



HSL4 EXPANSION ANCHOR

Technical Datasheet

Update: Jan-23



HSL4 expansion anchor

Ultimate-performance heavy-duty expansion anchor

Anchor versions		Benefits
	HSL4 Bolt version (M8-M24)	- 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 - Tracefast improves quality assurance of anchor installation by making every fastener uniquely identifiable and allowing easy documentation - Easily removable for temporary and machine fastening applications or retrofit needs
	HSL4-G Threaded rod version (M8-M24)	
	HSL4-B Safety cap version (M12-M24)	
	HSL4-SK Countersunk version (M8-M12)	

Base material		Load conditions				
	Concrete (uncracked)		Concrete (cracked)			
Installation conditions		Other information				
	Diamond cored holes	Hollow drill bit drilling	Variable embedment depth	Impact wrench with adaptative torque module		



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Approvals/certificates

Description	Authority / Laboratory	No. / Date of issue
European technical Assessment ^{a)}	CSTB, Marne-la-Vallée	ETA-19/0556 / 2022-11-02
Fire test report	CSTB, Marne-la-Vallée	ETA-19/0556 / 2022-11-02
European technical Assessment ^{b)}	CSTB, Marne-la-Vallée	ETA-19/0858 / 2022-11-02
ICC-ES report incl. seismic ^{c)}	ICC evaluation service	ESR 4386 / 2020-03
Shock approval	Civil Protection of Switzerland	BZS D 19-601
ACI 349-01 nuclear suitability	Hilti, Inc. Plano, Texas	2021-01-19

a) All data for static or seismic load cases given in this section according to ETA-19/0556, issued 2022-11-02.

b) All data for fatigue relevant load cases given in this section according to ETA-19/0858, issued 2022-11-02.

c) For more details on Technical Data according to ICC please consult the relevant HNA FTM.

Static and quasi-static resistance (for a single anchor)

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Steel failure
- Minimum base material thickness
- Concrete C 20/25, $f_c = 20 \text{ N/mm}^2$

Effective anchorage depth ^{a)}

Anchor size	M8			M10			M12		
Effective anchorage depth h_{ef} [mm]	$h_{ef,1}^{b)}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}^{b)}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}^{b)}$	$h_{ef,2}$	$h_{ef,3}$
	60	80	100	70	90	110	80	105	130
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

a) HSL4-SK only available in sizes M8-M12, HSL4-B only available in sizes M12-M24

b) HSL4-SK can only be set in position 1.



Characteristic resistance

Anchor size				M8			M10			M12		
Non-cracked concrete												
Tension	HSL4 / HSL4-B HSL4-G HSL4-SK ^{a)}	N _{Rk}	[kN]	22,9	29,3	29,3	28,8	42,0	46,4	35,2	52,9	67,4
Shear	HSL4 / HSL4-B	V _{Rk}	[kN]	31,1	31,1	31,1	60,5	60,5	60,5	89,6	89,6	89,6
	HSL4-G			26,1	26,1	26,1	41,8	41,8	41,8	59,3	59,3	59,3
	HSL4-SK ^{a)}	t _{fix}	[mm]	≥11	-	-	≥11	-	-	≥13	-	-
		V _{Rk}	[kN]	31,1	-	-	60,5	-	-	89,6	-	-
		t _{fix}	[mm]	<11	-	-	<11	-	-	<13	-	-
		V _{Rk}	[kN]	14,6	-	-	23,2	-	-	33,7	-	-
Cracked concrete												
Tension	HSL4 / HSL4-B HSL4-G HSL4-SK ^{a)}	N _{Rk}	[kN]	12,0	12,0	12,0	16,0	16,0	16,0	24,6	24,0	24,0
Shear	HSL4 / HSL4-B	V _{Rk}	[kN]	31,1	31,1	31,1	52,4	60,5	60,5	66,5	89,6	89,6
	HSL4-G			26,1	26,1	26,1	41,8	41,8	41,8	59,3	59,3	59,3
	HSL4-SK ^{a)}	t _{fix}	[mm]	≥11	-	-	≥11	-	-	≥13	-	-
		V _{Rk}	[kN]	31,1	-	-	52,4	-	-	66,5	-	-
		t _{fix}	[mm]	<11	-	-	<11	-	-	<13	-	-
		V _{Rk}	[kN]	14,6	-	-	23,2	-	-	33,7	-	-
Anchor size				M16			M20			M24		
Non-cracked concrete												
Tension	HSL4 / HSL4-B HSL4-G	N _{Rk}	[kN]	49,2	65,0	65,0	68,8	94,9	95,0	90,4	100	100
Shear	HSL4 / HSL4-B	V _{Rk}	[kN]	137,7	158,5	158,5	186,0	186,0	186,0	204,5	204,5	204,5
	HSL4-G			120,6	120,6	120,6	155,3	155,3	155,3	204,5	204,5	204,5
Cracked concrete												
Tension	HSL4 / HSL4-B HSL4-G	N _{Rk}	[kN]	34,4	36,0	36,0	48,1	50,0	50,0	63,3	65,0	65,0
Shear	HSL4 / HSL4-B	V _{Rk}	[kN]	96,4	135	158,5	182,9	186,0	186,0	202,4	204,5	204,5
	HSL4-G			96,4	120,6	120,6	155,3	155,3	155,3	202,4	204,5	204,5

a) HSL4-SK can only be set in position 1.



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Design resistance

Anchor size				M8			M10			M12		
Non-cracked concrete												
Tension	HSL4 / HSL4-B HSL4-G HSL4-SK ^{a)}	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 ^{a)}	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 ^{a)}	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 ^{a)}	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		
Non-cracked 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

a) HSL4-SK can only be set in position 1



Recommended loads ^{b)}

Anchor size				M8			M10			M12		
Non-cracked concrete												
Tension	HSL4 / HSL4-B HSL4-G HSL4-SK ^{a)}	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 ^{a)}	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 ^{a)}	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 ^{a)}	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		
Non-cracked 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

a) HSL4-SK only available in sizes M8-M12, HSL4-B only available in sizes M12-M24

b) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on thy type of loading and shall be taken from national regulations.



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Seismic resistance (for a single anchor)

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Steel failure
- Minimum base material thickness
- Concrete C 20/25, $f_c = 20 \text{ N/mm}^2$
- $\alpha_{\text{gap}} = 0,5$

Effective anchorage depth for seismic C2 ^{a)}

Anchor size		M10			M12					
Effective anchorage depth	h_{ef} [mm]	$h_{\text{ef},1}^{\text{b)}$	$h_{\text{ef},2}$	$h_{\text{ef},3}$	$h_{\text{ef},1}^{\text{b)}$	$h_{\text{ef},2}$	$h_{\text{ef},3}$			
		70	90	110	80	105	130			
Anchor size		M16			M20			M24		
Effective anchorage depth	h_{ef} [mm]	$h_{\text{ef},1}$	$h_{\text{ef},2}$	$h_{\text{ef},3}$	$h_{\text{ef},1}$	$h_{\text{ef},2}$	$h_{\text{ef},3}$	$h_{\text{ef},1}$	$h_{\text{ef},2}$	$h_{\text{ef},3}$
		100	125	150	125	155	185	150	180	210

a) HSL4-SK only available in sizes M8-M12, HSL4-B only available in sizes M12-M24

b) HSL4-SK can only be set in position 1.

Characteristic resistance in case of seismic category C2

Characteristic resistance in case of seismic category C2												
Anchor size				M10			M12					
Tension	HSL4 / HSL4-B	N _{Rk,seis}	[kN]	12,2	12,2	12,2	20,9	25,8	25,8			
	HSL4-G											
	HSL4-SK			12,2	-	-	20,9	-	-			
Shear	HSL4 / HSL4-B	V _{Rk,seis}	[kN]	12,7	12,7	12,7	15,3	15,3	15,3			
	HSL4-G											
		t _{fix}	[mm]	≥11	-	-	≥13	-	-			
	HSL4-SK	V _{Rk,seis}	[kN]	12,7	-	-	15,3	-	-			
Anchor size				M16			M20			M24		
Tension	HSL4 / HSL4-B	N _{Rk,seis}	[kN]	29,3	34,2	34,2	40,1	40,1	40,1	45,9	45,9	45,9
	HSL4-G											
Shear	HSL4 / HSL4-B	V _{Rk,seis}	[kN]	30,9	30,9	30,9	39,1	39,1	39,1	44,0	44,0	44,0
	HSL4-G											

Design resistance in case of seismic category C2

Anchor size				M10			M12					
Tension	HSL4 / HSL4-B	N _{Rd,seis}	[kN]	8,1	8,1	8,1	14,0	17,2	17,2			
	HSL4-G											
	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											
		t _{fix}	[mm]	≥11	-	-	≥13	-	-			
	HSL4-SK	V _{Rd,seis}	[kN]	10,2	-	-	12,2	-	-			
Anchor size				M16			M20			M24		
Tension	HSL4 / HSL4-B	N _{Rd,seis}	[kN]	19,5	22,8	22,8	26,7	26,7	26,7	30,6	30,6	30,6
	HSL4-G											
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											

Effective anchorage depth for seismic C1 ^{a)}

Anchor size			M8			M10			M12		
Effective anchorage depth	h_{ef}	[mm]	$h_{ef,1}^{b)}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}^{b)}$	$h_{ef,2}$	$h_{ef,3}$	$h_{ef,1}^{b)}$	$h_{ef,2}$	$h_{ef,3}$
			60	80	100	70	90	110	80	105	130
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

a) HSL4-SK only available in sizes M8-M12, HSL4-B only available in sizes M12-M24

b) HSL4-SK can only be set in position 1.

Characteristic resistance in case of seismic category C1

Anchor size				M8			M10			M12		
Tension	HSL4 / HSL4-B HSL4-G	N _{Rk,seis}	[kN]	12,0	12,0	12,0	16,0	16,0	16,0	20,9	24,0	24,0
	HSL4-SK			12,0	-	-	16,0	-	-	21,9	-	-
Shear	HSL4 / HSL4-B	V _{Rk,seis}	[kN]	8,9	8,9	8,9	22,1	22,1	22,1	28,3	29,1	29,1
	HSL4-G			7,5	7,5	7,5	15,3	15,3	15,3	19,3	19,3	19,3
	HSL4-SK ^{a)}	t _{fix}	[mm]	≥11	-	-	≥11	-	-	≥13	-	-
		V _{Rk,seis}	[kN]	8,9	-	-	22,1	-	-	28,3	-	-
Anchor size				M16			M20			M24		
Tension	HSL4 / HSL4-B HSL4-G	N _{Rk,seis}	[kN]	29,3	36,0	36,0	40,9	50,0	50,0	53,8	65,0	65,0
Shear	HSL4 / HSL4-B	V _{Rk,seis}	[kN]	41,0	57,1	57,1	54,9	54,9	54,9	81,8	81,8	81,8
	HSL4-G			41,0	43,4	43,4	45,8	45,8	45,8	-	-	-

Design resistance in case of seismic category C1

Anchor size				M8			M10			M12		
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			6,0	6,0	6,0	12,2	12,2	12,2	15,4	15,4	15,4
	HSL4-SK ^{a)}	t _{fix}	[mm]	≥11	-	-	≥11	-	-	≥13	-	-
		V _{Rk,seis}	[kN]	7,1	-	-	14,9	-	-	18,8	-	-
Anchor size				M16			M20			M24		
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			27,3	34,7	34,7	36,6	36,6	36,6	-	-	-



<http://hilti.to/traceable-fastener>



Fatigue resistance

All data in this section applies to:

- Correct setting using Hilti seismic filling set (See setting instruction)
- No edge distance and spacing influence
- Minimum base material thickness
- Concrete C 20/25, $f_c = 20 \text{ N/mm}^2$
- Only applicable to HSL4-G version

Effective anchorage depth

Anchor size			M16			M20		
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

Characteristic resistance

Anchor size				M16			M20		
Non-cracked concrete									
Tension	HSL4-G	$\Delta N_{Rk,0,\infty}$	[mm]	8,3	8,3	8,3	12,0	12,0	12,0
Shear	HSL4-G	$\Delta V_{Rk,0,\infty}$	[mm]	8,0	8,0	8,0	10,0	10,0	10,0
Cracked concrete									
Tension	HSL4-G	$\Delta N_{Rk,0,\infty}$	[mm]	8,3	8,3	8,3	12,0	12,0	12,0
Shear	HSL4-G	$\Delta V_{Rk,0,\infty}$	[mm]	8,0	8,0	8,0	10,0	10,0	10,0

Design resistance

Anchor size				M16			M20		
Non-cracked concrete									
Tension	HSL4-G	$\Delta N_{Rk,0,\infty}$	[mm]	6,1	6,1	6,1	8,9	8,9	8,9
Shear	HSL4-G	$\Delta V_{Rk,0,\infty}$	[mm]	5,9	5,9	5,9	7,4	7,4	7,4
Cracked concrete									
Tension	HSL4-G	$\Delta N_{Rk,0,\infty}$	[mm]	6,1	6,1	6,1	8,9	8,9	8,9
Shear	HSL4-G	$\Delta V_{Rk,0,\infty}$	[mm]	5,9	5,9	5,9	7,4	7,4	7,4

For more information about different failure modes under fatigue load please see the full ETA-19/0858 report.



Materials

Mechanical properties ^{a)}

Anchor size			M8	M10	M12	M16	M20	M24
HSL4, HSL4-G, HSL4-B, HSL4-SK								
Nominal tensile strength	f_{uk}	[N/mm ²]	800	800	800	800	800	800
Yield strength	f_{yk}	[N/mm ²]	640	640	640	640	640	640
Stressed cross-section	A_s	[mm ²]	36,6	58,0	84,3	157	245	353
Moment of resistance	W	[mm ³]	31,3	62,5	109	277	541	935
Characteristic bending resistance without sleeve	$M^{0}_{Rk,s}$	[Nm]	30,0	60,0	105,0	266,0	519,0	898,0

a) HSL4-SK only available in sizes M8-M12, HSL4-B only available in sizes M12-M24

Material quality

Part		Material
Carbon Steel		
HSL4	Cone	Carbon steel, galvanized to $\geq 5 \mu\text{m}$
HSL4-G	Expansion sleeve	Carbon steel, galvanized to $\geq 5 \mu\text{m}$
HSL4-B	Collapsible element	POM + TPE Plastic element
HSL4-SK	Distance sleeve	Carbon steel, galvanized to $\geq 5 \mu\text{m}$
HSL4	Washer	Carbon steel, galvanized to $\geq 5 \mu\text{m}$
	Hexagonal bolt	Carbon steel, galvanized to $\geq 5 \mu\text{m}$, rupture elongation $\geq 12\%$
HSL4-G	Hexagonal nut	Carbon steel, galvanized to $\geq 5 \mu\text{m}$
	Threaded rod	Carbon steel, galvanized to $\geq 5 \mu\text{m}$, rupture elongation $\geq 12\%$
HSL4-B	Hexagonal bolt with safety cap	Carbon steel, galvanized to $\geq 5 \mu\text{m}$, rupture elongation $\geq 12\%$
HSL4-SK	Countersunk bolt	Carbon steel, galvanized to $\geq 5 \mu\text{m}$, rupture elongation $\geq 12\%$
	Cup washer	Carbon steel, galvanized to $\geq 5 \mu\text{m}$

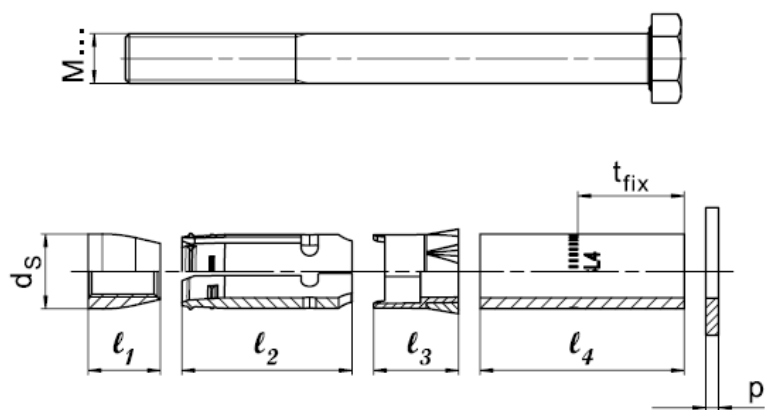


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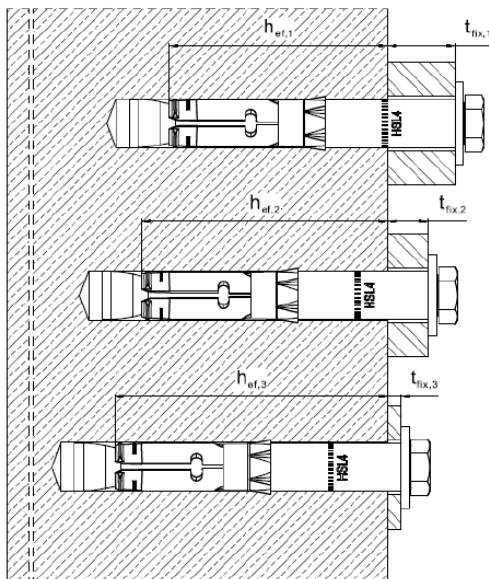
Anchor dimensions of HSL4, HSL4-G, HSL4-B, HSL4-SK

Anchor version	Thread size	t _{fix} [mm]		d _s [mm]	l ₁ [mm]	l ₂ [mm]	l ₃ [mm]	l ₄ [mm]		p [mm]
		min	max					min	max	
HSL4	M8	5	200	11,9	12	32	15,2	19	214	2
HSL4-G	M10	5	200	14,8	14	36	17,2	23	218	3
HSL4 HSL4-G HSL4-B	M12	5	200	17,6	17	40	20	28	223	3
	M16	10	200	23,6	20	54,4	24,4	34,5	224,5	4
	M20	10	200	27,6	20	57	31,5	51	241	4
	M24	10	200	31,6	22	65	39	57	247	4
HSL4-SK	M8	6	20	11,9	12	32	15,2	18,2	28,2	2
	M10	6	20	14,8	14	36	17,2	32,2		3
	M12	8	25	17,6	17	40	20	40		3



Setting information

Setting positions ^{a)}



Setting position

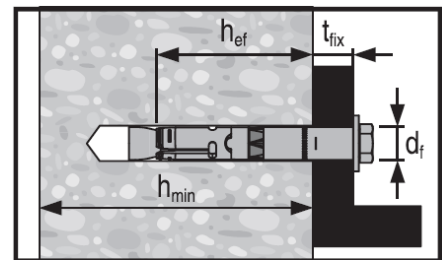
①

Setting position

②

Setting position

③



a) HSL4-SK can only be set in position 1.

Setting details for HSL4

Anchor version		M8			M10			M12		
Nominal diameter of drill bit	d ₀ [mm]	12			15			18		
Max. cutting diameter of drill bit	d _{cut} [mm]	12,5			15,5			18,5		
Max. diameter of clearance hole in the fixture	d _f [mm]	14			17			20		
Setting position	i	①	②	③	①	②	③	①	②	③
Fixture thickness	t _{fix,1} [mm]	5-200			5-200			5-200		
Effective fixture thickness	t _{fix,i}	t _{fix,1} ¹⁾ - Δi								
Reduction of fixture thickness	Δi [mm]	0	20	40	0	20	40	0	25	50
Effective anchorage depth	h _{ef,i} [mm]	60	80	100	70	90	110	80	105	130
Min. depth of drill hole	h _{1, i} [mm]	80	100	120	90	110	130	105	130	155
Min. thickness of concrete member	h _{min,i} [mm]	120	170	190	140	195	215	160	225	250
Width across flats	SW [mm]	13			17			19		
Installation torque	T _{inst} [Nm]	15			25			60		
Anchor version		M16			M20			M24		
Nominal diameter of drill bit	d ₀ [mm]	24			28			32		
Max. cutting diameter of drill bit	d _{cut} [mm]	24,55			28,55			32,7		
Max. diameter of clearance hole in the fixture	d _f [mm]	26			31			35		
Setting position	i	①	②	③	①	②	③	①	②	③
Fixture thickness	t _{fix1} [mm]	10-200			10-200			10-200		
Effective fixture thickness	t _{fix,i}	t _{fix,1} ¹⁾ - Δi								
Reduction of fixture thickness	Δi [mm]	0	25	50	0	30	60	0	30	60
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 member	h _{min,i} [mm]	200	275	300	250	380	410	300	405	435
Width across flats	SW [mm]	24			30			36		
Installation torque	T _{inst} [Nm]	75			145			210		



A cross-sectional diagram of a bolted joint. A bolt is shown passing through a plate. A split pin (cotter pin) is inserted through the end of the bolt and a hole in the plate to lock the joint. The split pin has a circular head on one end and a split, forked end on the other.

Anchor version			M8			M10			M12		
Nominal diameter of drill bit	d_0	[mm]	12			15			18		
Max. cutting diameter of drill bit	d_{cut}	[mm]	12,5			15,5			18,5		
Max. diameter of clearance hole in the fixture	d_f	[mm]	14			17			20		
Setting position	i		①	②	③	①	②	③	①	②	③
Fixture thickness	$t_{fix,1}$	[mm]	5-200			5-200			5-200		
Effective fixture thickness	$t_{fix,i}$		$t_{fix,1}^{1)} - \Delta i$								
Reduction of fixture thickness	Δi	[mm]	0	20	40	0	20	40	0	25	50
Effective anchorage depth	$h_{ef,i}$	[mm]	60	80	100	70	90	110	80	105	130
Min. depth of drill hole	$h_{1,i}$	[mm]	80	100	120	90	110	130	105	130	155
Min. thickness of concrete member	$h_{min,i}$	[mm]	120	170	190	140	195	215	160	225	250
Width across flats	SW	[mm]	13			17			19		
Installation torque	T_{inst}	[Nm]	20			27			60		
Anchor version			M16			M20			M24		
Nominal diameter of drill bit	d_0	[mm]	24			28			32		
Max. cutting diameter of drill bit	d_{cut}	[mm]	24,55			28,55			32,7		
Max. diameter of clearance hole in the fixture	d_f	[mm]	26			31			35		
Setting position	i		①	②	③	①	②	③	①	②	③
Fixture thickness	t_{fix1}	[mm]	10-200			10-200			10-200		
Effective fixture thickness	$t_{fix,i}$		$t_{fix,1}^{1)} - \Delta i$								
Reduction of fixture thickness	Δi	[mm]	0	25	50	0	30	60	0	30	60
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 member	$h_{min,i}$	[mm]	200	275	300	250	380	410	300	405	435
Width across flats	SW	[mm]	24			30			36		
Installation torque	T_{inst}	[Nm]	70			105			180		

A technical drawing of a bolted joint. It shows a bolt passing through a plate, with a split pin (cotter pin) inserted through the bolt's end to lock it in place. The split pin is shown in a cross-section, with its two ends inserted into the bolt's end. The bolt is shown in a cross-section, and the plate is shown in a cross-section. The split pin is shown in a cross-section, with its two ends inserted into the bolt's end.

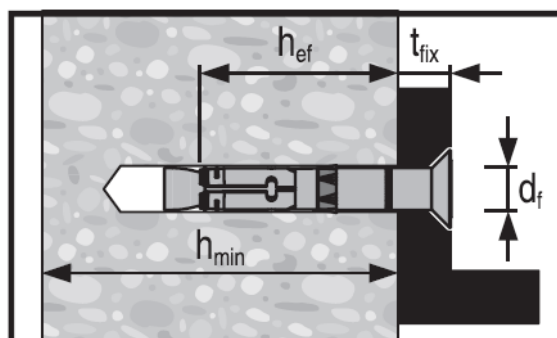
Anchor version		M12			M16			M20			M24		
Nominal diameter of drill bit	d ₀ [mm]	18			24			28			32		
Max. cutting diameter of drill bit	d _{cut} [mm]	18,5			24,55			28,55			32,7		
Max. diameter of clearance hole in the fixture	d _f [mm]	20			26			31			35		
Setting position	i	①	②	③	①	②	③	①	②	③	①	②	③
Fixture thickness	t _{fix,1} [mm]	5 - 200			10 - 200			10 - 200			10 - 200		
Effective fixture thickness	t _{fix,i}	t _{fix,1} ¹⁾ - Δi											
Reduction of fixture thickness	Δi [mm]	0	25	50	0	25	50	0	30	60	0	30	60
Effective anchorage depth	h _{ef,i} [mm]	80	105	130	100	125	150	125	155	185	150	180	210
Min. depth of drill hole	h _{1,i} [mm]	105	130	155	125	150	175	155	185	215	180	210	240
Min. thickness of concrete member	h _{min,i} [mm]	160	225	250	200	275	300	250	380	410	300	405	435
Width across flats	SW [mm]	24			30			36			41		
Installation torque	T _{inst} [Nm]	The torque moment is controlled by the safety cap											

Setting details for HSL4-SK ^{a)}

Anchor version			M8	M10	M12
Nominal diameter of drill bit	d_0	[mm]	12	15	18
Max. cutting diameter of drill bit	d_{cut}	[mm]	12,5	15,5	18,5
Max. diameter of clearance hole in the fixture	d_f	[mm]	14	17	20
Top diameter of countersunk head in the fixture	d_h	[mm]	22,5	25,5	32,9
Bottom diameter of countersunk head in the fixture	d_h	[mm]	11,4	14,4	17,4
Height of the countersunk head in the fixture	h_{cs}	[mm]	5,8	5,8	8,0
Min. Fixture thickness	$t_{fix,min}^{b)}$	[mm]	6	6	8
Effective anchorage depth	h_{ef}	[mm]	60	70	80
Min. depth of drill hole	h_1	[mm]	80	90	105
Min. thickness of concrete member	h_{min}	[mm]	120	140	160
Width across flats	SW	[mm]	5	6	8
Installation torque	T_{inst}	[Nm]	20	32	65

a) HSL4-SK can only be set in position 1.

b) The influence of the thickness of fixture to the characteristic resistance for shear loads, steel failure without lever arm is taken into account



Installation equipment

Anchor size	M8	M10	M12	M16	M20	M24
Rotary hammer	TE 2 – TE 30			TE 40 – TE 80		
Diamond coring	DD 30-W or DD-EC-1 + SPX-T DD 110 / 150 + SPX-L handheld		DD 30-W or DD-EC-1 + SPX-T DD 110 / 150 + SPX-L handheld DD 120 / 160 / 150 + SPX-L		DD 30-W or DD-EC-1 + SPX-T DD 110 / 150 + SPX-L handheld DD 120 / 160 / 150 / 200 / 250 + SPX-L	
Other tools	blow out pump, hammer, torque wrench ¹⁾					

1) HSL4-B only requires a regular wrench as it automatically ensures correct torque is applied.



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Setting parameters for HSL4, HSL4-G, HSL4-B, HSL4-SK ^{a)}

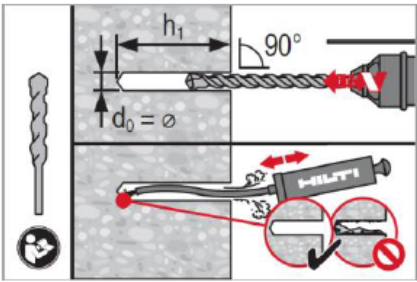
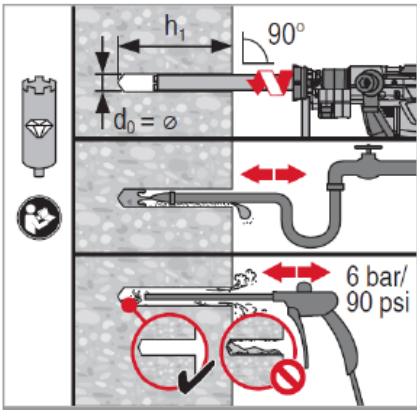
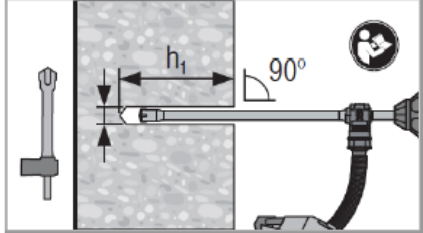
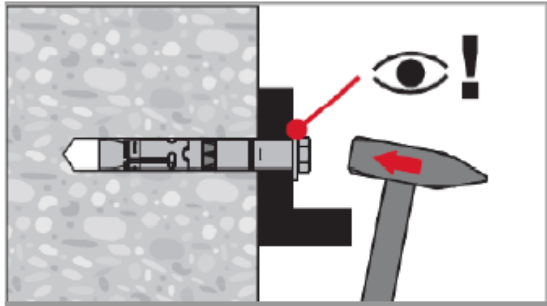
Anchor size			M8			M10			M12		
Setting position ^{b)}	i		①	②	③	①	②	③	①	②	③
Minimum base material thickness	h_{min}	[mm]	120	170	190	140	195	215	160	225	250
Uncracked concrete											
Minimum spacing	s_{min}	[mm]	60			70			80		
	for $c \geq$	[mm]	100			100			160		
Minimum edge distance	c_{min}	[mm]	60			70			80		
	for $s \geq$	[mm]	100			160			240		
Cracked concrete											
Minimum spacing	s_{min}	[mm]	50			70			70		
	for $c \geq$	[mm]	80			100			140		
Minimum edge distance	c_{min}	[mm]	60			70			70		
	for $s \geq$	[mm]	80			120			160		
Anchor size			M16			M20			M24		
Setting position	i		①	②	③	①	②	③	①	②	③
Minimum base material thickness	h_{min}	[mm]	200	275	300	250	380	410	300	405	435
Uncracked concrete											
Minimum spacing	s_{min}	[mm]	100			125			150		
	for $c \geq$	[mm]	240			300			300		
Minimum edge distance	c_{min}	[mm]	100			150			150		
	for $s \geq$	[mm]	240			300			300		
Cracked concrete											
Minimum spacing	s_{min}	[mm]	80			120			120		
	for $c \geq$	[mm]	180			220			260		
Minimum edge distance	c_{min}	[mm]	100			120			120		
	for $s \geq$	[mm]	200			220			280		

a) HSL4-SK only available in sizes M8-M12, HSL4-B only available in sizes M12-M24

b) HSL4-SK can only be set in position 1.

Setting instructions

*For detailed information on installation of each specific HSL4 version, see instruction for use given with the package of the product.

Setting instruction		
Hole drilling and cleaning		
a) Hammer drilling (HD) with manual cleaning (MC): 	b) Diamond coring (DD) with flushing and blowing 	c) Hammer drilling (HD) with hollow drill bit (HDB) 
Anchor setting		
Hammer setting, check setting		
		

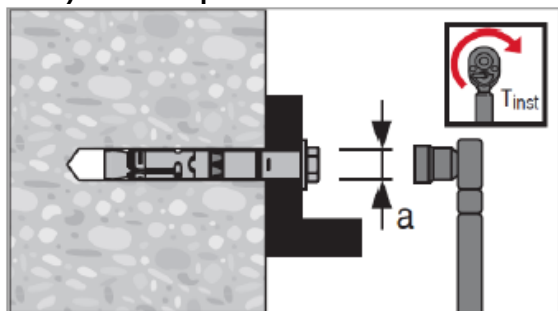


<http://hilti.to/traceable-fastener>

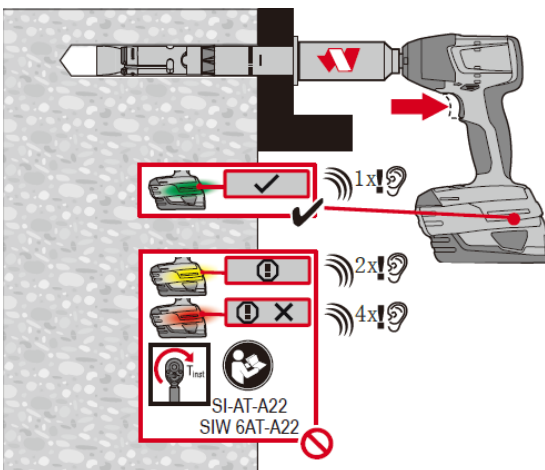
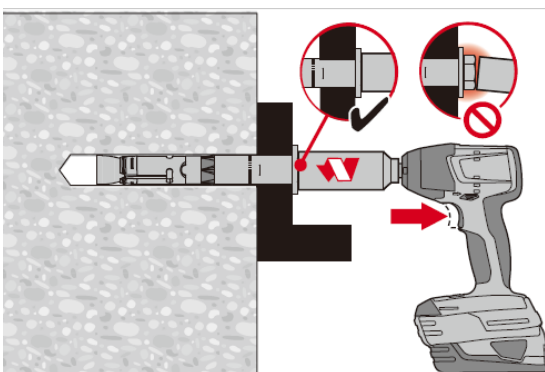
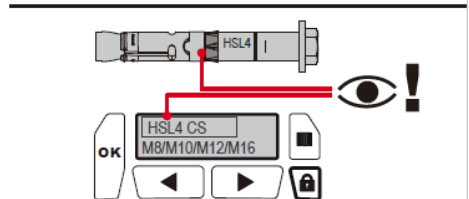
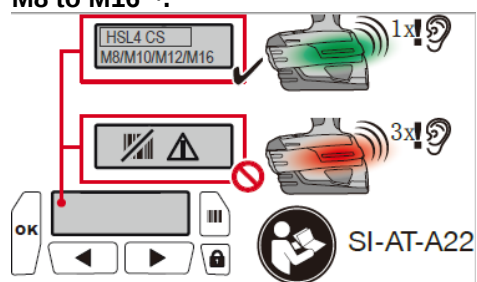


Anchor torquing for HSL4, HSL4-G, SL-4-SK

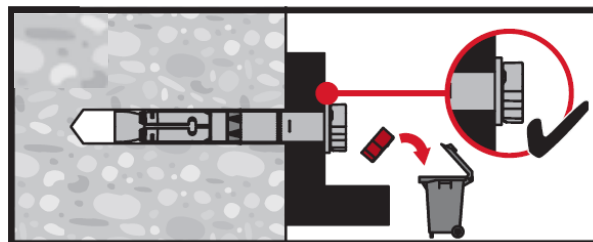
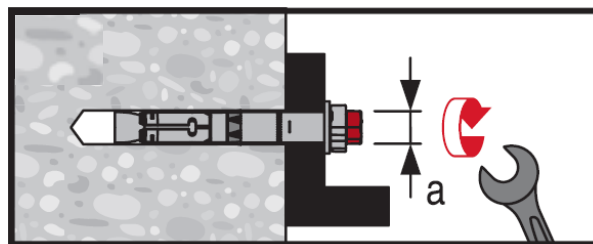
a) Use torque wrench



b) Machine torquing: Only HSL4 and HSL4-G M8 to M16 ^{a)}



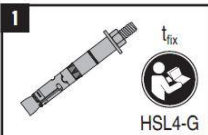
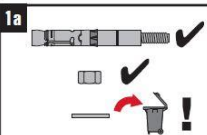
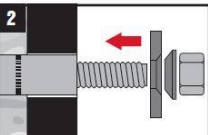
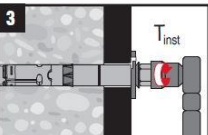
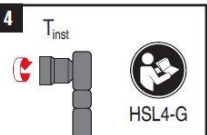
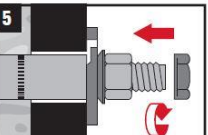
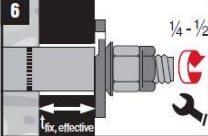
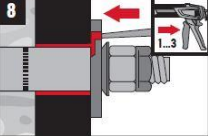
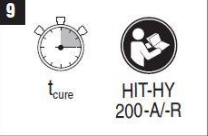
HSL4-B Safety cap



a) Equivalent combination of Hilti SIW + SI-AT tool, compatible to this anchor type, may be used (e.g. Hilti SIW 4AT-22 with SI-AT-22)

Setting instructions

*For detailed information on installation of HSL4-G version, see instruction for use given with the package of the product.

Installation instructions for the filling set																
HSL4-G																
1  HSL4-G t_{fix}	1a 	2 	3  T_{inst}	4  T_{inst} HSL4-G	5 	6  $\frac{1}{4} - \frac{1}{2}$ $t_{fix, effective}$	7  HIT-HY 200-A/-R	8 	9  t_{cure} HIT-HY 200-A/-R	<table border="1"> <thead> <tr> <th>Size</th> <th>$t_{fix, effective}$ (mm)</th> </tr> </thead> <tbody> <tr> <td>M16</td> <td>10 ... 200</td> </tr> <tr> <td>M20</td> <td>10 ... 200</td> </tr> </tbody> </table>	Size	$t_{fix, effective}$ (mm)	M16	10 ... 200	M20	10 ... 200
Size	$t_{fix, effective}$ (mm)															
M16	10 ... 200															
M20	10 ... 200															