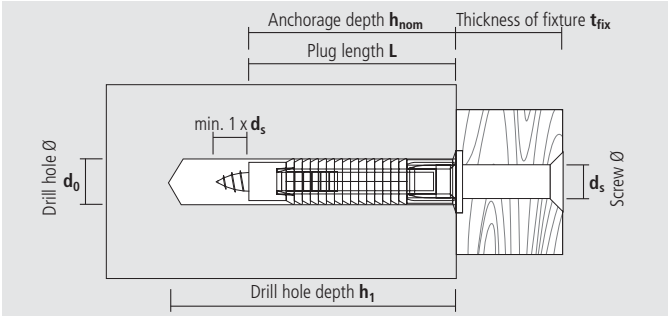
Plug FX

Advantages

- 4-side expansion for high pull out values
- Compatible with different types of screws such as wood screws, chipboard screws, self-tapping screws, etc.
- Efficient anti-rotation lugs prevents rotation in the drill hole
- Plug collar prevents slipping into the drill hole
- High quality and ageing resistant nylon
- Temperature resistant from -40°C to +80°C

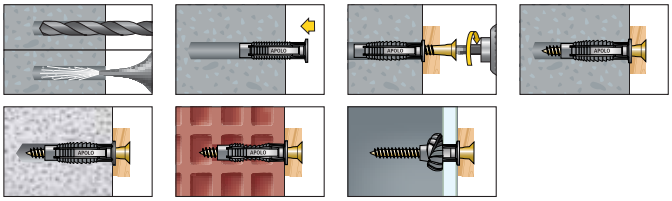
Suitable building materials

- ✔ Concrete
- ✔ Natural stone
- ✔ Solid brick
- ✔ Solid sand-lime brick
- ✔ Lightweight solid concrete blocks
- ✔ Aerated concrete
- ✔ Gypsum blocks
- ✔ Hollow brick
- ✔ Hollow sand-lime brick
- ✔ Lightweight hollow concrete blocks



Minimum edge distance: 1x plug length

Mounting



Watch at www.celo-apolo.de/en

FX without screw								Price	Packing	
Type	Art-No		d_0	$h_1 \geq$	$h_{nom} \geq$	L	d_s	€/		
	new	old	[mm]	[mm]	[mm]	[mm]	[mm]	100 pcs	[pcs]	[pcs]
FX 5	95FX	500124	5	35	25	25	2,5 - 4		100	6000
FX 6	96FX	500126	6	40	30	30	3,5 - 5		100	6000
FX 8	98FX	500128	8	55	40	40	4,5 - 6		100	2700
FX 10	910FX	500130	10	70	50	50	6 - 8		50	1350
FX 12	912FX	500138	12	80	60	60	8 - 10		25	675

FX incl. PZ chipboard screw (FX6 and 8) and hex-head wood screw (FX 10) respectively								Price	Packing	
Type	Art-No		d_0	$h_1 \geq$	$h_{nom} \geq$	L	d_s x L_s[1]	€/		
	new	old	[mm]	[mm]	[mm]	[mm]	[mm]	100 pcs	[pcs]	[pcs]
FX 6 SPS	96FXSZ	–	6	40	30	30	4,5 x 45		50	3000
FX 8 SPS	98FXSZ	–	8	55	40	40	5,0 x 60		50	1350
FX 10 SKS	910FXK	–	10	70	50	50	7,0 x 65		25	675

[1] Screw length

Plug FX

FX in round box								Price	Packing	
Type	Art-No		d_0	$h_1 \geq$	$h_{nom} \geq$	L	d_s	€/ box	[pcs]	[boxes]
	new	old	[mm]	[mm]	[mm]	[mm]	[mm]			
FX 6	96EXPFX	–	6	40	30	30	3,5 - 5		300	10
FX 8	98EXPFX	–	8	55	40	40	4,5 - 6		125	10
FX 10	910EXPFX	–	10	70	50	50	6 - 8		70	10

Recommended loads F_{rec} using wood screws with the largest applicable screw diameter and full anchorage depth

Type	d_s	Concrete C20/25	Solid stone MZ 12 / KSV 12	Aerated concrete P2	Aerated concrete P4	Hollow brick HLz 12	Hollow sand-lime brick KSL 12
	[mm]	F_{rec} [kN]	F_{rec} [kN]	F_{rec} [kN]	F_{rec} [kN]	F_{rec} [kN]	F_{rec} [kN]
FX 5	4	0,20	0,21	0,03	0,05	0,15	0,23
FX 6	5	0,47	0,42	0,05	0,10	0,20	0,39
FX 8	6	0,52	0,50	0,10	0,14	0,23	0,60
FX 10	8	1,28	0,90	0,16	0,30	0,45	0,67
FX 12	10	1,91	1,10	0,28	0,40	0,50	0,74

F_{rec}: Recommended safe working loads incl. safety factor (μ=7)
Values must be reduced by ca. 40% when using chipboard screws (especially in solid building materials)

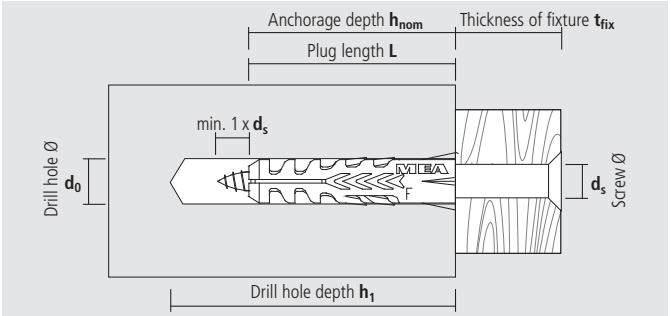
Standard plug F

Advantages

- High pull out values due to high expansion ability (four-sided expansion in the middle section)
- Very good screw guidance, i.e. the screw cannot move out of the plug during the screwing in
- Good twist resistance
- Strong design prevents bending when hammered in
- Good load values even in perforated bricks and aerated concrete

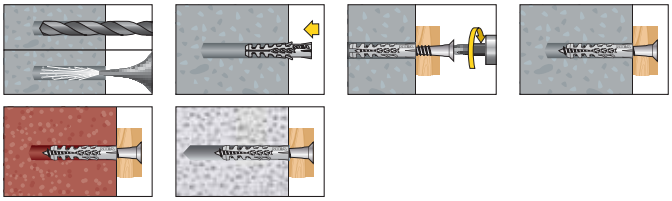
Suitable building materials

- ✔ Concrete
- ✔ Natural stone
- ✔ Solid brick
- ✔ Solid sand-lime brick
- ✔ Lightweight solid concrete blocks
- ✔ Aerated concrete
- ✔ Gypsum blocks



Minimum edge distance: 1x plug length

Mounting



F without screw								Price	Packing	
Type	Art-No new	Art-No old	d_0 [mm]	$h_1 \geq$ [mm]	$h_{nom} \geq$ [mm]	L [mm]	d_s [mm]	€/ 100 pcs	[pcs]	[pcs]
F 4	94NF	500204	4	30	20	20	2 - 3		200	12000
F 5	95NF	500105	5	35	25	25	2,5 - 4		100	6000
F 6	96NF	500106	6	40	30	30	3,5 - 5		100	6000
F 7	97NF	500207	7	40	30	30	4 - 5,5		50	3000
F 8	98NF	500108	8	55	40	40	4,5 - 6		100	2700
F 10	910NF	500110	10	70	50	50	6 - 8		50	1350
F 12	912NF	500112	12	80	60	60	8 - 10		25	675
F 14	914NF	500114	14	90	70	70	10 - 12		20	540
F 16	916NF	500116	16	100	80	80	12 - 14		10	270
F 20	920NF	500120	20	120	90	90	16		5	135

Recommended loads F_{rec} and F_{eff} using wood screws with the largest applicable screw diameter and full anchorage depth

Type	d_s	Concrete C20/25		Solid sand-lime brick KSL 12		Solid brick MZ 12		Aerated concrete P2		Aerated concrete P4		Hollow brick HLz 12	
	[mm]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]
F 4	3	0,12	0,83	0,14	0,98	0,14	0,97					0,08	0,56
F 5	4	0,23	1,64	0,33	2,28	0,24	1,66	0,04	0,31	0,04	0,26	0,09	0,61
F 6	5	0,31	2,18	0,37	2,60	0,38	2,63	0,05	0,32	0,06	0,40	0,12	0,87
F 8	6	0,34	2,35	0,43	3,00	0,46	3,24	0,07	0,49	0,07	0,46	0,13	0,88
F 10	8	0,77	5,37	0,78	5,47	0,79	5,54	0,10	0,70	0,10	0,73	0,22	1,53
F 12	10	1,55	10,83	1,90	13,33	1,57	11,00	0,15	1,05	0,16	1,14	0,30	2,09
F 14	12	4,15	29,02	–	–	–	–	–	–	0,28	1,99	0,43	3,04
F 20	16	5,50	38,50	–	–	–	–	–	–	–	–	–	–

F_{rec}: Recommended safe working loads incl. safety factor (μ=7) F_{eff}: Effective pull out values excl. safety factor
Values must be reduced by ca. 40% when using chipboard screws (especially in solid building materials)

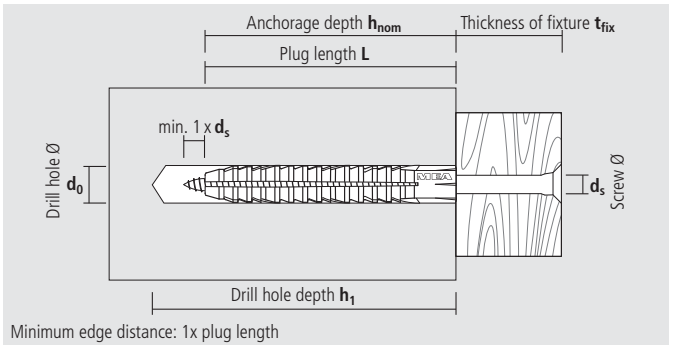
Standard plug FL extra long

Advantages

- The extra long expansion area enables fixings in solid and perforated material with dense and porous structure (e.g. old buildings)
- The multiple wing construction secures an anti-rotating effect
- The FL has no collar; it can be used for pre-inserted mounting and through-mounting
- The FL is also suitable for reduced setting depth for bridging thin insulations, plaster, etc.

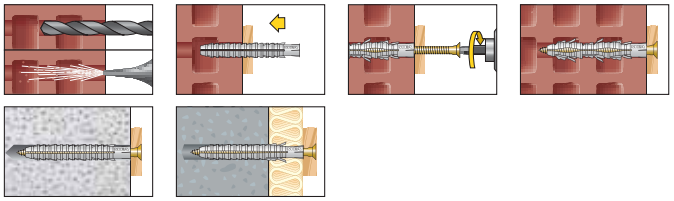
Suitable building materials

- ✔ Concrete
- ✔ Natural stone
- ✔ Solid brick
- ✔ Solid sand-lime brick
- ✔ Lightweight solid concrete blocks
- ✔ Aerated concrete
- ✔ Gypsum blocks
- ✔ Hollow brick
- ✔ Hollow sand-lime brick
- ✔ Lightweight hollow concrete blocks



Minimum edge distance: 1x plug length

Mounting



FL without screw

Type	Art-No new	Art-No old	d_0 [mm]	$h_1 \geq$ [mm]	$h_{nom} \geq$ [mm]	L [mm]	d_s [mm]	Price €/ 100 pcs	Packing [pcs]	Packing [pcs]
FL 6-60	9660FL	500160	6	70	60	60	3,5 - 4,5		100	2700
FL 8-80	9880FL	500161	8	90	80	80	4,5 - 5,5		50	600
FL 10-90	91090FL	500162	10	105	90	90	6 - 7		25	300

Recommended loads F_{rec} using wood screws with the largest applicable screw diameter and full anchorage depth

Type	d_s [mm]	Concrete C20/25 F_{rec} [kN]	Aerated concrete P2 F_{rec} [kN]	Aerated concrete P4 F_{rec} [kN]	Aerated concrete P6 F_{rec} [kN]	Hollow sand-lime brick KSL 12 F_{rec} [kN]	Hollow brick HLz 12 F_{rec} [kN]
FL 6-60	4,5	0,17	0,05	0,07	0,15	0,13	0,10
FL 8-80	5,5	0,33	0,09	0,14	0,30	0,15	0,12
FL 10-90	7	0,56	0,19	0,25	0,33	0,22	0,20

F_{rec}: Recommended loads incl. safety factor (μ = 7).
In solid building materials reduce anchorage depth or use smaller screw diameter
Values must be reduced by ca. 30% when using chipboard screws (especially in solid building materials)

Multi-purpose plug MZ and MZK

Multi-purpose plug MZ

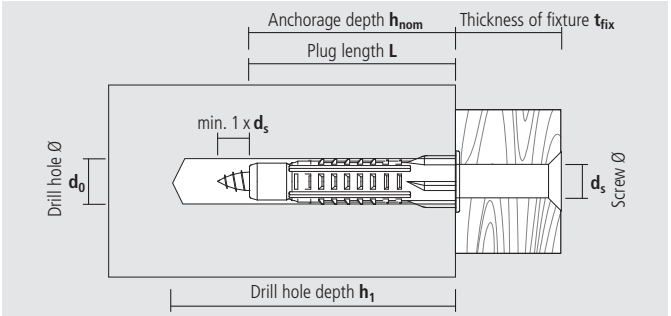
Multi-purpose plug MZK with collar

Advantages

- Knotting plug that is proven millions of times; excellent performance in almost every building material
- The 4-sided expansion in solid building materials and the knotting in perforated bricks or board materials always provides a secure fixing with high pull out values
- High quality polyethylene guarantees long lasting elasticity and reliable knotting behaviour
- Compatible with many types and sizes of screws

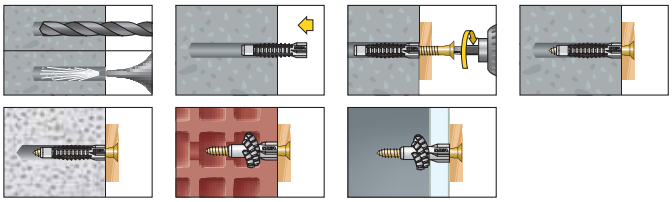
Suitable building materials

- ✔ Concrete
- ✔ Natural stone
- ✔ Solid brick
- ✔ Solid sand-lime brick
- ✔ Lightweight solid concrete blocks
- ✔ Aerated concrete
- ✔ Gypsum blocks
- ✔ Hollow brick
- ✔ Hollow sand-lime brick
- ✔ Lightweight hollow concrete blocks
- ✔ Plasterboard
- ✔ Chipboard



Minimum edge distance: 1x plug length

Mounting



MZ without collar

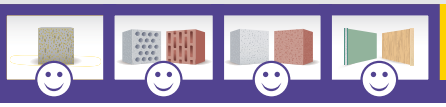
Type	Art-No new	Art-No old	d_0 [mm]	$h_1 \geq$ [mm]	$h_{nom} \geq$ [mm]	L [mm]	h_{min}[1] [mm]	d_s [mm]	Price €/ 100 pcs	Packing [pcs]	Packing [pcs]
MZ 6	96MZ	500170	6	40	29	29	7	3-4,5		100	6000
MZ 6-40	9640MZ	500173	6	50	40	40	7	3-4,5		100	4800
MZ 8	98MZ	500172	8	60	48	48	9	4-6		100	1800
MZ 10	910MZ	500174	10	75	59	59	12	6-8		50	900
MZ 12	912MZ	500175	12	85	71	71	15	8-10		50	600
MZ 14	914MZ	500176	14	95	75	75	15	10-12		25	300

[1] Min. thickness of structural part or board (e. g. for applications in plasterboard)

MZK with collar

Type	Art-No new	Art-No old	d_0 [mm]	$h_1 \geq$ [mm]	$h_{nom} \geq$ [mm]	L [mm]	h_{min}[1] [mm]	d_s [mm]	Price €/ 100 pcs	Packing [pcs]	Packing [pcs]
MZK 6	96MZK	500180	6	40	29	30	7	3-4,5		100	4800
MZK 6-41	9641MZK	500183	6	50	40	41	7	3-4,5		100	2700
MZK 8	98MZK	500182	8	60	48	49	9	4-6		100	1800
MZK 10	910MZK	500184	10	75	59	60	12	6-8		50	900
MZK 12	912MZK	500190	12	85	71	72	15	8-10		50	600
MZK 14	914MZK	500191	14	95	75	76	15	10-12		25	300

[1] Min. thickness of structural part or board (e. g. for applications in plasterboard)



Multi-purpose plug MZ and MZK

MZK with collar, incl. PZ chipboard screw (MZK 6, 6-41 and 8) and Hexagon wood screw (MZK 10) respectively

Type	Art-No		d_0	$h_1 \geq$	$h_{nom} \geq$	L	h_{min}[1]	$d_s \times L_s$[2]	Price	Packing	
	new	old	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	€/ 100 pcs	[pcs]	[pcs]
MZK 6 SPS	96MZKSZ	–	6	40	29	30	7,0	4,5 x 45		50	2400
MZK 6-41 SPS	9641MZKSZ	–	6	50	40	41	7,0	4,5 x 50		50	1350
MZK 8 SPS	98MZKSZ	–	8	60	48	49	9,5	5,0 x 70		50	900
MZK 10 SKS	910MZKK	–	10	75	59	60	12,0	6,0 x 80		25	450

[1] Min. thickness of structural part or board (e. g. for applications in plasterboard)
[2] Screw length

MZK with collar, in round box

Type	Art-No		d_0	$h_1 \geq$	$h_{nom} \geq$	L	h_{min}[1]	d_s	Price	Packing	
	new	old	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	€/ Dose	[pcs]	[Dosen]
MZK 6-41	9641EXPMZK	500283	6	50	40	41	7,0	3 - 4,5		200	10
MZK 8	98EXPMZK	500282	8	60	48	49	9,5	4 - 6		90	10
MZK 10	910EXPMZK	500284	10	75	59	60	12,0	6 - 8		50	10
MZK 12	912EXPMZK	500290	12	85	71	72	15,0	8 - 10		25	10

[1] Min. thickness of structural part or board (e. g. for applications in plasterboard)

Loads for wood screws F_{rec} and F_{eff} for the largest applicable screw diameter and full anchorage depth

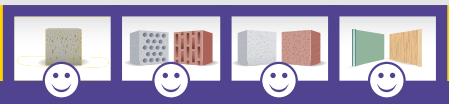
Type	Concrete C20/25		Solid sand-lime brick KSV 12		Solid brick MZ 12		Aerated concrete P2		Aerated concrete P4		Hollow brick HLz 12		Plasterboard 12,5 mm		Chipboard 16 mm	
	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]
MZ/MZK 6	0,30	2,08	0,26	1,81	0,16	1,09	0,04	0,30	0,06	0,43	0,22	1,57	0,06	0,45	0,21	1,47
MZ/MZK 6-41	0,72	5,03	0,51	3,54	0,27	1,90	0,06	0,43	0,12	0,83	0,21	1,44	0,08	0,57	0,15	1,05
MZ/MZK 8	0,52	3,64	0,59	4,10	0,43	3,03	0,11	0,77	0,14	1,01	0,27	1,90	0,09	0,63	0,23	1,58
MZ/MZK 10	1,56	10,90	1,07	7,50	0,68	4,78	0,13	0,94	0,25	1,72	0,31	2,15	0,08	0,58	0,25	1,72
MZ/MZK 12	2,02	14,12	1,31	9,20	–	–	0,23	1,63	0,39	2,72	0,42	2,92	0,11	0,74	0,37	2,56
MZ/MZK 14	–	–	–	–	–	–	0,37	2,59	0,59	4,11	0,33	2,31	–	–	–	–

F_{rec}: Recommended safe working loads incl. safety factor (μ=7)
F_{eff}: Effective pull out values excl. safety factor

Loads for chipboard screws F_{rec} and F_{eff} for the largest applicable screw diameter and full anchorage depth

Type	Concrete C20/25		Solid sand-lime brick KSV 12		Solid brick MZ 12		Aerated concrete P2		Aerated concrete P4		Hollow brick HLz 12		Plasterboard 12,5 mm		Chipboard 16 mm	
	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]
MZ/MZK 6	0,06	0,39	0,06	0,44	0,05	0,38	0,02	0,17	0,03	0,20	0,08	0,56	0,03	0,23	0,14	1,00
MZ/MZK 6-41	0,17	1,19	0,15	1,05	0,08	0,58	0,04	0,26	0,05	0,33	0,17	1,20	0,09	0,61	0,21	1,55
MZ/MZK 8	0,24	1,71	0,24	1,67	0,21	1,49	0,06	0,40	0,10	0,68	0,26	1,81	0,09	0,62	0,29	2,06
MZ/MZK 10 [1]	0,17	1,22	0,17	1,18	0,16	1,09	0,07	0,50	0,12	0,84	0,35	2,45	0,10	0,69	0,29	2,02

F_{rec}: Recommended safe working loads incl. safety factor (μ=7)
F_{eff}: Effective pull out values excl. safety factor
[1] Load values apply to chipboard screws with Ø 6



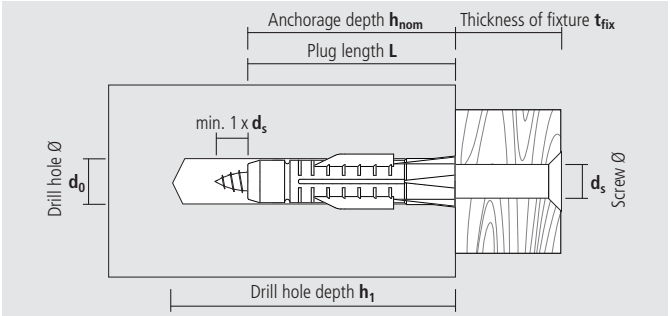
Universal plug AZ and AZK

Universal plug AZ

Universal plug AZK with collar

Advantages

- Suitable for nearly all building materials. In solid building materials the plug's body expands against the drill hole. In perforated building materials, plasterboards, etc. the plug knots
- Usable with wood screws and chipboard screws with different diameters
- High-quality polyethylene guarantees long-lasting elasticity and consequently no brittle breaks, even after years

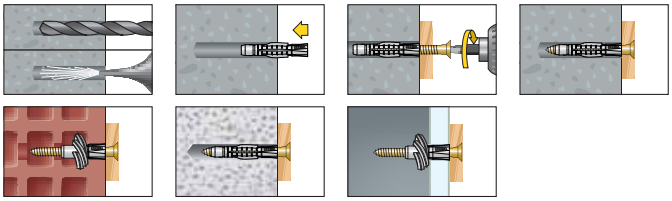


Minimum edge distance: 1x plug length

Suitable building materials

- ✔ Concrete
- ✔ Natural stone
- ✔ Solid brick
- ✔ Solid sand-lime brick
- ✔ Aerated concrete
- ✔ Gypsum blocks
- ✔ Hollow brick
- ✔ Hollow sand-lime brick
- ✔ Lightweight hollow concrete blocks
- ✔ Plasterboard
- ✔ Chipboard

Mounting



AZ without collar

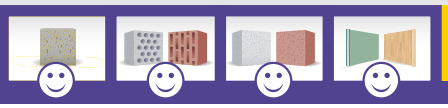
Type	Art-No new	Art-No old	d_0 [mm]	$h_1 \geq$ [mm]	$h_{nom} \geq$ [mm]	L [mm]	h_{min}[1] [mm]	d_s [mm]	Price €/ 100 pcs	Packing [pcs]	Packing [pcs]
AZ 5	95AZ	501460	5	40	30	30	7,0	3-4		100	4800
AZ 6	96AZ	501462	6	50	37	37	9,5	4-5		100	4800
AZ 8	98AZ	501464	8	60	50	50	12,5	5-6		100	1800
AZ 10	910AZ	501466	10	75	60	60	15,0	7-8		50	900
AZ 12	912AZ	501468	12	85	70	70	18,0	8-10		25	450

[1] Min. thickness of structural part or board (e. g. for applications in plasterboard)

AZK with collar

Type	Art-No new	Art-No old	d_0 [mm]	$h_1 \geq$ [mm]	$h_{nom} \geq$ [mm]	L [mm]	h_{min}[1] [mm]	d_s [mm]	Price €/ 100 pcs	Packing [pcs]	Packing [pcs]
AZK 5	95AZK	501470	5	40	30	31	7,0	3-4		100	4800
AZK 6	96AZK	501472	6	50	37	38	9,5	4-5		100	2700
AZK 8	98AZK	501474	8	60	50	51	12,5	5-6		100	1800
AZK 10	910AZK	501476	10	75	60	61	15,0	7-8		50	900
AZK 12	912AZK	501478	12	85	70	71	18,0	8-10		25	450

[1] Min. thickness of structural part or board (e. g. for applications in plasterboard)



Universal plug AZ and AZK

Loads for wood screws F_{rec} and F_{eff} for the largest applicable screw diameter and full anchorage depth

Type	d_s	Concrete C20/25		Hollow brick HLz 12		Hollow brick Poroton T12		Hollow sand-lime brick KSL 12		Solid stone KS12 / Solid brick MZ 12		Aerated concrete P2		Plasterboard 12,5 mm		Plasterboard 2 x 12,5 mm	
	[mm]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]
AZ 5	4	0,16	1,14	0,21	1,49	0,10	0,72	0,17	1,19	0,16	1,11	0,03	0,19	0,07	0,48	–	–
AZ 6	5	0,23	1,61	0,23	1,60	0,13	0,93	0,34	2,35	0,19	1,36	0,05	0,37	0,09	0,64	–	–
AZ 8	6	0,46	3,22	0,32	2,22	0,15	1,02	0,31	2,19	0,27	1,89	0,06	0,43	0,09	0,65	–	–
AZ 10	8	1,25	8,78	0,31	2,15	0,19	1,33	0,52	3,66	0,86	6,02	0,11	0,79	0,09	0,65	0,17	1,22
AZ 12	10	1,47	10,28	0,35	2,46	0,25	1,73	0,48	3,38	0,91	6,36	0,20	1,39	–	–	0,22	1,56

F_{rec}: Recommended safe working loads incl. safety factor (μ=7)
F_{eff}: Effective pull out values excl. safety factor

Loads for chipboard screws F_{rec} and F_{eff} for the largest applicable screw diameter and full anchorage depth

Type	d_s	Concrete C20/25		Hollow brick HLz 12		Hollow brick Poroton T12		Hollow sand-lime brick KSL 12		Solid stone KS12 / Solid brick MZ 12		Aerated concrete P2		Plasterboard 12,5 mm		Plasterboard 2 x 12,5 mm	
	[mm]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]	F_{rec} [kN]	F_{eff} [kN]
AZ 5	4	0,07	0,47	0,24	1,68	0,14	0,97	0,15	1,03	0,12	0,84	0,02	0,14	0,06	0,45	–	–
AZ 6	5	0,11	0,80	0,27	1,86	0,12	0,82	0,30	2,10	0,12	0,84	0,05	0,37	0,08	0,54	–	–
AZ 8	6	0,16	1,14	0,22	1,54	0,13	0,92	0,34	2,38	0,18	1,26	0,07	0,46	0,09	0,61	–	–

F_{rec}: Recommended safe working loads incl. safety factor (μ=7)
F_{eff}: Effective pull out values excl. safety factor

Aerated concrete plug GB

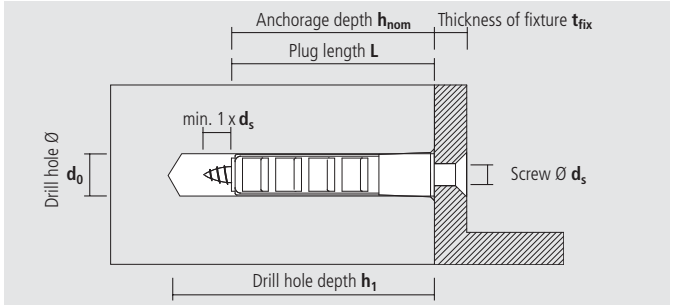
GB 12

Advantages

- Specialised plug with excellent pull out values in aerated concrete; to be used with wood screws
- The GB 12 is approved by DIBt, Germany, combined with Apolo MEA safety screws SSS (see page 100)
- Once the screw has been screwed in, the expansion force is transferred over three flanks optimally by developing a type of undercut
- All Apolo MEA aerated concrete plugs can also be hammered into a smaller drill hole in P4 aerated concrete; generally even without pre-drilling in P2

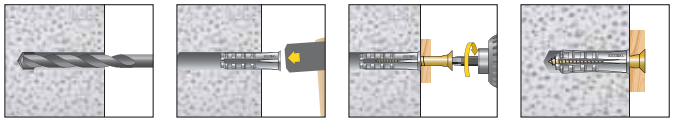
Suitable building materials

✔ Aerated concrete
✔ Gypsum blocks



Minimum edge distance: 1x plug length

Mounting



GB

Type	Art-No new	Art-No old	d_0* [mm]	$h_1 \geq$ [mm]	$h_{nom} \geq$ [mm]	L [mm]	d_s [mm]	Price €/ 100 pcs	Packing [pcs]	Packing [pcs]
GB 10**	910GB	502010	10	65	55	55	4,5 - 6		25	675
GB 12	912GB	502012	12	70	60	60	7 - 8		20	540
GB 14	914GB	502014	14	90	75	75	10		10	270

* All GB sizes can be hammered into smaller drill holes when used in aerated concrete P4
** GB 10 can be hammered into aerated concrete P2 without pre-drilling a hole

Loads F_{rec} and F_{eff}

Type	Wood screws Ø [mm]	Aerated concrete P2 F_{rec} [kN]	Aerated concrete P2 F_{eff} [kN]	Aerated concrete P4 F_{rec} [kN]	Aerated concrete P4 F_{eff} [kN]
GB 10	6	0,25	1,5	0,55	3,3
GB 12*	SSS 7	0,30	2,5	0,50	4,4
GB 14	10	0,50	3,0	1,10	6,7

F_{rec}: Recommended safe working loads incl. safety factor (μ=6)
F_{eff}: Effective pull out values excl. safety factor
* GB 12 approved by DIBt, Germany, in conjunction with apolo MEA safety screws SSS Ø 7 mm (see following table)

Loads F_{per} as well as spacing and edge distance for GB 12 according to DIBt approval

Type	Aerated concrete PB2 / PP2 F_{per} [kN]	Aerated concrete PB4 / PP4 F_{per} [kN]	Aerated concrete PB6 / PP6 F_{per} [kN]	Spacing a ≥ PB2 / PP2 [mm]	Spacing a ≥ ≥ PB4 / PP4 [mm]	Edge distance $a_r \geq$ PB2 / PP2 [mm]	Edge distance $a_r \geq$ ≥ PB4 / PP4 [mm]	Min. thickness of structural part d [mm]
GB 12	0,30	0,50	0,80	150	200	100	150	120

F_{per}: Permissible load for loads in any direction (tension, pressure, diagonal)
For further information please refer to the approval

Scaffold plug GR

Scaffold plug GR

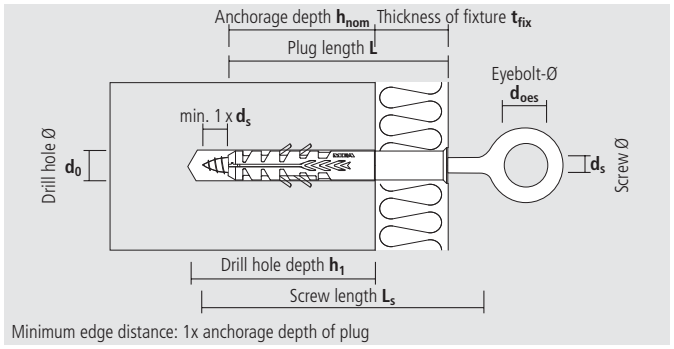
Eyebolt screw OES

Advantages

- Specialised plug for all scaffold installations in solid building materials in according to DIN 4420 and the guidelines of the German professional construction associations
- Nylon Plug GR matches optimally with the eyebolt OES for high pull out values
- Markings on the eyebolt screw help to screw in the screw with the correct depth
- Cover cap AK to seal the plug

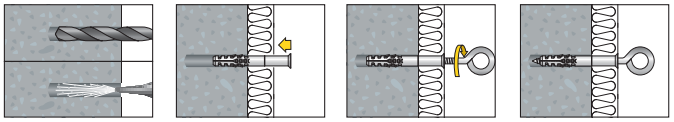
Suitable building materials

✔ Concrete
✔ Solid brick
✔ Natural stone
✔ Solid sand-lime brick



Minimum edge distance: 1x anchorage depth of plug

Mounting



GR

Type	Art-No new	Art-No old	d_0 [mm]	$h_1 \geq$ [mm]	$h_{nom} \geq$ [mm]	L [mm]	$t_{fix} \leq$ [mm]	Price €/ 100 pcs	Packing [pcs]	Packing [pcs]
GR 14-70	91470GR	502510	14	90	70	70	0		40	320
GR 14-100	914100GR	502512	14	90	70	100	30		40	320
GR 14-135	914135GR	502514	14	90	70	135	65		40	320
GR 14-185	914185GR	502508	14	90	70	185	115		40	320

Loads F_{eff} using eyebolt screws OES Ø 12

Type	Concrete C20/25 F_{eff} [kN]	Solid brick MZ 12 F_{eff} [kN]	Solid sand-lime brick KSV 12 F_{eff} [kN]
GR 14	15,0	14,0	15,0

F_{eff}: Effective pull out values/Ultimate loads excl. Safety factors

OES, zinc plated

Type	Art-No new	Art-No old	d_s [mm]	L_s [mm]	d_{oes} [mm]	Price €/ 100 pcs	Packing [pcs]
OES 12-90	91290OES	502522	12	90	23		20
OES 12-120	9121200ES	502524	12	120	23		20
OES 12-160	9121600ES	502526	12	160	23		20
OES 12-190	9121900ES	502528	12	190	23		20
OES 12-230	912230OES	502530	12	230	23		20
OES 12-300	912300OES	502534	12	300	23		20
OES 12-350	912350OES	502532	12	350	23		20

AK for GR

Type	Art-No new	Art-No old	Suitable for d_s [mm]	Length [mm]	Price €/ 100 pcs	Packing [pcs]	Packing [pcs]
Cover caps AK	91AKGR	502540	GR 14	53		50	600

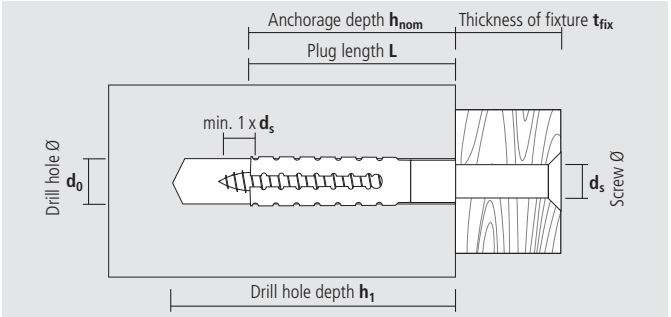
Blockwork anchor MSD

Advantages

- Suitable for fastening water pipes with pipe clamps using wood screws and chipboard screws
- When used with hanger bolts, Blockwork anchor MSD complies the technical guidelines for gas pipe installations (TRGI 3.3.7.2.)
- Toothed surface provides a secure grip in different base materials

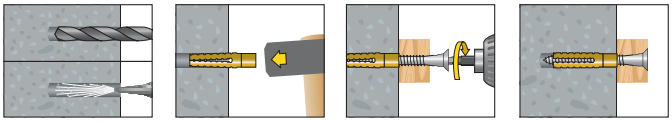
Suitable building materials

- ✔ Concrete
- ✔ Natural stone
- ✔ Solid brick
- ✔ Solid sand-lime brick
- ✔ Lightweight solid concrete blocks
- ✔ Aerated concrete
- ✔ Lochsteine
- ✔ Hollow brick



Minimum edge distance: 1x plug length

Mounting



MSD

Type	Art-No new	Art-No old	d_0 [mm]	$h_1 \geq$ [mm]	$h_{nom} \geq$ [mm]	L [mm]	d_s [mm]	Price €/ 100 pcs	Packing [pcs]	Packing [pcs]
MSD 6-32	9B632MSD	503605	7-9*	38	32	32	5-6		100	2000
MSD 8-38	9B838MSD	503610	10-12*	46	38	38	6-8		100	2000
MSD 8-60	9B860MSD	503615	10-12*	68	60	60	6-8		50	1000

* depending on building material, see following table

Loads F_{eff} at largest applicable screw diameter and full anchorage depth

Type	Concrete C20/25		Solid sand-lime brick		Solid brick MZ 12		Aerated concrete P2		Aerated concrete P4		Lightweight solid concrete blocks		Hollow brick HLz 12	
	d_0 [mm]	F_{eff} [kN]	d_0 [mm]	F_{eff} [kN]	d_0 [mm]	F_{eff} [kN]	d_0 [mm]	F_{eff} [kN]	d_0 [mm]	F_{eff} [kN]	d_0 [mm]	F_{eff} [kN]	d_0 [mm]	F_{eff} [kN]
MSD 6-32	9	1,4	8	1,2	8	1,2	ohne	0,6	7	1,2	5	0,9	7	0,9
MSD 8-38	12	1,8	11	1,6	11	1,6	ohne	1,2	10	2,1	6	1,2	10	1,5
MSD 8-60	12	3,2	11	2,9	11	2,9	6	1,8	10	2,7	6	1,8	10	1,65

F_{eff}: Effective pull out values excl. safety factor