FIXING SOCKETS

03

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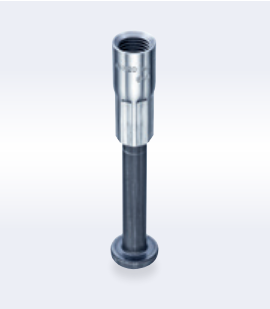
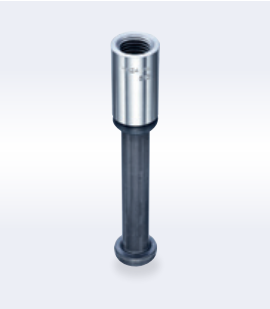
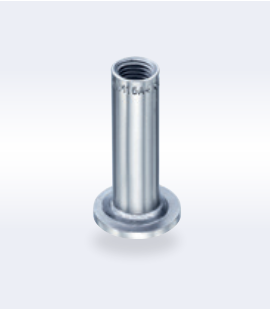
New Stud Anchor Systems with ETA approval and design software



Pressed



Friction welded

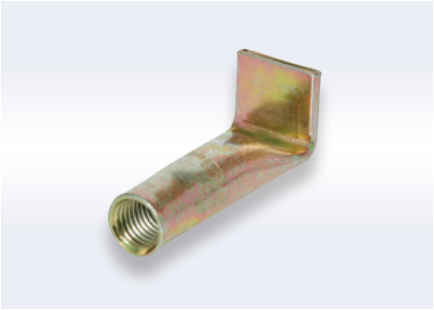


Socket with end plate

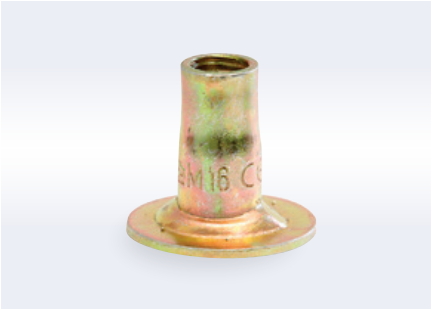
Solid Cross-hole Sockets

Crosspin Sockets

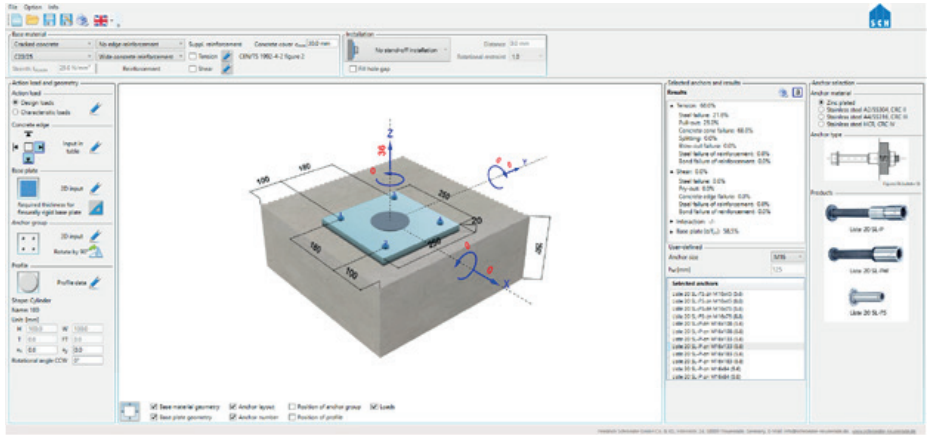
Bent End Sockets



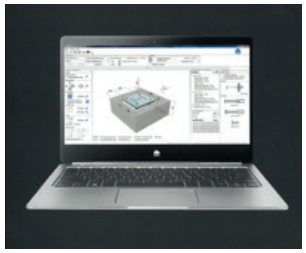
Prop Sockets

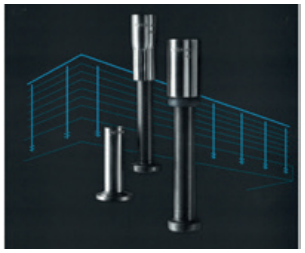


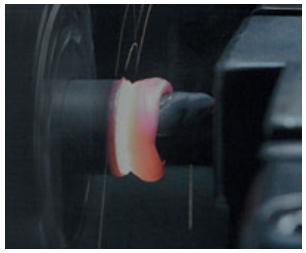
STUD ANCHORS



When ordering please specify diameter and length e.g. CFS-SL-P M16x133 (A4-70)







Stud Anchor System with ETA approval and design software

Description:
Stainless steel or electroplated threaded sockets connected to the stud.

Scope of Application:
Applicable for anchoring concrete elements with corrosion-resistance up to class IV. For fixing elements with axial and transverse loads. 3D Schroeder FixPro software is available for bespoke applications and dimensioning.

Component	CFS-SL-P-ZN	CFS-SL-P-A4 (M12, M16)	CFS-SL-P-A4 (M20, M24, M30)
Socket	Steel E355 + N, electrogalvanized	Stainless steel grade A4 1.4401, 1.4404 or 1.4571	Stainless steel grade A4 1.4401, 1.4404 or 1.4571
Headed stud	Steel S235J2 + C470 or S355	Stainless steel grade A2 1.4301, 1.4303	Steel S235J2 + C470 or S355, headed stud in base of socket sealed
Nailing plate	Available	Available	Available

For bespoke calculation, load enquiry or software download, please contact CFS.

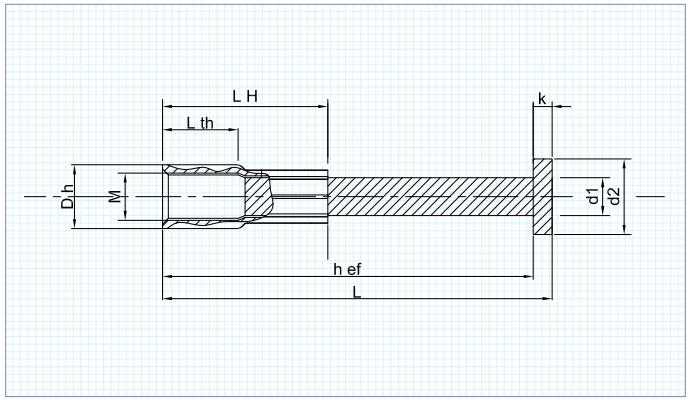
PRESSED STUD ANCHOR

Pressed Stud Anchor CFS-SL-P-ZN:

- Electroplated threaded socket pressed on steel stud, available in various lengths with socket diameter M12, M16, M20, M24, M30

Stainless Steel Pressed Stud Anchor CFS-SL-P-A4:

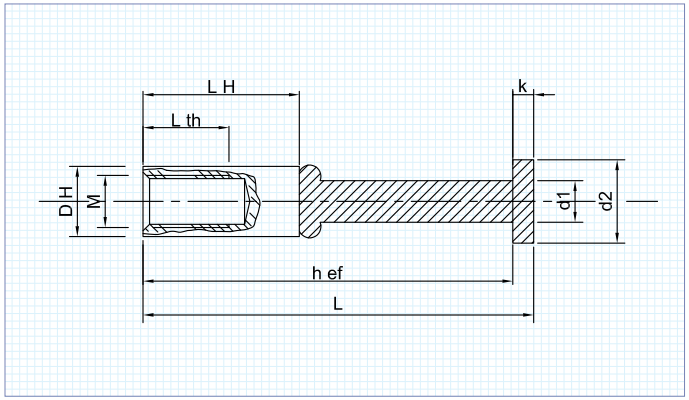
- Threaded socket made from stainless steel grade A4(1.4401, 1.4404 or 1.4571)
- Thread sizes M12 and M16: pressed on stainless steel (grade A2) stud
- M20, M24, M30: pressed on steel headed stud, base of the socket is sealed
- All stud anchors are available in different lengths and with additional nailing plate added on the bottom



M	L	DH	LH	Lth	d1	d2	k	hef	LH	Lth	k
	CFS-SL-P-ZN [mm]								CFS-SL-P-A4 [mm]		
12	79	15.5	43	25	10	19	7.1	72	42	25	7.1
	104		43	25	10	19	7.1	97	42	25	7.1
	154		43	25	10	19	7.1	147	42	25	7.1
16	84	21.1	57	28	10	19	7.1	77	58	28	7.1
	108		55	27	13	25	8	100	56	27	8
	133		55	27	13	25	8	125	56	27	8
	183		55	27	13	25	8	175	56	27	8
20	140	27.0	70	32	16	32	8	132	70	31	8
	165		70	32	16	32	8	157	70	31	8
	190		70	32	16	32	8	182	70	31	8
	240		70	32	16	32	8	232	70	31	8
24	173	31.0	83	38	19	32	10	163	87	40	8
	198		83	38	19	32	10	188	87	40	8
	248		83	38	19	32	10	238	87	40	8
	298		83	38	19	32	10	288	87	40	8
30	213	39.5	98	56	22	35	10	203	97	55	10
	238		98	56	25	40	12	226	97	55	12
	313		98	56	25	40	12	301	97	55	12
	363		98	56	25	40	12	351	97	55	12

Custom versions with length up to 525mm available

FRICTION WELDED STUD ANCHOR



Friction welded Stud anchor CFS-SL-FW-A4

Component	CFS-SL-FW-A4
Socket	Stainless steel A4 - 1.4401, 1.4404 or 1.4571
Headed stud	Steel S235J2 + C470 or F355
Nailing plate	Available

M	L	DH	LH	Lth	d2	k	hef
CFS-SL-FW-A4 [mm]							
12	127	16.0	60	25	19	7.1	120
	152	16.0	60	25	19	7.1	145
16	127	22.0	60	28	32	8	119
	152	22.0	60	28	32	8	144
	202	22.0	60	28	32	8	194
20	150	27.0	60	33	32	8	142
	200	27.0	60	33	32	8	192
	250	27.0	60	33	32	8	242
24	152	36.0	60	38	35	10	142
	202	36.0	60	38	35	10	192
	252	36.0	60	38	35	10	242
	302	36.0	60	38	35	10	292
27	152	40.0	60	38	40	12	140
	227	40.0	60	38	40	12	215
	302	40.0	60	38	40	12	290
	352	40.0	60	38	40	12	340
30	152	45.0	60	38	40	12	140
	227	45.0	60	38	40	12	215
	302	45.0	60	38	40	12	290
	352	45.0	60	38	40	12	340

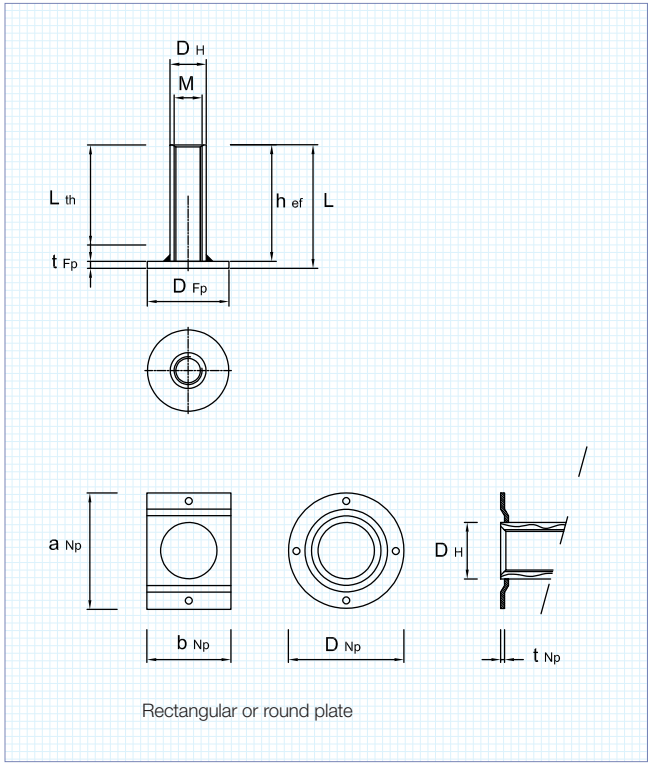
Friction welded Stud anchor CFS-SL-FW-Duplex

Component	CFS-SL-FW-Duplex
Socket	Stainless steel duplex 1.4462
Headed stud	Steel S235J2 + C470 or F355

M	L	DH	LH	Lth	d1	d2	k	hef
CFS-SL-FW-Duplex [mm]								
12	132	16.0	60	25	13	25	8	124
	157	16.0	60	25	13	25	8	149
16	131	22.0	60	28	16	32	8	123
	156	22.0	60	28	16	32	8	148
	206	22.0	60	28	16	32	8	198
20	157	28.0	60	33	22	35	10	147
	207	28.0	60	33	22	35	10	197
	257	28.0	60	33	22	35	10	247
24	157	35.0	60	38	25	40	12	145
	207	35.0	60	38	25	40	12	195
	232	35.0	60	38	25	40	12	220
	257	35.0	60	38	25	40	12	245
	307	35.0	60	38	25	40	12	295

Custom versions with length up to 525mm available

STUD ANCHOR WITH END PLATE



Rectangular or round plate

Stud Anchor with End Plate CFS-SL-FS-ZN or A4

CFS-SL-FS-ZN	CFS-SL-FS-A4
Threaded socket welded to end plate, electroplated 1	Threaded socket welded to end plate. Stainless steel grade A4 1.4401, 1.4404 or 1.4571

Stud Anchor with End Plate CFS-SL-FS-ZN or A4 dimensions

M	L	DH	LH	Lth >=	DFp	tNp	hef
CFS-SL-FS-ZN or A4 [mm]							
12	55	15.5	52	45	35	3	52
16	45	21.1	41	35	40	4	41
16	75	21.1	71	65	40	4	71

Custom versions with free length up to 150mm (M12) and 200mm (M16)

Lth- usable thread length

hef = Lh - embedment depth

Min. element thicknesses, min. centre-to-centre spacings and edge distances

Version			CFS-SL-P-ZN and CFS-SL-P-A4						
Type	M	M12	M16	M16	M20 (1)	M24		M30	M30
			mm						
Length	L	all	84	>84	all	all		<=213	>213
						P-ZN (2)	P-A4		
Headed stud diameter	d1	10	10	13	16	19	16	22	25
Min. centre-to-centre space	S_{min}	50	50	70	80	100	80	100	100
Min. edge distance	C_{min}	50	50	50	50	70	50	70	100
Min. element thickness	h_{min}		Socket length L + C_{nom}, C_{nom} to EN 1992-1						

Version		CFS-SL-FW-A4				CFS-SL-FW-Duplex			
Type	M	M12	M16	M24	M27	M12	M16	M20	M24
Length	L	all	all	all	all	all	all	all	all
	d1	10	16	22	25	13	16	22	25
Headed stud diameter	S_{min}	50	80	100	100	70	80	100	100
Min. centre-to-centre space	C_{min}	50	50	70	100	50	50	70	100
Min. edge distance	h_{min}	Socket length L + C_{nom}, C_{nom} to EN 1992-1							

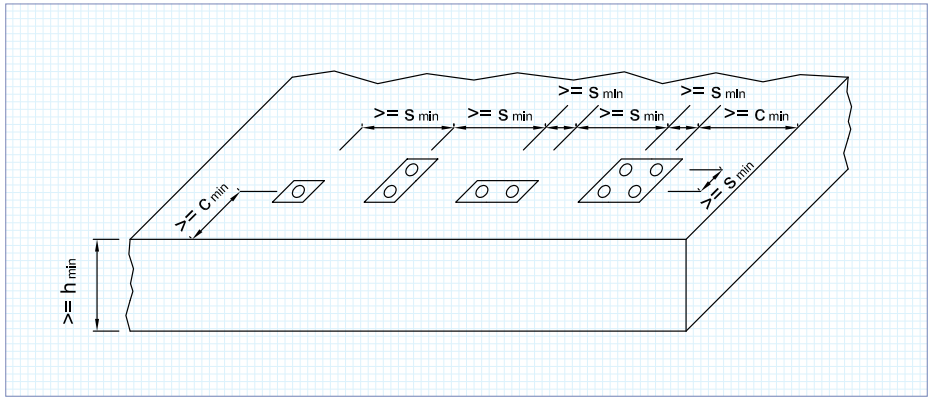
Version		CFS-FS-P-ZN and CFS-SL-FS-A4				CFS-SL-FS-ZN and CFS-SL-FS-A4 without corrosion protection requirements 4			
Type	M	M12		M16		M12		M16	
Length	L	55	75	45	75	55	75	45	75
Min. centre-to-centre space	S_{min}	190	260	150	260	190	260	150	260
Min. edge distance	C_{min}	95	130	75	130	95	130	75	130
Min. element thickness	h_{min}	Socket length L + C_{nom}, C_{nom} to EN 1992-1				Socket length L + 10			

1) The centre-to-centre spacings and edge distances for type M16 with 13 mm headed stud apply for the M20 custom version with 13 mm headed stud.

2) The centre-to-centre spacings and edge distances for combination Pressed Bolt Anchor SL-P-A4 M24 apply for the Pressed Bolt Anchor SL-P-ZN M24 custom version with 16 mm headed stud.

3) Intermediate values can be obtained by linear interpolation

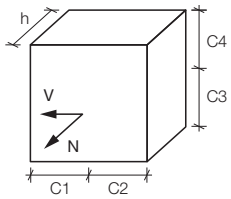
4) Compressive forces on the anchors are not permitted.



PRESSED STUD ANCHOR DESIGN LOADS

Design loads were calculated using:

- Cracked Concrete
- For shear loads: $C_3 = C_4 \geq 1.5\ C_1$
- For axial load: h ≥ L + Cnom
- For shear loads: straight edge bar 2 ø x 12, stirrups ø12/ e=100
- Fixing bolt grade 8.8 for SL-P-ZN, grade A4-70 for SL-P-A4 ≤ H24; A4-50 for H30



Design resistances given in the tables are valid for the associated edge distances and element thicknesses (centre-to-centre between two inserts s>c). However, these are not minimum spacings. Resistances might increase or decrease depending on the fixing condition. By adding supplementary reinforcement resistances can be increased.

Design Resistances for **Tensile** Actions (axial load was applied)

Version	Pressed Stud Anchor CFS-SL-P-ZN									
Type	M12		M16		M20**		M24***		M30	
Length, mm	79	154	84	183	140	240	173	248	213	363
Headed stud diameter	10	10	10	13	16	16	19	19	22	25
NRd [kN]										
C20/25	17	20	18	36	43	60	44	52	44	77
C50/60	21.2	21.2	24	41	63	63	68	89	68	155
$C_1, C_2, C_3, C_4 >$	125	125	125	200	200	300	200	300	200	400

Design Resistances for **Shear** Actions (shear load was applied)

C20/25	11.5	14.6	14.5	21.5	25	30.5	31.5	38	41	52
C50/60	14.6	14.6	23	28	39	47	49	58	65	82
$C_1 \geq$	100	100	125	125	150	150	175	175	200	200
h≥	125	200	125	220	200	280	220	280	250	400

** Standard M20 has a 16mm headed stud, in the custom version a 13 mm headed stud.
*** Standard M24 has a 19 mm headed stud, in the custom version a 16 mm headed stud.

Design Resistances for **Tensile** Actions (axial load was applied)

Version	Pressed Stud Anchor CFS-SL-P-A4									
Type	M12		M16		M20**		M24		M30	
Length, mm	79	154	84	183	140	240	173	248	213	363
Headed stud diameter	10	10	10	13	16	16	16	16	22	25
NRd [kN]										
C20/25	14	14	19	27	43	44	44	56	43	77
C50/60	14	14	23	27	47	47	57	57	68	95
$C_1, C_2, C_3, C_4 >$	125	125	125	200	200	200	200	250	200	300

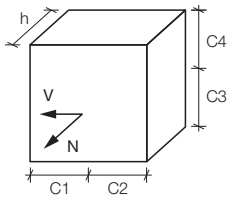
Design Resistances for **Shear** Actions (shear load was applied)

C20/25	8.6	8.6	12	16.3	20.5	25	28	31	37	44
C50/60	8.6	8.6	16.3	16.3	28	28	34	34	57	57
$C_1 \geq$	75	75	100	100	125	125	150	150	175	175
h≥	110	185	125	220	180	280	220	280	250	400

FRICTION WELDED STUD ANCHOR DESIGN LOADS

Design loads were calculated using:

- Cracked Concrete
- For shear loads: $C_3 = C_4 \geq 1.5\ C_1$
- For axial load: h ≥ L + Cnom
- For shear loads: straight edge bar 2 ø x 12, stirrups ø12/ e=100
- For SL-FW-A4 fixing bolt A4-70
- For SL-FW-Duplex fixing bolt grade 80



Design Resistances for **Tensile** Actions (axial load was applied)

Version	Friction welded Stud anchor CFS-SL-FW-A4											
Type	M12		M16		M20		M24		M27		M30	
Length, mm	127	152	127	202	150	250	152	302	152	352	152	352
Headed stud diameter	10	10	16	16	16	16	22	22	25	25	25	25
NRd [kN]												
C20/25	20	21.5	36	44	44	60	48	58	47	77	47	77
C50/60	24.6	24.6	56	58	63	63	75	118	73	150	73	150
$C_1, C_2, C_3, C_4 >$	125	125	175	200	200	250	250	300	250	340	250	340

Design Resistances for Shear Actions (shear load was applied)

C20/25	14	14	19	22	25	31	27	42	37	54	41	70
C50/60	17.5	17.5	29	34	39	39	42	65	57	85	64	108
$C_1 \geq$	100	100	125	125	150	150	175	175	225	225	250	250
h≥	175	200	175	250	200	300	200	350	200	400	200	400

Design Resistances for **Tensile** Actions (axial load was applied)

Version	Friction welded Stud anchor CFS-SL-FW-Duplex							
Type	M12		M16		M20		M24	
Length, mm	132	157	131	206	157	257	157	257
Headed stud diameter	13	13	16	16	22	22	25	25
NRd [kN]								
C20/25	28	28	38	44	50	58	50	77
C50/60	38	38	60	63	79	120	78	154
$C_1, C_2, C_3, C_4 >$	150	150	200	200	250	300	250	350

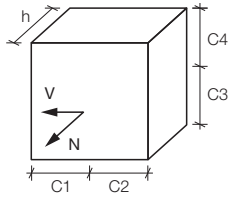
Design Resistances for Shear Actions (shear load was applied)

C20/25	18	19	22	28	29	38	39	55
C50/60	22.2	22.2	34	43	45	58	61	84
$C_1 \geq$	125	125	150	150	175	175	250	250
h≥	175	200	175	250	200	300	200	300

STUD ANCHOR WITH END PLATE DESIGN LOADS

Design loads were calculated using:

- Cracked Concrete
- For shear loads: C3 = C4 ≥ 1.5 C1
- For axial load: h ≥ L + Cnom
- For shear loads: straight edge bar 2 ø x 12, stirrups ø12/ e=100
- Fixing bolt grade 8.8 for SL-P-ZN, grade A4-70 for SL-P-A4 ≤ M24; A4-50 for M30



Maximum Design Resistances for Tensile Actions (axial load was applied)

Version	SL-FS-ZN			SL-FS-A4		
Type	M12	M16		M12	M16	
Length, mm	55	45	75	55	45	75
	kN					
C20/25	10.5	7.5	17	10.5	7.5	17
C50/60	16.5	11.5	26	11.4	11.5	25.2
$C_1, C_2, C_3, C_4 \geq$	100	100	130	100	100	130

Maximum Design Resistances for Shear Actions (shear load was applied)

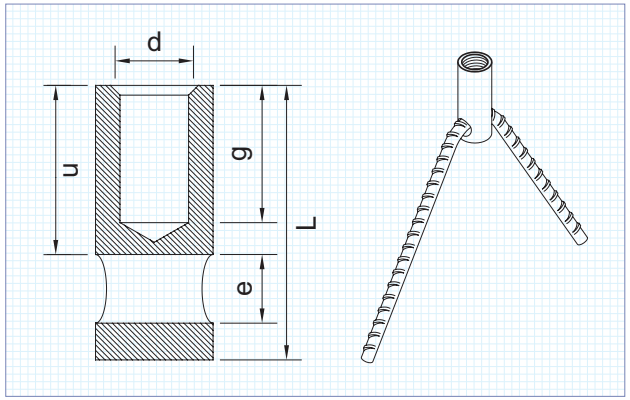
C20/25	9	7.5	14	8.5	7.5	14
C50/60	14.3	11.5	21.5	8.5	11.5	16.5
$C_1 \geq$	100	100	130	100	100	130
h≥	90	80	110	90	80	110

Fixing socket grade > 5.6 or A4 - 50 for axial load.

Fixing socket grade 8.8 for FS- ZN and A4-50 for FS-A4 for shear loads.

SOLID CROSS-HOLE SOCKETS

- Electroplated or Stainless Steel Solid Rod A2, (A4 on request)
- M thread - suitable for fixing
- The socket is anchored into the concrete unit using a reinforcement bar passed through the cross-hole.
- Stainless Steel socket provides good corrosion resistance
- Sockets can be used in a wide range of applications due to the flexible way in which the reinforcement can be applied; pipes, walls, slabs
- These sockets may also be used as lifting sockets



Part No Electroplated	Part No Stainless Steel	Load Group, T	Dimensions of socket (mm)				
			d	L	L1	g	e
CFS-LSRH-10	CFS-LSRHS-10	0.4	M 10	50	27	21	9
CFS-LSRH-12	CFS-LSRHS-12	0.5	M 12	50	30	23	11
CFS-LSRH-16	CFS-LSRHS-16	1.2	M 16	75	34	26	14
CFS-LSRH-20	CFS-LSRHS-20	2	M 20	75	42	33	16
CFS-LSRH-24	CFS-LSRHS-24	2.5	M 24	100	52	42	18
CFS-LSRH-30	CFS-LSRHS-30	4	M 30	125	70	54	22

Essential Steps:

Fixing – Check Fixing Load Capacity Table page 03-14

Axial Pull & Shear Pull – include Anchorage Reinforcement page 03-15 and Shear Reinforcement page 03-16

FIXING DESIGN CAPACITIES FOR CROSS-HOLE SOCKETS

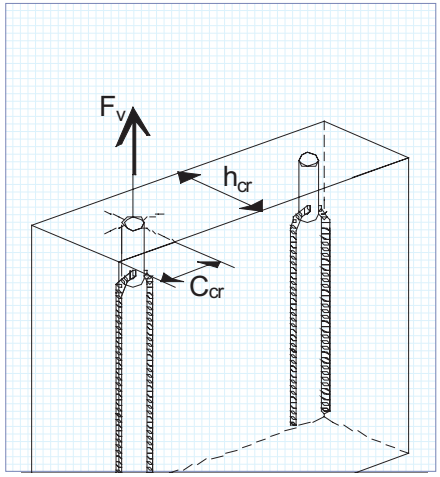
These tables are for these sockets to be used as fixing points. They should be compared to the design loads on the socket.

These tables show a typical situation and you should check that your situation is within these parameters. If your situation falls out of these parameters, please contact CFS for bespoke advice and calculations.

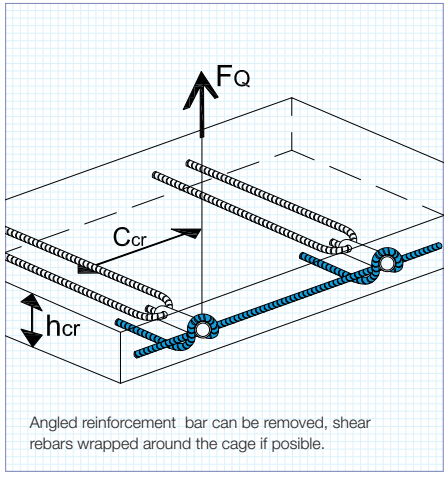
Where two or more sockets are in use, they should be spaced at a minimum of 2xCcr apart.

Minimum reinforcement of two layers of 131mm²/m mesh.

Minimum concrete strength = 25N/mm²



Axial Pull – Include Anchorage Reinforcement page 03-15



Angled reinforcement bar can be removed, shear rebars wrapped around the cage if posible.

Shear Pull – include Anchorage Reinforcement page 03-15 and Shear Reinforcement page 03-16

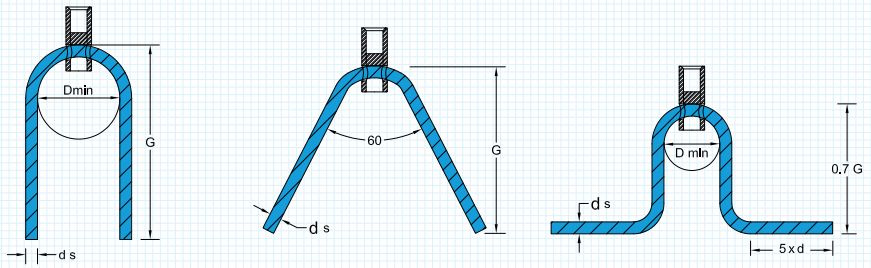
Part No	Typical Installation Conditions		Axial Load	Shear Load
	Edge Distance	Element thickness	F_V	F_Q
	C_{cr}	h_{cr}		
	mm		kN	
CFS-LSRH-10	140	80	10	4.6
CFS-LSRH-12	140	80	15.0	6.6
CFS-LSRH-16	180	100	22.5	10.0
CFS-LSRH-20	250	120	45.0	19.5
CFS-LSRH-24	300	120	50.0	20.8
CFS-LSRH-30	350	160	65.0	33.5

ANCHORAGE REINFORCEMENT FOR CROSS-HOLE SOCKETS

Cross-hole sockets must be used with anchorage reinforcement. Without this they are ineffective and unsafe.

The legs of the reinforcement should be vertical as shown here, or may be angled up to 60° from the vertical depending on the application.

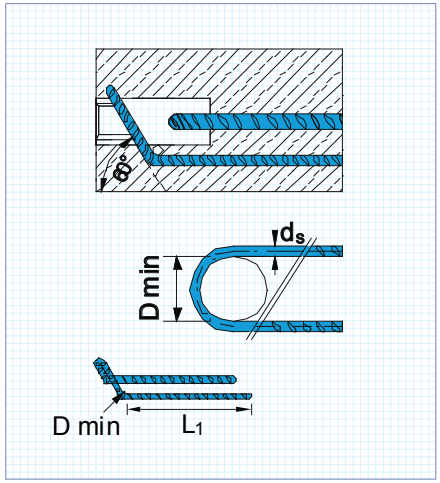
Alternative Rebar Arrangements

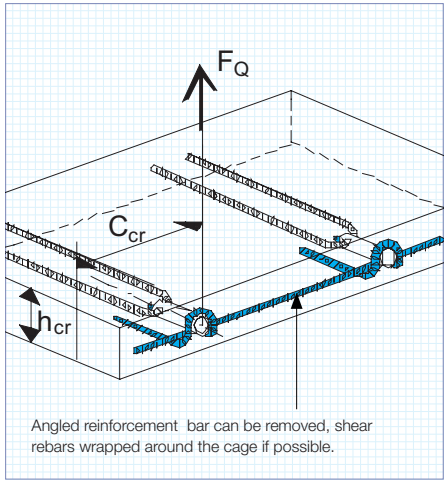


Part No	Reinforcement B500B (min)		
	d_s	G	D_{min}
	mm		
CFS-LSRH-10	8	250	60
CFS-LSRH-12	8	300	60
CFS-LSRH-16	10	350	70
CFS-LSRH-20	12	400	80
CFS-LSRH-24	12	700	116
CFS-LSRH-30	16	600	135

SHEAR REINFORCEMENT FOR CROSS-HOLE SOCKETS

Where the unit is being tilted, or the lift is in the edge of the element resulting in a shear pull on the socket, the reinforcement shown here must be used. It is important that the bar is placed as close to the surface of the element as concrete cover requirements allow.



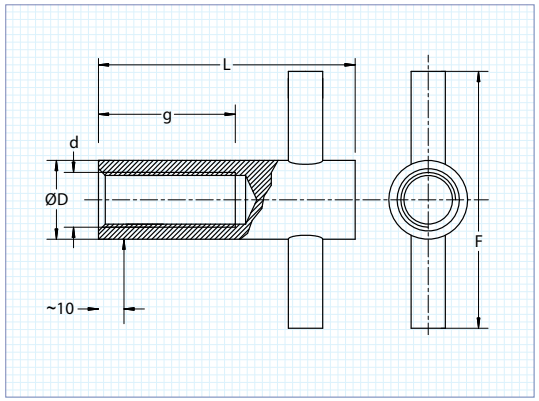


Angled reinforcement bar can be removed, shear rebars wrapped around the cage if possible.

Part No	Reinforcement B500B (min)			
	d_s	L_1	D_{min}	Total Length
CFS-LSRH-10	8	95	32	295
CFS-LSRH-12	8	95	32	295
CFS-LSRH-16	8	130	32	370
CFS-LSRH-20	10	170	40	480
CFS-LSRH-24	10	185	40	520
CFS-LSRH-30	16	195	64	590

CROSSPIN SOCKETS

- Zinc plated or stainless steel A2, (A4 on request)
- M thread
- The socket is anchored into the concrete via the crosspin.
- Stainless steel socket provides the highest corrosion resistance
- Sockets used only for axial loading require no further reinforcement



Part No Zinc Plated	Part No Stainless Steel	Dimensions of socket				
		d	L	D	F	g
		mm				
CFS-LSRB-10-50	CFS-LSRBS-10-50	M10	50	16	50	25
CFS-LSRB-12-50	CFS-LSRBS-12-50	M12	50	18	75	20
CFS-LSRB-12-75	CFS-LSRBS-12-75	M12	75	18	75	40
CFS-LSRB-16-75	CFS-LSRBS-16-75	M16	75	23	75	40
CFS-LSRB-20-75	CFS-LSRBS-20-75	M20	75	28	90	35
CFS-LSRB-24-100	CFS-LSRBS-24-100	M24	100	32	100	55

Essential Steps:

Fixing – Check Fixing Load Capacity Table page 03-18, 03-19

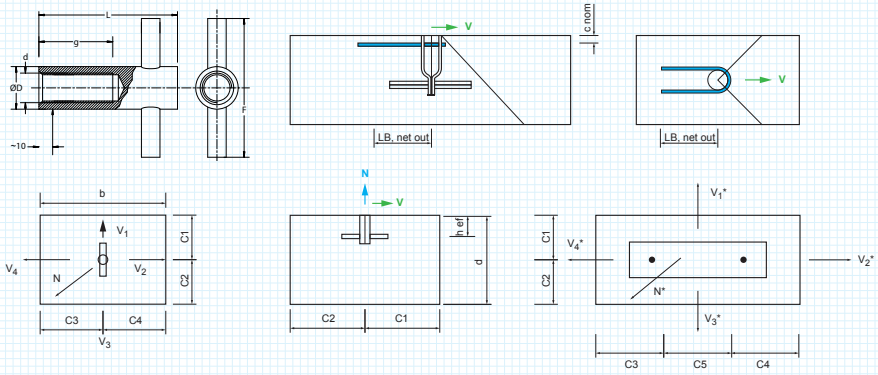
Shear Pull – Include Shear Reinforcement page 03-20

FIXING DESIGN CAPACITIES FOR SOLID CROSSPIN SOCKETS

Crosspin load data table

Part . No	hef	length cross pin	edge c1= c2=c3=c4	Element thickness	Shear U bar (bent ends, with min. end leg length 5*d)		Single socket Nrd, kN		Single socket Shear U bar		Sockets in pairs Nrd, kN	Sockets in pairs Vrd, kN Shear U bar	
Prefix: LSRB for galvanised, LSRBS for stainless	(mm)				d, mm	Lb,net, out	Galvanised	Stainless	no	yes		no	yes
Uncracked concrete (30/37)													
CFS-LSRB(S)-10-50	38	50	75	75	6	50	13.7	9.5	8.2	8.2	19	16.4	16.4
CFS-LSRB(S)-12-50	34	75	75	75	6	50	13.1		8.1	8.1	26.2	16.2	16.2
CFS-LSRB(S)-12-75	59	75	75	100	8	50	14.2		9.2	10.8	28.4	18.4	21.6
CFS-LSRB(S)-16-75	56	75	75	100	8	50	14.8		9.5	10.8	29.6	19	21.6
CFS-LSRB(S)-20-75	51	90	75	100	8	50	15.9		9.6	10.8	31.8	19.2	21.6
CFS-LSRB(S)-24-100	70	100	75	125	8	50	12.4		10.6	10.8	24.8	21.2	21.6
	70	100	100	125	8	75	23.8		15.2	16.2	47.6	30.4	32.4
Cracked concrete (30/37)													
CFS-LSRB(S)-10-50	38	50	75	75	6	50	9.8	9.5	5.8	8.1	19	11.6	16.2
CFS-LSRB(S)-12-50	34	75	75	75	6	50	9.4		5.8	8.1	18.8	11.6	16.2
CFS-LSRB(S)-12-75	59	75	75	100	8	50	10.1		6.5	10.1	20.2	13	20.2
CFS-LSRB(S)-16-75	56	75	75	100	8	50	10.6		6.7	10.6	21.2	13.4	21.2
CFS-LSRB(S)-20-75	51	90	75	100	8	50	11.4		6.8	10.8	22.8	13.6	21.6
CFS-LSRB(S)-24-100	70	100	75	125	8	50	8.9		7.5	10.8	17.8	15	21.6
	70	100	100	125	8	75	17		10.8	16.2	34	21.6	32.4

Comment: Packing shims (steel washers) must be used with recess plate to fill the space between the socket surface and back of the fixing component.



V2* = V2 V4* = V4 → close edge is significant for failure

C1 = Edge distance towards the free edge where the shear force acts.
C2 = Edge distance in the direction away from the force.
C3 and C4 = Edge distances perpendicular to the shear force action.
Please note that the socket should be orientated with the pin parallel to the shear force action as shown here.

These tables are for crosspin sockets to be used as fixing devices. They should be compared to the design loads on the socket. These tables show a typical situation and you should check that your situation is within these parameters. If your situation falls out of these parameters, please contact CFS for bespoke advice and calculations.

Crosspin load data table

Part . No	hef	length cross pin	edge c1 = c2	edge c3 = c4	Element thickness	Shear U bar (bent ends, with min. end leg length 5*d)		C25/30 Nrd, kN		C25/30 Vrd, kN no		C25/30 Vrd, kN yes		C35/45 Nrd, kN		C35/45 Vrd, kN Shear U bar no		C35/45 Vrd, kN Shear U bar yes		C50/60 Nrd, kN		C50/60 Vrd, kN Shear U bar no		C50/60 Vrd, kN Shear U bar yes	
Prefix: LSRB for galvanised (G), LSRBS for Stainless Steel (SS)	(mm)					d,mm	Lb,net, out	G	SS	G	SS	G	SS	G	SS	G	SS	G	SS	G	SS	G	SS	G	SS
Uncracked concrete																									
CFS-LSRB(S)-10-50	38	50	80	55	80	6	100	13.1	9.5	5.0		10.2		16.1	9.5	6.1		12.3		18.6	9.5	7.1		12.3	
CFS-LSRB(S)-12-50	34	75	90	55	80	6	100	13.8		5.0		10.2		17.0		6.1		12.3		19.6		7.1		12.3	
CFS-LSRB(S)-12-75	59	75	125	90	100	8	130	23.1	20.2	10.5		17.6	16.9	23.1	20.2	12.8		21.9	16.9	23.1	20.2	14.8		21.9	16.9
CFS-LSRB(S)-16-75	56	75	120	80	100	8	130	23.3		9.2		17.6		28.6	26.4	11.3		21.9		33	26.4	13	13.1	21.9	
CFS-LSRB(S)-20-75	51	90	120	75	100	8	130	22.9	23	8.6		17.6		28.0		10.5		21.9		32.3	32.6	12.1	12.2	21.9	
CFS-LSRB(S)-24-100	70	100	160	100	130	12	200	33.2		13.7		40.7		40.7		16.8		49.2	42.2	46.9		19.4		49.2	42.2
Cracked concrete																									
CFS-LSRB(S)-10-50	38	50	80	55	80	6	100	9.4	9.3	3.5		9.4	9.3	11.5	9.5	4.3		11.5	11.4	13.3	9.5	5		12.3	
CFS-LSRB(S)-12-50	34	75	90	55	80	6	100	9.9		3.5		9.9		12.1		4.3		12.1		14		5		12.3	
CFS-LSRB(S)-12-75	59	75	125	90	100	8	130	18.6		7.4		17.6	16.9	22.8	20.2	9.1		21.9	16.9	23.1	20.2	10.5		21.9	16.9
CFS-LSRB(S)-16-75	56	75	120	80	100	8	130	16.7	16.6	6.5	6.6	16.7	16.6	20.4	20.3	8.0		20.4	20.3	23.6	23.5	9.2	9.3	21.9	
CFS-LSRB(S)-20-75	51	90	120	75	100	8	130	16.3	16.4	6.1		16.3	16.4	20.0	20.1	7.4	7.5	20	20.1	23.1	23.3	8.6		21.9	
CFS-LSRB(S)-24-100	70	100	160	100	130	12	200	23.7		9.7		37.9		29.0		11.9		46.4	42.2	33.5		13.7		49.2	42.2

U Bars at the edge (<=100mm) wide reinforcement - (e>=100mm and ds<=10mm),
no extra rebars for axial load - insufficient edge distance
axial load and shear load at the same time; N_{rd} / N_{rd} + V_{rd} / V_{rd} <=1,2

V_{rd} * (2) = V_{rd} (2) and V_{rd} * (4) = V_{rd} * (4): for shear loads you only have to consider the fixing point close to the edge

G - galvanised

S - stainless steel

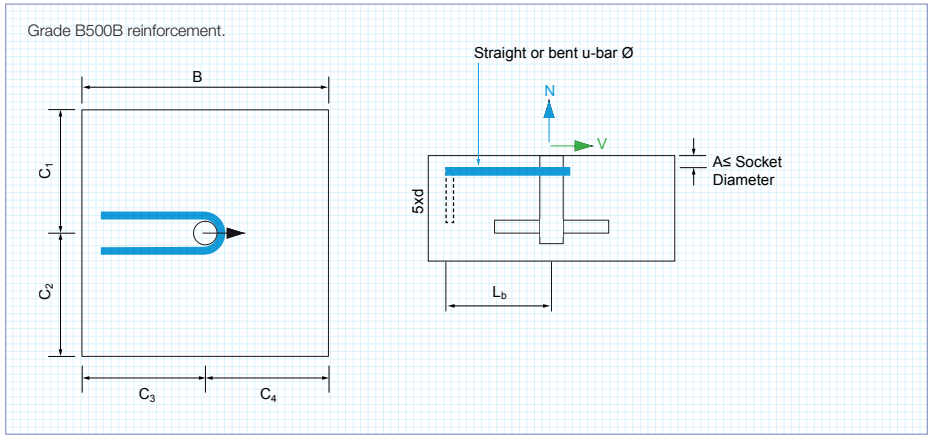
Where there is axial load and shear load at the same time, please ensure that each of the axial and shear components are less than the capacities and also that:

$$\frac{\text{Axial Component}}{\text{Axial Capacity}} + \frac{\text{Shear Component}}{\text{Shear Capacity}} \leq 1.2$$

Where two or more sockets are in use, they should be spaced at a minimum of 2xC3 apart.
Crosspin Shear Reinforcement – if required, include the Shear Reinforcement page 03-20

SHEAR REINFORCEMENT FOR CROSSPIN SOCKETS

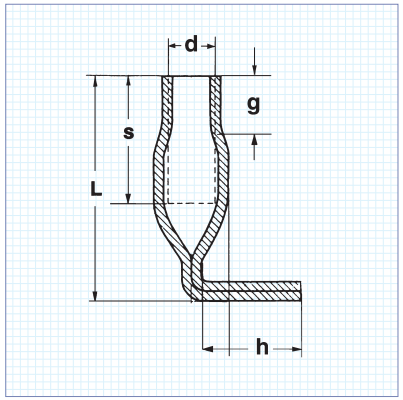
Where the values with reinforcement have been used from the load capacities table, the following reinforcement must be included.



Part No Zinc Plated	Part No Stainless Steel	U-Bars	
		d Ø	L_b
		mm	
-	CFS-LSRBS-10-42	8	100
CFS-LSRB-10-50	CFS-LSRBS-10-50	8	100
CFS-LSRB-12-50	CFS-LSRBS-12-50	8	100
CFS-LSRB-12-75	CFS-LSRBS-12-75	8	130
CFS-LSRB-16-75	CFS-LSRBS-16-75	8	130
CFS-LSRB-20-75	CFS-LSRBS-20-75	8	130
CFS-LSRB-20-100	CFS-LSRBS-20-100	12	200
CFS-LSRB-24-100	CFS-LSRBS-24-100	12	200

BENT END FIXING SOCKET

- Socket with bent end. Zinc plated or stainless steel A2, (A4 on request)
- M thread
- The socket is anchored into the concrete unit due to the bent shape.
- Additional reinforcement is not required.
- Sockets can be used in a wide range of applications



Part No Zinc Plated	Part No Stainless Steel	Dimensions of socket					Wall thickness	Minimum edge distance	Axial Load	Shear Load
		d	L	h	g	s				
		mm					mm		kN	
CFS-FSB-8-30	CFS-FSBS-8-30	M8	30	20	8	12	90	60	2.6	2.5
CFS-FSB-10-35	CFS-FSBS-10-35	M10	35	21	10	18	105	70	3.4	3.1
CFS-FSB-12-45	CFS-FSBS-12-45	M12	45	25	12	20	135	90	5.4	4.6
CFS-FSB-16-60	CFS-FSBS-16-60	M16	60	30	15	22	180	120	9.5	7.1
CFS-FSB-20-70	CFS-FSBS-20-70	M20	70	30	18	24	210	140	12.5	9
CFS-FSB-24-80	CFS-FSBS-24-80	M24	80	37	21	30	240	160	51.1	11.1

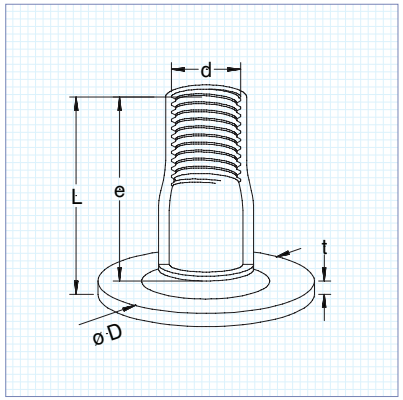
Concrete strength should be a minimum of 25N/mm^2. Shear load is given without additional reinforcement.

Where there is axial load and shear load at the same time, please ensure that each of the axial and shear components are less than the capacities and also that the comparison do not exceed 1.2.

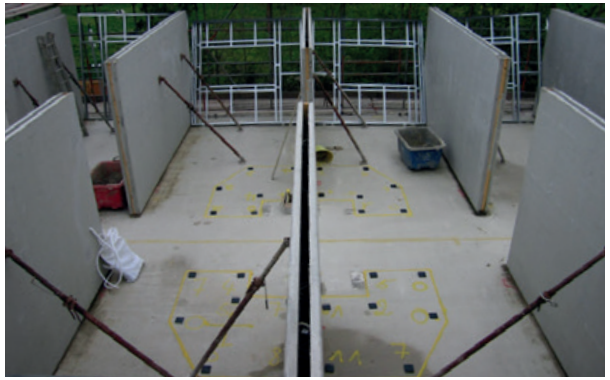
$$\frac{\text{Axial Component}}{\text{Axial Capacity}} + \frac{\text{Shear Component}}{\text{Shear Capacity}} \leq 1.2$$

PROPPING SOCKETS

- Zinc plated sockets for use in propping and other applications
- M thread
- Socket with welded round plate
- Plastic adhesive cap plate available
- May be used for both fixing and lifting operations



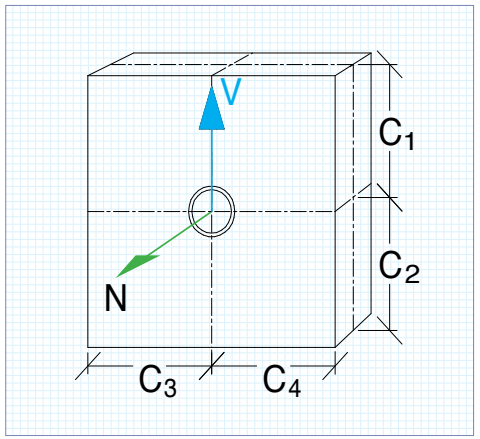
Part No	Dimensions of socket				
	d	L	e	t	D
	mm				
CFS-FAR-16-50	M16	45	42	3	50
CFS-FAR-16-70	M16	43	38	5	70
Plastic Adhesive Cap					
CFS-FAP	-	-	-	3	50



DESIGN FIXING CAPACITIES FOR PROPPING SOCKETS

These tables are for these sockets to be used as fixing devices. They should be compared to the design loads on the socket.

These tables show a typical situation and you should check your situation is within these parameters. If your situation falls out of these parameters, please contact CFS for bespoke advice and calculations.



Part No	Wall thickness	Minimum edge distance	Without Anchorage reinforcement		With Anchorage reinforcement	
		C_1, C_2, C_3, C_4	Axial, N_{Rd}	Shear, V_{Rd}	Axial, N_{Rd}	Shear, V_{Rd}
	mm		kN		kN	
CFS-FAR-16-50	55	400	17	13	17	15.4
CFS-FAR-16-70	55	400	19.5	13	19.5	15.5

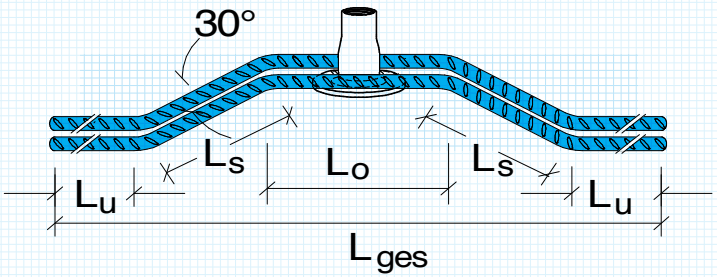
The loads here are for use in fixing and propping applications. Concrete strength should be a minimum of 25N/mm^2

For propping applications with an angled load, please ensure that

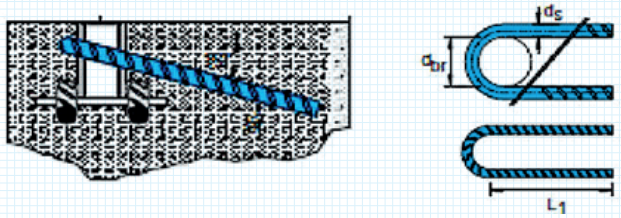
$$\frac{\text{Axial Design Load}}{\text{Axial Capacity}} + \frac{\text{Shear Design Load}}{\text{Shear Capacity}} \leq 1.2$$

ANCHORAGE AND SHEAR REINFORCEMENT FOR PROPPING SOCKETS

Anchorage Reinforcement



Shear Reinforcement



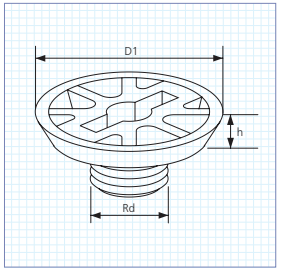
Part No	Anchorage Reinforcement B500B minimum					Shear Reinforcement B500B minimum	
	d_s	L_u	L_s	L_o	L_{ges}	d_s	L_1
	mm					mm	
CFS-FAR-16-50	8	195	70	90	420	8	130
CFS-FAR-16-70	8	195	70	90	420	8	130

ACCESSORIES

Plastic Recess Plate

The nail plate is used to attach the socket anchors to the formwork. The plastic nail plates are available for thread sizes M/Rd12 to M/Rd52. The plastic recess plate produces a recess into which a lifting loop or a rotating eye can be threaded.

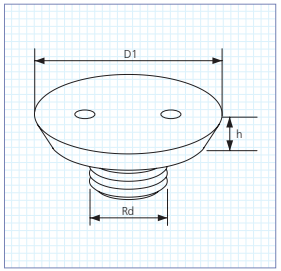
Part No	Dimensions mm			Colour
	Rd	D1	h	
CFS-NP-12	M/Rd 12	58	10	Orange
CFS-NP-16	M/Rd 16	58	10	Red
CFS-NP-20	M/Rd 20	65	10	Light Green
CFS-NP-24	M/Rd 24	90	10	Black
CFS-NP-30	M/Rd 30	90	10	Dark Green
CFS-NP-36	M/Rd 36	96/100	10	Blue
CFS-NP-42	M/Rd 42	96/100	10	Grey
CFS-NP-52	M/Rd 52	96/100	10	Yellow



Architectural Stainless Steel cap for lifting sockets

We can provide architectural socket caps to use directly in sockets and other threaded products to cover up the exposed thread and provide an architecturally pleasing appearance. These are available in all sizes and produced to order to suit your concrete recess dimension. Please contact CFS to discuss your requirement.

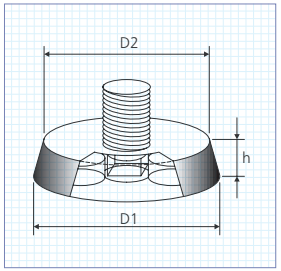
Part No	Dimensions mm		
	Rd	D1	h
CFS-SSC-12	M/Rd 12	58	10
CFS-SSC-16	M/Rd 16	58	10
CFS-SSC-20	M/Rd 20	65	10
CFS-SSC-24	M/Rd 24	90	10
CFS-SSC-30	M/Rd 30	90	10
CFS-SSC-36	M/Rd 36	96/100	10
CFS-SSC-42	M/Rd 42	96/100	10
CFS-SSC-52	M/Rd 52	96/100	10



Magnetic Recess Plate

The magnetic nail plate attaches socket anchors to steel formwork by magnets. They are available for thread sizes M/Rd12 to M/Rd52. The magnetic recess plate produces a recess into which a lifting loop or a rotating eye can be threaded.

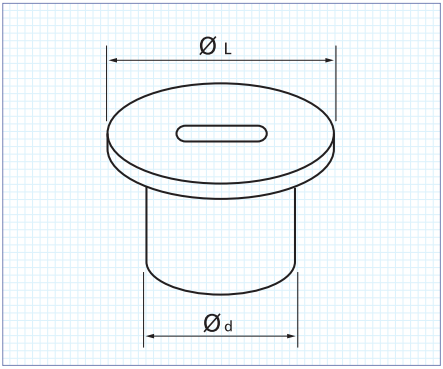
Part No	Thread	Adhesion	D1	D2	h
	mm	kPa	mm		
CFS-MAG-12	12	50	50.9	47	10
CFS-MAG-16	16	50	59.2	56	10
CFS-MAG-20	20	100	73.5	70	10
CFS-MAG-24	24	100	78.2	74	12
CFS-MAG-30	30	120	94.2	90	12
CFS-MAG-36	36	120	105.2	101	12
CFS-MAG-42	42	120	115.3	110	15
CFS-MAG-52	52	120	135.3	130	15



ACCESSORIES

Seal Cap

For using directly in sockets and other threaded products for capping of socket threads.



Part No	For Lifting Anchor	Dimensions mm	
		ØL	Ød
CFS-CAPG-12	M/Rd 12	18.5	12
CFS-CAPG-16	M/Rd 16	25.5	16
CFS-CAPG-20	M/Rd 20	32.5	20
CFS-CAPG-24	M/Rd 24	35.5	24
CFS-CAPG-30	M/Rd 30	44.0	30
CFS-CAPG-36	M/Rd 36	52.5	36
CFS-CAPG-42	M/Rd 42	55.9	42
CFS-CAPG-52	M/Rd 52	69.5	52