

DEHA FACING PANEL ANCHOR SYSTEM 8000

TECHNICAL INFORMATION



DEHA FACING PANEL ANCHOR SYSTEM 8000

FB 05-E-UAE

FACADE



HALFEN·DEHA

YOUR BEST CONNECTIONS

SYSTEMATIC SOLUTIONS

ANCHORING TECHNOLOGY	REINFORCEMENT TECHNOLOGY	TRANSPORT ANCHORAGE SYSTEMS
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HALFEN HTU CAST IN CHANNELS CONCRETE	HALFEN REBEND CONNECTION HBT CONCRETE	DEHA TRANSPORT ANCHOR SYSTEM CONCRETE
HALFEN BRICK TIE CHANNELS CONCRETE	REINFORCEMENT COUPLERS HGC CONCRETE	DEHA HD-ANCHOR SYSTEM CONCRETE
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HALFEN SHEAR BOLT ANCHORS CONCRETE	HALFEN DI-TRAPEZ-BOX® HBB CONCRETE	FRAMING SYSTEMS
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HALFEN CONCRETE SCREW HCB CONCRETE	DEHA REINFORCEMENT SPACERS CONCRETE	HALFEN FRAMING CONSTRUCTIONS FRAMING
	HALFEN COLUMN SHOE CONCRETE	POWERCLICK
		HALFEN POWERCLICK FRAMING SYSTEM POWERCLICK
BRICKWORK SUPPORT SYSTEMS	STONE SUPPORT SYSTEMS	CONCRETE FACADE
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HALFEN BRICK TIES FACADE	CURTAIN WALL	DEHA SLEEVE SANDWICH PANEL ANCHORS FACADE
TENSION ROD SYSTEMS	HALFEN CURTAIN WALL SUPPORT SYSTEMS FACADE	HALFEN WIRE SANDWICH PANEL ANCHORS FACADE
DETAN TENSION ROD SYSTEM FACADE		

CONCRETE, FACADE, FRAMING - in these three segments we offer a wide product range. Quality and technical competence of a well-known brand stand behind each product.

HALFEN, DEHA, DEMU und FRIMEDA, these are the brands of the sales organisations of the HALFEN GROUP offering the suitable system for every fixing requirement.

An application orientated solution of high technical standard as well as highest quality and safety level.

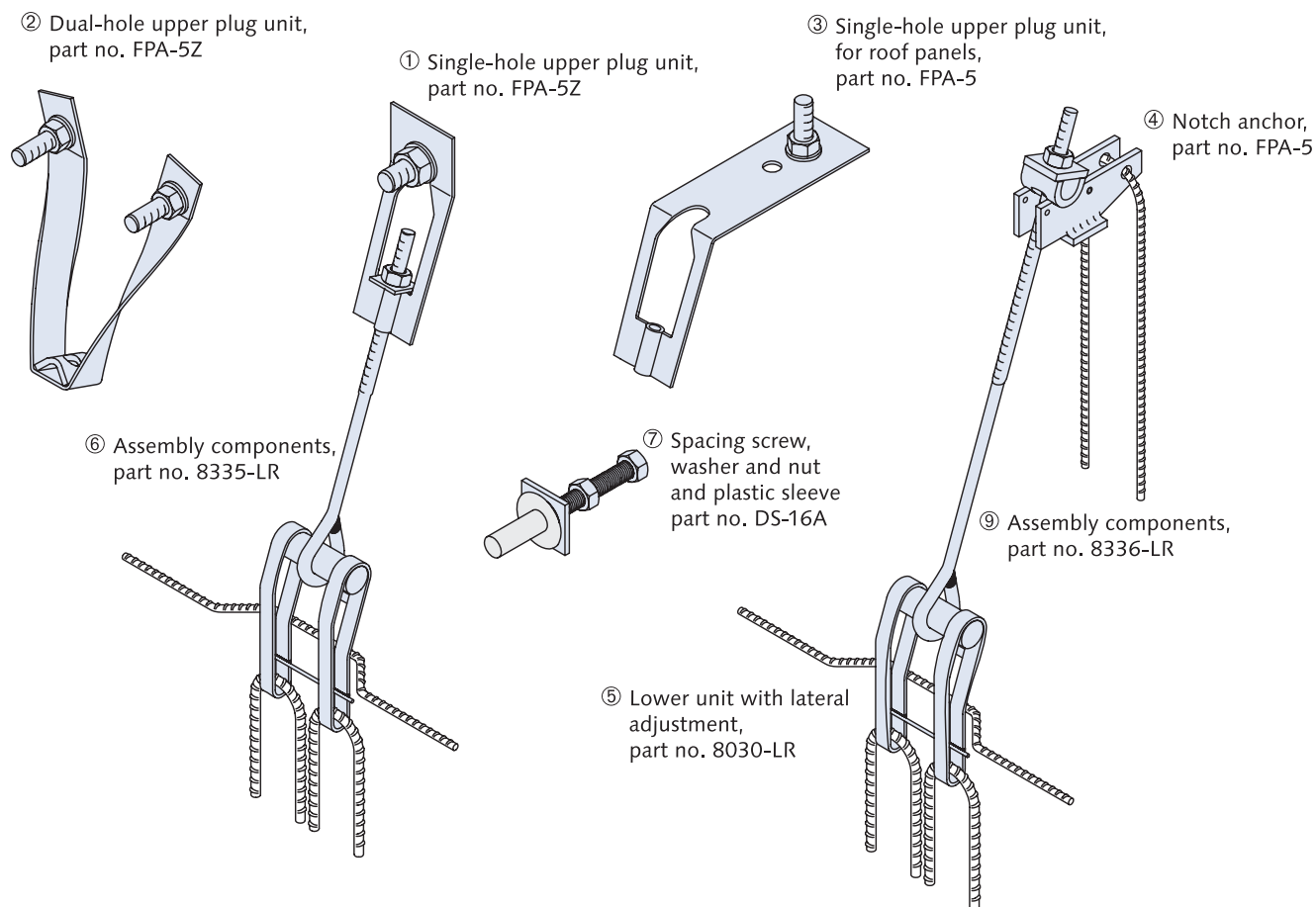


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COMPONENT PARTS OF THE FACING PANEL ANCHORS

SYSTEM 8000 AND 8300



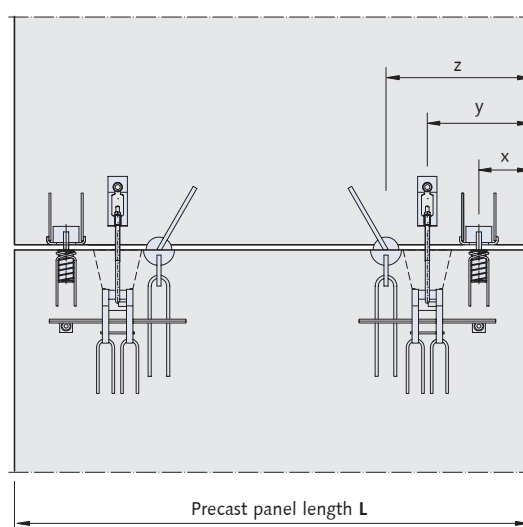
ARRANGEMENT OF COMPONENTS WITHIN THE PRECAST PANEL

We recommend installing the panel support fixing at a distance of $L/5$ to the edge of the precast unit.

In other cases the fixing elements should be arranged symmetrically to the centroidal axis.

Please ensure that there is enough distance between DS spacer bolts and the installation axis of the panel support fixing.

If using restraint dowels, they must be arranged at the outer possible position.

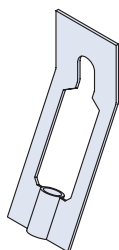


$y = \text{approx. } 1/5 \text{ from } L > x$
 $z > y$, between the panel support fixings

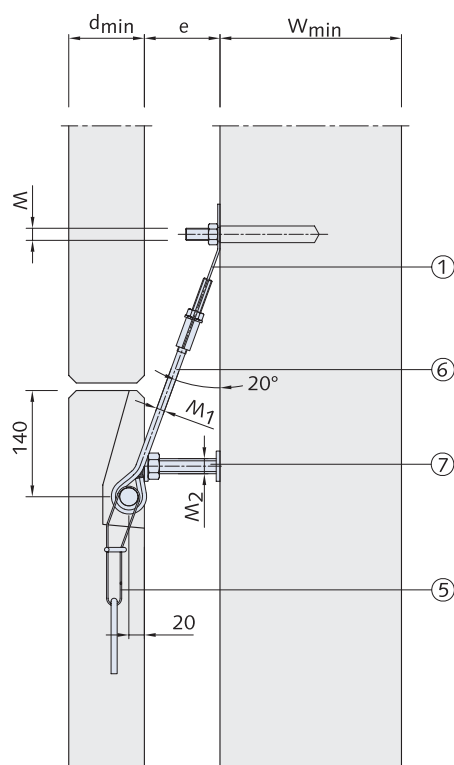
x mm	Panel length L mm
100	bis 1000
150-200	1000-3000
300-400	3000-6000

FACING PANEL ANCHOR SYSTEM

FACING PANEL ANCHOR SYSTEM 8000, WITH SINGLE-HOLE UPPER PLUG UNIT, STANDARD, PART NO. 8001-LR



1. Single-hole upper plug unit,
part no. FPA-5-STB
5. Lower unit with lateral adjustment
and polystyrene recess plug,
part no. 8030-LR
6. Assembly components :
Load-bearing bolts, threaded rod,
nuts and washer,
part no. 8035-LR
7. Spacing screw, washer and nut
part no. DS-16A, see page 14



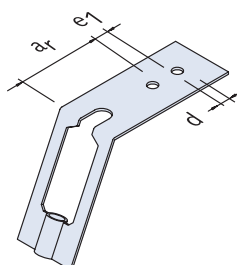
*1 higher e-values possible with use of bigger spacing screws (M_2) see diagram page 15.

*2 fixing only with undercut plugs, C-channels or bore anchors for maximum tensile force in accordance with individual calculation (Please state thread M when ordering).

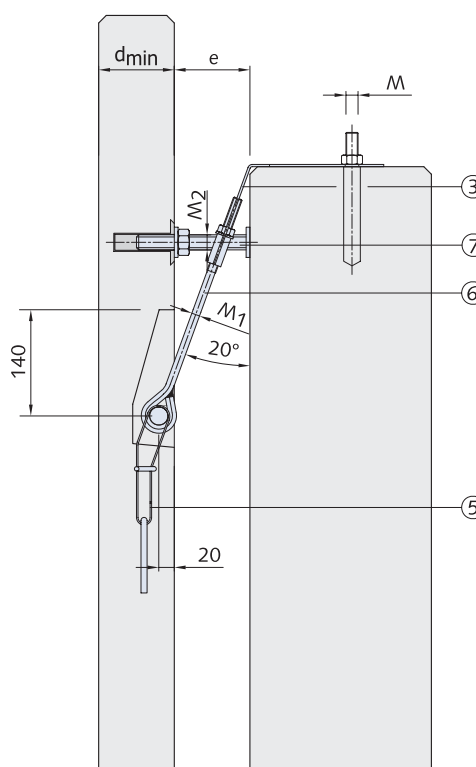
Load range kN	d _{min}	M*2	M ₁	M ₂	e*1	W _{min}	max.Tensile Force kN
5,0	80	M10	M8	M10	50 / 75 / 100	in accordance with engineer	5,43
8,0		M12	M10	M12			8,69
11,5		M16	M12	M16			12,49
16,0	90	M20	M14				17,38
22,0		M20	M16	M20			23,90
34,0	100	M24	M20				36,94

FACING PANEL ANCHOR SYSTEM

FACING PANEL ANCHOR SYSTEM 8000, WITH SINGLE-HOLE UPPER PLUG UNIT, ROOF PANEL, PART NO. 8002-LR



3. Single-hole upper plug unit,
for roof panels
part no. FPA-5A-STB
5. Lower unit with lateral adjustment
and polystyrene recess plug,
part no. 8030-LR
6. Assembly components :
Load-bearing bolts, threaded rod,
nuts and washer
part no. 8035 - LR
7. Spacing screw, washer and nut
part no. DS-16A, see page 14



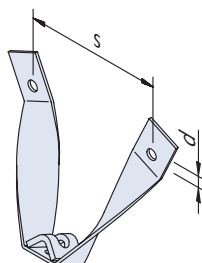
*1 higher e-values possible with use of bigger spacing screws (M_2), see diagram page 15.

*2 fixing with undercut plugs, C- channels or bore anchors for maximum tensile force in acc. with individual calculation. (Please state thread M and edge distance a_r when ordering).

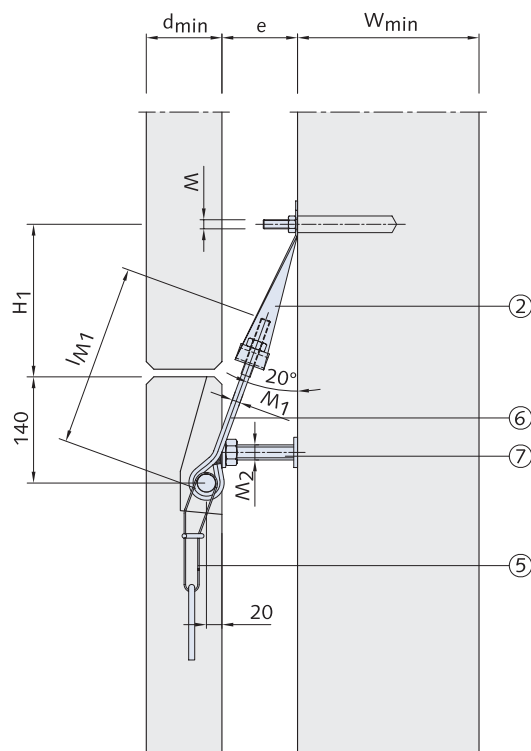
Load range kN	M	a _r	d	e ₁	d _{min}	M ₁	M ₂	e*1	max.Tensile Force kN
5,0	10	110	11	22	80	M8	M10	50 / 75 / 100	5,52
8,0	12	135	13	26		M10	M12		8,83
11,5	16	155	17	34		M12	M16		12,69
16,0	20	210	21	41	90	M14			17,65
22,0	20	210	21	41		M16	M20		24,27
34,0	24	260	25	50	100	M20			37,52

FACING PANEL ANCHOR SYSTEM

FACING PANEL ANCHOR SYSTEM 8000, WITH DUAL-HOLE UPPER PLUG UNIT, STANDARD, PART NO. 8003-LR



2. Dual-hole upper plug unit,
part no. 8020-LR
5. Lower unit with lateral adjustment
and polystyrene recess plug,
part no. 8030-LR
6. Assembly components :
Load-bearing bolts, threaded rod,
nuts and washer,
part no. 8035-LR
7. Spacing screw, washer and nut,
part no. DS-16A, see page 14



*1 only type 8003

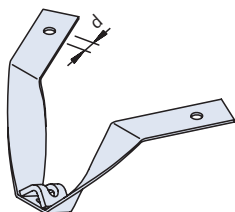
*2 higher e-values possible with longer threaded rods. Possibly also bigger Spacing screws (M_2) must be used - see diagramm page 15.

*3 fixing with undercut plugs, C- channels or bore anchors for maximum tensile force in acc. with individual calculation. (Please state thread M when ordering).

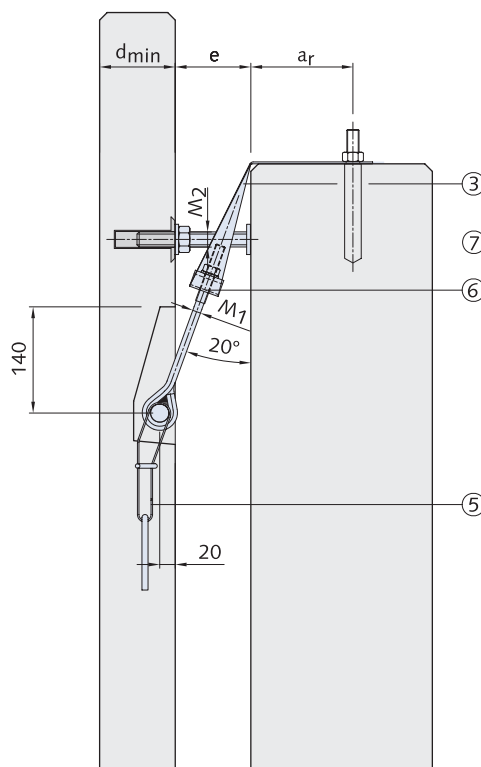
Load group kN	d	s	M^{*3}	d_{min}	M_1	M_2	e^{*2}	W_{min}	max.Tensile Force kN
5,0	8,5	120	in accordance with engineer	80	M8	see page 15	50 / 75 / 100	in accordance with engineer	5,52
8,0	10,5	135		80	M10				8,83
11,5	12,5	160		80	M12				12,69
16,0	12,5	160		90	M14				17,65
22,0	16,5	170		90	M16				24,27
34,0	22,5	190		100	M20				36,18
46,0*1	25,0	250		120	M27				48,95

FACING PANEL ANCHOR SYSTEM

FACING PANEL ANCHOR SYSTEM 8000, WITH DUAL-HOLE UPPER PLUG UNIT, ROOF PANEL, PART NO. 8004-LR



2. Dual-hole upper plug unit,
part no. 8020-LR
5. Lower unit with lateral adjustment
and polystyrene recess plug,
part no. 8030-LR
6. Assembly components :
Load-bearing bolts, threaded rod,
nuts and washer,
part no. 8035-LR
7. Spacing screw, washer and nut,
part no. DS-16A, see page 14

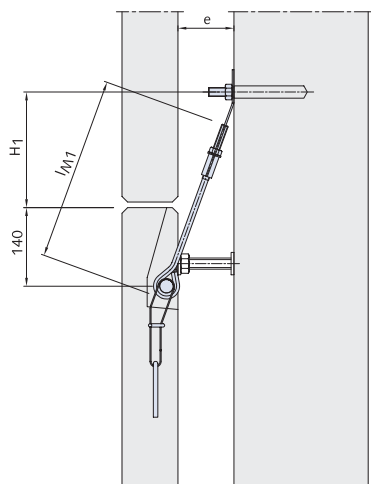


*1 higher e-values possible with longer threaded rods. Possibly also bigger Spacing screws (M_2) must be used - see diagramm page 15.

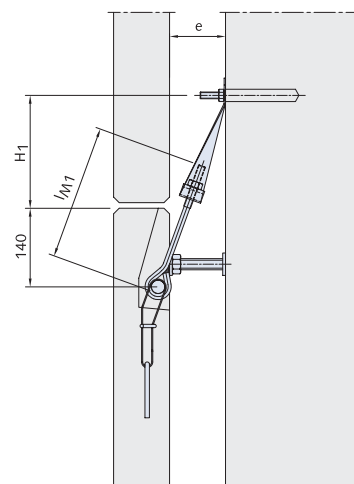
Load group kN	d	d _{min}	a _r	M ₁	M ₂	e*1	max.Tensile Force kN
5,0	8,5	80	to be calculated by engineer	M8	see page 15	50 / 75 / 100	5,52
8,0	10,5	80		M10			8,83
11,5	12,5	80		M12			12,69
16,0	12,5	90		M14			17,65
22,0	16,5	90		M16			24,27
34,0	22,5	100		M20			36,18

FACING PANEL ANCHOR SYSTEM

**FACING PANEL ANCHOR SYSTEM 8001,
WITH UPPER PLUG UNIT, STANDARD**



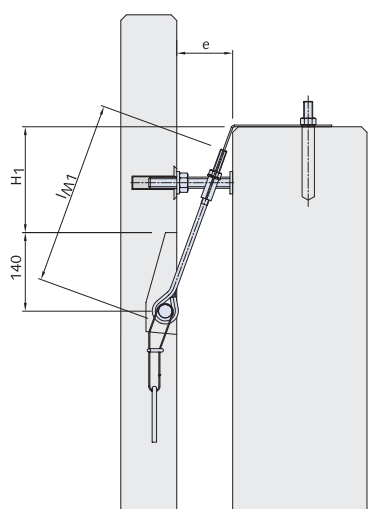
**FACING PANEL ANCHOR SYSTEM 8003,
WITH DUAL-HOLE UPPER PLUG UNIT, STANDARD**



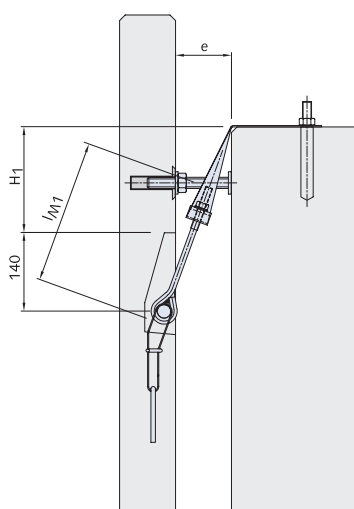
Load range kN	5,0		8,0		11,5		16,0		22,0		34,0		46,0 only for 8003	
e	H ₁	I _{M1}	H ₁	I _{M1}	H ₁	I _{M1}	H ₁	I _{M1}	H ₁	I _{M1}	H ₁	I _{M1}	H ₁	I _{M1}
50	205	200	205	200	210	200	210	190	210	200	215	200	225	210
75	275	265	275	260	280	265	280	255	280	265	285	265	295	275
100	340	335	345	335	345	335	345	325	350	335	350	335	360	345

other cavities and anchor-lengths on request

**FACING PANEL ANCHOR SYSTEM 8002,
WITH UPPER PLUG UNIT, ROOF PANEL**



**FACING PANEL ANCHOR SYSTEM 8003,
WITH DUAL-HOLE UPPER PLUG UNIT, ROOF PANEL**

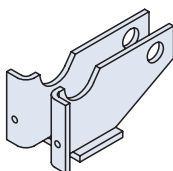


Load range kN	5,0		8,0		11,5		16,0		22,0		34,0	
e	H ₁	I _{M1}	H ₁	I _{M1}	H ₁	I _{M1}	H ₁	I _{M1}	H ₁	I _{M1}	H ₁	I _{M1}
50	195	200	195	200	195	200	195	190	195	200	195	200
75	265	265	265	260	265	265	265	255	265	265	265	265
100	330	335	330	335	330	335	330	325	330	335	330	335

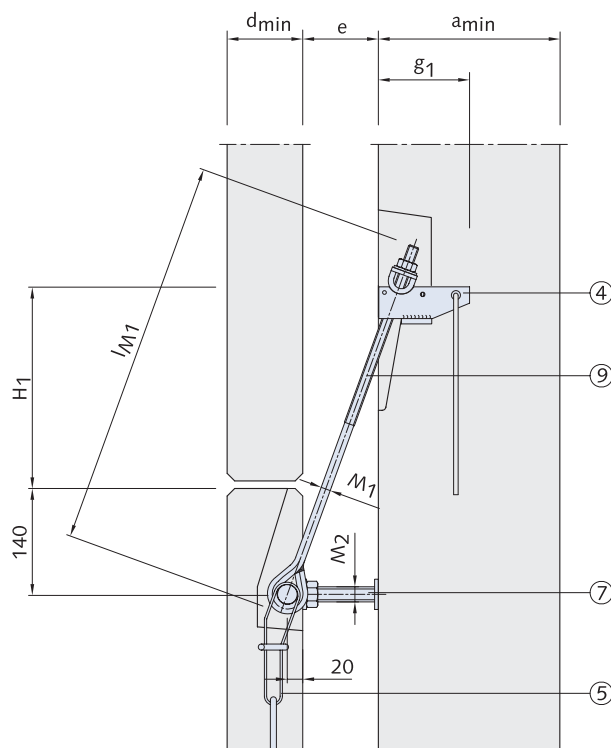
other cavities and anchor-lengths on request

FACING PANEL ANCHOR SYSTEM

FACING PANEL ANCHOR SYSTEM 8300 WITH EMBEDMENT PART, STANDARD, PART NO. 8300-LR



4. Notch anchor with polystyrene recess plug, part no. 8310-LR
5. Lower unit with lateral adjustment and polystyrene recess plug, part no. 8030-LR
7. Spacing screw, washer and nut, part no. DS-16A, see page 14
9. Assembly components : Load-bearing bolt, saddle, rider, threaded rod and coated nut, part no. 8336-LR



*1 for 56kN different shape of embedment part

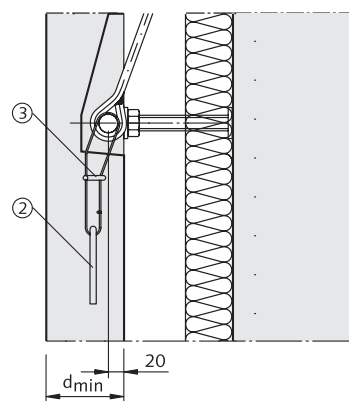
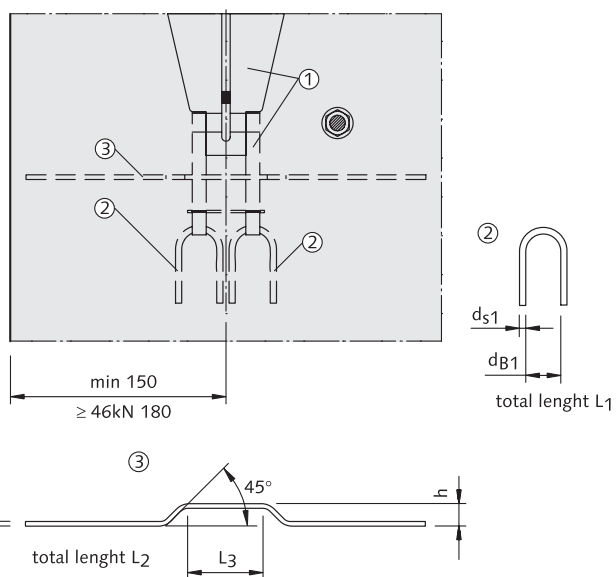
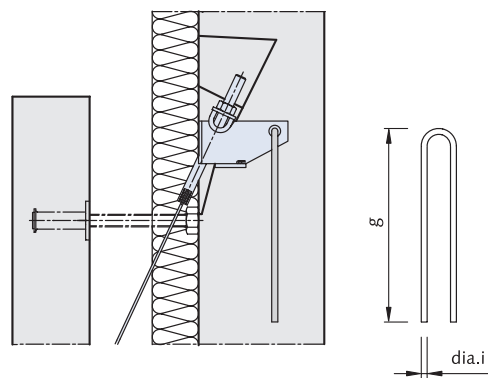
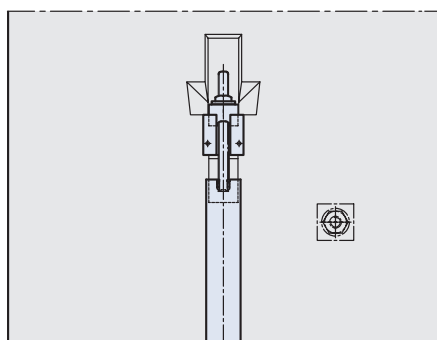
*2 higher e-values possible with longer threaded rods. Possibly also bigger Spacing screws (M_2) must be used - see diagramm page 15.

Load range kN	5,0		8,0		11,5		16,0		22,0		34,0		46,0		56,0*1	
e	H ₁	l _{M1}	H ₁	l _{M1}	H ₁	l _{M1}	H ₁	l _{M1}	H ₁	l _{M1}	H ₁	l _{M1}	H ₁	l _{M1}	H ₁	l _{M1}
50	220	320	220	335	225	355	235	375	245	395	245	415	260	455	270	500
75	290	395	290	410	295	430	305	450	315	470	315	485	330	525	340	575
100	360	465	360	480	365	505	370	520	385	545	385	560	400	600	410	645
M	8		10		12		14		16		20		27		30	

Load range kN	d _{min}	a _{min}	M ₁	M ₂	e*2	g ₁
5,0	80	100	M8	M10	50 / 75 / 100	81
8,0		115	M10	M12		85
11,5		125	M12	M16		96
16,0	90	140	M14			115
22,0		160	M16	M20		134
34,0	100	180	M20			155

FACING PANEL ANCHOR SYSTEM

REQUIRED REINFORCEMENT



① Lower unit of facing panel anchor, with recess plug.

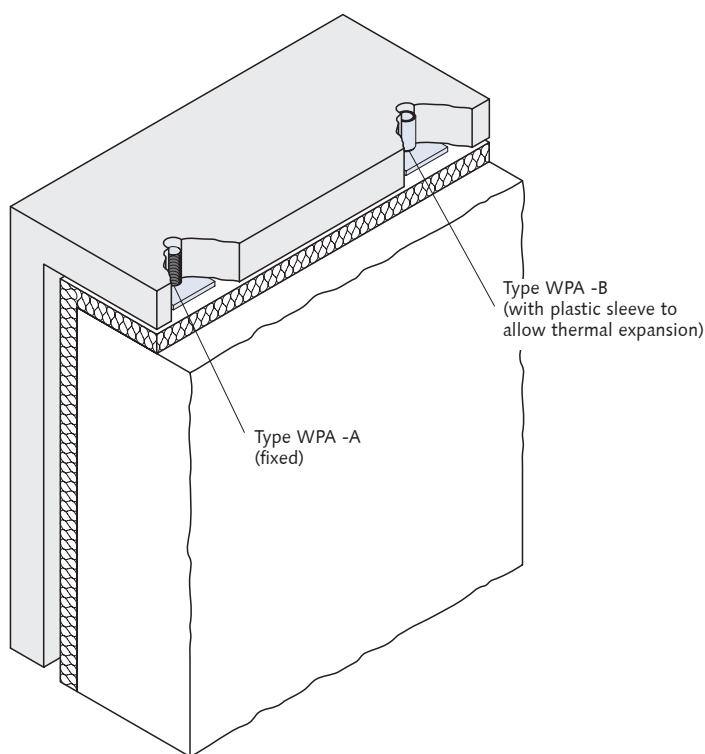
② Reinforcement loop

③ Bent bar

Load range kN	d_{min} mm	L_1 mm	d_{s1} mm	d_{B1} mm	L_2 mm	d_{s2} mm	L_3 mm	h mm	g mm	dia.i mm
5.0	80	143	6	40	300	6	88	30	200	Ø 6
8.0		209			410		89		200	Ø 6
11.5		222			530		97		200	Ø 8
16.0	90	292	8	45	420	2 Ø 6	95	40	250	Ø 8
22.0		311			510		105		250	Ø 10
34.0	100	389	12	60	590	2 Ø 8	124	50	300	Ø 12
46.0	120	450			660	2 Ø 10	126	60	350	Ø 16

HALFEN TOP FIXING DOWEL TYPE WPA-A/B

SELECTION TABLE



The Top Fixing Dowel is adjustable for height $\pm 15\text{mm}$.
(with $b = 20\text{mm}$: $+15/-10\text{mm}$).
One dowel should be fitted with a plastic sleeve to allow thermal expansion.

Ordering example :

Product
Type
Load range(kN)
Dimension b (mm)

WPA -A -11.5 - 60

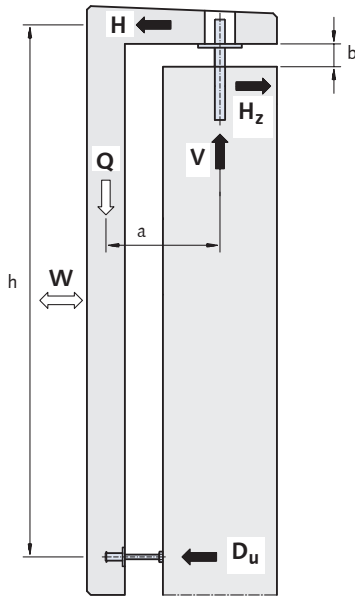
Product	Type	Load range V [kN]	5.0	8.0	11.5	16.0	22.0	34.0
		Colour	yellow	red	blue	green	brown	black
		Order no. -A	0241.010-00001	0241.010-00002	0241.010-00003	0241.010-00004	0241.010-00005	0241.010-00006
		Order no. -B	0241.020-00001	0241.020-00002	0241.020-00003	0241.020-00004	0241.020-00005	0241.020-00006
WPA-	-A/-B	b [mm]	H max. [kN]	H max. [kN]	H max. [kN]	H max. [kN]	H max. [kN]	H max. [kN]
		20	3.40	6.07	-	-	-	-
		30	2.94	5.26	6.27	9.85	13.30	19.57
		40	2.58	4.64	5.54	8.73	11.80	17.42
		50	2.31	4.15	4.96	7.83	10.61	15.70
		60	2.08	3.76	4.49	7.10	9.63	14.28
		70	1.90	3.43	4.10	6.50	8.82	13.10
		80	-	-	3.77	5.99	8.14	12.10
		l [mm]	275	275	310	315	345	375
		t [mm]	65	65	70	75	75	75
		min c [mm]	140	140	160	160	190	220
		dia. d [mm]	22	27	29	34	38	44
		e [mm]	M24 x 1.5	M28 x 1.5	M30 x 1.5	M35 x 1.5	M39 x 1.5	M45 x 1.5
		lg [mm]	115	115	120	125	125	125
		rl [mm]	110	115	120	125	140	140
		g [mm]	10	10	12	12	15	15
		dia. p [mm]	60	70	70	70	80	80
		max Hzl [kN]	5.18	9.25	9.85	15.48	20.37	29.36

subject to change without notice

HALFEN TOP FIXING DOWEL TYPE WPA-A/B

CALCULATION OF LOADS

CALCULATION OF LOADS



Applied loads: (light arrows)

Q = 1/2 dead weight of the panel
(with symmetrical suspension of the panel)

W = 1/2 wind load on the panel
 W_d = wind pressure
 W_s = wind suction

Loads on fixings (dark arrows)

$$V = Q$$

$$D_{u,Q} = \frac{Q \times a}{h} = H_{exz}$$

$$H_{max} = H_{exz} + W_s \times 0,5 = D_o$$

$0.5 \times W_s$ corresponds 1/4 wind load on the whole panel

$D_u = D_{u,Q} + 0.5 W_d$ = wind load on 1/4 panel

Checking calculation:

$H_{max} \leq$ table value see page 10

$$D_u \cdot g \geq 1.2 W_s$$

otherwise suction restraint fixing required.

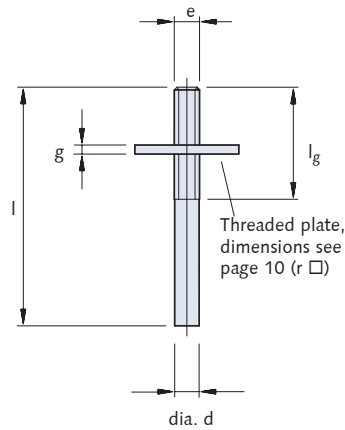
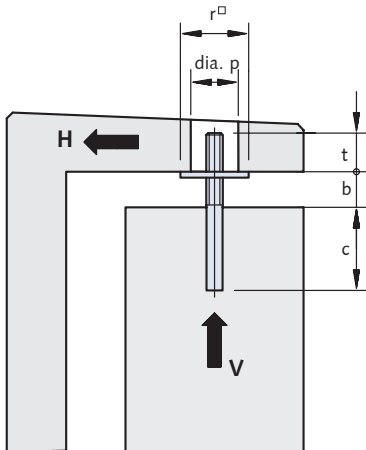
Dimensions:

a = Load eccentricity
calculate for small panel unit height with value a (centroidal axis to axis of anchor). With tall panels (e.g. storey height) its position can be assumed approximately on the panels centre line.

h = distance between lower and upper restraint fixings

Further information see page 10

CALCULATION



Load range V [kN]	Dowel [thread]	A [mm ²]	W [mm ³]
5.0	M24 x 1.5	380	1045
8.0	M28 x 1.5	573	1932
11.5	M30 x 1.5	661	2393
16.0	M35 x 1.5	908	3858
22.0	M39 x 1.5	1134	5387
34.0	M45 x 1.5	1521	8362

subject to change without notice

The table values V or H_{exz} and/or H_{max} may be exceeded providing the following checks are carried out (please consult HALFEN-DEHA technical department):

A = Cross-sectional area of the dowel
 W = Section modulus of the dowel
 σ = Steel stress

$$Nd = 1.35 (V + \sqrt{3} \times H_{max})$$

$$Md = 1.35 \times H_{max} (b+35)$$

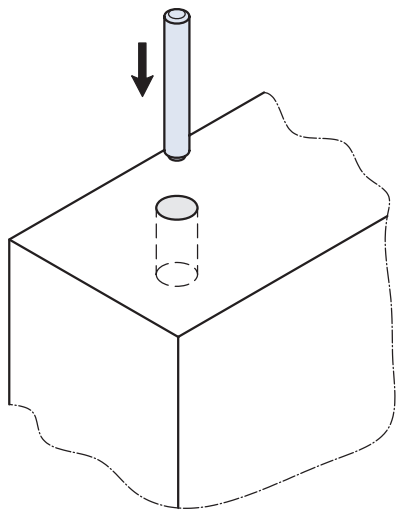
$$\frac{N}{N_d} + \frac{M}{M_{pld}} < 1$$

$$N_d = A \times \frac{200}{1.1} = 181.82 \times A \text{ [N]}$$

$$M_{pld} = 1.69 \times W \times \frac{200}{1.1} = 307.27 \times W \text{ [N]}$$

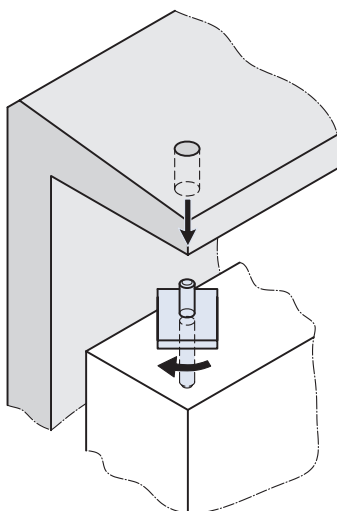
HALFEN TOP FIXING DOWEL TYPE WPA-A/B

ASSEMBLY AND INSTALLATION INSTRUCTION

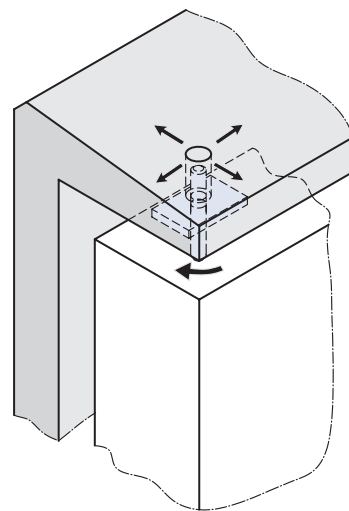


1. Form a recess in the structure (grout hole) for the dowel may be cast directly into the concrete, in which case care should be taken to ensure that the dowel remains perpendicular.
2. The dowel (when not cast-in) should be grouted into the structure vertically using concrete (strength 35 N/mm²)
3. Form a recess in the precast unit for grouting in the dowel once aligned (recess dia.p see table page 10).

4. The tapped plate is then twisted on to the exposed thread of the dowel.



5. Positioning of the corner panel is then achieved vertically by use of the tapped plate and horizontally within the grout recess.



6. Once finally positioned the recess in the panel is grouted up with concrete (concrete strength $\geq 25\text{N/mm}^2$). The panel must be temporarily secured in its final position until the concrete grout has cured.

HORIZONTAL ANCHORING

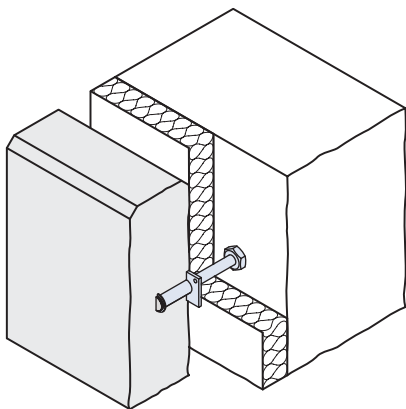
HALFEN-SPACER BOLTS, WIND ANCHORS, DOWEL RESTRAINT FIXINGS, SUMMARY OF TYPES

HALFEN SPACER BOLTS

Horizontal anchors are used as horizontal support of facing panels. The selection of the version is made according to section, distance and accessibility. A lot of various Halfen-DEHA anchors in different load ranges are allowable.

Versions:

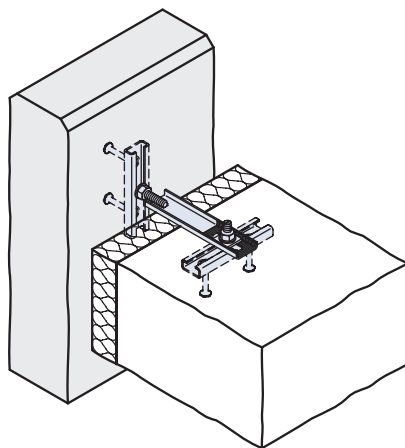
type DS - 13, DS - 16A
Spacer bolt Type DS - 13



HALFEN WIND ANCHORS

Version for the use between orthogonal surfaces:

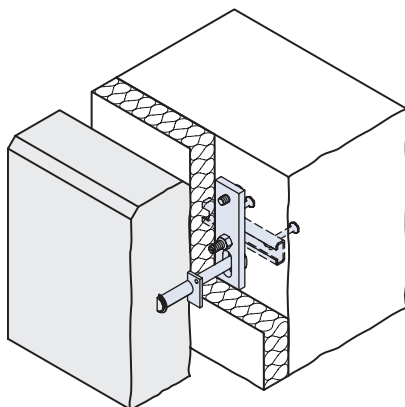
type HKZ Hammer-head restraint tie
type HKZ-GF Hammer-head screw tie
type HKZ-GU Hammer-head restraint tie, U-shaped



Restraint tie Type HKZ-GU

Version for the use between parallel surfaces:

type LD Adjustable restraint
type SPV Restraint with turnbuckle
type WDK Plastic wind anchor



Adjustable restraint Type LD

HALFEN DOWEL RESTRAINT FIXING

Upper socket:

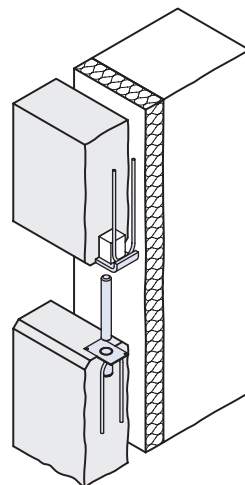
Type HFV 1 Slotted plastic socket KS
Type HFV 2 Slotted steel socket A4
Type HFV 5 Plastic socket KS
Type HFV 8 Fixed socket A4

Dowels:

Type HFV 3 Loose dowel A4
Type HFV 7 Fixed dowel A4

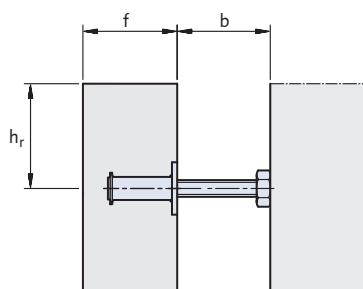
Lower socket:

Type HFV 4 Grouting socket A4
Type HFV 5 Plastic socket KS
Type HFV 8 Fixed socket A4
Type HFV 9 Plastic grouting socket KS



Dowel fixing Type HFV 238

HALFEN SPACER BOLTS TYPE DS-13/16



Ordering example :

Product
Type
Thread
Cavity b (mm)
DS-13-10-100

ALLOWABLE LOADS ON SPACER BOLTS

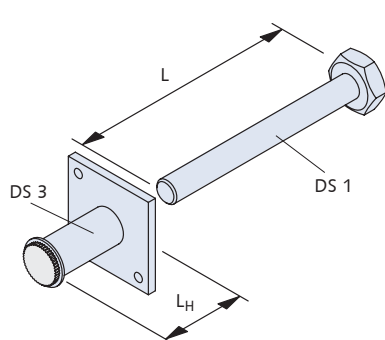
Product	Type	Cavity b [mm] ±20mm	Thread					
			M10	M12	M16	M20	M24	M27
			Allowable compressive load [kN]					
DS	13 16A	40	7.81	12.46	19.47	36.37	-	-
		60	7.81	12.46	19.47	36.37	46.60	-
		80	7.81	12.46	19.47	36.37	46.60	-
		100	7.60	12.46	19.47	36.37	46.60	60.60
		120	6.65	11.18	19.47	36.37	44.11	59.91
		140	5.83	10.02	19.47	36.37	41.56	56.81
		160	5.14	8.99	19.47	36.37	39.19	53.92
		180	4.54	8.09	19.47	34.83	36.98	51.20
		200	4.02	7.30	17.99	32.57	34.93	48.65
		220	-	-	16.63	30.49	33.01	46.25
		240	-	-	15.39	28.57	31.21	44.00

subject to change without notice
other cavity dimensions on request

all dimensions in mm

Thread	min f [mm]	min h _r [mm]	zul. N [kN]
M10	70	50	7.81
M12	70	90	12.46
M16	80	120	16.64
	90	120	19.47
M20	90	135	24.48
	100	150	28.80
M24	120	170	36.37
	120	180	38.40
M27	150	180	46.60
	120	225	55.20

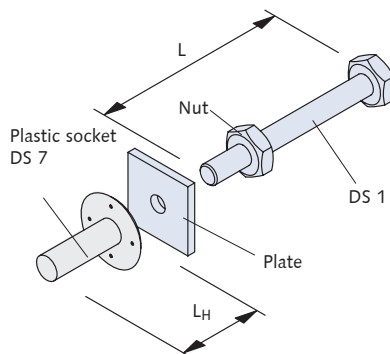
Allowable loads and edge distances for
Spacer bolts by using without additional
reinforcement.



Spacer bolt Type DS - 13

consists of: tensile/compressive socket DS 3
spacer bolt DS 1

This unit can be combined with LD
(see page 18)



Spacer bolt Type DS - 16 A

consists of: pressure plate, nut
spacer bolt DS 1, plastic sleeve

DS-16A is not suitable for restraint
Type LD.

HALFEN SPACER BOLTS TYPE DS-13/16

LENGTHS OF SPACER BOLTS

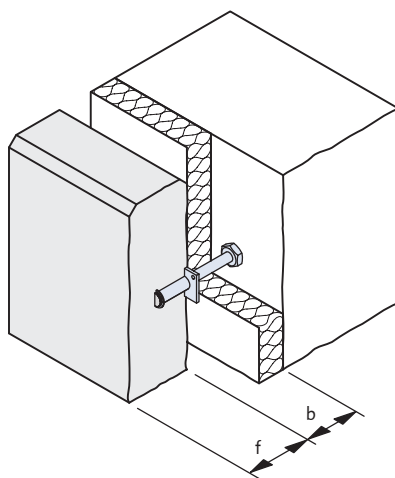
Cavity b [mm] ±20mm	M10	M12	M16	M20	M24	M27
	L DS-13/16A	L DS-13/16A	L DS-13/16A	L DS-13/16A	L DS-13	L DS-13
40	70	72	75	80	-	-
60	90	92	95	100	105	-
80	110	112	115	120	125	-
100	130	132	135	140	145	145
120	150	152	155	160	165	165
140	170	172	175	180	185	185
160	190	192	195	200	205	205
180	210	212	215	220	225	225
200	230	232	235	240	245	245
220	-	-	255	260	265	265
240	-	-	275	280	285	285

subject to change without notice
other cavity dimensions on request

all dimensions in mm

Recommended Halfen spacer bolts suitable for buildings up to 100 m height and maximum area of the precast unit with minimum thickness f.

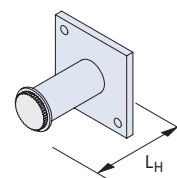
Load range of panel support fixing [kN]	Halfen spacer bolt DS	Cavity b up to [mm]
5.0	M10	150
5.0	M12	250
8.0	M12	160
8.0	M16	390
11.5	M16	310
16.0	M16	220
16.0	M20	420
22.0	M20	350
34.0	M20	230
34.0	M24	350
46.0	M20	180
46.0	M24	260
56.0	M24	210
56.0	M27	380



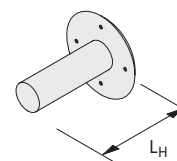
Consisting of :

- Type 13: spacer bolt DS 1
and socket DS 3
- Type 16: spacer bolt DS 1
and pressure plate and nut
plastic sleeve DS7

DS 3



DS 7

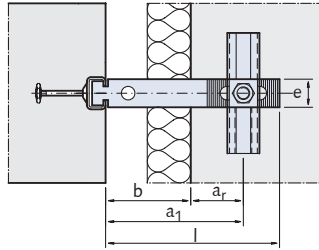
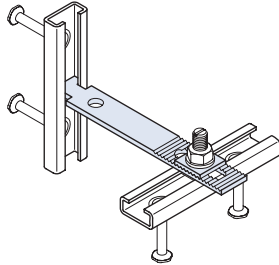


LENGTHS OF THE SOCKETS

Thread	M10	M12	M16	M20	M24	M27
tensile/compressive socket DS 3 L _H	58	59	64	72	75	80
Order-no.	0243.030-00001	0243.030-00002	0243.030-00003	0243.030-00004	0243.030-00005	0243.030-00006
Plastic Socket DS 7 for DS - 16 (order separately) L _H	70	70	80	80	-	-
Order-no.	0243.070-00001	0243.070-00001	0243.070-00001	0243.070-00001	0243.070-00001	0243.070-00001

HALFEN RESTRAINT TIE

TYPE HKZ (ONLY FOR TENSILE LOADS)



Ordering example :

Product/Type
Suitable channel
Distance a1
Material
HKZ-38/17-100-A4

Component parts :

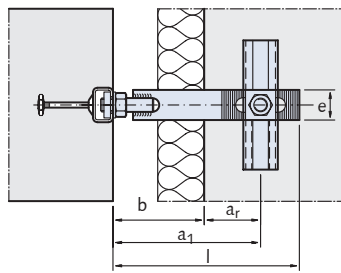
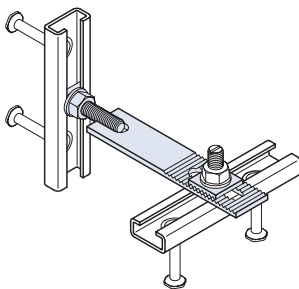
- Tie with slot and serrations
- Serrated washer

Order HALFEN T-head bolt separately.

Product	Suitable channel	a1 ± 20 [mm]	Load range (tensile) [kN]	Order-no. Stainless steel A4 0245.010-	b [mm]	l [mm]	e [mm]	ar [mm]	Slot [mm]	fixing to Halfen channel① with T-head bolt	Adjust- ment [mm]
HKZ	(HTA) 28/15	50	3.5	00001	0	90	25	50	11x55	HS 28/15 M10x30 recommended torque MA = 15 Nm	a1 or b ± 20mm
		75		00002	25	115					
		100		00003	50	140					
		125		00004	75	165					
		150		00005	100	190					
		175		00006	125	215					
		200		00007	150	240					
HKZ	(HTA) 38/17	75	7.0	0245.020- 00002	0	115	30	75	13x55	HS 38/17 M12x50 recommended torque MA = 25 Nm	a1 or b ± 20mm
		100		00003	25	140					
		125		00004	50	165					
		150		00005	75	190					
		175		00006	100	215					
		200		00007	125	240					

subject to change without notice
① short lengths 150, 200, or 250 mm long or
officially approved drilled bolts
Galvanized version on request
Check edge distances ar when using drilled bolts.

TYPE HKZ-GF (SUITABLE FOR TENSILE AND COMPRESSIVE LOADS)



Ordering example :

Product/Type
Suitable channel
Distance a1
Material
HKZ-38/17-100-A4

Component parts :

- Tie with welded threaded rod, pre-assembled locking plate, nut and U-washer
- Serrated washer

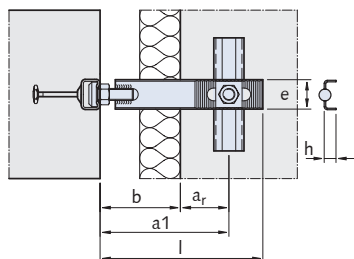
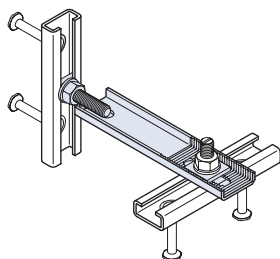
Order HALFEN T-head bolt separately.

Product	Suitable channel	a1 ± 20 [mm]	Load range (tensile/com- pression) [kN]	Order-no. Stainless steel A4 0245.050-	b [mm]	l [mm]	e [mm]	ar [mm]	Slot [mm]	fixing to Halfen channel① with T-head bolt	Adjust- ment [mm]
HKZ-GF	(HTA) 28/15	75	3.5	00001	25	115	30	50	11x55	HS 28/15 M10x30 recommended torque MA = 15 Nm	a1 or b ± 20mm
		100		00002	50	140					
		125		00003	75	165					
		150		00004	100	190					
		175		00005	125	215					
HKZ-GF	(HTA) 38/17	100	7.0	0245.060- 00002	25	143	35	75	13x55	HS 38/17 M12x50 recommended torque MA = 25 Nm	a1 or b ± 20mm
		125		00003	50	168					
		150		00004	75	193					
		175		00005	100	218					

subject to change without notice
① short lengths 150, 200, or 250 mm long or offici-
ally approved drilled bolts
Galvanized version on request
Check edge distances ar when using drilled bolts.

HALFEN RESTRAINT TIE

TYPE HKZ-GU (SUITABLE FOR TENSILE AND COMPRESSIVE LOADS)



Ordering example:

Product/Type
Suitable channel
Distance a1
Material

HKZ-GU-50/30-225-A4

Product	Suitable channel	a1 ± 20 [mm]	Load range (tensile/com- pression) [kN]	Order-no. Stainless steel A4 0245.090-	b [mm]	l [mm]	e [mm]	ar [mm]	h [mm]	Slot [mm]	fixing to Halfen channel① with T-head bolt	Adjust ment [mm]
HKZ-GU	38/17	200	±7.0	00001	125	243	44	75	12	13x 60	HS 38/17 M12x50 recommended torque MA = 15 Nm	a1 or b ± 20mm
		225		00002	150	268						
		250		00003	175	293						
HKZ-GU	50/30	200	±12.0	00001	50	245	56	150	15	17x 60	HS 38/17 M12x50 recommended torque MA = 25 Nm	a1 or b ± 20mm
		225		00002	75	270						
		250		00003	100	295						
		275		00004	125	320						
		300		00005	150	345						

Component parts :

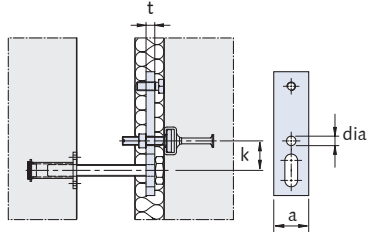
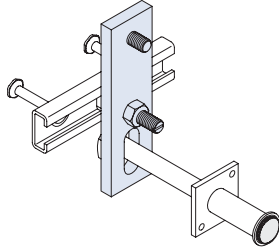
- Tie with serrations, welded threaded rod and pre-assembled locking plate, nut and U-washer
- Serrated washer

Order HALFEN T-head bolt separately.

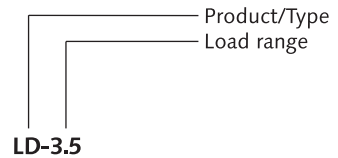
① short lengths 150, 200, or 250 mm long or officially approved drilled bolts
Galvanized version on request
Check edge distances ar when using drilled bolts.
subject to change without notice

HALFEN RESTRAINT

HALFEN ADJUSTABLE RESTRAINT TYPE LD (SUITABLE FOR TENSILE AND COMPRESSIVE LOADS)



Ordering example :



Component parts:

- Adjustable restraint with setscrew
- HALFEN bolt with nut

The adjustable restraint type LD should be used in conjunction with spacer bolts M10, M12 and M16.

When using spacer bolts M10 use U-washers between the bolt head and the slot.

(order separately).

Order spacer bolts separately.

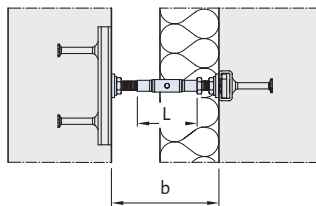
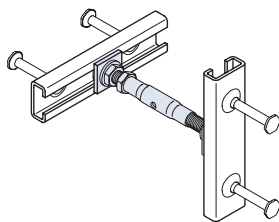
subject to change without notice
① short lengths 150, 200, or 250 mm long
For allowable compressive loads see "Spacer bolts" page 14

Product	Load range (tensile) [kN]	Order-no. 0244.000-	a [mm]	t [mm]	k ± 15 [mm]	a [mm]	fixing to Halfen channel①	Halfen T-head bolt dia. x L
LD	2.0	00001	40	10	38	11	HTA 28/15	M10x40
	3.5	00002	48	12	39	13	HTA 38/17	M12x50
	6.0	00003	60	15	46	17	HTA 49/30	M16x50

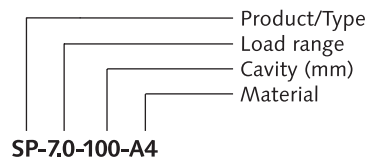
Installation:

1. Pass the spacer bolt through the slot in the strap. When using M10 spacer bolts use a washer under the bolt head.
2. Screw the spacer bolt into the socket and adjust.
3. Attach to the HALFEN channel.
4. Use the adjustor bolt to keep the strap parallel to the wall.
5. Tighten the HALFEN T-head bolt.

HALFEN RESTRAINT WITH TURNBUCKLE (SUITABLE FOR TENSILE AND COMPRESSIVE LOADS)



Ordering example :



Component parts :

- Turnbuckle
- 2 HALFEN T-head bolts (righthand/lefthand), 3 flat nuts, 2 U-washers and 2 locking washers

Order HALFEN channel separately.

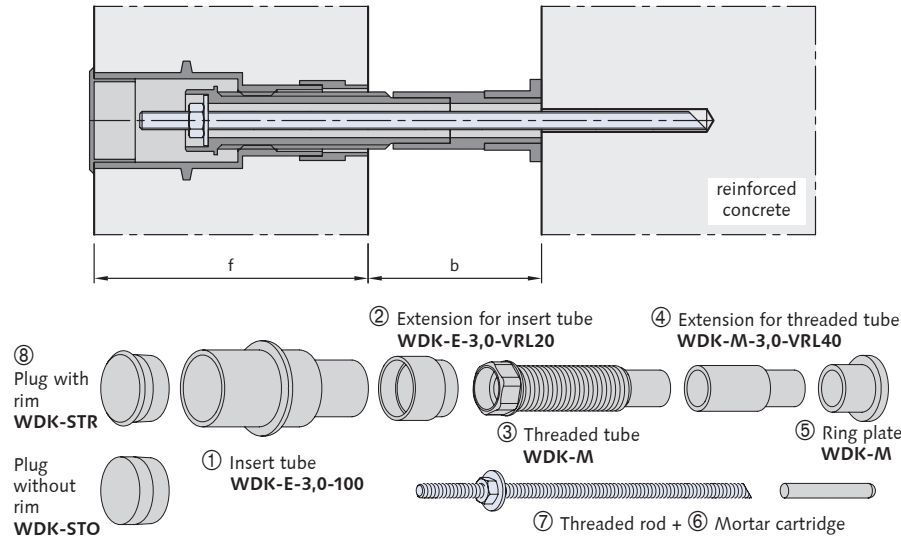
subject to change without notice
① Short length 150, 200, 250 mm long
All dimensions in mm.

Load range [kN]		5.0				7.0				10.0			
Product	Cavity b mm	Halfen T-head bolt lefthand thread M12	Turn-buckle L	Halfen T-head bolt righthand thread M12	Order-no. 0248.000	Halfen T-head bolt lefthand thread M16	Turn-buckle L	Halfen T-head bolt righthand thread M16	Order-no. 0248.000	Halfen T-head bolt lefthand thread M12	Turn-buckle L	Halfen T-head bolt righthand thread M12	Order-no. 0248.000
SPV	100±10	50	60	40	00001	50	60	40	00007	-	-	-	-
	120±15	50	75	40	00002	50	75	40	00008	-	-	-	-
	140±15	50	75	60	00003	50	75	60	00009	80	60	50	00013
	160±15	50	95	60	00004	50	95	60	00010	80	75	60	00014
	180±15	50	15	60	00005	50	115	60	00011	80	95	60	00015
	200±15	50	135	60	00006	50	135	60	00012	80	115	60	00016
Halfen channel		HTA 38/17①				HTA 38/17①				HTA 49/30①			

WIND ANCHOR

SUITABLE FOR TENSILE AND COMPRESSIVE LOADS

PLASTIC WIND ANCHOR TYPE WDK - 3.0

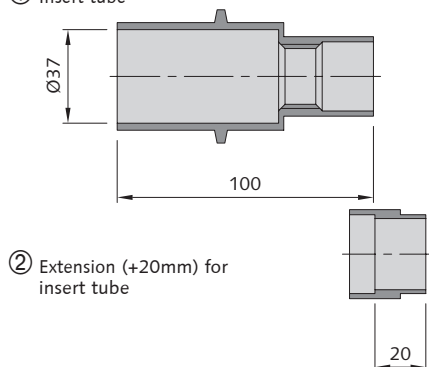


Product code	⑧ Plug with rim WDK-STR*	① Insert tube WDK-E-3,0-100	① Insert tube ② Extension WDK-E-3,0-120	② Extension for insert tube WDK-E-3,0-VRL20	③ Threaded tube WDK-M ⑤ Ring plate WDK-M	④ Extension for threaded tube WDK-M-3,0-VRL40**	⑦ Threaded rod + ⑥ Mortar cartridge		
Order-no.	0250.060-00001	0247.010-00001	0247.060-00002	0247.010-00003	0247.020-00001	0247.020-00004			0430.010-
f	b								
80	60	1	1	-	-	1	-	1	WDK-DUE-3.0-100- 20/ 60-A4 00014
80	80	1	1	-	-	1	-	1	WDK-DUE-3.0-100- 20/ 60-A4 00014
80	100	1	1	-	-	1	1	1	WDK-DUE-3.0-100- 70/100-A4 00015
80	120	1	1	-	-	1	1	1	WDK-DUE-3.0-100- 70/100-A4 00015
100	60	1	1	-	-	1	-	1	WDK-DUE-3.0-100- 20/ 60-A4 00014
100	80	1	1	-	-	1	1	1	WDK-DUE-3.0-100- 70/100-A4 00015
100	100	1	1	-	-	1	1	1	WDK-DUE-3.0-100- 70/100-A4 00015
100	120	1	1	-	-	1	2	1	WDK-DUE-3.0-100-110/140-A4 00016
120	60	1	-	1	-	1	1	1	WDK-DUE-3.0-100- 70/100-A4 00015
120	80	1	-	1	-	1	1	1	WDK-DUE-3.0-100- 70/100-A4 00015
120	100	1	-	1	-	1	2	1	WDK-DUE-3.0-100-110/140-A4 00016
120	120	1	-	1	-	1	2	1	WDK-DUE-3.0-100-110/140-A4 00016

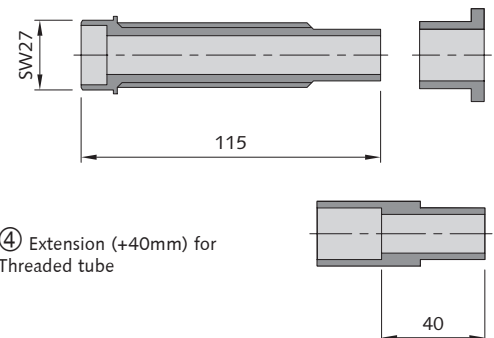
* alternative: Plug without rim WDK-STO, Order No. 0250.060-00002

**When using more than two extensions ④, an additional spacer bolt is required, which must be placed next to the WDK-Anchor(appr. 150-300mm distance). The spacer bolt must be dimensioned according to the applicable pressure load.

Installation parts : ① Insert tube



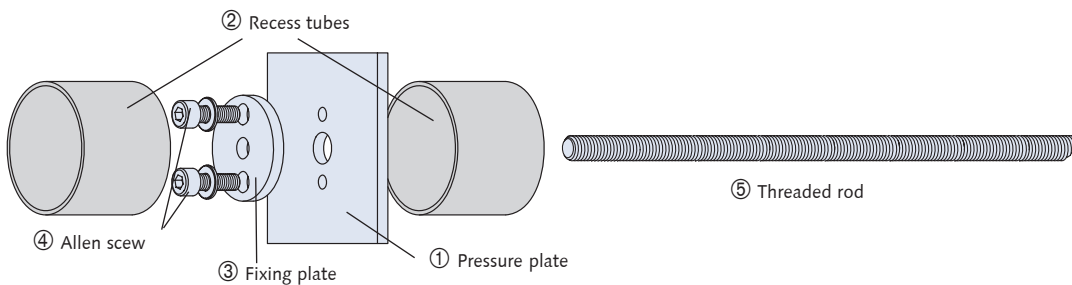
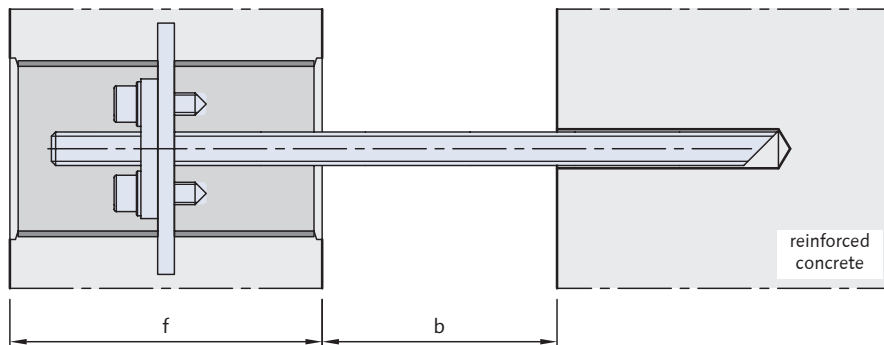
Component parts : ③ Threaded tube + ⑤ Ring plate



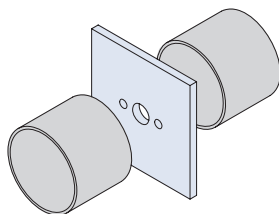
WIND ANCHOR

SUITABLE FOR TENSILE AND COMPRESSIVE LOADS

WIND ANCHOR TYPE WDI - 7.0



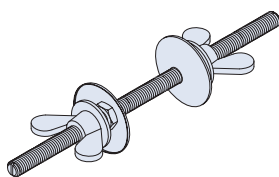
Installation parts :



WDI-7,0-E, Order No. 0247.030-f
consisting of:

- ① 1x Pressure plate
- ② 2x Recess tube

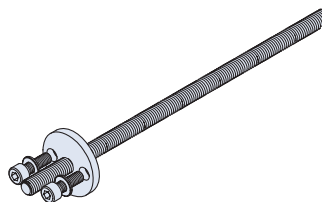
Always specify measure "f" when ordering.



Tool for the exact positioning of the embedment parts during casting of the concrete panel.

WDI-Z2, Order No. 0250.110-00010

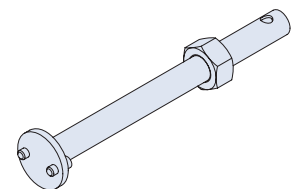
Component parts :



WDI-7,0-M, Order No. 0247.040-f-b
consisting of:

- ③ 1x Fixing plate
- ④ 2x Allen screw
- ⑤ 1x Threaded rod

Always specify measure "f" and "b" when ordering.



Installation tool

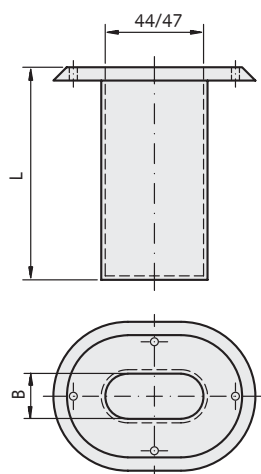
WDI-Z4, Order No. 0250.110-00011

For mortaring-in of the threaded rod we recommend the mortar set UPM Order No. 02502.110-00006
(sufficient for about 30 drilling holes)

HALFEN DOWEL RESTRAINT FIXINGS

UPPER PARTS AND DOWELS

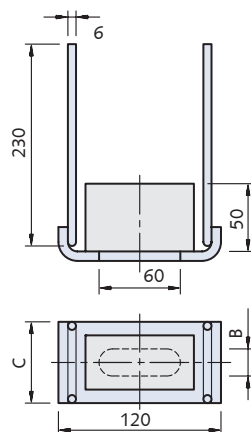
SLOTTED PLASTIC SOCKET TYPE HFV 1



Material: Plastic

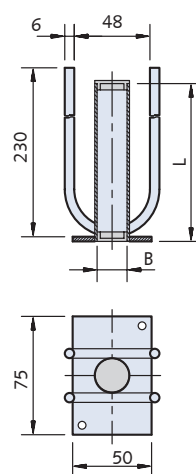
SLOTTED STEEL SOCKET TYPE HFV 2

Independently approved



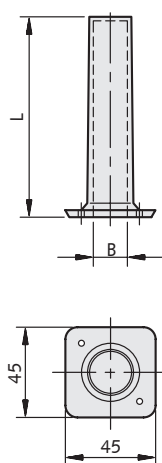
Material: Stainless steel A4

FIXED SOCKET TYPE HFV 8



Material: Stainless steel A4

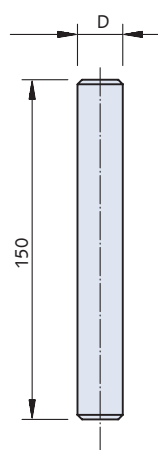
PLASTIC SOCKET TYPE HFV 5



Material: Plastic

LOOSE DOWEL TYPE HFV 3

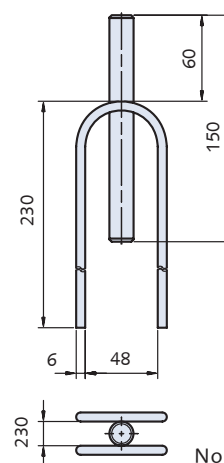
Independently approved



Material: Stainless steel A4

FIXED DOWEL TYPE HFV 7

Independently approved



Non stock item.
Ask for time of delivery.

Material: Stainless steel A4

Product	Upper parts												Dowels			
	HFV 1			HFV 2			HFV 5			HFV 8			HFV 7		HFV 3	
Load range [kN]	Order-no.	B [mm]	L [mm]	Order-no.	B [mm]	L [mm]	Order-no.	B [mm]	L [mm]	Order-no.	B [mm]	L [mm]	Order-no.	dia. [mm]	Order-no.	dia. [mm]
2.5	00001	18	100	00001	17	50	00001	16.5	100	00001	17	100	00001	16	00001	16
5.0	00002	22	100	00002	21	60	00002	20.5	100	00002	21	100	00002	18	00002	20

subject to change without notice

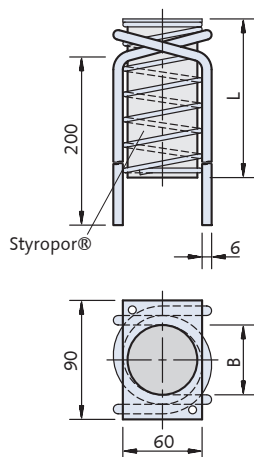
all dimensions in mm

HALFEN DOWEL RESTRAINT FIXINGS

LOWER PARTS

GROUTING SOCKET TYPE HFV 4

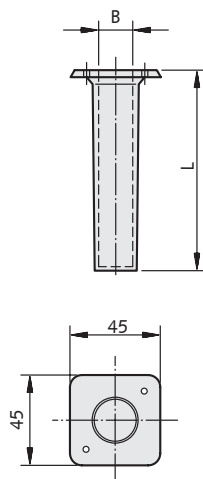
Independently approved



Remove polystyrene before placing dowel then fill up with mortar.

Material: Stainless steel A4

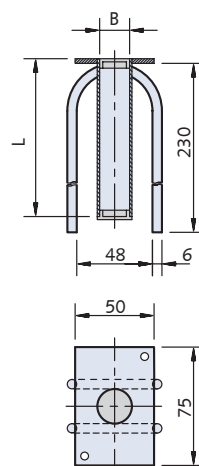
PLASTIC SOCKET TYPE HFV 5



Material: Plastic

FIXED SOCKET TYPE HFV 5

Independently approved



Material: Stainless steel A4

POSSIBLE COMBINATIONS OF DOWEL RESTRAINT FIXINGS

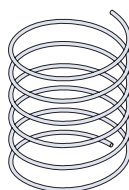
Product	Upper part	Dowel	Lower part	Independ. approved combination
HFV	1	3	4	-
	1	3	5	-
	1	3	8	-
	1	3	9	-
	2	3	4	jes
	2	3	5	-
	2	3	8	jes
	2	3	9	-
	5	3	4	-
	5	3	9	-
	8	3	4	jes
	8	3	9	-

Ordering example :

Product
Upper part
Dowel
Lower part
Load range (kN)

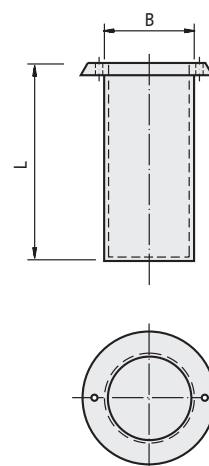
HFV - 2 3 8 - 2.5

SPIRAL REINFORCEMENT TYPE HFV-B FITS HFV 1, HFV 5, HFV 9



Spiral reinforcement 60 x 80	
Product	Order-no.
HFV-B-WB	0249.100-00001
HFV-B-A4	0249.100-00002

GROUTING SOCKET TYPE HFV 9



To be filled up with mortar after dowel is inserted.
Material: Plastic

Product	Lower parts											
	HFV 4			HFV 5			HFV 8			HFV 9		
Load range [kN]	Order-no.	B [mm]	L [mm]	Order-no.	B [mm]	L [mm]	Order-no.	B [mm]	L [mm]	Order-no.	B [mm]	L [mm]
2.5	00001	44	100	00001	16,5	100	00001	17	100	00001	40	100
5.0	00002	44	100	00002	20,5	100	00002	21	100	00002	40	100

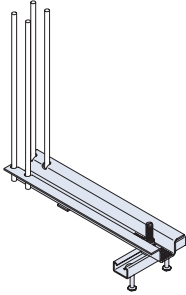
subject to change without notice

all dimensions in mm

HALFEN PARAPET CORBEL

SUMMARY OF TYPES

PARAPET CORBEL TYPE BRA-N, STANDARD



Parapet corbel with welded-on pressure plate:

Profile types: 100, 180, 300, 375, 500, 600, 750 and 900.

Other dimensions on request.

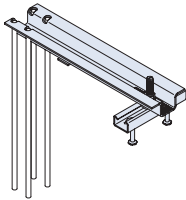
For vertical adjustment additional steel packing shims are required. The shims are to be placed underneath at the thrust bearing in front. Fixing with HAL-

FEN channels or approved anchor bolts. This type is used to fix parapet units such as balcony units.

The installation of the parapet corbel should be submerged in the floor slab (see example on page 27).

Only two parapet corbels are to be arranged per parapet unit. Otherwise an adjustable version should be used.

PARAPET CORBEL TYPE BRA-A, SPANDREL VERSION



Parapet corbel with welded-on pressure plate:

Profile types: 100, 180, 300, 375, 500, 600, 750 and 900.

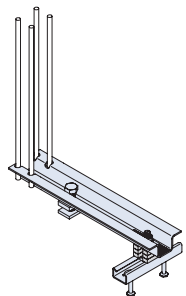
Other dimensions on request. For vertical adjustment additional steel packing shims are required. The shims are to be placed underneath at the thrust bearing in front. Fixing with HALFEN channels

or approved anchor bolts.

This type is used to fix parapet units such as spandrel panels at roof area (see example on page 27).

Only two parapet corbels are to be arranged per parapet unit. Otherwise an adjustable version should be used.

PARAPET CORBEL TYPE BRA-NJ, STANDARD ADJUSTABLE



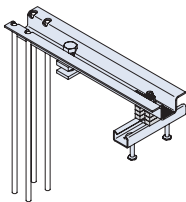
Parapet corbel with adjustor bolt:

Profile types: 100, 180, 300, 375, 500, 600, 750 and 900.

Other dimensions on request. Fixing with HALFEN channels or approved anchor bolts.

For vertical adjustment with adjustor bolt the adjusting equipment BRA-Z2 is required.

PARAPET CORBEL TYPE BRA-AJ, SPANDREL VERSION ADJUSTABLE



Parapet corbel with adjustor bolt:

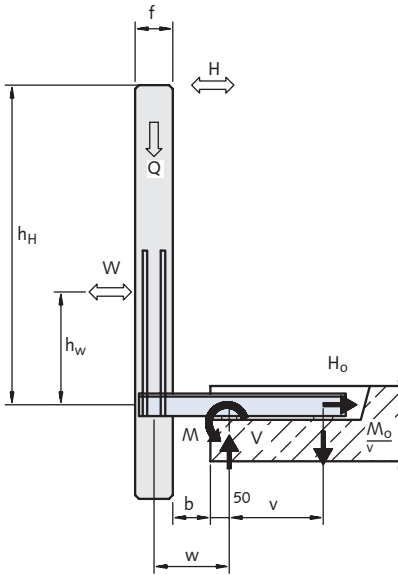
Profile types: 100, 180, 300, 375, 500, 600, 750 and 900.

Other dimensions on request. Fixing with HALFEN channels or approved anchor bolts.

For vertical adjustment with adjustor bolt the adjusting equipment BRA-Z2 is required.

HALFEN PARAPET CORBEL

CALCULATION OF LOADS



all dimensions in mm

Applied loads: (light arrows) $\Rightarrow$

Q = weight of the parapet panel

W = wind load on the parapet panel

H = point loads

Lever arms

$w = 50\text{mm} + b + 0.5f$

b = distance between parapet and the edge of the slab

f = thickness of parapet panel

h_w = centre of the parapet panel - axis of anchor

h_H = point load position (Note: point load may be applied at the upper edge of parapet) - axis of anchor

Bending moment

the largest bending moment on the parapet corbel occurs on the front support point:

$$M_Q = Q \times w$$

$$M_W = W \times h_w$$

$$M_H = H \times h_H$$

$$M_o = \frac{\Sigma M}{n} \quad \Sigma M = M_Q + M_W + M_H$$

Select the parapet corbel according to its allowable bending moment

n = number of parapet corbels per panel ≥ 2

if $n > 2$ use adjustable parapet corbels NJ/AJ

Checking calculation

$Q/n < \text{allow. } Q \text{ acc. to table page 27}$

Fixing equipment (behind)

$$R_z = \sqrt{(\Sigma H_o)^2 + \left(\frac{M_o}{v}\right)^2} < \text{allow. } R_z \text{ (fixing equipment)}$$

$H_o = \Sigma H = H + W$ (per anchor)

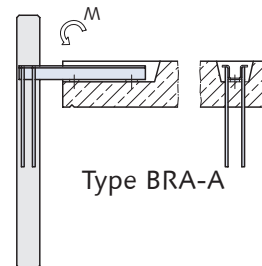
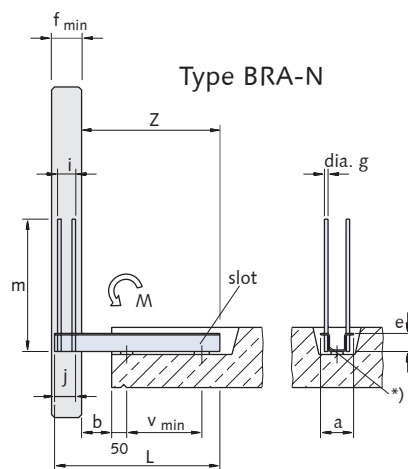
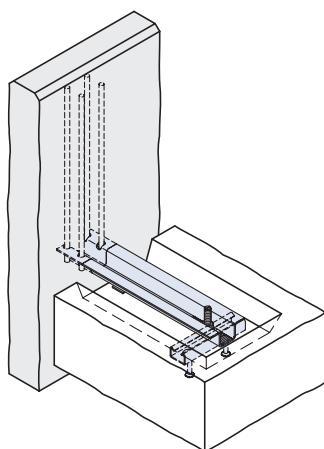
M_o = bending moment per anchor

bearing load (in front)

$$V = \frac{M_o}{v} + Q$$

HALFEN PARAPET CORBEL BRA-N/A

INDEPENDENTLY APPROVED



Ordering example :

Product
Type
Profile type
Dimension b
BRA - N - 300 - 120

Further details: see type test report (on request)

Product	Profile Type	100		180		300		375		500		600		750		900	
	allow. M [kNcm]	100		175		240		270		465		500		640		810	
	b [mm]	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.
BRA-N	0-30	340	00011	380	00051	480	00091	560	00131	530	00171	580	00211	605	00251	705	00291
	40-60	370	00021	410	00061	510	00101	590	00141	560	00181	610	00221	635	00261	735	00301
	70-90	400	00031	440	00071	540	00111	620	000151	590	00191	640	00231	665	00271	765	00311
	100-120	430	00041	470	00081	570	00121	650	00161	620	00201	670	00241	695	00281	795	00321
BRA-A			Order no.		Order no.		Order no.		Order no.		Order no.		Order no.		Order no.		Order no.
			0242.010-		0242.010-		0242.010-		0242.010-		0242.010-		0242.010-		0242.010-		0242.010-
	0-30	340	00011	380	00051	480	00091	560	00131	530	00171	580	00211	605	00251	705	00291
	40-60	370	00021	410	00061	510	00101	590	00141	560	00181	610	00221	635	00261	735	00301
	70-90	400	00031	440	00071	540	00111	620	000151	590	00191	640	00231	665	00271	765	00311
	100-120	430	00041	470	00081	570	00121	650	00161	620	00201	670	00241	695	00281	795	00321
	a [mm]	88		108		114		116		150		156		160		170	
	e [mm]	35		40		49		54		60		60		68		74	
	f _{min} [mm]	80		90		100		110		110		110		130		130	
	dia. g [mm]	8		10		12		14		14		14		16		16	
	i [mm]	40		50		60		70		70		70		90		90	
	j [mm]	45		55		65		75		75		75		100		100	
	m [mm]	350		420		500		550		650		650		700		700	
	v _{min} [mm]	130		160		250		320		290		340		340		440	
	slot	13x80		17x80		17x80		17x80		21x80		21x80		21x80		21x80	
	Max. RZ [kN]	7.74		11.05		9.97		9.09		16.65		15.67		20.00		20.11	
Halfen channel length 200 mm		HTA 40/25		HTA 49/30		HTA 49/30		HTA 49/30		HTA 54/33		HTA 54/33		HTA 54/33		HTA 54/33	

subject to change without notice

Adjustment for b= ± 20 mm

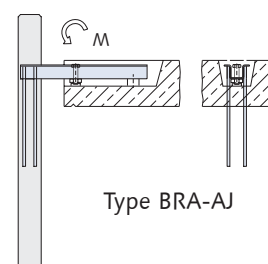
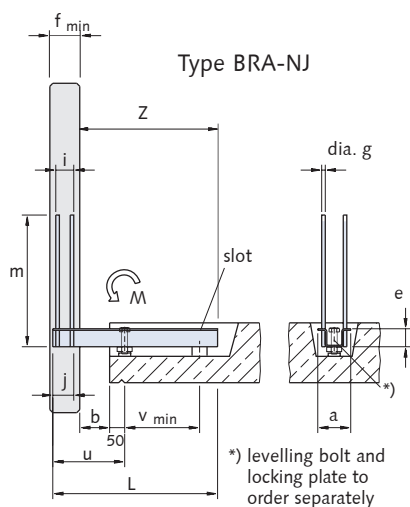
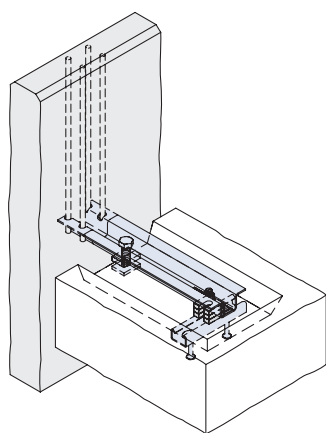
all dimensions in mm

To check the length of parapet corbel out of the concrete.
(concrete cover 20 mm).

$$Z = L - j - 20 \text{ mm}$$

HALFEN PARAPET CORBEL BRA-NJ/AJ

INDEPENDENTLY APPROVED



Product
Type
Profile type
Dimension b
BRA - NJ - 300 - 120

Further details: see type test report (on request)

Ordering example :

Product	Profile Type	100		180		300		375		500		600		750		900	
	allow. M [kNcm]	100		175		240		270		465		500		640		810	
BRA-N	b [mm]	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.	L [mm]	Order no.
			0242.040-		0242.040-		0242.040-		0242.040-		0242.040-		0242.040-		0242.040-		0242.040-
BRA-N	0-30	340	00011	380	00051	480	00091	560	00131	530	00171	580	00211	605	00251	705	00291
	40-60	370	00021	410	00061	510	00101	590	00141	560	00181	610	00221	635	00261	735	00301
	70-90	400	00031	440	00071	540	00111	620	000151	590	00191	640	00231	665	00271	765	00311
	100-120	430	00041	470	00081	570	00121	650	00161	620	00201	670	00241	695	00281	795	00321
BRA-A			Order no.		Order no.		Order no.		Order no.		Order no.		Order no.		Order no.		Order no.
			0242.030-		0242.030-		0242.030-		0242.030-		0242.030-		0242.030-		0242.030-		0242.030-
	0-30	340	00011	380	00051	480	00091	560	00131	530	00171	580	00211	605	00251	705	00291
	40-60	370	00021	410	00061	510	00101	590	00141	560	00181	610	00221	635	00261	735	00301
	70-90	400	00031	440	00071	540	00111	620	000151	590	00191	640	00231	665	00271	765	00311
	100-120	430	00041	470	00081	570	00121	650	00161	620	00201	670	00241	695	00281	795	00321
	a [mm]	88		108		114		116		150		156		160		170	
	e [mm]	35		40		49		54		60		60		68		74	
	f _{min} [mm]	80		90		100		110		110		110		130		130	
	dia.g [mm]	8		10		12		14		14		14		16		16	
	i [mm]	40		50		60		70		70		70		90		90	
	j [mm]	45		55		65		75		75		75		100		100	
	b + j + 20mm + 50mm																
	m [mm]	350		420		500		550		650		650		700		700	
	v _{min} [mm]	130		160		250		320		290		340		340		440	
	slot	13x80		17x80		17x80		17x80		21x80		21x80		21x80		21x80	
	Max. RZ [kN]	7.74		11.05		9.97		9.09		16.65		15.67		20.00		20.11	
Halfen channel length 200 mm		HTA 40/25		HTA 49/30		HTA 49/30		HTA 49/30		HTA 54/33		HTA 54/33		HTA 54/33		HTA 54/33	

subject to change without notice

all dimensions in mm

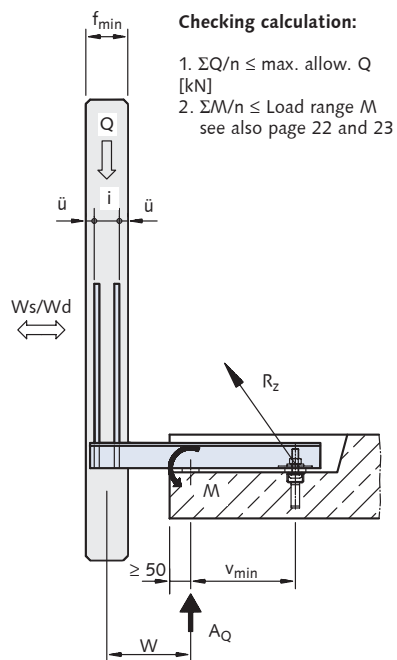
Adjustment for b= ± 20 mm

To check the length of parapet corbel out of the concrete.
(concrete cover 20 mm).

$$Z = L - j - 20 \text{ mm}$$

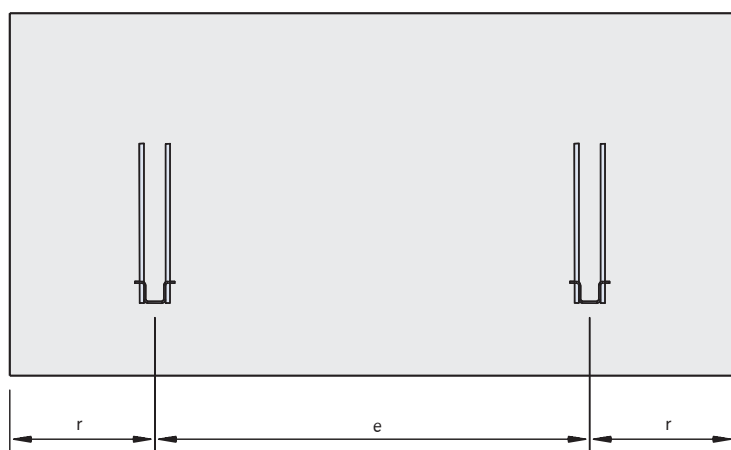
HALFEN PARAPET CORBEL

CALCULATION OF LOADS



W = distance between gravity axis of the load (Q) and front load-bearing point (A_Q)

w [mm]	Profile type							
	100	180	300	375	500	600	750	900
	max. allow. Q [kN]							
90	8.82	14.73	18.13	19.95	33.50	33.52	37.91	41.09
100	8.82	14.73	18.13	19.95	33.50	33.52	37.91	41.09
110	8.82	14.73	18.13	19.95	33.50	33.52	37.91	41.09
120	8.33	14.58	18.13	19.95	33.50	33.52	37.91	41.09
160	7.69	13.46	18.13	19.95	33.50	33.52	37.91	41.09
140	7.14	12.50	17.14	19.29	33.21	33.52	37.91	41.09
150	6.67	11.67	16.00	18.00	31.00	33.33	37.91	41.09
160	6.25	10.94	15.00	16.88	29.06	31.25	37.91	41.09
170	5.88	10.29	14.12	15.88	27.35	29.41	37.65	41.09
1810	5.56	9.72	13.33	10.55	25.83	27.78	35.56	41.09
190	5.26	9.21	12.63	14.21	24.47	26.32	33.68	41.09
200	5.00	8.75	12.00	13.50	23.25	25.00	32.00	40.50
210	4.76	8.33	11.43	12.86	22.14	23.81	30.48	38.57
220	4.55	7.95	10.91	12.27	21.14	22.73	29.09	36.82
230	4.35	7.61	10.43	11.74	20.22	21.74	27.83	35.22
240	4.17	7.29	10.00	11.25	19.38	20.83	26.67	33.75
250	4.00	7.00	9.60	10.80	18.60	20.00	25.60	32.40
Max. connection load for fixing equipment								
R _z [kN]	7.74	11.05	9.97	9.09	16.65	15.67	20.00	20.11
max. A _Q [kN]	9.07	13.60	17.00	18.93	31.13	31.00	35.46	38.60



$$f_{\min} = i + 2 \times \text{allow. } \ddot{u}$$

($\ddot{u}$ = minimum concrete cover)

$r \leq 500$ mm for all parapet units with capping pressure subject to change without notice
all dimensions in mm

w [mm]	Profile type							
	100	180	300	375	500	600	750	900
	max. e [mm] (limited due to thermal expansion)							
0	3800	4050	6000	6000	6000	6000	6000	6000
20	4500	4750	6000	6000	6000	6000	6000	6000
40	5250	5450	6000	6000	6000	6000	6000	6000
60	6000	6000	6000	6000	6000	6000	6000	6000
≥80	6000	6000	6000	6000	6000	6000	6000	6000

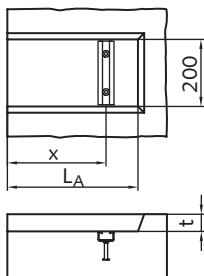
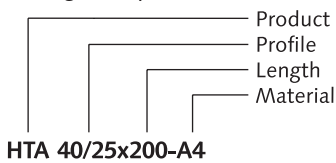
HALFEN PARAPET CORBEL

ACCESSORIES FOR ASSEMBLY

1. HALFEN channel for fixing the parapet unit to the structure. The HALFEN channel with typical length of 200 mm should be made of stainless steel (A4) if there is no concrete cover. If inserting to a recess and grout-in the galvanized version can be used.

Profile type	HALFEN channel	HALFEN bolts
100	HTA 40/25x200	M12x60
180	HTA 49/30x200	M16x60
300	HTA 49/30x200	M16x60
375	HTA 49/30x200	M16x60
500	HTA 54/33x200	M20x75
600	HTA 54/33x200	M20x75
750	HTA 54/33x200	M20x75
900	HTA 54/33x200	M20x75

Ordering example :



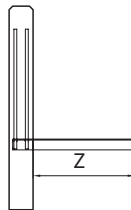
Profile type	L _A	t		x		
		BRA-N/A	BRA-NJ/AJ	b=0.	b=20.	b=30.
				10.	50.	60.
				40.	80.	90.
				70.	110	120
				100		
100	280	50	65	200	190	180
180	320	60	70	230	220	210
300	410	70	80	320	310	300
375	480	75	80	390	380	370
500	450	80	100	360	350	340
600	500	80	100	410	400	390
750	500	90	105	410	400	390
900	600	95	110	510	500	490

Assembly accessories:

- Ring spanner
- Torque wrench

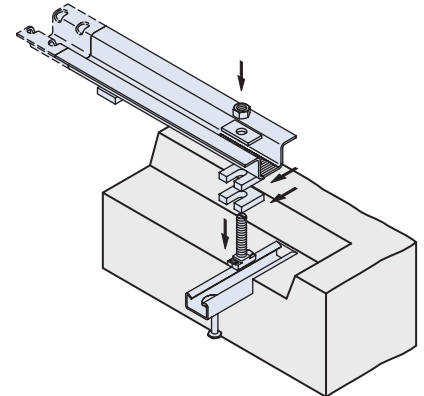
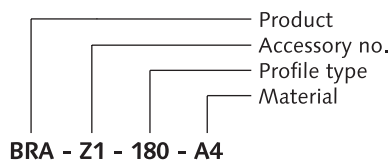
2. The parapet corbel is to be cast in perpendicular to the precast unit. A concrete cover of 20 mm to the welded-on reinforcement is assumed. For other concrete covers the difference is to be added (only for checking the anchor length - not for calculating the bending moments).

Profile type	100	180	300	375	500	600	750	900
b	Z							
0-30	275	305	395	465	435	485	485	585
40-60	305	335	425	495	465	515	515	615
70-90	335	365	455	525	495	545	545	645
100-120	365	395	485	555	525	575	575	675



3. Assembly parts: for fixing the Parapet corbels to the HALFEN channel an assembly set is required. The set consists of HALFEN bolts with nut and washer, locking plate and slotted shims in different thicknesses (3mm + 6mm). The criterias for using stainless steel (A4) parts or hot dip galvanized (fv) are to be observed. If there are no Halfen channels in the structure also approved anchor bolts can be used in accordance with the current approvals and manufacturers instructions (Rz see calculation). For this case the assembly set is to be used without the HALFEN bolts.

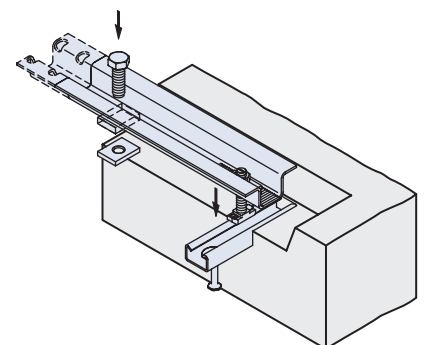
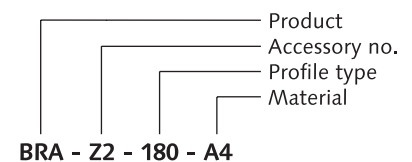
Ordering example :



4. Adjustor bolt and locking plate. The vertical adjustment set for NJ and AJ consists of a hexagonal-head bolt, a locking plate and a shim. Available in hot dip galvanized (fv) or stainless steel (A4) to suit site conditions (criteria as for assembly parts).

Profile type	Adjustor bolt
100	M16x40
180	M16x40
300	M20x50
375	M24x50
500	M27x60
600	M27x60
750	M30x60
900	M33x70

Ordering example :



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