SUPERPLUS

Self-undercutting anchor

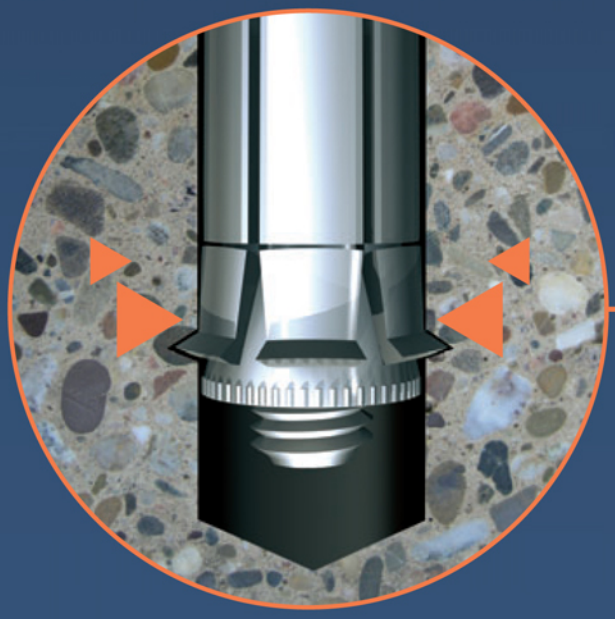
The undercut fixing system that does not require a special setting tool.

Type BLS **Type ILS**

Function: Automatically self-undercutting. The unique design of the **SUPERPLUS** causes an undercut to be created when the installation torque is applied. As torque is applied to the anchor the cone is drawn into the anchor sleeve and the sleeve's outer cutting teeth expand and undercut into the base material. This results in a durable mechanical interlock with base material that functions in both cracked and non-cracked concrete.

Benefits:

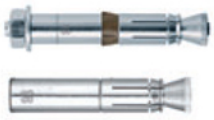
- High capacity in cracked and non-cracked concrete
- High reliability due to undercut technology
- Simple installation, no special drill bit or setting tool required
- Applying torque creates undercut
- Two approved embedment depths per diameter
- Lower installed cost than traditional undercut anchors
- Reduced edge distances and spacings



B.S.N. the professional fastener

SUPERPLUS

CONSTRUCTION:



BLS with hex nut, washer and threaded stud

ILS with internally threaded sleeve

R 120

MATERIAL:

- Grade 8.8 carbon steel, zinc plated and blue passivated
- A4-80 stainless steel

BASE MATERIAL:

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

APPROVALS:

ETA-01/0011 – Option 1 – Carbon steel, zinc plated
ETA-05/0013 – Option 1 – A4 stainless steel

LOAD RANGE:

Tension: N_{perm} = 4.3 - 56.1 [kN]
Shear: V_{perm} = 4.3 - 90.7 [kN]

PRODUCT RANGE:

BLS: M8, M12 and M16, carbon steel, zinc plated and blue passivated / A4 stainless steel
ILS: M8, carbon steel, zinc plated and blue passivated

APPLICATIONS:

- Power plants
- Steel and industrial plants
- Cable trays
- Machines
- Facades
- Base plates

BENEFITS:

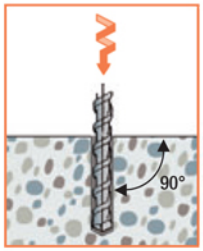
- High tension and shear capacity
- Simple self-undercutting installation
- No special drill bit or setting tool required
- Reduced edge distances and spacings
- Two embedment depths per diameter
- Shallow embedment depths

PRODUCT DESCRIPTION:

The „LIEBIG **SUPERPLUS**“ is available in zinc plated carbon steel and A4 stainless steel. Its design offers the high load capacity and reliability of an undercut anchor, but with the ease of installation of an expansion anchor. In contrast to competing undercut anchor systems, the **SUPERPLUS** does not require special drill bits or setting tools. You need only apply the torque to create the self-undercut.

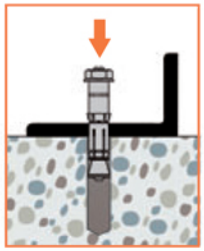
INSTALLATION:

Through-fix installation shown

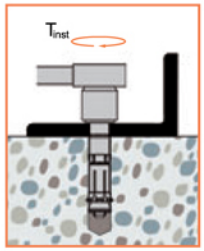


Drill hole

Clean hole (blowing)



Insert anchor through fixture



Apply recommended fastening torque with a calibrated torque-wrench

Foto: Liebherr

B.S.N. the professional fastener

Carbon steel, zinc plated

SUPERPLUS BLS

Threaded stud with hex nut and washer
Material: Grade 8.8 carbon steel, zinc plated and blue passivated
Approvals: ETA-01/0011 – Option 1

Type	Order Code	Thread Size	Ø x Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Total Length	Weight	Box Quantity
			d_o x h_1	t_{fix}	d_f	h_{ef}	L		
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg/100 pcs]	[pcs]
BLS M8-14/40/15	BLS0814040015	M8	14 x 60	15	16	40	80	8.0	25
BLS M8-14/80/25	BLS0814080025	M8	14 x 100	25	16	80	130	13.4	25
BLS M12-20/80/15	BLS1220080015	M12	20 x 105	15	21	80	130	26.5	10
BLS M12-20/80/30	BLS1220080030	M12	20 x 105	30	21	80	145	29.5	10
BLS M12-20/150/30	BLS1220150030	M12	20 x 175	30	21	150	215	43.5	10
BLS M12-20/150/50	BLS1220150050	M12	20 x 175	50	21	150	235	46.0	10
BLS M16-25/150/30	BLS1625150030	M16	25 x 185	30	26	150	220	70.0	10
BLS M16-25/150/40	BLS1625150040	M16	25 x 185	40	26	150	230	72.0	10
BLS M16-25/150/60	BLS1625150060	M16	25 x 185	60	26	150	250	76.0	10
BLS M16-25/200/40	BLS1625200040	M16	25 x 235	40	26	200	280	89.0	10
BLS M16-25/200/60	BLS1625200060	M16	25 x 235	60	26	200	300	95.0	10

Custom lengths available on request.

See page 15 for technical data.

A4 stainless steel

SUPERPLUS BLS

Threaded stud with hex nut and washer
Material: A4-80 stainless steel
Approvals: ETA-05/0013 – Option 1

Type	Order Code	Thread Size	Ø x Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Total Length	Weight	Box Quantity
			d_o x h_1	t_{fix}	d_f	h_{ef}	L		
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg/100 pcs]	[pcs]
BLS M8-14/80/25A4	BLS0814080025A4	M8	14 x 100	25	16	80	130	13.4	25
BLS M12-20/80/15A4	BLS1220080015A4	M12	20 x 105	15	21	80	130	26.5	10
BLS M12-20/80/30A4	BLS1220080030A4	M12	20 x 105	30	21	80	145	29.5	10
BLS M16-25/150/30A4	BLS1625150030A4	M16	25 x 185	30	26	150	220	70.0	10
BLS M16-25/150/40A4	BLS1625150040A4	M16	25 x 185	40	26	150	230	72.0	10

Custom lengths available on request.

See page 16 for technical data.

Internally threaded, Carbon steel, zinc plated

SUPERPLUS ILS

Internally threaded sleeve
Material: Grade 8.8 carbon steel, zinc plated and blue passivated

Type	Order Code	Thread Size	Ø x Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Total Length	Weight	Box Quantity
			d_o x h_1	t_{fix}	d_f	h_{ef}	L		
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg/100 pcs]	[pcs]
ILS M8-14/80	ILS0814080	M8	14 x 100	-	10	80	93	8.7	25

Custom lengths available on request.

See page 17 for technical data.

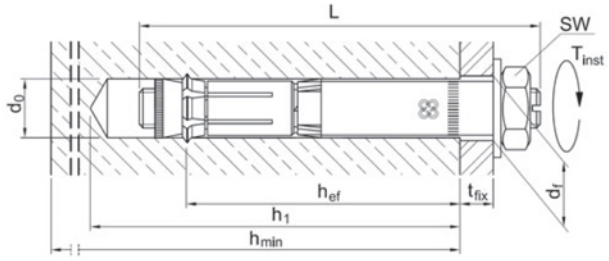
Carbon steel, zinc plated

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-01/0011.

Material: Carbon steel, Grade 8.8, zinc plated and blue passivated

Thread size				M8	M8	M12	M12	M16	M16
Effective embedment depth (h_{ef})			[mm]	40	80	80	150	150	200
Type BLS...				M8-14/40/…	M8-14/80/…	M12-20/80/…	M12-20/150/…	M16-25/150/…	M16-25/200/…
Permissible tension loads[1]									
N_{perm}	Cracked concrete	C20/25	[kN]	4.3	7.6	11.9	19.0	23.8	35.7
		C30/37	[kN]	5.2	9.3	14.5	23.2	29.0	43.6
		C40/50	[kN]	6.0	10.7	16.8	26.9	33.6	50.4
		C50/60	[kN]	6.6	10.8	18.5	28.4	36.9	53.0
	Non-cracked concrete[3]	C20/25	[kN]	6.1	10.8	17.2	28.4	44.1	53.0
		C30/37	[kN]	7.4	10.8	21.0	28.4	53.0	53.0
		C40/50	[kN]	8.6	10.8	24.3	28.4	53.0	53.0
		C50/60	[kN]	9.4	10.8	26.7	28.4	53.0	53.0
Permissible shear loads[1] [2]									
V_{perm}	Cracked concrete	C20/25	[kN]	4.3	23.7	24.6	40.0	63.0	67.4
		C30/37	[kN]	5.3	23.7	30.0	40.0	67.4	67.4
		C40/50	[kN]	6.1	23.7	34.6	40.0	67.4	67.4
		C50/60	[kN]	6.7	23.7	38.1	40.0	67.4	67.4
	Non-cracked concrete[3]	C20/25	[kN]	6.1	23.7	34.4	40.0	67.4	67.4
		C30/37	[kN]	7.4	23.7	40.0	40.0	67.4	67.4
		C40/50	[kN]	8.6	23.7	40.0	40.0	67.4	67.4
		C50/60	[kN]	9.4	23.7	40.0	40.0	67.4	67.4
Permissible bending moments[1] [4]									
M_{perm}			[Nm]	17.1	17.1	60.0	60.0	152.0	152.0
Spacings, edge distances and member thicknesses									
Effective embedment depth		h_{ef}	[mm]	40	80	80	150	150	200
Characteristic spacing[5]		$s_{cr,N}$	[mm]	120	240	240	450	450	600
Minimum spacing		s_{min}	[mm]	100	80	120	150	200	150
Characteristic edge distance[5]		$c_{cr,N}$	[mm]	60	120	120	225	225	300
Minimum edge distance		c_{min}	[mm]	80	50	100	80	150	100
Minimum member thickness		h_{min}	[mm]	100	160	160	300	300	400
Installation data									
Drill hole diameter		d_0	[mm]	14	14	20	20	25	25
Drill hole depth		h_1	[mm]	60	100	105	175	185	235
Clearance hole in the fixture	Through-fix anchorage	d_f	[mm]	16	16	21	21	26	26
	Installation on threaded stud	d_f	[mm]	10	10	14	14	18	18
Width across flats		sw	[mm]	17	17	22	22	27	27
Installation torque		T_{inst}	[Nm]	25	25	80	80	180	180

Installed anchor



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 ≥ 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 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) If spacings or edge distances become smaller than the characteristic values (i.e. s ≤ $s_{cr,N}$ and/or c ≤ $c_{cr,N}$) a calculation per ETAG 001, Annex C, design method A must be performed. For details, see ETA-01/0011.

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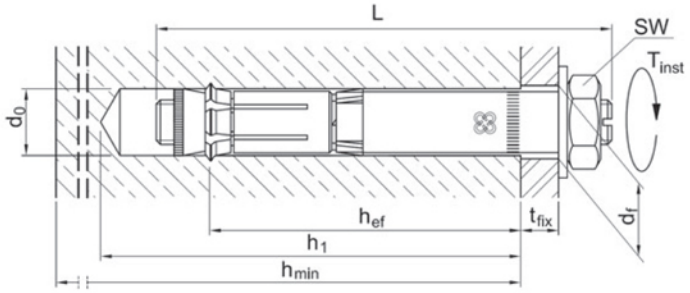
A4 stainless steel

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.
Design calculations shall follow the requirements of ETA-05/0013.

Material: A4-80 stainless steel

Thread size				M8	M8	M12	M12	M16	M16
Effective embedment depth (h_{ef})			[mm]	40	80	80	150	150	200
Type BLS...				M8-14/40/...	M8-14/80/...	M12-20/80/...	M12-20/150/...	M16-25/150/...	M16-25/200/...
Permissible tension loads[1]									
N_{perm}	Cracked concrete	C20/25	[kN]	4.3	5.7	11.9	19.0	28.6	28.6
		C30/37	[kN]	5.2	7.0	14.5	23.2	34.9	34.9
		C40/50	[kN]	6.0	8.1	16.8	26.9	40.3	40.3
		C50/60	[kN]	6.6	8.9	18.5	29.5	44.3	44.3
	Non-cracked concrete[3]	C20/25	[kN]	6.1	13.1	17.2	30.1	44.1	56.1
		C30/37	[kN]	7.4	13.1	21.0	30.1	53.8	56.1
		C40/50	[kN]	8.6	13.1	24.3	30.1	56.1	56.1
		C50/60	[kN]	9.4	13.1	26.7	30.1	56.1	56.1
Permissible shear loads[1) 2)]									
V_{perm}	Cracked concrete	C20/25	[kN]	4.3	24.0	24.6	48.5	63.0	90.7
		C30/37	[kN]	5.3	24.0	30.0	48.5	76.8	90.7
		C40/50	[kN]	6.1	24.0	34.6	48.5	88.8	90.7
		C50/60	[kN]	6.7	24.0	38.1	48.5	90.7	90.7
	Non-cracked concrete[3]	C20/25	[kN]	6.1	24.0	34.4	48.5	88.2	90.7
		C30/37	[kN]	7.4	24.0	42.0	48.5	90.7	90.7
		C40/50	[kN]	8.6	24.0	48.5	48.5	90.7	90.7
		C50/60	[kN]	9.4	24.0	48.5	48.5	90.7	90.7
Permissible bending moment[1) 4)]									
M_{perm}			[Nm]	16.1	16.1	56.4	56.4	142.9	142.9
Spacings, edge distances and member thicknesses									
Effective embedment depth		h_{ef}	[mm]	40	80	80	150	150	200
Characteristic spacing[5]		$s_{cr,N}$	[mm]	120	240	240	450	450	600
Minimum spacing		s_{min}	[mm]	80	80	150	150	150	180
Characteristic edge distance[5]		$c_{cr,N}$	[mm]	60	120	120	225	225	300
Minimum edge distance		c_{min}	[mm]	60	50	100	80	100	100
Minimum member thickness		h_{min}	[mm]	100	160	160	300	300	400
Installation data									
Drill hole diameter		d_0	[mm]	14	14	20	20	25	25
Drill hole depth		h_1	[mm]	60	100	105	175	185	235
Clearance hole in the fixture	Through-fix anchorage	d_f	[mm]	16	16	21	21	26	26
	Installation on threaded stud	d_f	[mm]	10	10	14	14	18	18
Width across flats		sw	[mm]	17	17	22	22	27	27
Installation torque		T_{inst}	[Nm]	25	25	80	80	180	180

Installed anchor



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) If spacings or edge distances become smaller than the characteristic values (i.e. $s \leq s_{cr,N}$ and/or $c \leq c_{cr,N}$) a calculation per ETAG 001, Annex C, design method A must be performed. For details, see ETA-05/0013.

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Internally threaded anchor, 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.

Material: Carbon steel, zinc plated and blue passivated

Thread size		**M8**
Effective embedment depth (h_{ef})	[mm]	**80**
Type ILS...		**M8-14/80**

Permissible tension loads[1]

N_{perm}	Cracked concrete	**C20/25**	[kN]	7.6
		C30/37	[kN]	9.3
		C40/50	[kN]	10.7
		C50/60	[kN]	10.8
	Non-cracked concrete[3]	**C20/25**	[kN]	10.8
		C30/37	[kN]	10.8
		C40/50	[kN]	10.8
		C50/60	[kN]	10.8

Permissible shear loads[1][2]

V_{perm}	Cracked concrete	**C20/25**	[kN]	8.4
		C30/37	[kN]	8.4
		C40/50	[kN]	8.4
		C50/60	[kN]	8.4
	Non-cracked concrete[3]	**C20/25**	[kN]	8.4
		C30/37	[kN]	8.4
		C40/50	[kN]	8.4
		C50/60	[kN]	8.4

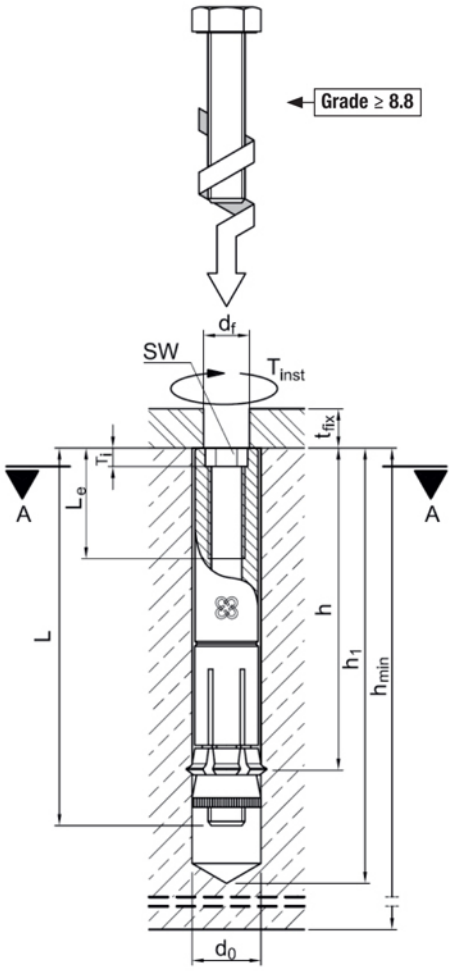
Spacings, edge distances and member thicknesses

Effective embedment depth	h_{ef}	[mm]	80
Characteristic spacing[4]	$s_{cr,N}$	[mm]	240
Minimum spacing	s_{min}	[mm]	80
Characteristic edge distance[4]	$c_{cr,N}$	[mm]	120
Minimum edge distance	c_{min}	[mm]	50
Minimum member thickness	h_{min}	[mm]	160

Installation data

Drill hole diameter	d_0	[mm]	14
Drill hole depth	h_1	[mm]	100
Clearance hole in the fixture	d_f	[mm]	10
Threaded depth	L_e	[mm]	12 to 23
Hexagon socket depth	T_i	[mm]	4
Width across flats	sw	[mm]	8
Installation torque	T_{inst}	[Nm]	25

Installed anchor



Section A - A

1) The permissible loads have been calculated assuming that grade 8.8 fasteners are used and using the partial safety factors for resistances stated in ETA-01/0011 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) If spacings or edge distances become smaller than the characteristic values (i.e. $s \leq s_{cr,N}$ and/or $c \leq c_{cr,N}$) a calculation per ETAG 001, Annex C, design method A must be performed. For details, see ETA-01/0011.

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