s_{cr,N}$	[mm]	300	375	450	375	465	555	450	540	630
Edge distance for splitting failure and concrete cone failure	$c_{cr,sp}$	[mm]	190	285	340	240	355	425	285	450	525
	$c_{cr,N}$	[mm]	150	188	225	188	233	278	225	270	315

Setting details other information HSL4

Anchor version HSL4			M8	M10	M12
Width across flats	SW	[mm]	13	17	19
Installation torque	T_{inst}	[Nm]	15	25	60

Anchor version HSL4			M16	M20	M24
Width across flats	SW	[mm]	24	30	36
Installation torque	T_{inst}	[Nm]	75	145	210

Setting details other information HSL4-G

Anchor version HSL4-G			M8	M10	M12
Width across flats	SW	[mm]	13	17	19
Installation torque	T_{inst}	[Nm]	20	27	60
Thickness of Hilti filling set	h_{fs}	[mm]	8	9	10
Effective fixture thickness with Hilti filling set	$t_{fix,ef}$	[mm]	t_{fix} - h_{fs}		

Anchor version HSL4-G			M16	M20	M24
Width across flats	SW	[mm]	24	30	36
Installation torque	T_{inst}	[Nm]	70	105	180
Thickness of Hilti filling set	h_{fs}	[mm]	11	13	15
Effective fixture thickness with	$t_{fix,ef}$	[mm]	t_{fix} - h_{fs}		

Setting details other information HSL4-B

Anchor version HSL4-B			M12	M16	M20	M24
Width across flats	SW	[mm]	19	24	30	36
Installation torque	T_{inst}	[Nm]	The torque moment is controlled by the safety cap			

Setting details other information HSL4-SK

Anchor version HSL4-SK			M8	M10	M12
Top diameter of countersunk head in	d_c	[mm]	22,5	25,5	32,9
Bottom diameter of countersunk head	d_h	[mm]	11,4	14,4	17,4
Height of the countersunk head in the	h_{cs}	[mm]	5,8	5,8	8,0
Min. fixture thickness	$t_{fix,min}$	[mm]	6	6	8
Hexagon socket screw key	SW	[mm]	5	6	8
Installation torque	T_{inst}	[Nm]	20	32	65