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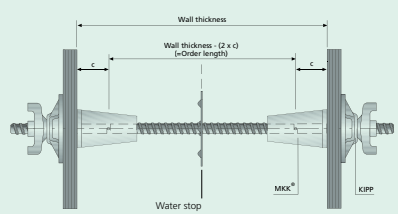
Anchoring technology Tie rods

Applications, properties, benefits

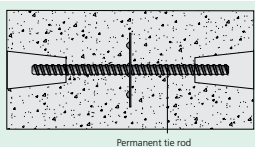
**BETOMAX® tie rods – The all-purpose solution for modern shuttering:**

- Depending on the type, BETOMAX® tie rods have working loads up to 240 kN
- Weldable (see system description for welding conditions)
- Load limit for accessories according to DIN 18216
- BETOMAX® - All-round thread makes BETOMAX® tie rods especially resistant to vibrating
- BETOMAX® - tie rods can be bent (e.g. loops, round and angle hooks, pigtail anchors)
- BETOMAX® - tie rods are compatible with Uni-system accessories 15 / 20 / 26.5

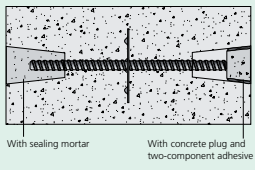
Tie rod installed



Tie rod after removal of shuttering



After closing conical holes



**BETOMAX® 15**

Approved by German building authority No. Z-12.5-82  
 Weldable and bendable tie rod with all-round thread.  
 Compatible with all Uni 15 system accessories.  
 Various dimensions and galvanization available on request.



Item No.	Length cm/m	Packing unit	Weight kg/piece
18550200	20.00 cm	1 piece	0.310
18550250	25.00 cm	1 piece	0.390
18550300	30.00 cm	1 piece	0.470
18550350	35.00 cm	1 piece	0.540
18550400	40.00 cm	1 piece	0.620
18550500	50.00 cm	10 pieces/bundle	0.780
18550750	75.00 cm	10 pieces/bundle	1.160
18550850	85.00 cm	10 pieces/bundle	1.320
18551000	1.00 m	10 pieces/bundle	1.550
18551250	1.25 m	10 pieces/bundle	1.940
18551500	1.50 m	10 pieces/bundle	2.330
18551750	1.75 m	10 pieces/bundle	2.710
18552000	2.00 m	10 pieces/bundle	3.100
18552250	2.25 m	5 pieces/bundle	3.490
18552500	2.50 m	5 pieces/bundle	3.890
18553200	3.20 m	5 pieces/bundle	4.960
18559999	* 6.40 m	1 piece	9.920

\* Useful length approx. 6.30 m.

**BETOMAX® 20**

Weldable and bendable tie rod with all-round thread.  
 Compatible with all Uni 20 system accessories.

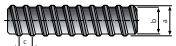


Item No.	Length m	Packing unit	Weight kg/unit
14529999	*6.35 m	piece	16.510/pc.
14528888	Various dim.	metre + make-up supplement	2.600/m

\* Useful length approx. 6.25 metre.

**BETOMAX® 26.5**

Weldable and bendable tie rod with all-round thread.  
 Compatible with all Uni 26.5 system accessories.



Item No.	Length m	Packing unit	Weight kg/unit
17539999	*6.30 m	piece	28.980/pc.
17538888	Various dim.	metre + make-up supplement	4.600/m

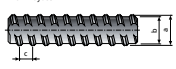
\* Useful length approx. 6.20 metre.

**Technical data**

	B 15	B 20	B 26.5
External diameter a	17.0 mm	22.0 mm	30.0 mm
Core diameter b	15.0 mm	20.0 mm	26.5 mm
Pitch c	10.0 mm	10.0 mm	13.0 mm
Working load	<sup>1)</sup> 165 kN	150 kN	240 kN
Breaking load	142 kN	300 kN	510 kN
Yield point <sup>1)</sup>	1.15	<sup>1)</sup> Values comply with approval specification	
Partial safety factor for tie rod <sup>1)</sup>	1.50		
Partial safety factor for acting load <sup>1)</sup>	1.50		

**Uni 15® / 20**

\* Approved by German building authority No. Z-12.5-81  
 Tie rod made of non-weldable pre-stressed steel.  
 D&W system



Item No.	Desig.	Length mm	Packing unit	Weight kg/metre
20598888	Uni 15	Various dim.	metre + make-up supplement	1.440
22538888	Uni 20	Various dim.	metre + make-up supplement	2.500

**Technical data**

	Uni 15	Uni 20
External diameter a	17.0 mm	22.0 mm
Core diameter b	15.0 mm	20.0 mm
Pitch c	10.0 mm	10.0 mm
Working load	90 kN	160 kN
Breaking load	190 kN	340 kN

Tie rods continued on page 5

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Anchoring technology Tie rods / Tools / Waler plates

**KO 10 round thread**

- Made from hot-rolled round steel
- Chemical compositions equivalent to that for BSt 500 construction steel.
- Highly wear-resistant thread around the entire circumference
- Good welding properties



Item No.	Length m	Packing unit piece	Weight kg/metre
11509999	*6.10 m	piece	0.500
11508888	Various dim.	metre	0.500

\* Useful length approx. 6.00 metre

**Technical data**

External diameter a  
 Core diameter b  
 Pitch c  
 Working load  
 Breaking load  
 Mandrel Diameter

**KO 10**

9.6 mm  
 8.1 mm  
 4.0 mm  
 15 kN  
 32 kN  
 90.0 mm

**Stud spanner**

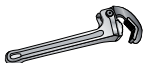
For tightening and releasing tie rods.



Item No.	for tie rods type	Packing unit piece	Weight kg/piece
90200400	BETOMAX® B 15	1	1.640

**Universal spanner**

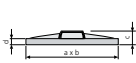
Ratchet spanner with spring-loaded hook jaw. For tightening and releasing tie rods.



Item No.	for tie rods type	Packing unit piece	Weight kg/piece
90200440	B 15/B 20/B 26.5 Ø max. 37.5 mm	1	0.760
90200442	B 15/B 20/B 26.5 Ø max. 50 mm	1	1.600

**Waler plate TE**

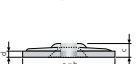
Cast and galvanized.



Item No.	Hole Ø mm	Plate size a x b x c x d mm	Packing unit pieces/bundle	Weight kg/piece
10121218	20	120x120x28x8	10	0.820

**Steel waler plate**

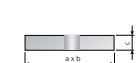
Pressed and galvanized.



Item No.	Hole Ø mm	Plate size a x b x c x d mm	Packing unit pieces/bundle	Weight kg/piece
10121020	20	120x120x20x10	10	1.100
11011092	12	110x110x20x5	10	0.450

**Steel waler plate plain**

Plain design, galvanized.

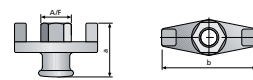


Item No.	Hole Ø mm	Plate size a x b x c mm	Packing unit pieces/bundle	Weight kg/piece
10121225	25	120x120x20	10	2.120
10121234	34	120x120x20	10	2.100

Accessories' loadability according to DIN 18216

**Wing nut**

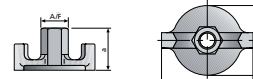
Compatible with Uni 15 and 20, galvanized.



Item No.	Thread	Dimension a x b mm	A/F mm	Packing unit pieces/bag	Weight kg/piece
20472000	B 15	55/85	27	50	0.310
14473000	B 20	60/110	36	25	0.410

**Waler wing nut Ø 70**

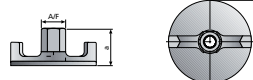
Galvanized. Compatible with Uni 15.



Item No.	Thread	Dimension a x b x c mm	A/F mm	Packing unit pieces/bag	Weight kg/piece
20480700	B 15	50x95x70	27	50	0.406

**Waler wing nut Ø 110**

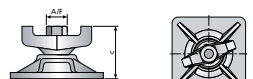
Forged with tapped thread, galvanized. Compatible with Uni 15.



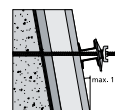
Item No.	Thread	Dimension a x b mm	A/F mm	Packing unit pieces/bag	Weight kg/piece
20481100	B 15	50x110	27	25	0.920

**KIPP**

Galvanized swivel-joint plate. For use with inclined shuttering. Compatible with Uni 15.

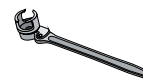


Item No.	Thread	Dimension a x b x c mm	A/F mm	Packing unit pieces/bag	Weight kg/piece
20021230	B 15	120x120x66	27	10	1.100
20021350	B 15	135x185x66	27	10	1.850



**Wing nut spanner**

Securely seated with stem and grips. No risk of accidents caused by slipping off.



Item No.	for wing nuts	Packing unit piece	Weight kg/piece
91218200	B 15	1	2.500

Accessories' loadability according to DIN 18216

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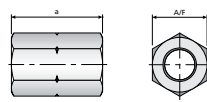
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Anchoring technology Screwed fastenings

**Hex nut**

Made of free-cutting steel. Compatible with Uni-rods. Not for strength welding!

Quality S 355 (St 52-3) on request. Weldable



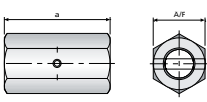
Item No.	Thread	Height a mm	A/F mm	Packing unit pieces/bag	Weight kg/piece
20430100	B 15	50	30	100	0.210
20440230*	B 15	25	30	250	0.105
14430400	B 20	60	36	50	0.500
21430800	B 26.5	80	46	25	0.800
11430700	KO 10	20	17	30	0.130

\* Use only as a locknut (St 52-3).

**Threaded connecting sleeve**

Made of free-cutting steel, with stop pin, for extending tie rods. Compatible with Uni-rods. Not for strength welding!

Quality S 355 (St 52-3) on request. Weldable

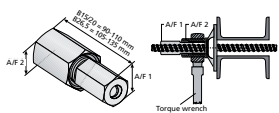


Item No.	Thread	Height a mm	A/F mm	Packing unit pieces/bag	Weight kg/piece
20450100	B 15	105	30	50	0.440
14450800	B 20	110	36	50	0.650
21450700	B 26.5	150	46	10	1.400

**Pre-tension nut**

Made of free-cutting steel. Fine-pitch thread for pre-tensioning. Compatible with Uni-rods.

Observe maximum unscrewed length!



Item No.	Designation	A/F1 mm	A/F2 mm	Packing unit pieces	Weight kg/piece
20451820	Pre-tension nut B 15	30	41	1	0.670
14451120	Pre-tension nut B 20	36	46	1	0.780
21451260	Pre-tension nut B 26.5	46	60	1	1.320

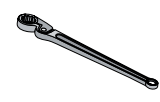
Torque settings	Pre-tensioning force				
	10 kN	30 kN	50 kN	70 kN	90 kN
B 15	55 Nm	170 Nm	280 Nm	400 Nm	520 Nm
B 20	58 Nm	180 Nm	300 Nm	413 Nm	533 Nm
B 26,5	65 Nm	185 Nm	315 Nm	445 Nm	575 Nm

Accessories' loadability according to DIN 18216

Tools

**Ratchet spanner**

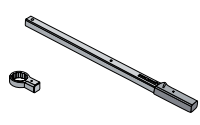
For hex nuts and threaded connecting sleeves.



Item No.	A/F mm	Packing unit piece	Weight kg/piece
91024500	24	1	0.500
91027400	27	1	0.500
91030500	30	1	0.810
91036300	36	1	1.270
91046900	46	1	2.400

**Torque wrench**

Torque wrench for variable torque settings. (see table Pre-tension nut).

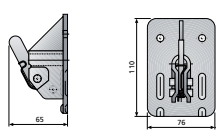


Item No.	Designation	Packing unit piece	Weight kg/piece
91145200	Torque wrench 200 Nm	1	1.440
91147240	Torque wrench 400 Nm	1	1.580
91149270	Torque wrench insert A/F 27	1	0.180
91149300	Torque wrench insert A/F 30	1	0.220
91149410	Torque wrench insert A/F 41	1	0.260

Inserts for A/F 46 and 60 available on request

**Tension jack**

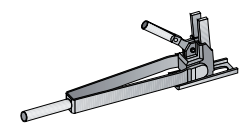
Reinforced tension jack, galvanized, with spring. For prestressing wire from 5 to 10 mm. Maximum load 10 kN for Ø 10 mm according to DIN 18216.



Item No.	Designation	Packing unit	Weight kg/piece
27301100	Tension jack	25 pcs./bundle 50 pcs./bag	0.470

**Tension lever**

Tension lever for tension jack.



Item No.	Designation	Packing unit piece	Weight kg/piece
27311700	Tension lever	1	3.430

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Anchoring technology Water stops / Cones

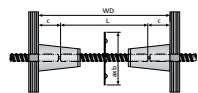
BETOMAX<sup>®</sup> - water stops – Applications, properties, benefits

- 120 x 120 mm square water stop offers best protection against infiltration of water
- Molded round water-stop plate, 120 mm diameter, ensures greatest possible protection against lateral infiltration of water.
- Water stop with studs improves bonding with concrete and resistance to torsional stress. Compliance with striking time is essential.
- Conical holes can be closed with mortar or a concrete plug when the cone is removed
- In conjunction with Cone EX, the concrete cover is 35 or 50 mm
- Concrete cover c with MKK<sup>®</sup> B15 is 50 mm

**Water stop, welded on**

*Inspection report*

120 x 120 mm square water stop ensures water impermeability. Studs improve bonding with concrete



Item No.	Thread	Plate size a x b mm	Packing unit piece	Weight kg/piece
10291812	B 15	120x120	1	0.320
10291412	B 20	120x120	1	0.320
10291712	B 26.5	120x120	1	0.320

Calculation of tie rod cut length (L):  $L = WD - 2c$

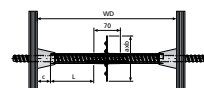
Cut length rod must be ordered separately.

**Water stop B15, square\***

*\*Inspection report*

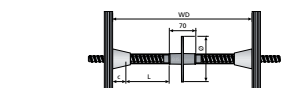
**Water stop B15, round**

Compatible with Uni 15. The water stop B 15 has two sockets for accommodating Dist K-26 rough cut tubes with a tight seal. This prevents wet cement from entering and concreting in the tie rod. Studs improve bonding with concrete. Reducing adapters are available for Dist K-22 and Dist FB-22. The 70 mm dimension becomes 125 mm if a reducing adapter is used.



Calculation of tie tube cut length (L):  $L_{K-26} = WD - 2c - 70$

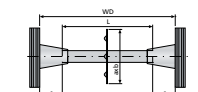
Calculation of tube cut length (L) with reducing adapter and K22 or FB22:  $L_{K-22/FB22} = \frac{WD - 2c - 125}{2}$



**Water stop St 22, welded on**

*Inspection report*

On Dist St-22. Prevents infiltration of water. The steel tube is closed watertight with the FLUPP St plug. Cone EX with 35 or 50 mm cover. Once the cone is removed, the conical hole has to be closed with mortar or a concrete plug.



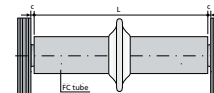
Item No.	Plate size a x b mm	Packing unit piece	Weight kg/piece
10290311	120x120	1	0.320

Calculation of tube cut length (L):  $L = WD - 2c$

Cut length of tube must be ordered separately (see Tubular spreader technology).

**SD - water stop**

Swelling-active SD water stop reliably prevents lateral water infiltration. Is fitted with the BETOMAX<sup>®</sup> SD installation pliers



- New type of sealing ring on a synthetic elastomer basis
- Automatic swelling responds to moisture and wetness
- Defined swelling capacity designed specifically for sealing purposes
- Universally applicable with fiber-reinforced concrete, steel distance tubes and plastic tubes with diameters ranging from 22 to 40 mm
- Simplest installation and reliable handling with the special BETOMAX<sup>®</sup> SD installation pliers

Item No.	Designation	Ø inside/outside mm	Packing unit	Weight kg/unit
61922888	Fibrous concrete spacer tube 22, cut length	22/40	piece	1.760
63122130	Plastic spacer tube K-22 rough, cut length	22/26	metre	0.210
63126190	Plastic spacer tube K-26 rough, cut length	26/30	metre	0.240
63132190	Plastic spacer tube K-32 rough, cut length	32/36	metre	0.285
62022150	Steel spacer tube St-22, cut length	24.8/26	metre	0.378
61822381	SD ring seal		piece	0.056
61822400	SD installation pliers		piece	0.313

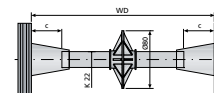
Calculation of tube cut length Dist (L):  $L = WD - 2c$

Cut length of tube must be ordered separately.

**WARO - tube water stop**

WARO prevents infiltration of water when it is slipped onto Dist K-22 plastic tubing. Moisture the sealing ring and tube first in order to facilitate mounting.

Important: Not suitable for pressure water.

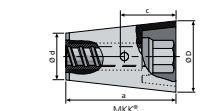


Item No.	Designation	Packing unit	Weight kg/100 pcs.
60022100	WARO-tube water stop	100	2.720

**MKK<sup>®</sup>**

Metal-plastic cone for multiple use in concrete. Compatible with Uni-rods.

Application: see e.g. **water stop, welded on**

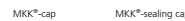


Item No.	Thread	Packing unit	Weight kg/piece
18402000	B 15	25	0.590
14402000	B 20	25	0.770
21408000	B 26.5	10	1.670

MKK<sup>®</sup> cap for flush sealing of the MKK<sup>®</sup> on the formwork. MKK<sup>®</sup> sealing cap for sealing the MKK<sup>®</sup> on rough surfaces with tilt equalisation up to 3°.

Dimensions MKK <sup>®</sup> :	a mm	Ø D mm	Ø d mm	c mm	A/F mm
B 15	95	61	40	50	27
B 20	126	70	42	65	32
B 26.5	135	103	57	70	46

Close the conical holes with BETOMAX<sup>®</sup> sealing mortar, the special sealing mortar or concrete plugs with two-component adhesive (see Building materials technology).



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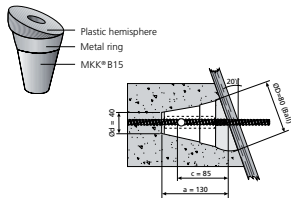
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Anchoring technology Cones / Accessories / Tools

**MKK® Vario B15**

The MKK® Vario consists of a galvanized ring and a plastic hemisphere. Together with the angle adapter, the MKK® Vario B15 can be used to offset any angle up to 20°.



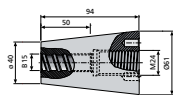
Item No.	Designation	Packing unit	Weight
		piece	kg/piece
18403000	MKK® Vario B15	1	0.810
18403100	Vario B15 angle adapter	1	0.310

**Assembly:**  
 The MKK® Vario B15, carrying the ring, is placed in the shuttering. The hemisphere is placed on the tie rod and forced into the ring with the aid of the shuttering.

**Applications:**  
 Curved structures, e.g. tunnel entrances, and haunching, e.g. at base/wall transition of settling tanks.

**SKK®**

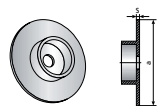
The SKK® BETOMAX® 15 steel climbing cone is used in conjunction with the BETOMAX® 15 tie rod and an M 24 bolt. It is used wherever the MKK® B15 is selected as the leading cone. The SKK® is tightened and released with the special SKK® spanner. Compatible with Uni 15.



Item No.	Designation	Packing unit	Weight
		pieces/bag	kg/piece
18405400	SKK® BETOMAX®15	10	1.270
18469300	Nailable plate M24, galvanized	1	0.100

**Cap for MKK®**

Prevents penetration of MKK® by concrete.



Item No.	for MKK®	Packing unit	Weight
		pieces/bag	kg/piece
18409100	B 15	50	0.004
14409200	B 20	50	0.006
21409300	B 26.5	50	0.011

**Dimensions cap for MKK®:**

	a	s
B 15	63	2
B 20	68	2
B 26.5	103	2

**MKK® - sealing cap B15**

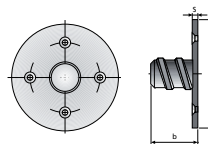
For sealing the MKK® on rough surfaces with tilt equalisation up to 3°.



Item No.	for MKK®	Packing unit	Weight
		pieces/bag	kg/piece
18409300	B15	25	0.053

**Nailable plate for MKK®**

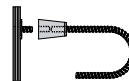
For securing the MKK® BETOMAX® 15, for example, when used as a leading cone. The nailable plate is fixed to the formwork.



Item No.	Designation	Packing unit	Weight
		piece	kg/piece
20469300	B 15	1	0.100
14469300	B 20	1	0.190
17651000	B 26.5	1	0.200

**Dimensions nailable plate:**

	a	b	s
B 15	58	25	3
B 20	70	27	3
B 26.5	100	27	3



**Special-MKK® - spanner**

For removing the MKK®. Cannot tilt, no risk of accidents caused by slipping off.

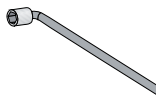
Item No.	for MKK®	Packing unit	Weight
		piece	kg/piece
90418000	B 15	1	2.450
90414600	B 20	1	2.860
90423400	B 26.5	1	7.320



**Cranked box spanner**

An inexpensive alternative for unscrewing the MKK® without the benefits of the special MKK® spanner.

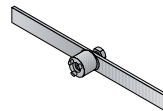
Item No.	for MKK®	A/F mm	Packing unit	Weight
			piece	kg/piece
90227100	B 15	27	1	1.150
90230200	B 20	32	1	1.620



**Special-SKK® - spanner**

For releasing the SKK®

Item No.	for SKK®	Packing unit	Weight
		piece	kg/piece
91318000	B 15	1	4.040



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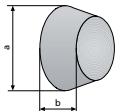
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Anchoring technology Cones / Accessories

**Concrete plug for MKK®**

Inspection report

For closing conical holes. Bonded in with two-component adhesive. 1 kg of adhesive is sufficient for approx. 40 B 15 plugs.



Item No.	for MKK®	Dimensions a / b mm	Packing unit pieces/box	Weight kg/piece
18392015	B 15	60 / 49	75	0.240
14392020	B 20	67 / 50	60	0.337
21393000	B 26.5	102 / 60	25	0.700

**2-component adhesive**

Inspection report

Epoxy resin adhesive. For making waterproof resilient joints with concrete plugs. The components are colour-coded: component A is white, component B black. Mixing ratio 1:1. Reaction temperature 50-60°C

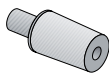


Item No.	for MKK®	Packing unit	Weight kg/components A+B
61800200	2-comp. adhesive	1 pot each	2 x 1.500
61800300	2-comp. adhesive	Twin cartridge A+B	1.430
61800310	2-comp. injection gun	each	1.220

**SBK® / CBK®**

Steel-concrete cone, remains in concrete.

Closed flush with fibrous concrete plug 22/20. Compatible with Uni 15.



Item No.	Thread	Work. load	Packing unit pieces/box	Weight kg/piece
SBK® 20425000	B 15	90 kN	40	0.820
CBK® 20426500	B 15	75 kN	50	0.440

Dimensions SBK®/CBK®:		a	c	D	d
SBK® B 15		136	100	58	52
CBK® B 15		108	75	52	48

Permanent tie rod length = WD - 2c

**Fibrous concrete plug**

Makes flush seal for SBK®/CBK®.

Watertight seal obtained with two-component adhesive.



Item No.	Ø mm	Length mm	Packing unit pieces/bag	Weight kg/1000 pcs.
61800320	22	20 (CBK®)	1000	13.600
61800350	22	50 (SBK®)	500	38.000

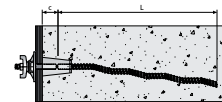
Single-ended rods

**Pigtail anchor**

Made from weldable and bendable BETOMAX® tie rods 15, 20 and 26.5

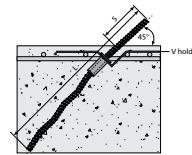
- For one-ended anchoring in concrete
- For use as permanent (internal) tie rods
- Also for use in conjunction with cones, e.g. for climbing formwork

Item No.	Thread	Packing unit pieces/bundle	Weight kg/piece
18560550	B 15	10	0.852
14560590	B 20	5	1.820
17560600	B 26.5	1	4.600



Dimensions pigtail anchor:

	L	c	S
B 15	550	50	70
B 20	700	65	80
B 26.5	800	70	100

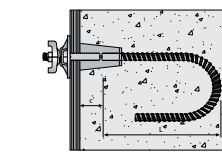


**Round hook**

Made from weldable and bendable BETOMAX® tie rods 15, 20 and 26.5

- Same applications as pigtail anchor, but also for smaller wall thicknesses

Item No.	Thread	Packing unit pieces/bag	Weight kg/piece
18570250	B 15	25	0.670
18570450	B 15	25	0.980
14570500	B 20	1	2.250
17570650	B 26.5	1	4.630



Dimensions round hook:

	L	c
B 15	250	50
B 15	450	50
B 20	500	65
B 26.5	650	70



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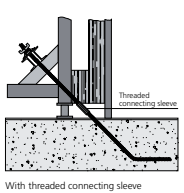
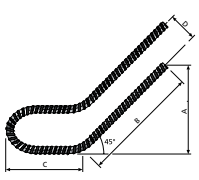
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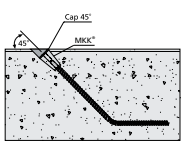
Anchoring technology Single-ended rods

**Anchor loop**

- Made from weldable and bendable BETOMAX® tie rods 15, 20 and 26.5
- For anchoring supports, for single-sided formwork
- Installed in first concreting section, in floor slab
- Can be extended with threaded connecting sleeve and MKK®



With threaded connecting sleeve



With MKK® and cap 45°

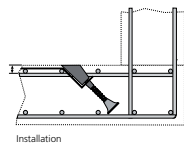
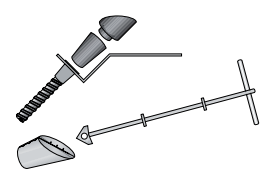
Item No.	Thread	Packing unit, piece	Weight kg/piece
18581750	B 15	1	2.710
14581530	B 20	1	3.900
17581620	B 26.5	1	9.200

**Load numbers**  
(referred to one leg):

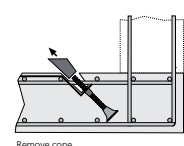
Working loads	Breaking loads	Thread	A	B	C	D
85 kN	160 kN	B 15	30	40	30	23
150 kN	300 kN	B 20	30	40	30	30
245 kN	520 kN	B 26.5	35	45	45	30

**Finishing Cone B15 / B20 / B26,5**

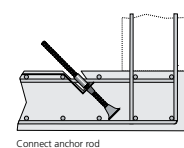
The finishing cone for the perfect concrete surface.  
 Example: execution with Finishing Cone B15



Installation



Remove cone



Connect anchor rod

Item No.	Designation	Packing unit, pieces	Weight kg/piece
18402000	MKK Betomax 15	25	0.500
18409145	MKK Cap 45° B15	50	0.040
18409146	Sealing washer for MKK slope compensation	100	0.001
18581200	Anchor Bracket B15	1	0.500
14409245	Finishing Cone B20 45°	40	0.090
14581200	Anchor Bracket B20 45°	1	0.500
21409245	Finishing Cone B26.5 45°	40	0.090
17581200	Anchor Bracket B26.5 45°	1	0.500
90414500	Extraction tool	1	0.320

**Features, properties:**

- Recessed installation of the lost anchor rod
- Cone can be fitted at precisely 45°
- Finishes perfectly flush with the surface
- Cone can be easily removed with the help of the extraction tool (for B20 und B26.5)
- A connecting nut can be easily fitted once the cone has been pulled
- Closing mortaring of the recess with BETOMAX® sealing mortar

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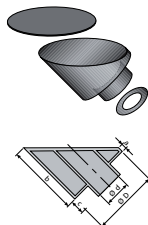
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Anchoring technology Single-ended rods / Accessories

**45° cap B15**

Made of plastic. For use with MKK<sup>®</sup> when installing at 45°.

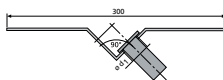


Item No.	Designation	Packing unit pieces	Weight kg/piece
18409145	45° cap B15	1	0.041
18409146	Sealing washer for MKK angle adapter	100	0.001
18409148	Compensation washer 90 x 60 x 10 selfadhesive for MKK 45° angle adjuster	100	0.010

Thread	a	b	c	Ø d	Ø D
B 15	5	70	14	30	65

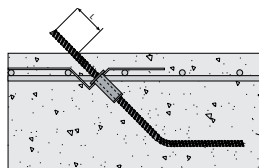
**V Holder**

Steel strip and plastic sleeve for anchoring aids for single-sided wall formwork. For installing tie rods, anchor loops, pigtail anchors, round hooks etc. at 45°.



Item No.	Designation	Ø mm	Packing unit piece	Weight kg/piece
18581000	V Holder B 15	15	1	0.420
14581000	V Holder B 20	20	1	0.420
17581000	V Holder B 26.5	26.5	1	0.420

Thread	Ø d <sub>1</sub>
B 15	25
B 20	32
B 26.5	40



Thread	L
B 15	70
B 20	80
B 26.5	100

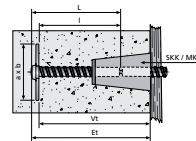
Illustrated with anchor loop  
 L = Projection for fastening with threaded connecting sleeve

**Barrier tie rod**

**Inspection report**

Suitable for use as a one-sided anchor. Typically used for climbing formwork, scaffold anchors and thin-walled structures.

Consists of bendable and weldable B15 threaded tie rod and plate (90 x 120 x 10 mm).



Item No.	Designation	Length mm	Thread	Weight kg/piece
18901016	Barrier tie rod B15	160	B15	1.120
18901099	Barrier tie rod B15 on request	B15	B15	on request

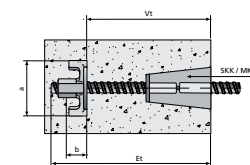
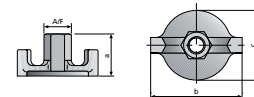
a x b	t	L	l	Vt	Et
90 x 120	10	180	160	210	230

Vt = Anchoring depth  
 Et = Installed depth

Rod failure at max. tensile load

**ROTOR**

Casting, for one-sided anchoring. Max. load depends on the concrete quality and installation depth (Et). Compatible with Uni 15.



Item No.	Designation	Dim. mm a x b x c	A/F mm	Packing unit pieces/bag	Weight kg/piece
20467001	Rotor B 15	50x95x70	27	50	0.406

Concrete quality B 25  
 Vt = 20 cm  
 for 90 kN working load

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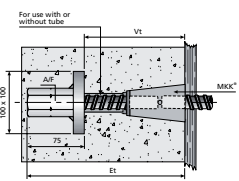


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Anchoring technology Single-ended rods

**End anchor B 20**  
 Inspection report

Made from an anchor plate with welded-on B 20 hexagon nut.  
 For one-sided anchoring. Compatible with Uni 20.



Item No.	Designation	Packing unit piece	Weight kg/piece
14580100	End anchor B 20	1	1.480

Vt = Anchoring depth  
 Et = Installed depth

**Anchoring depth:** Vt = 175 mm  
 (Acc. to test certificate, failing load in concrete 177 kN and concrete quality B25)

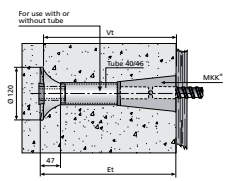
**Falling load in concrete:**  
 235 kN in uncracked concrete  
 177 kN / 181 kN in cracked concrete (test cone dia. restricted to 850 mm)

**Concrete strength:** 30 N / mm<sup>2</sup>

- Max. load depends on the concrete quality and anchoring depth (Vt)

**End anchor B 26.5**  
 Inspection report

Casting for one-sided anchoring.



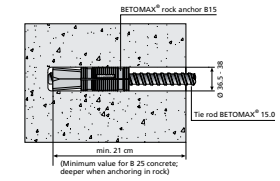
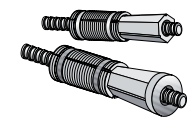
Item No.	Designation	Packing unit piece	Weight kg/piece
17580100	End anchor B 26.5	1	1.320

Vt = Anchoring depth  
 Et = Installed depth

- Max. load depends on the concrete quality and anchoring depth (Vt)

**Rock anchor B15\* / B20**  
 \* Approved by German building authority No. Z-21.6-1827

For securing single-sided formwork in concrete or rock walls.  
 Compatible with Uni 15. Also for attaching ledge consoles to components without concreted-in anchoring parts, e. g. when renovating existing structures.



Item No.	Designation	Packing unit pieces/box	Weight kg/piece
20491810*	Rock anchor B15	50	0.420
14491810	Rock anchor B20	15	1.331
20491880**	Rock anchor testing device	1	17.800
20491812	SDS hammer drill 37 x 570 x 450 mm	1	1.700
90210120	Placing tool for rock anchor B15	1	2.500
90210130	Placing tool for rock anchor B20	1	6.620
90210140	Cleaning brush for rock anchor	1	0.153

\*\* Available for hire on request

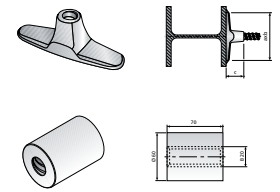
- Bore hole depths / working loads:**
- B15:** Bore hole Ø 36,5-38 mm using a 37 mm drill (recommended)
  - B15:** Bore hole depths for 90 kN working load: min. 21 cm in concrete C20/25
  - B20:** Bore hole Ø 52,0 mm
  - B20:** Bore hole depths: min. 40 cm in concrete C20/25
  - Placing depth in bed rock depending on strength
  - Minimum edge clearance at least 1.5 x bore hole depth
  - Hole spacing at least 3 x bore hole depth
  - Please observe installation instructions

**Conduct tensile test before applying final load**

- Test load can be applied with BETOMAX® rock anchor testing device – **please ask for details**

**FITSCH®**

Forged weld-on part with fillet weld.  
 a = 4 mm. Weld on all round!  
 Steel quality: S 355 (St 52-3) with tapped thread.  
 Compatible with Uni 15.



Item No.	Designation	Dimension mm a x b x c	Packing unit pieces/bag	Weight kg/piece
20198100	FITSCH® B15	130x30x50	50	0.400
14536070	FITSCH® B20	Ø 60 / h=70	1	1.340

- Weld seam's compliance with DIN 18800 to be statically verified

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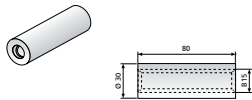
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Anchoring technology Single-ended rods

**Weldable socket B15/80 S 355 (St52-3)**

For tie rods B15; Compatible with Uni 15.



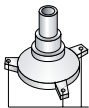
Item No.	Designation	Packing unit <small>(pieces/box)</small>	Weight <small>kg/piece</small>
20198300	Weldable socket B15/80 S 355 (St52-3)	50	0.300

- Weld seam's compliance with DIN 18800 to be statically verified
- Not for use as connecting sleeve
- Socket weldable in longitudinal direction

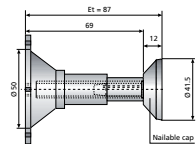
**CLIMAX® anchoring sleeve**

**Inspection report**

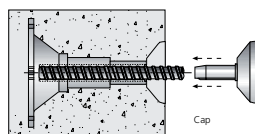
For one-ended anchoring with BETOMAX® 15. Typical applications: bridge floor edge shuttering, consoles, scaffolding and single-sided formwork. Manufactured from fibre-reinforced plastic.



Retaining holes for binding wire



Et = Installed depth



• Falling load in concrete (F) with B25 = 50 kN

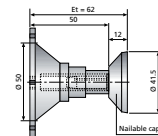
**CLIMAX® - Fifty**

**Inspection report**

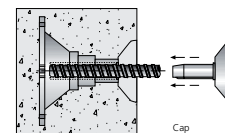
For one-ended anchoring with BETOMAX® 15. Shallow installed depth of 51 mm (sleeve) and 12 mm (nailable cap) for precast concrete cavity walls. Manufactured from fibre-reinforced plastic.



Retaining holes for binding wire



Et = Installed depth



• Falling load in concrete (F) with B25 = 32 kN

Item No.	Designation	Packing unit <small>(pieces)</small>	Weight <small>kg/piece</small>
20468250	CLIMAX®-Fifty sleeve	50	0.047
20468300	CLIMAX® nailable cap	50	0.007
20468400	CLIMAX® cap	50	0.007
20468550	CLIMAX®-Fifty sleeve and nailable cap	50	0.054
92001032	Socket with tommy bar for nailable disc	1	0.340

**Anchoring technology Single-ended rods**

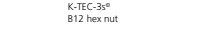
**K-TEC-3s<sup>®</sup> – Applications, properties, benefits**

The BETOMAX<sup>®</sup> K-TEC-3s<sup>®</sup> can be reused several times and combines the benefits of a coarse thread for temporary machine fastening with those of a self-tapping concrete screw.

- Numerous applications**  
 Suitable for all temporary fastening requirements for low to medium loads, e.g. for fastening machines such as core drilling and concrete finishing machines etc.
- Build:** Rugged B15 formwork tie thread  
 Facilitates the use of all types of screwed fastening: Kipp B15 with hex nut, waler wing nut or similar
- Adv:** High-strength, self-tapping special thread  
 For reliable, positive anchoring in the concrete
- Easy procedure**  
 Supremely simple system with minimal number of components
- Enormous time saving**  
 Drilled hole does not need cleaning, no additional work procedures
- For installing close to edge and to each other**  
 No plugs, no expansion
- Resists high loads**  
 Thanks to perfect positive fit in the concrete
- Minimal tooling**  
 Cordless screw driver recommended
- Very simple inspection**  
 Check the hole diameter (14 mm) and depth, and ensure that the bolt is tight
- Reusable**  
 Depending on surface conditions, up to 20 stress actions possible.  
 Simple control due to checking gauge (has to be ordered separately)

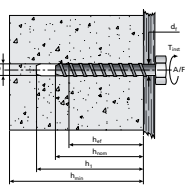
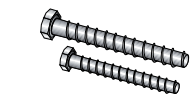
Labels in diagram:  
 - Self-centring tip  
 - Self-tapping special thread  
 - Reliable positive anchoring of thread in concrete  
 - Friction welded joint for maximum strength  
 - High-strength tie rod, also suitable for repeated fastening tasks on site  
 - B15 coarse thread for wide variety of anchoring tasks and all types of conventional construction fastening  
 - Kipp B15 with hex nut -waler wing nut etc.  
 - Molded spanner flat AF 13 for cordless screw driver

Item No.	Designation	Packing unit/ piece	Weight kg/piece
18602230	K-TEC-3s <sup>®</sup> B15	1	0.300
18602280	B12 x 10 / L = 230 mm K-TEC-3s <sup>®</sup> B15	1	0.400
18602400	B12 x 10 / L = 280 mm K-TEC-3s <sup>®</sup> B15	1	0.580
18602600	B12 x 10 / L = 400 mm K-TEC-3s <sup>®</sup> B15	1	0.800
20020950	Kipp B15 round with hex nut, galvanized	1	0.770



**MULTI-MONTI<sup>®</sup> screw anchor**

For securing guide posts and BETOMAX<sup>®</sup> kerb shuttering, galvanized.



Item No.	Designation	Packing unit/ pieces/box	AVF	Weight kg/piece
74416120	MULTI-MONTI <sup>®</sup> screw anchor 16x120	10	24	0.180
74416150	MULTI-MONTI <sup>®</sup> screw anchor 16x150	10	24	0.240
74412080	MULTI-MONTI <sup>®</sup> screw anchor 12x80	10	18	0.140

Different diameters available on request.

- Benefits:**
- Simply installed by inserting with associated benefits of:
  - Enormous time and cost savings
  - Easy to remove
  - Multiple use for temporary fixings, e.g. erecting guide posts
  - Steel tested in low-strength, undecured concrete

Permissible maximum loads for a single anchor plug for fastenings in cracked and noncracked concrete in accordance with ETA 05/0010 and ETA 05/0011.\*

Anchor plug size	MMS-12	MMS-16
Approval Notification No. ETA 05/05/	gvz	gvz
	0010	0010
<b>Largest permissible tensile load<sup>1)</sup> „N<sub>adm</sub>“ for one anchor plug without rim effect<sup>2)</sup></b>		
Cracked concrete C20/25 <sup>3)</sup>	[kN]	4.9
Non-cracked concrete C20/25 <sup>3)</sup>	[kN]	6.5
<b>Largest permissible shearing force<sup>1)</sup> „V<sub>adm</sub>“ for one anchor plug without rim effect<sup>2)</sup></b>		
Cracked concrete C20/25 <sup>3)</sup>	[kN]	12.8 <sup>4)</sup>
Non-cracked concrete C20/25 <sup>3)</sup>	[kN]	12.8 <sup>5)</sup>
<b>Permissible bending moment<sup>1)</sup> „M<sub>adm</sub>“</b>		
	[Nm]	40.4
		107.1

Component dimensions and installation parameters	
Nominal drill diameter	d <sub>0</sub> = [mm] 10.0 14.0
Drill hole depth	h <sub>1</sub> ≥ [mm] 85.0 130.0
Total anchoring depth	h <sub>tot</sub> ≥ [mm] 75.0 115.0
Computed anchoring depth	h <sub>eff</sub> = [mm] 54.5 87.5
Min. axis distance	s <sub>min</sub> = [mm] 60.0 100.0
Min. rim distance	c <sub>min</sub> = [mm] 60.0 100.0
Min. component thickness	h <sub>min</sub> = [mm] 125.0 180.0
Through-hole in component to be connected	d <sub>1</sub> ≤ [mm] 14.0 18.0
Recommended max. tightening torque <sup>4)</sup>	T <sub>max</sub> = [Nm] 55.0 110.0

\* Please note that the entire approval notification must be observed when dimensioning sizes.  
 Remarques: <sup>1)</sup> d ≥ 1.5 x h<sub>0</sub> and s ≥ 3 x h<sub>0</sub>  
<sup>2)</sup> d ≥ 10 x h<sub>0</sub>  
<sup>3)</sup> The concrete has been assumed to be normally reinforced. Accordingly greater resistances are possible with greater concrete strengths.  
<sup>4)</sup> The tightening torque has not been defined in the approval notification; adherence to this specification therefore bears no relevance to approval.  
<sup>5)</sup> Steel failure relevant.  
<sup>6)</sup> The partial safety coefficients specified in the approval notification for the anchor plug resistances and the partial safety coefficient for the effect of h<sub>0</sub> = 1.35 have been taken into account. Please observe the specifications for Design Method A set out in Appendix C of ETAG or our design aid in the event of combined loads and anchor plug groups as well as the effects of axes and rms.