# **FORBUILD**

## FORMWORK ACCESSORIES

#### Dear Readers,

ever since the foundation of our company, we have been dealing in the distribution of formwork accessories, which are characterised by high quality, and enjoy recognition among investors, designers and contractors. We are striving to expand and perfect formwork accessory components continuously, so as to be able to provide complete satisfaction to or customers, the number of whom still grows. For us, this is the best confirmation of the quality of the products we offer.

We are convinced that by providing you with this catalogue, we will make your decision concerning the choice of the proper technical solution a simpler one. Should you have any doubts or concerns, our technical advisors are there to aid you at every stage of your project.

We will be very grateful for any remarks concerning both the actual content, as well as the graphic form and mode of presentation of the information we offer.

Choosing Forbuild, you are choosing a reliable partner and satisfaction with a good investment.

We supply the technology, experience and high quality. Build with us ensures success.

FORBUILD SA



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## FORMWORK ACCESSORIES

## GENERAL INFORMATION

Forbuild offers a broad range of formwork accessories, which may be used for the majority of available formwork systems.

In order to maintain the assumed spacing between the formwork slabs, one uses formwork tie rods along with the necessary equipment.

A formwork tie rod is a threaded rod or wire, the task of which is to transfer the stretching force emerging as a result of concrete pressure on to the formwork slabs. The pad is a type of plastic or concrete pipe, its use, beside protecting for the formwork slabs from moving, allows the user to reclaim the tie and use it again.

#### ■ WIRE TIE IN A PLASTIC OR CONCRETE PROTECTIVE PIPE

The simplest tie that can be manufactured at the construction site is a wire tie, made of a wire that is 5-10 mm thick. The tie is placed in a spacer pipe, always terminated (in case of plastic spacer inlays) by plastic cones or by a special seal in case of a concrete spacer pipe. A wire protected in this way is tensioned using a special wire grip and the tensioning wire tensioner. The process openings left over after the formwork is dismantled are covered by plugs, and in case of concrete pipes, are puttied over using special filler mortar.





#### WIRE TIE IN A PLASTIC OR CONCRETE PROTECTIVE PIPE



Closing process openings using the STOPF plug in a system consisting of a plastic pipe and the IN end.



Closing of process openings using the FLUPP plug and the EX concrete plug introduced using the two-component adhesive compound AB-Plus in a system consisting of a plastic pipe and an EX type 01 cone.



a plastic pipe and an EX type 04 cone.

Closing of process openings using the FLUPP plug, the EX 22 plastic Closing of process openings using the FLUPP plug and the EX type 03 plug and the EX type 04 concrete plug, introduced using the two- concrete plug introduced using the two-component adhesive compound component adhesive compound AB-Plus in a system consisting of AB-Plus in a system consisting of a plastic pipe and an EX type 03 cone.



Closing of process openings using the PCW plug and the FB plug introduced using the two-component adhesive compound AB-Plus and filler mortar, in a system consisting of a plastic pipe and an FB pipe end seal.

Closing of process openings using a type EX 22 plastic plug and filler mortar, in a system consisting of a plastic pipe and an EX type 01 cone.

#### THREADED WIRE TIE IN A PLASTIC PROTECTIVE PIPE

Threaded formwork ties, named Forbuild and SGS, to be used with formwork, including washers and nuts, transfer loads within the range of 85 kN to 240 kN. They come in two types. The first are cold-rolled Forbuild B ties, which thanks to their low carbon content are characterised by good welding properties. They can be bent (eg. to form wavy anchors, anchor loops and hook anchors). The other kind, named SGS, do not have this advantage, however, they are provided with a double symmetric thread break along the tie, which helps with its self-cleaning during screwing in and away of the nut.

The length of the formwork tie is appropriately adapted to the width of the formed wall and the formwork system.

For reasons of economy, the best solution is to place the formwork tie in a spacer pipe cover.

In case of a plastic pipe ending with plastic cones, which are removed after the formwork is removed, the holes being thus created are sealed with concrete caps using the AB-Plus adhesive. The tie passage is insulated against water pressure by a water partition, which provides guarantees tightness for a pressurised water column of up to 20 m.



Plastic pipe ending with the IN terminator plugged with the STOPF cap.

Plastic pipe ending with the EX cone plugged with the EX cap using the two-component adhesive AB-Plus.

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#### ■ WIRE TIE IN A PLASTIC OR CONCRETE PROTECTIVE PIPE



Closing of a plastic pipe, terminating in an EX type 04 cone, using the EX type 04 concrete plug with the two-component adhesive compound AB-Plus.

Closing of a plastic pipe, terminating in an EX type 03 cone, using the EX type 03 concrete plug with the two-component adhesive compound AB-Plus.



Sealing system of a passage left over after the removal of a tie, from water intrusion, using a water partition – allows one to obtain a water tightness against a water column of up to 20 m.

#### THREADED ROD TIE IN A PROTECTIVE CONCRETE PIPE

One can also achieve tightness security for a tie passage through the use of a concrete spacer pipe, the interior of which, after the removal of formwork, is plugged with an appropriate number of concrete plugs with a diameter of 22 m and length depending on the water pressure. Before commencement of the introduction of plugs, a good solution is to place beforehand a PVC plug in an FB pipe, to reduce adhesive consumption. The passage is afterwards smoothed out using levelling mortar.





The concrete pipe terminating in a pipe end seal of type FB, using the FB plug, with the use of the two-component adhesive AB-Plus and filler mortar. This method allows one to achieve tightness safety against a water column of up to 20 m.



## PRODUCTS

## Formwork accessories WALL FORMWORK ACCESSORIES

### Tie rod type B



The type B tie rod is executed as a fully threaded rod of carbon steel type 18MnV5. The rod thread is cold-rolled, and has a trapezoidal cross-section. The rod, which the tie is made of, has the ability to be bent into shape and welded. The calculated load bearing capacity of the tie rods when stretched is 85 kN to 240 kN, depending on the tie rod cross-section. Upon special customer request, we can provide galvanised tie rods, as this provides greater resistance to wear in an aggressive environment.

The maximum tie rod length is 6.00 m.

#### Usage:

The tie rod is a component of formwork, which transfers the pressure force of the concrete mix through formwork slabs and supporting elements. It ensures the maintenance of formwork dimensions. It can be protected by a K type plastic spacer pipe or by an FB concrete pipe, as in such a case it can be reclaimed and utilised again.

Symbol	Outer diameter (D) [mm]	Core diameter (d) [mm]	Thread length (p) [mm]	Working load [kN]	Destructive force [kN]
B15	17,0	15,0	10,0	85	150
B20	22,0	20,0	10,0	150	260
B26,5	30,0	26,5	13,0	240	465

Symbol	Thread designation	Length* [m]	Package [pcs.]	Retail unit	Mass [kg/r.m.]	Art. no.
Tie rod B15	B15	6,00	1	r.m.	1,550	AS-DK-SC-1-00759
Tie rod B20	B20	6,00	1	r.m.	2,600	AS-DK-SC-1-00760
Tie rod B26,5	B26,5	6,00	1	r.m.	4,600	AS-DK-SC-1-00762

\* Tie rods of other lengths can be ordered

## Tie rod SGS



Usage:

The tie rod is a component of formwork, which transfers the pressure force of the concrete mix through formwork slabs and supporting elements. It ensures the maintenance of formwork dimensions. It can be protected by a K type plastic spacer pipe or by an FB concrete pipe, as in such a case it can be reclaimed and utilised again. The SGS tie rod is manufactured of St 900/1100 carbon steel. The tie rod thread is hot-rolled, and has a trapezoidal crosssection. Two breaks of the thread, symmetric against the section axis, ensure self-cleaning of the tie rod during screwing in and away of nuts. The rod, which the tie is made of, cannot be bent or welded. The load bearing capacity of the SGS 15 tie rod is 90 kN, the value for the SGS 20 tie rod is 160 kN. Upon special request, we are able to manufacture galvanised tie rods, as this provides better wear resistance in an aggressive environment. The standard length of SGS tie rods is 6.00 m, and the maximum permitted length is 12 m (upon request).

Symbol	Outer diameter (D) [mm]	Core diameter (d) [mm]	Thread length (p) [mm]	Working load [kN]	Destructive force [kN]
SGS 15	17,0	15,0	10,0	90	175
SGS 20	22,0	20,0	10,0	160	340

Symbol	Thread designation	Length* [m]	Package [pcs.]	Retail unit	Mass [kg/r.m.]	Art. no.				
Tie rod SGS 15	SGS 15	6,00	1	pcs.	1,440	AS-DK-SC-0-00763				
Tie rod SGS 20	SGS 20	6,00	1	pcs.	2,500	AS-DK-SC-0-05271				

\* Tie rods of other lengths can be ordered



## Water partition D110 OS



The D110 OS water partition is manufactured as a cast unit with a welded embossed steel sheet attached. The water partition thread is compatible with B15 and SGS 15 tie rods, which are threaded into the cast during assembly. The tie rods need to be shielded with a K26 plastic spacer pipe or using a 22/26 water partition reduction, together with the K22 plastic spacer pipe.

#### Usage:

At spots, where the necessity of passage of the tie rod through a concrete component exists, on which water exerts pressure.



Symbol	Thread designation	Diameter [mm]	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Water partition D110 OS	B15/SGS15	110	1	pcs.	0,700	AS-DK-SC-1-00740

## Water partition D 65



The D65 water partition is a cast unit. It is provided in one of two variants: with a greater and smaller plate diameter. Both partitions are compatible with B15 and SGS 15 tie rods, threaded into the partition and shielded with a K26 plastic spacer pipe or using a 22/26 water partition reduction, together with the K22 plastic spacer pipe.

#### Usage:

At spots, where the necessity of passage of the tie rod through a concrete component exists, on which water exerts pressure.



Symbol	Thread designation	Diameter [mm]	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Water partition D 65	B15/SGS15	65	1	pcs.	0,525	AS-DK-SC-0-00742

## Water partition reduction adapter 22/26



Connecting component made of synthetic material, highly resistant to destruction in construction site conditions.

Usage:

Permits fast connection of the K22 plastic spacer pipe with the Forbuild system water partitions. The water partition reduction adapter can be used as a joining component for the K22 plastic spacer pipe.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Water partition reduction adapter 22/26	250	pcs.	0,060	AS-DK-SC-0-00664

## Formwork accessories WALL FORMWORK ACCESSORIES

## Steel pad ST



The embossed steel pad is used to transfer the loads emerging as a result of concrete pressure from the formwork slabs, through the nut, to the formwork tie rod. Special embossing on the pad increases its robustness. The pad is zinc-coated to stand to corrosion.

#### Usage:

The pad is used so it can be put under the tensioning nut for B15, B20 as well as SGS 15 and SGS 20 tie rods, together with butterfly and hexagonal nuts.



Symbol	Opening diameter Φ [mm]	Dimensions a x b x c x d [mm]	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Steel pad ST 20	20	120 x 120 x 20 x 10	1	pcs.	1,100	AS-DK-SC-0-00733
Steel pad ST 25	25	120 x 120 x 20 x 10	1	pcs.	1,340	AS-DK-SC-0-00734

## Steel pad SG



The smooth steel pad is made of certified steel protected by galvanic coating. The task of the pad is to transfer the loads emerging as a result of concrete pressure from the formwork slabs, through the nut, to the formwork tie.

#### Usage:

The pad is used so it can be put under the tie nut for B15, B20 as well as SGS 15 and SGS 20 tie rods, together with butterfly and hexagonal nuts.



Symbol	Opening diameter Φ [mm]	Dimensions a x b x c x d [mm]	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Steel pad SG 25	25	120 x 120 x 20	1	pcs.	1,100	AS-DK-SC-0-00735
Steel pad SG 34	34	120 x 120 x 20	1	pcs.	1,340	AS-DK-SC-0-00736

## Plate nut D70



The D70 plate nut is made of ductile white cast iron protected by a zinc coat. It has a resistance surface with a diameter of 70 mm, which replaces the thrust washer. It is threaded onto the tie rod using a butterfly nut spanner, ratchet wrench or socket spanner.

#### Usage:

Used to tie formwork slabs using B15 and SGS 15 tie rods.



Symbol	Thread designation	Dimensions axb xc[mm]	SW [mm]	Package bag [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Plate nut D70	B15	50 x 95 x 70	27	50	pcs.	0,470	AS-DK-SC-1-00086

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## Plate nut D100



The D70 plate nut is made of ductile white cast iron protected by a zinc coat. It has a resistance surface with a diameter of 100 mm, which replaces the thrust washer. It is threaded onto the tie rod using a butterfly nut spanner, ratchet wrench or socket spanner.

#### Usage:

Used to tie formwork slabs using B15 and SGS 15 tie rods.



Symbol	Thread designation	Dimensions a x b [mm]	SW [mm]	Package bag [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Plate nut D100	B15	50 × 100	27	25	pcs.	0,635	AS-DK-SC-1-00085

## Butterfly nut



The butterfly nut is made of ductile white cast iron. The nut thread corresponds to the standards of threaded rods. The nut requires the use of a compression spacer. It is protected by a galvanic coat increasing its usable lifetime. It is threaded onto the tie rod using a butterfly nut spanner, ratchet wrench or socket spanner.

#### Usage:

The butterfly nut, together with a compression spacer, is used to tie formwork slabs in conjunction with formwork tie rods. It comes in two types, with B15 and B20 threads, thanks to which its scope of use spans B15, B20, SGS 15 and SGS 20 tie rods.



Symbol	Thread designation	Dimensions a x b [mm]	SW [mm]	Package bag [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Butterfly nut B15	B15	55 x 85	27	100	pcs.	0,310	AS-DK-SC-1-00079
Butterfly nut B20	B20	60 x 110	36	50	pcs.	0,495	AS-DK-SC-1-00080

## Articulated nut KP



The articulated nut, with a thrust plate, is made of ductile white cast iron. It is galvanised. The KP articulated nut is used to tie formwork with the B15 tie rod, and to maintain the formwork slabs at a specified separation using the spacer pipe. Thanks to the articulated nut structure, it can be used at an angle. It is threaded onto the rod using a ratchet wrench, socket wrench as well as a butterfly nut wrench. The KP nut can broadly be used for tunnel formwork, where formwork slabs are placed at angles.

Usage:

To be used with B15 and SGS 15 tie rods.



Symbol	Thread designation	Dimensions a x b x c [mm]	SW [mm]	Package bag [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Articulated nut KP-S B15	B15	120 x 120 x 66	27	1	pcs.	1,260	AS-DK-SC-1-00081

## Hexagonal connector nut



The hexagonal connector nut is made out of 115sMn30+C machining steel, and has a thread compatible with the Forbuild system. Halfway through the nut length, a lock bolt is installed. It is ideal for use to extend the threaded tie rod connections. It is threaded onto the tie rod using a ratchet wrench or socket wrench. It cannot be welded.

#### Usage:

Used to join together two formwork tie rods.



Symbol	Thread designation	Height a [mm]	SW [mm]	Package bag [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Hexagonal connector nut B15 L=105 mm	B15	105	30	50	pcs.	0,445	AS-DK-SC-0-00084
Hexagonal connector nut B20 L=110 mm	B20	110	36	50	pcs.	0,650	AS-DK-SC-0-00728
Hexagonal connector nut B26,5 L=150 mm	B26,5	150	46	10	pcs.	1,400	AS-DK-SC-0-00729

### Hexagonal nut



The hexagonal nut is used instead of the butterfly nut, it is manufactured of S355J2C+C steel (according to the former ST52-3 standard), and has a thread compatible with the Forbuild system. The hex nut is ideal for hard-to-reach places. It is screwed onto the tie rod using a ratchet wrench or socket wrench. It can be welded.



Usage: Used for B15, B20 and B26,5 tie rods, as well as SGS 15 and SGS 20 tie rods.

Symbol	Thread designation	Height a [mm]	SW [mm]	Package bag [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Hexagonal nut B15 L=90 mm	B15	90	30	50	pcs.	0,385	AS-DK-SC-0-08820
Hexagonal nut B15 L=70 mm	B15	70	30	50	pcs.	0,300	AS-DK-SC-0-00720
Hexagonal nut B15 L=50 mm	B15	50	30	100	pcs.	0,215	AS-DK-SC-0-00719
Hexagonal nut B15 L=25 mm	B15*	25	30	250	pcs.	0,100	AS-DK-SC-0-00716
Hexagonal nut B20 L=60 mm	B20	60	36	50	pcs.	0,500	AS-DK-SC-0-00722
Hexagonal nut B26,5 L=80 mm	B26,5	80	46	25	pcs.	0,800	AS-DK-SC-0-00727

\* Only use as lock nut

## Plastic cone EX



The synthetic material cone has a large adhesion surface to formwork. Thanks to this, compression damage on the surface of formwork slabs does not emerge. To facilitate installation or removal, use the EX cone spanner. The resulting process opening left over by the cone is plugged using the EX 22/50 plug type 03 using the AB-Plus adhesive.



Usage:

Together with the K22/26 spacer pipe it is used at spots where specific watertightness of the plug is required.

Symbol	Concrete cover	Dimensions [mm]		[mm]	Package	Retail	Mass	Art no	
Symbol	[mm]	а	<b>a</b> 1	ΦD	Φd	bag [pcs.]	unit	[kg/bag]	Art. no.
Plastic cone EX 22/50 typ 03	50	70	50	62	26	120	bag	3,650	AS-DK-SC-0-00758



## Concrete plug EX



The EX concrete plug is made out of microfibre-reinforced concrete of grade C30/37 with a water resistance class of W8.

#### Usage:

Used for sealing process openings left over after the use of EX 22/50 type 03 plastic cones or FCB/FCMB cones. The plugs are attached using the AB-Plus two-component adhesive, a kilogram of which is sufficient to attach approx. 40 plugs.



Symbol		Dimensions	;	Package	Retail	Mass	Ant no
Symbol	a [mm]	ΦD [mm]	Φd [mm]	box [pcs.]	unit	[kg/box]	Art. no.
Concrete plug EX typ 03	45	60	50	75	box	16,500	AS-DK-SC-0-23460

### Plastic cone EX



Usage:

EX cones are used when joining together formwork slabs using tie rods. Together with the spacer pipe, they create perfect protection of the tie rod against contamination by concrete, allowing its re-use. EX cones provide a passage cover of 50 mm.

EX cones are synthetic material compounds attached onto K-22 or K-26 plastic spacer pipes. They provide a guarantee of tightness, which fully protects formwork tie rods against contamination by concrete. The large contact surface of the cones with the formwork slab prevents damage. They are easily removed by the EX cone spanner. The left over openings are easily plugged using the EX type 04 concrete plug attached using the AB-Plus adhesive, or plugged using filling mortar. If the water pressure on the passage through the concrete component is low, then first of all seal the plastic pipe off from the pressure side using the rubber FLUPP 22 or FLUPP 26 plug, and then close the entire system with the EX type 04 concrete plug. In case the component is not under water pressure, filler mortar is sufficient. However, first close the K-22 plastic spacer pipe with the EX 22 plastic plug.



	Di	mensio	ons [mi	n]	Concrete cover	Package	Retail	Mass	Art no
Symbol	а	Φd₁	$\mathbf{\Phi}\mathbf{d}_2$	ΦD	[mm]	bag [pcs.]	unit	[kg/bag]	Art. no.
Plastic cone EX 22/50 typ 04	62	26	34	53	50	250	bag	7,750	AS-DK-SC-0-00753
Plastic cone EX 26/50 typ 04	62	30	36	52	50	250	bag	7,850	AS-DK-SC-0-00755

Introduced onto K-22 or K-26 spacer pipes.

## Concrete plug EX

The EX concrete plug is made out of microfibre-reinforced concrete of grade C30/37 with a water resistance class of W8.

#### Usage:

Used for sealing process openings left over after the use of EX 22/50 type 04 plastic cones. The plugs are attached using the AB-Plus two-component adhesive, a kilogram of which is sufficient to attach approx. 80 plugs.



Cumhal		Dimensions		Package	Retail	Mass	Art no	
Symbol	a [mm]	ΦD [mm]	Φd [mm]	box [pcs.]	unit	[kg/box]	Art. no.	
Concrete plug EX typ 04	35	50	39	120	box	13,000	AS-DK-SC-0-23462	

## Formwork accessories WALL FORMWORK ACCESSORIES

## Plastic cone EX



The synthetic material cone is installed in a spacer inlay. It ensures tightness, thus protecting the tie rod used to join two formwork slabs against contamination. The cone is easily removed using the EX cone wrench. After the EC cone is removed, the spacer pipe is plugged by the FLUPP plug. The opening left over after the EX cone can be sealed using the EX 22 plastic plug (for the K-22 plastic pipe). Cone left over after openings can also be plugged with the EX concrete plug by application of the AB-Plus adhesive.



#### Usage:

Usage with a plastic spacer pipe yields a lower cover thickness, and hence, this type of cone is rarely used in cases of high water pressure on the concrete component.

Symbol	Dime	ensions	[mm]	Concrete cover	Package	Retail	Mass	Ant no	
Symbol	а	a ¢d ¢D	φD	[mm]	bag [pcs.]	unit	[kg/bag]	Art. no.	
Plastic cone EX 22/10 typ 01	10	22	43	10	500	bag	2,600	AS-DK-SC-0-00751	
Plastic cone EX 22/10U typ 01*	10	22	43	10	250	bag	2,700	AS-DK-SC-0-23748	
Plastic cone EX 22/15 typ 01	15	22	43	15	500	bag	4,000	AS-DK-SC-0-00752	
Plastic cone EX 26/10 typ 05	10	26	48	10	250	bag	1,500	AS-DK-SC-0-00754	
Plastic cone EX 32/10 typ 05	10	32	48	10	250	bag	2,000	AS-DK-SC-0-00756	

\* plastic cone with insulation

## Concrete plug EX



The plug is made out of C30/37 construction concrete, with microfibre reinforcement and a water resistance class of W8. The plug is affixed using the epoxy resin-based AB-Plus adhesive compound. The adhesive is sufficient for approx. 150 pcs. per kg.

#### Usage:

The EX type 01 plug is used to seal openings left over after EX type 01 cones, whereby the EX type 05 plug is used to seal openings left over by EX type 05 cones used for B15, B20, SGS 15 and SGS 20 tie rods. When affixing the plug, turn it around by 180 degrees to distribute the adhesive evenly.



Curruh al	Dime	ensions	[mm]	Package	Retail	Mass	Art no	
Symbol	а	φ <b>d</b>	φD	box [pcs.]	unit	[kg/box]	Art. NO.	
Concrete plug EX type 01	7	20	39	100	box	2,700	AS-DK-SC-0-27018	
Concrete plug EX type 05	12	22	45,5	50	box	2,150	AS-DK-SC-0-27058	

## Plastic plug EX



The EX 22 plastic plug for the K-22 spacer pipe allows the sealing of process openings left behind by plastic cones. Used at spots where no water pressure threat exists to reduce the consumption of filler mortar.

Usage:

For the K-22 plastic spacer pipe, reduces mortar use and improves passage tightness.



Symbol	Dimensions [mm]			Package	Retail	Mass	Art no	
Symbol	а	φ <b>d</b>	φD	bag [pcs.]	unit	[kg/bag]	Art. no.	
Plastic plug EX 22	22	22	31	250	bag	0,750	AS-DK-SC-0-00681	



### Plastic end cap IN



The IN end cap, fulfilling the role of a cone, is manufactured of synthetic material. It is used for sealing spacer pipe ends. The IN end cap remains in the concrete and is sealed using the STOPF plug, assuring tightness of the passage against rain water. The IN end cap protects the interior of the spacer pipe very tightly during concreting, against the intrusion of concrete and the contamination of the tie rod running inside.

#### Usage:

For K-22, K-26, K-32 plastic pipes, as well as for the IN 26 end cap as termination of the M 24 anchor component.



Symbol	Dimensions [mm]			Concrete cover	Package	Retail	Mass	Ant no
Symbol	а	φd	φD	[mm]	bag [pcs.]	unit	[kg/bag]	Art. no.
Plastic end cap IN 22	35	26	22	25	500	bag	1,500	AS-DK-SC-0-00671
Plastic end cap IN 26	34	29	26	25	250	bag	3,000	AS-DK-SC-0-00672
Plastic end cap IN 32	39	36	32	30	250	bag	3,250	AS-DK-SC-0-00673

## Plastic plug STOPF



The STOPF plastic plug is used to achieve a tight seal of the IN end cap. The STOPF plug protects the passage left over by the formwork tie rod at a low water pressure value, against its intrusion to the other side of the concreted component. Together with the FLUPP plug, it constitutes an effective protection system against the intrusion of rain water to the other side of the concreted component.



Usage: For closing of openings STOPF 20 – FORBOLD-K

STOPF 22-32 - IN plastic end cap

Symbol	Dime	nsions	Package	Retail	Mass	Aut an
	a [mm]	d [mm]	bag [pcs.]	unit	[kg/bag]	Art. no.
Plastic plug STOPF 20	16	20	1000	bag	2,000	AS-DK-SC-0-00690
Plastic plug STOPF 22	18	22	1000	bag	2,500	AS-DK-SC-0-00691
Plastic plug STOPF 26	27	26	1000	bag	6,000	AS-DK-SC-0-00692
Plastic plug STOPF 32	16	32	1000	bag	4,000	AS-DK-SC-0-00693

## Plastic spacer pipe K



Made out of synthetic material of different internal diameters, from 22 mm, through 26 mm, up to 32 mm. It is compatible with all tie rods from the FORBUILD range. Its special uneven outer surface improves adhesion to concrete. The plastic spacer pipe, in concert with cones, is there to protect the tie rod against contamination and to allow its repeated use. At spots where the water pressure is low, they are sealed with the FLUPP plug, and the entire system is sealed with a concrete plug introduced using the two-component AB-Plus adhesive.

#### Usage:

As protection for formwork tie rods and tie rods in water partitions. Note that the K spacer pipe should not be longer than 600 mm. If such a situation would arise, cut the pipe halfway and join using the D22 spacer pipe connector to improve the rigidity of the protective pipe.

Symbol	Int./ext./length diameter [mm]	Package [m/bunch]	Retail unit	Mass [kg/r. m.]	Art. no.
Plastic spacer pipe K-22/25	22/25/2000	100	bunch	0,210	AS-DK-SC-0-00745
Plastic spacer pipe K-22/26	22/26/2000	100	bunch	0,215	AS-DK-SC-0-00746
Plastic spacer pipe K-26	26/30/2000	50	bunch	0,240	AS-DK-SC-0-00749
Plastic spacer pipe K-32	32/36/2000	50	bunch	0,285	AS-DK-SC-0-00750

## Rubber plug FLUPP



The FLUPP rubber plug is manufactured out of a flexible (rubber) material, and is used to tightly seal the plastic spacer pipe. The task of the plug is to protect against intrusions of water under low hydrostatic pressure. The plug is easily inserted using the FLUPP plug installation device.

#### Usage:

The FLUPP rubber plug is used to seal plastic spacer pipes.



Symbol a	Dimensions		Package	Retail	Mass		
	a [mm]	ΦD [mm]	bag [pcs.]	unit	[kg/bag]	Art. no.	
Rubber plug FLUPP 20	28	24	500	bag	2,750	AS-DK-SC-0-00685	
Rubber plug FLUPP 22	33	28	500	bag	5,000	AS-DK-SC-0-00686	
Rubber plugFLUPP 26	30	30	250	bag	3,000	AS-DK-SC-0-00687	
Rubber plug FLUPP 32	37	36	125	bag	2,500	AS-DK-SC-0-00688	

## Plug installation device FLUPP



The tool consists of a diameter 10 rod and a handle. The bevelled rod edges protect the rubber plugs against puncture.

#### Usage: For fast embedding of FLUPP rubber plugs.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Plug introduction device FLUPP	1	pcs.	0,170	AS-DK-SC-0-00744

## Concrete spacer pipe FB



The FB 22/40 concrete spacer pipe, with an inner diameter of 22 mm, is manufactured out of dispersed fibrereinforced concrete. It is foreseen for SGS 15 and B15 type tie rods. During assembly, the pipe end is protected against intrusions of concrete by a concrete pipe seal. In case of water pressure, first press a concrete pipe PVC plug into the pipe using a plug installation device, and afterwards affix the FB concrete plug to the concrete pipe using the two-component AB-Plus adhesive.

#### Usage:

As protection of formwork tie rods also used for  $\mathsf{B15}$  water partitions.

Symbol	Int./ext. diameter [mm]	Lenght [mm]	Package pallet [mb]	Retail unit	Mass [kg/r.m.]	Art. no.
Concrete spacer pipe FB 22/40	22/40	1250	500	pallet	2,200	AS-DK-SC-0-00670

#### **Remarks:**

Depending o the delivery, the ends of pipes may require some evening out. The maximum length needed to cut to fit should not exceed 2-3 cm, however.



## Spacer pipe joint D22



The joint is made of synthetic material, with a resistance flange.

#### Usage:

For joining plastic and concrete spacer pipes, inner opening diameter 22 mm, for K-22 and FB22/40 pipes.



Symbol	Dimer	nsions	Package	Retail	Mass	Art no
Symbol	a [mm]	d [mm]	bag [pcs.]	unit	[kg/bag]	Art. IIO.
Spacer pipe joint D22	48	22	250	bag	1,250	AS-DK-SC-0-00772

## Spacer pipe seal FB



The concrete spacer pipe seal for pipe ends is made of synthetic material. It protects the formwork tie rod and the interior of the spacer pipe against contamination by concrete. It also fulfils the role of a cone closing off the end of the spacer pipe, acting as reinforcement between the pipe and formwork slab. After removal of the formwork, the concrete pipe end seal is removed, and the resultant opening is filled and smoothed out with filler mortar.



#### Usage:

Used as end and seal of concrete spacer pipes with an internal opening diameter of 22 mm.

Symbol	Dime	ensions	mm]	Package	Retail	Mass	Art no
Symbol	а	φ <b>d</b>	φD	bag [pcs.] unit	[kg/bag]	Art. no.	
Spacer pipe seal FB	26	22	36	500	bag	1,000	AS-DK-SC-0-00769

## Filler mortar



Filler mortar is a ready-to-use dry mix, to which only water needs to be added. Before use, thoroughly clean the base surface and wet it until saturated. Remove standing water and exercise caution when removing cement slurry, as the capillary porosity of the concrete needs to be open.

- resistance to temperatures up to 250 °C
- mortar granularity 0-0.32 mm
- water requirement: 16-20%, I. e. 4-5 litres per 25 kg

Usage:

For filling spots left over after cones, and finishing work.

#### Resistance values of filler mortar:

Compression resistance as N/mm <sup>2</sup>			Extension resistance at bending as N/mm <sup>2</sup>					
Days				Days				
1	3	7	28	1	3	7	28	
45	52 61 77		5,2	6,5	7,2	9,8		

Symbol	Package bag [pcs.]	Retail unit	Mass [kg/bag]	Art. no.
Filler mortar	1	bag	25,000	CH-KZ-00-0-02801

## Formwork accessories WALL FORMWORK ACCESSORIES

## Seal removal tool



Made out of a metal square profile. The shape of the square yields a handle as well as special claws which, upon insertion into the seal opening, extend out and grab its edges. This allows for quick removal of FB spacer pipe seals.

#### Usage:

Greatly useful tool for fast removal of FB concrete spacer pipe seals and EX 22/10 and EX 22/15 cones.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Seal removal tool	1	pcs.	0,100	AS-DK-SC-0-05781

## PVC plug for FB concrete spacer pipe



The synthetic material plug is impressed into a concrete pipe with an inner diameter of 22 mm, and fulfils the function of a thrust component for the introduced concrete plug. It also acts as a seal. The FB plug installation device is useful for placing the PVC plug in the concrete pipe opening.

#### Usage:

The thrust component in the FB 22/40 concrete spacer pipe for the FB concrete sealing plug. Its use reduces the amount of adhesive needed when it is attached.



Symbol	Package bag [pcs.]	Retail unit	Mass [kg/ bag]	Art. no.
PVC plug for FB concrete spacer pipe	500	bag	1,500	AS-DK-SC-0-08224

## Concrete plug FB



The FB concrete plug is used for tight sealing of FB concrete spacer pipes, and it is introduced using the two-component AB-Plus adhesive. In case of water pressure, the tightness of the system based on the FB pipe is ensured against a water column of 25 m. The FB plug installation device is useful during installation, as first of all the PVC plug is impressed into the concrete pipes. The consumption of the AB-Plus adhesive is approx. 150 L=20 mm plugs per kilogram or approx. 70 L=50 mm plugs per kilogram.



#### Usage:

As sealing against water pressure of the FB 22/40 concrete spacer pipe.

Symbol	Diameter [mm]	Length a [mm]	Package bag [pcs.]	Retail unit	Mass [kg/ bag]	Art. no.
Concrete plug FB 22 L=20 mm	20	20	1000	bag	13,000	AS-DK-SC-0-00665
Concrete plug FB 22 L=50 mm	20	50	500	bag	16,500	AS-DK-SC-0-00666

## Plug installation device FB



The tool is manufactured out of a metal rod with a diameter of 20 mm, with a blocking spacer installed.

#### Usage:

For precise introduction of plugs into the opening of the FB-22/40 concrete spacer pipe.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Plug installation device FB 22 L=20 mm	1	pcs.	0,450	AS-DK-SC-0-05782
Plug installation device FB 22 L=50 mm	1	pcs.	0,500	AS-DK-SC-0-00770

## Two-component adhesive AB-Plus



A two-component adhesive based on specially modified liquid epoxy resin.

The adhesive is foreseen for introducing concrete plugs, the goal of which is not only plugging openings left behind cones, but also sealing the entire formwork tie rod passage against the influence of water. Own research conducted with respect to tightness of adhesive sealing joints covered a pressure range of up to 5 bar for concrete plugs.

#### Scope of use:

The AB-Plus two-component adhesive is used as a joining and sealing element for passages of formwork tie rods.

#### Mode of preparation:

In order to prepare the adhesive, mix each component separately very thoroughly. Then, both components are mixed at a ratio of 1:1 until a uniform mass is achieved. The glued surfaces must be fat-free and clean, not contaminated. The application time is about one hour at  $+20^{\circ}$ C. The glue thickness should be about 2 mm, and surplus adhesive should not flow outwards. The glue should not be used at temperatures below 8°C.

#### Estimated consumption of the AB-Plus adhesive:

Elemente	FB 22 L=20 mm	FB 22 L=50 mm	EX type 01	EX type 03	EX type 04
pcs./kg	about 150	about 70	about 150	about 40	about 80

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Two-component adhesive AB-Plus	1 x component A 1 x component B	set	2 x 1,000	CH-KZ-00-33275

## Tie wire tensioner

A simple and effective tool to tension tie wire. The tension force is 10 kN.



Usage: Together with the grip, it is used to tie formwork together using tie wire.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Tie wire tensioner	1	pcs.	3,430	AS-DK-SC-0-00731

## Formwork accessories WALL FORMWORK ACCESSORIES

## Tensioning wire grip



A reinforced grip, with a spring, for tensioning wire with a diameter between 5 and 10 mm. Permits proper mounting of the wire and prepares it for tensioning. The maximum load is 20 kN.

Usage: To be used with a tie wire tensioner.



Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Tensioning wire grip	25	pcs.	0,375	AS-DK-SC-0-00767

## Socket wrench FCB





Usage:

For screwing in and out of FCB cones. An economic alternative to the special FCB wrench.

Symbol	SW [mm]	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Socket wrench FCB-15	27	1	pcs.	1,150	NA-NA-00-0-04720
Socket wrench FCB-20	32	1	pcs.	1,620	NA-NA-00-0-04721

## Special cone wrench FCB



All-metal wrench with a ratchet mechanism and mounting screw, available in all variants, for screwing in of FCB cones.

Usage: For screwing in and out of FCB cones.

Symbol	SW [mm]	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Special cone wrench FCB-15	27	1	pcs.	2,450	NA-NA-00-0-04724
Special cone wrench FCB-20	32	1	pcs.	2,860	NA-NA-00-0-04725
Special cone wrench FCB-26,5	46	1	pcs.	7,320	NA-NA-00-0-04726



## Cone removal wrench EX



All-metal wrench. The wrench grip is a universal grip, and fits all type EX cones.

#### Usage:

For installation and removal of EX synthetic material cones



Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Cone removal wrench EX	1	pcs.	0,420	NA-NA-00-0-04713
Cone removal wrench EX type 03	1	pcs.	0,640	NA-NA-00-0-04714

## Special wrench FCMB-15

Metal wrench with a fixing screw and appropriate recesses that fit the cone, and the mounting screw prevents them from slipping out.



Usage: For screwing in and out of FCMB cones.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Special wrench FCMB 15	1	pcs.	4,040	NA-NA-00-0-04727

## Butterfly nut wrench



Metal wrench for butterfly nuts, equipped with a torque mechanism which improves work efficiency. Especially designed to ensure safety and guarantee proper nut tightness.

Usage:

For screwing in and removal of butterfly nuts.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Butterfly nut wrench	1	pcs.	2,500	NA-NA-00-0-04710

## Formwork accessories WALL FORMWORK ACCESSORIES

## Wearing ratchet wrench SW



Resistant to weather influences, all-metal wrench with a ratchet system.

#### Usage:

For precise screwing in and removal of hexagonal and butterfly nuts.

Symbol	SW [mm]	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Wearing ratchet wrench SW 24	24	1	pcs.	0,500	NA-NA-00-0-04729
Wearing ratchet wrench SW 27	27	1	pcs.	0,500	NA-NA-00-0-04730
Wearing ratchet wrench SW 30	30	1	pcs.	0,810	NA-NA-00-0-04731
Wearing ratchet wrench SW 36	36	1	pcs.	1,270	NA-NA-00-0-04732
Wearing ratchet wrench SW 46	46	1	pcs.	2,400	NA-NA-00-0-04733

## Wrench for screwing in and out of tie rods B15



wrench made of metal, special grip claw simplifies introduction and removal of B15 tie rods.

*Usage:* For precise introduction and removal of B15 tie rods.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Wrench for screwing in and out of tie rods B15	1	pcs.	1,640	NA-NA-00-0-04715

## Universal wrench for screwing tie rods in and out



Universal wrench for screwing in and removal of tie rods. Made of metal with a tempered clamp.

#### Usage:

For precise screwing in and out of tie rods.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Universal wrench for screwing tie rods in and out	1	pcs.	2,46	NA-NA-00-0-04728



# ADDITIONAL ACCESSORIES



## ADDITIONAL ACCESSORIES

Additional components required during the execution of formwork-based concrete structures are: CENTER round plates, permitting the setting of formwork slabs on the surface,

- ■T-battens, the task of which is joining together two formwork slabs with almost undamaged edges
- adhesive foam, used at joining spots of formwork with existing surfaces, both horizontal as well as vertical ones
- the DREIKA batten, bevelling the edges of the concrete component, making them more resistant to damage.
- the plastic formwork plug, allowing the closing of existing openings left behind by tie rods in formwork slabs.



CENTER plate



Plastic T-batten



Adhesive foam









DREIKA plastic batten



DREIKA L plastic batten



Plastic formwork plug

## Plastic batten DREIKA



A batten for bevelling the edges of concrete components. It is manufactured of impact-resistant hardened PVC. The bevelled corner of the concrete component becomes more resistant to damage during disassembly of the formwork and during use, which cannot be guaranteed if the edge remains without a bevel.

#### Usage:

For bevelling of edges of concreted components.



Curryhal	Dimensions		Length	Package	Retail	Mass		
Symbol	a [mm]	b [mm]	c [mm]	[mm]	bunch/pallet [r. m.]	unit	[kg/100 r.m.]	Art. no.
Plastic batten DREIKA L10	14	10	8,5	2500	100/5400	bunch	10,00	AS-DK-SC-0-00703
Plastic batten DREIKA L15	21	15	12,5	2500	100/5500	bunch	15,20	AS-DK-SC-0-00705
Plastic batten DREIKA L20	28	20	15,5	2500	100/4500	bunch	18,00	AS-DK-SC-0-00707
Plastic batten DREIKA L25	35	25	14	2500	50/2450	bunch	25,60	AS-DK-SC-0-00708
Plastic batten DREIKA L30	42	30	14	2500	50/1800	bunch	32,40	AS-DK-SC-0-00709
Plastic batten DREIKA 11/11	16	11	-	2500	100/9000	bunch	3,30	AS-DK-SC-0-00698
Plastic batten DREIKA 15/15	21	15	-	2500	100/5600	bunch	5,70	AS-DK-SC-0-00699
Plastic batten DREIKA 20/20	28	20	-	2500	100/5500	bunch	8,90	AS-DK-SC-0-00700
Plastic batten DREIKA 25/25	35	25	-	2500	100/2700	bunch	10,56	AS-DK-SC-0-00701
Plastic batten DREIKA 30/30	42	30	-	2500	50/2400	bunch	15,98	AS-DK-SC-0-00702

## Plastic batten T



Frequently at construction sites, formwork slabs, especially their edges, become damaged. This damage influences the look of the cast concreted components. Small edge damage can be eliminated by using the T-batten, which shields the damaged edges of the formwork plate from view.

Usage:

For sealing of space between the formwork slabs.



Symbol	Dimensions a x b [mm]	Length [mm]	Package [r.m./bunch]	Retail unit	Mass [kg/r.m.]	Art. no.
Plastic batten T	40 × 20	2000	100	bunch	0,168	AS-DK-SC-0-00713



## Adhesive foam in a roll



Single-side adhesive polyester foam

#### Usage:

Used for sealing spaces between formwork slabs as well as formwork slab joints with ready components.

Symbol	D	imensions		Package	Retail	Mass	Art. no.
	Thickness[mm]	Width [mm]	Length [m]	roll [r.m.]	unit	[kg/roll]	
Adhesive foam in a roll 16x6 mm L=10 mb	6	16	10	10	roll	0,083	AS-DK-SC-0-00732

## Round plate Center



The center round plate is made of synthetic material.

Usage:

Uncommonly useful tool permitting the setting of formwork slabs in positions on base slabs. Works very well when determining the spacing of formwork walls installed on bottom slabs.



Symbol	Package bag [pcs.]	Retail unit	Mass [kg/bag]	Art. no.	
Round plate Center	500	pcs.	7,500	AS-DK-SC-0-00662	

## Plastic formwork plug



The plug is made of synthetic material

Usage:

For plugging openings left after tie rods in formwork slabs.



Symbol	Dimensions [mm]			Package	Retail	Mass	
	d,	<b>d</b> <sub>2</sub>	d <sub>2</sub> D bag [pcs.]		unit	[kg/bag]	Art. no.
Plastic formwork plug D18	16	20	24	250	pcs.	0,500	AS-DK-SC-0-00677
Plastic formwork plug D22	20	24	27	250	pcs.	0,625	AS-DK-SC-0-00678
Plastic formwork plug D22 type 2	20	24	34	500	pcs.	2,000	AS-DK-SC-0-00679

## GENERAL INFORMATION

Large-area ceiling formwork is composed of a load-bearing and a support structure.

The load bearing structure of a large-area formwork is made up by the plates, plate girders, main girders, which are also called the superstructure.

These elements are laid out in the following order: The plate rests on the plate girders, and these in turn rest on the main girders.

The main girders collect the load from the plate through the plate girders, and transfer this to the support structure.

Forbuild offers, among its large-area formwork accessories, support structures consisting of the following:

- Crosswise head
- Support-mounting stabilising tripod
- Tripod transport and storage containers



## **FORBUILD**

## Crosswise head



The crosswise head is made of normal S235JRG2 hot-dip galvanised steel per PN-EN ISO 1461.

As a component, it allows direct support of ordinary wooden ceiling formwork timbers (battens) or a mesh, as well as those with a full web.

The crosswise head is a part of a formwork system, which, in concert with a (height-adjustable) support makes up the entirety of support for the ceiling slab formwork. During installation of the system, note the stability of the supports (stabilising tripod) and their vertical arrangement.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Crosspiece head	1	pcs.	2,50	SS-XX-00-0-01934

## Stabilising tripod



The tripod is made of S200305 steel and hot-dip galvanised. The tripod height is approx. 840 mm, the area required after extension is about 0.85 sq m.

#### Usage:

The tripod is used for adjustable ceiling supports (from 40 to 80 mm in diameter) as a stabilising component in the first installation stages. The tripod bears no forces acting on the support. The articulated structure of the tripod legs permits arrangement of the support both in a corner as well as directly beside a wall.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.	
Stabilising tripod	1	pcs.	8	SS-ST-00-0-01940	

## Transport container



The containers are made entirely out of steel profiles and mesh. The type A container is welded all around, and provided with a swing-away side, whereby the F type container (mesh container) has fully collapsible walls, greatly reducing the space required to store empty containers.

#### Usage:

The containers are used for storage and transport of various kinds of formwork accessories.



Crushal	Dimensions [mm]			Package	Retail	Mass	Mass with maximum load	And the	
Symbol	а	b	с	[pcs.]	unit	[kg/pcs.]	[kg]	Art. no.	
Transport container Type A	800	800	1200	1	pcs.	74,0	1200	SB-TW-MT-0-05979	
Transport container Type F (mesh container)	1100	1150	1200	1	pcs.	105,0	605	SB-TW-MT-0-05811	







## SINGLE-SIDE ANCHORS



## GENERAL INFORMATION

It often happens that already during the erection of a structure, there arises the need of installation of various kinds of equipment to the structure surface. This equipment can be suspended scaffolding, single-side formwork, slip formwork or a great multitude of other devices, which require anchoring in the structure surface.

Anchoring in structural components is executed using the M24 anchoring component or a different anchor type connected using FCMB or FCB cones. The cone, together with the anchor component, permits single-side attachment of equipment to the structure. The images show the anchoring methods. The main connector of the anchor to the relevant component is the cone, with the resistance of the cone equal to the resistance of the anchor.

The anchor installation begins with the mounting to the formwork plate of an installation grip. The placement on the formwork slab of the grip is the point, at which eg. a working platform shall be affixed. Such a grip is then provided with a screw-on cone or M24 anchor component. The cone is screwed on by hand until resistance is felt. The ultimate step in the anchoring process is screwing in of the anchor component into the cone. After the conclusion of concreting, and removal of the formwork, the assembly grip is removed, and when the concrete reaches 70% of its strength at C20/25, one can begin to affix the suspended equipment. The installation of such devices requires M24 hex head screws (per PN-EN ISO 4014:2004) at class 8.8 (per PN-EN ISO 8981). The screw length should be adjusted considering the thread length and the thickness of the affixed item. All anchor components should be installed in the concrete reinforcement area.

After removal of the equipment, the cone is removed from the component surface turning in the counterclockwise direction. Special spanners are foreseen for this purpose. The ultimate stage is sealing the openings left over after removal of the cones. This can be done using special mortar or via specially prepared microfibre-reinforced concrete plugs, installed in the opening using the two-component AB-Plus adhesive. When plugging the opening, one should in particular note that the joined surfaces should be free of dust and oils. When plugging an opening with the concrete plug using the AB-Plus adhesive, note for the adhesive to fully fill the space between the plug and the opening. A practical method to achieve this is covering the entire joining surfaces of the cone with adhesive, and then placing it in the opening, slightly twisting it so that the adhesive would fill the slit. Do not permit the adhesive to leave the opening, and its possible surplus should be collected with a trowel.

Thanks to well-suited and fitting anchor components, as well as supplementary material, which together, as a system ensure a very strong bond between the structure and the suspended component, you secure for yourself improved work safety. Remember, though, that for construction and frequently economic reasons, the length of the components anchored in the concrete does not always ensure that the fill forces are transferred into the concrete; accordingly, a damage risk arises for the mounting area. The anchored (stay-in-place) components should be selected considering the shape of the structural element, in which the anchoring is to take place, its dimensions, the mounting spot and foremost requirements of statics. For this purpose, in many instances, if the burdening force is higher, the anchor needs to transfer forces to the concrete using reinforcement inlays.






Example of use of the FCMB cone with anchoring.



Example of use of the FORBOLD-C sleeve anchor .



Example of use of the M24 anchoring component.

### Plastic-metal cone FCB



Usage:

The FCB plug can be used very widely. It is used as a connector between singleside anchoring and the component affixed to the anchor (suspended scaffolding, advertising banners); it aids when mounting formwork slabs, acting as a connector between the tie rod and compression nut that is screwed onto the connector piece made of threaded tie rod, protruding out of the cone and passing through the formwork slab. The plastic-metal cone is used for joining together two threaded rods in the FORBUILD system. Assembly and removal of the cone should take place using the FCB cone spanner. The FCB grip is used for mounting the cone. In order to avoid contamination of the cone internal thread, the FCB cap can be used.

In case of the cone for B15 and SFS 15 tie rods, use the FCB B15 seal, which provides excellent isolation of the cone on rough surfaces and has the option of adapting to an angle of up to 3°. To plug the opening left behind by the cone use a special concrete plug (per the following table) attached using the AB-Plus adhesive or filler mortar.



Cone dimensions	a [mm]	D [mm]	d [mm]	c [mm]	SW [mm]	Concrete plug sealing the cone
FCB B15	95	61	40	50	27	Concrete plug EX type 03
FCB B20	126	70	42	65	32	Concrete plug EX type 13
FCB B26,5	135	103	57	70	46	Concrete plug EX type 18

Symbol	Thread designation	Package bag [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Plastic-metal cone FCB B15	B15	25	pcs.	0,500	AS-ZJ-00-0-00852
Plastic-metal cone FCB B20	B20	25	pcs.	0,800	AS-ZJ-00-0-00853
Plastic-metal cone FCB B26,5	B26,5	10	pcs.	1,670	AS-ZJ-00-0-00854

## Concrete plug EX



The plug is made out of C30/37 construction concrete, with microfibre reinforcement and a water resistance class of W8.

### Usage:

It is used to seal process openings left behind after the use of EX 22/50 type 03 FCB/FCMB plastic cones. The cones are attached using the two-component AB-Plus adhesive, a kilogram of which is sufficient to attach approx. 40 plugs.



Constrat		Dimensions		Package	Retail	Mass		
Symbol	a [mm]	ΦD [mm]	Фd [mm]	box [pcs.]	unit	[kg/box]	Art. no.	
Concrete plug EX type 03	45	60	50	75	box	16,500	AS-DK-SC-0-23460	
Concrete plug EX type 13	53	68	56	60	box	16,600	AS-DK-SC-0-28106	
Concrete plug EX type 18	60	102	60	25	box	17,500	AS-DK-SC-0-00676	



## Cap FCB



The FCB cap is made of synthetic material. It prevents sifting through of concrete to the inside of the FCB cone. The cap is compatible with all kinds of tie rods available in the FORBUILD system.

### Usage:

To achieve protection of the FCB cone thread against contamination.

Symbol	Dimensions a x s [mm]	Package bag [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Cap FCB B15	63 x 2	50	bag	0,004	AS-ZJ-00-0-00873
Cap FCB B20	68 x 2	50	bag	0,006	AS-ZJ-00-0-00874
Cap FCB B26,5	103 x 2	50	bag	0,011	AS-ZJ-00-0-00875



## Cone seal FCB-15



Used to seal the FCB cone on rough surfaces. Can adapt itself to an angle of up to 3°. Seal used only for B15 type cones.

Usage: For sealing of FCB cones with the B15 thread.

Symbol	Package bag [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Cone seal FCB-15	25	bag	0,053	AS-ZJ-00-0-00849



## Nailing grip FCB



The steel grip, using which one affixes the FCB cone to the formwork slab. First of all, affix the grip to the formwork slab, and then screw the cone onto the grip thread.

### Usage:

The grip is used for assembly of single-side anchors, where the necessity arises to affix anchors together with cones to formwork slabs.



Symbol	Thread designation	Dimensions a x b x s [mm]	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Nailing grip FCB 15	B15	60 x 24 x 3	1	pcs.	0,100	AS-ZJ-00-0-00862
Nailing grip FCB 20	B20	80 x 24 x 3	1	pcs.	0,140	AS-ZJ-00-0-00861
Nailing grip FCB 26,5	B26,5	100 x 27 x 3	1	pcs.	0,200	AS-ZJ-00-0-00863

### Metal cone FCMB



The metal cone is used to connect on the one said a tie rod, and on the other side, a threaded rod or an M24 screw. The installation and removal of the cone should be done with the FCMB cone spanner. The FCMB grip is used to install the cone in place. The opening left over after the cone is sealed by a special EX type 03 concrete plug made of structural concrete, attached using the AB-Plus adhesive.

The resistance of the cone equals the resistance of the formwork tie rods. The durability of the cone allows it to be reused.

*	a c

### Usage:

Cone dimensionsa<br/>[mm]D<br/>[mm]d<br/>[mm]c<br/>[mm]Concrete plug sealing the coneFCMB B15/M2495614045Concrete plug EX type 03

May be used as termination of single-side anchors, to which subsequently a component can be affixed using a crew or an M24threaded rod.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Metal cone FCMB B15/M24	1	pcs.	1,200/pcs.	AS-ZJ-00-0-00858
Screw M24 L=55 mm	1	pcs.	0,320/pcs.	AS-ZJ-00-0-00859
Concrete plug EX type 03	75	box	16,500/box	AS-DK-SC-0-23460

## Nailing grip FCMB

			Sec.		
5	dit.	大		Tin.	2
1				27	
3	62	10.9	3.3		7
	1000	10.00		Same	

A metal grip, thanks to which the FCMB cone can be affixed to a formwork slab. First of all, hammer the grip to the formwork slab, afterwards screw in the FCMB cone.

Usage:

For mounting of the FCMB cone to formwork. This method can be used for single-side anchors.

Symbol	Thread designation	Dimensions a x b x s [mm]	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Nailing grip FCMB-24 L=25 mm	M24	80 x 25 x 3	1	pcs.	0,160	AS-ZJ-00-0-00865



## Sleeve anchor and cap FORBOLD-C



Anchor sleeve, compatible with the D&W system. It is manufactured of a fibreglass-reinforced material. The openings in the mounting components of the FORBOLD-C unit are used to mount tie wire to the main component rebar using it. Working load – up to 40 kN (depending on concrete class).

### Usage:

For single-side anchors together with the B15 tie rod. Ideal for use with large-area formwork, scaffolding, single-side formwork.



Symbol	Package bag [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Sleeve anchor FORBOLD-C	50	pcs.	2,500	AS-ZJ-00-0-00836
Cap FORBOLD-C	50	pcs.	0,350	AS-ZJ-00-0-00837



## Wavy anchor



The wavy anchor is made of a welded threaded rod, type B15, B20 or B26,5.

### Usage:

For single-sided anchoring in concrete. Used as a stay-inplace (internal) anchor, together with cones it is used for mounting slip formwork, working platforms, etc.

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Symbol	Thread	Dime	nsions	Retail	Retail	Mass	Art. no.
	designation	L [mm]	a [mm]	unit	unit	[kg/pcs.]	
Wavy anchor B15	B15	550	95	1	pcs.	0,852	AS-ZJ-00-1-00180
Wavy anchor B20	B20	700	170	1	pcs.	1,820	AS-ZJ-00-1-00181
Wavy anchor B26,5	B26,5	800	220	1	pcs.	4,600	AS-ZJ-00-1-00182

### Hook anchor



Made of a welded threaded rod, type B15, B20 or B26,5, bendable.

Usage:

Broad scope of use – just like for the wavy anchor – however it is ideally suited for thinner walls.



Symbol	Thread	Dime	nsions	Package	Retail	Mass	Art. no.	
	designation	L [mm]	a [mm]	[pcs.]	unit	[kg/pcs.]		
Hook anchor B15 L=250 mm	B15	250	150	1	pcs.	0,670	AS-ZJ-00-1-00138	
Hook anchor B15 L=450 mm	B15	450	150	1	pcs.	0,980	AS-ZJ-00-1-00184	
Hook anchor B20 L=500 mm	B20	500	190	1	pcs.	2,250	AS-ZJ-00-1-00185	
Hook anchor B26,5 L=650 mm	B26,5	650	250	1	pcs.	4,630	AS-ZJ-00-1-00186	

### Plate anchor



Composed of a threaded welded B-type rod and a plate having the dimensions  $90 \times 120 \times 10$  mm.

### Usage:

Ideal for single-side anchors with slip formwork and structures with low wall thickness.



Thread designation	a x b [mm]	t [mm]	L [mm]	l [mm]	Vt [mm]
B15	90 x 120	10	120	100	150
B15	90 x 120	10	180	160	210
B15	90 x 120	10	420	400	450
B20	100×130	10	185	160	215
B20	100×130	10	325	300	350

Vt-minimum anchor depth.

For the maximum force, the shear occurs at the rod, not at the weld.

Symbol	Thread designation	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Plate anchor B15 L= 100 mm	B15	1	pcs.	0,970	AS-ZJ-00-1-00846
Plate anchor B15 L= 160 mm	B15	1	pcs.	1,070	AS-ZJ-00-1-00847
Plate anchor B15 L= 400 mm	B15	1	pcs.	1,450	AS-ZJ-00-1-00848
Plate anchor B20 L= 160 mm	B20	1	pcs.	1,500	AS-ZJ-00-0-19748
Plate anchor B20 L= 300 mm	B20	1	pcs.	1,900	AS-ZJ-00-1-00845

### Anchor element B20



The anchor element is made up of an anchor plate with a B20 hex nut welded on. It is used for single-side anchoring. Compatible with FORBUILD tie rods.

### Shear force:

235 kN in concrete without cracks or breaks

177 kN / 181 kN in concrete with cracks and breaks (torn out cone limited to a diameter of 850 mm) (according to the test certificate, the tear from the concrete occurred at a force of 177 kN, concrete class C20/25).



Concrete resistance: 30 N / mm<sup>2</sup> *Minimum anchoring depth:* 175 mm Usage:

Ideal for use with the V grip at an angle of 45°.

The maximum load depends on the concrete class and anchor depth.

Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Anchor element B20	1	pcs.	1,480	AS-ZJ-00-0-00840

## Anchor element B26,5



Cast element used for single-side anchoring. Compatible with the D&W 26,5 system.

### Usage:

Perfect for use with the V grip at an angle of 45°.

Maximum load bearing capacity depends on the concrete class and anchoring depth.



Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Anchor element B26,5	1	pcs.	1,320	AS-ZJ-00-0-00841

## Anchor element M24



Consisting of an anchor plate with an M24 threaded sleeve welded on. Before mounting the component to the formwork, the anchor element should be terminated with the IN26 ending. After removal of the formwork, one installs on the hardened concrete surface I. e scaffolding, platforms, using the M24 x 70 screw. After conclusion of the work, the openings are closed with the STOPF 26 plug.



### Usage:



For single-side anchors. A component anchored close to rebar for an M24 screw of class 8.8 can bear a working load of 150 kN.

Symbol	Thread designation	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Anchor element M 24	M24	1	pcs.	1,300	AS-ZJ-00-0-00842
Screw M 24 L=70 mm	M24	1	pcs.	0,350	AS-ZJ-00-0-00860



## Nailing grip M24



The grip is made of metal, thanks to which one may affix the M24 anchor element. First of all, nail the grip to the formwork slab, and then screw in the anchor element or the M24 anchor element to the grip thread.

### Usage:

The grip finds use in case of mounting of single-side anchors, where the necessity of mounting of an anchor with a cone to the formwork slab arises.



Symbol	Thread designation	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Nail grip M 24 L=45 mm	M24	1	pcs.	0,230	AS-ZJ-00-0-00866

## Grip FORBOLD-F



The FORBOLD-F grip is made as a welded forged component, made of S355J2C class steel, with a threaded opening. It is compatible with the FORBUILD system.

The grip is welded along its entire circumference with a continued weld of a = 4 mm.

Used to install tie rods to steel components by welding.



Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Grip FORBOLD-F B15	1	pcs.	0,370	AS-ZJ-00-0-00867

### Anchor bolt B15





Anchor bolt, compatible with the B15 tie rod, made of metal, galvanised.

### Usage:

Usage:

The anchor is used for single-side anchoring of formwork to rock or concrete walls. *Drilling depth / Load values:* Opening diameter 36,5-38 mm. Recommended bit size 36. *Opening drilling depth:* In concrete up to 90 kN – at least 20 cm for concrete class C20/25. *Drilling depth in rock dependent on rock resistance:* In rocks over 91 kg/cm2 – at least 2.0 m In rocks over 68 kg/cm2 – at least 2.5 m

In rocks over 45 kg/cm2 – at least 3.0 m



Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Anchor bolt B15	50	pcs.	0,275	AS-ZJ-00-0-00843

### Formwork accessories SINGLE-SIDE ANCHORS

### Grip V



Composed of a sheet metal band and a synthetic material grip. Used for components anchoring single-side formwork.

### Usage:

Used to install anchor rods, anchor loops, wavy anchors, hook anchors, etc., at an angle of  $45^\circ\!.$ 



Symbol	Thread designation	Outer diameter d, [mm]	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Grip V B15	B15	25	1	pcs.	0,420	AS-ZJ-00-0-00868
Grip V b20	B20	32	1	pcs.	0,420	AS-ZJ-00-0-00869
Grip V B26,5	B26,5	40	1	pcs.	0,420	AS-ZJ-00-0-00870

### Cone plug FCB



The FCB cone plug is made of synthetic material. The 45° plug protects the thread of the FCB cone from contamination during concreting, when the cone is placed at an angle of 45° against the surface.

Usage: Used together with the V grip.

Thread designation	a [mm]	b [mm]	c [mm]	d [mm]	D [mm]
B15	5	70	14	30	65



Symbol	Package [pcs.]	Retail unit	Mass [kg/pcs.]	Art. no.
Cone plug FCB 45/B15	1	pcs.	0,420	AS-ZJ-00-0-00872

## Anchor loop



The anchor loop is made of a welded threaded rod of B15, B20 and B26,5 that is able to bend.

### Usage:

To install single-wall formwork to bottom labs.

Installation takes place during the first phase of concreting of the bottom slab.



Symbol Three	Thread	Dimensions [mm]		Shear Calculated value		Package	Retail	Mass	Art. no.		
	designation	A B C D [kN]	per single rod [kN]	[pcs.]	unit	[kg/pcs.]					
Anchor loop B15	B15	300	400	300	240	160	85	1	pcs.	2,350	AS-ZJ-00-1-00187
Anchor loop B20	B20	300	400	300	260	300	150	1	pcs.	4,100	AS-ZJ-00-1-00188
Anchor loop B26,5	B26,5	340	450	450	340	520	245	1	pcs.	8,800	AS-ZJ-00-1-00189



### EXAMPLES OF USE OF SINGLE-SIDE ANCHORS



Example of use of the B15 anchor bolt.



Example of use of an anchor loop, together with the FCB B15 plastic-metal cone during the installation of buffers.



Example of use of the FORBOLD-F grip during the execution of an outside wall based on stay-in-place formwork.





# PERMANENT SHUTTERING



### STEEL MESH FOR PERMANENT SHUTTERING – GENERAL INFORMATION



During the execution of monolithic structures, it is sometimes necessary for the work to be carried out in a continuous manner, however, in many cases, this is not an option. In such a case, working brakes become a necessity. Working brakes in monolithic structures are contact surfaces between hardened concrete and concrete that is freshly poured. Despite the fact that working brakes are invisible in the structure, they are usually the weak spots. That is why they should be placed at locations, where the joint between hardened and freshly poured concrete does not materially influence the structure safety. These spots cannot be found where the highest bending moments arise, and at tough-to-reach spots. In ceiling slabs and concrete battens, it is recommended to execute working brakes at a distance of approx. 1.5-1.4 of the slab span, counting from its support. In components, in which high compression forces arise, working brakes should be executed perpendicular to the influence of these forces.

A working brakes may be executed using stay-in-place formwork like STC. Permanent shuttering is profiled mesh, the task of which is to create as big a contact surface between the hardened and freshly poured concrete as possible.

The load bearing capacity of the joint executed using STC mesh is done based on Eurocode 2.

## STP



Used to execute working brakes in reinforced concrete structures. A toothed joint with a profiled shape eliminates the phenomenon of faulting between neighbouring reinforced concrete slabs, and ensures insulation of the working brakes. It does not have its own load bearing structure. Heights exceeding 1.2 metres are achieved through joining of mats using sheet metal screws. Perfect in concert with the P100 injection system.

Up to a height of 30 pcs., the STP system is self-supporting, above this height one uses stabilising supports and fixes it using reinforcement mesh. With heights exceeding 90 pcs., retention of rebar rods is used.

Symbol	Thickness	Dimensions		Package	Retail	Mass	Art. no.
	[mm]	Width b [m]	Length I [m]	bunch [psc.]	unit	[kg/pcs.]	
STP h=1200 mm l=2250	0,7	1,20	2,25	20	pcs.	6,020	AS-TR-PR-1-00178
STP h=1000 mm I=2250	0,7	1,00	2,25	20	pcs.	5,020	AS-TR-PR-1-00177

## STC

A drawn and galvanised metal mesh, used as permanent shuttering for the creation of working brakes.



Symbol	Thickness	Dimer	nsions	Package	Retail	Mass	Art. no.
	[mm]	Width b [m]	Length I [m]	bunch [psc.]	unit	[kg/pcs.]	
STC 0,30	0,30	0,60	2,50	20	pcs.	1,350	AS-TR-PR-0-00821
STC 0,45	0,45	0,60	2,50	20	pcs.	2,600	AS-TR-PR-0-00822

## BESTAL – GENERAL INFORMATION

At times, it becomes necessary to execute a joint in a location, which during use will be subject to water under pressure. Such spots are joints of bottom slabs and walls of containers. In order to insulate these spots, special bands are used, to be selected according to the pressure, temperature as well as aggression level of the liquid stored in the container. The bands are placed vertically between the vertical rods of the batten named BESTAL. BESTAL mounting battens are made of STC type mesh and rebar rods. The batten is based on the top layer reinforcement of the concrete slab, and then, during concreting, it is filled half-way, meaning, until the top mesh edge. This concrete creates a sort of rib that ensures stability to the sealing band during the later concreting of the wall.

### Mode of installation:

The Bestal batten comes in one of two types, as a single-component unit and as a two-component unit. The first of these may be used along an arch due to the fact that its main rods are cut, however, the second kind is used along straight lines. The Bestal single unit has its vertical rods shifted with respect to each other; such an arrangement provides the option of placement in the created space of a sealing band. The batten is placed on the top layer of slab rebar, and stabilised using tie wire. The situation is similar for the Bestal double batten, with the different, however, that the space for insertion of a sealing band is achieved by a shift of two profiles in such a way so that vertical rods of the batten pass each other by about 11 mm. After the sealing band is inserted between the vertical Bestal battens, one can commence concreting of the slab, at the same time filling the Bestal batten up to the upper edge of the mesh with concrete. Such an insulation of the working brakes fully protects against pressurised water intrusions.



 ${\sf BESTAL}\,{\sf double}$ 

## Formwork accessories FORMWORK FOR WORKING BRAKES

## BESTAL single



The BESTAL single batten is used as a working brakes at curved (bow) spots. The sealing band for the working brakes is inserted between the vertical rods. The rods are shifted by about 15 mm.



Symbol	Length [mm]	h [mm]	b [mm]	a [mm]	Dimensions [mm]	Package pallet [pcs./r.m.]	Retail unit	Mass [kg/pcs.]	Art. no.
BESTAL single 150/1	1420	150	50	80	70 x 1470	220/312,4	pallet	1,500	AS-TR-PR-0-02021
BESTAL single 200/1	1420	200	60	110	100 × 1470	144/204,5	pallet	1,650	AS-TR-PR-0-02023
BESTAL single 240/1	1420	240	70	130	120 x 1470	112/159,0	pallet	1,880	AS-TR-PR-0-02025
BESTAL single 320/1	1420	320	80	170	160 × 1470	70/99,4	pallet	2,140	AS-TR-PR-0-02028

## BESTAL double



The BESTAL double batten is used as a working brakes at straight spots. The sealing band is inserted into a slit created individually from vertical rods of BESTAL double as a result of their shift with respect to each other. It should amount to approx. 15 mm.



Symbol	Length [mm]	h [mm]	b [mm]	a [mm]	Dimensions [mm]	Package pallet [pcs./r.m.]	Retail unit	Mass [kg/pcs.]	Art. no.
BESTAL double	1420	150	50	80	70 × 1470	360/255,6	pallet	1,100	AS-TR-PR-0-02020
BESTAL double	1420	200	60	110	100 × 1470	224/159,0	pallet	1,150	AS-TR-PR-0-02022
BESTAL double	1420	240	70	130	120 x 1470	196/139,2	pallet	1,280	AS-TR-PR-0-02024
BESTAL double	1420	320	80	170	160 x 1470	120/85,2	pallet	1,440	AS-TR-PR-0-02026



# LIGHT FORMWORK SYSTEM

### GENERAL INFORMATION

The price of labour itself in many countries is continuously increasing. In order to reduce it, people search for cheap and quickly implementable solutions.

In the construction industry, a large part of resources foreseen for the execution of an investment project arises due to costs related to the execution of foundations. This is related to the fact of use of large-volume formwork and heavy equipment, such as i. e. cranes, to create walls and foundation slabs.

This is not always adequate to the goal, which we face under construction site conditions. FORBUILD, attempting to accommodate Your needs, suggests modern solutions in the form of light steel formwork. This

formwork, thanks to their simplicity and light weight, may be erected very quickly, transported in a simple and inexpensive way, and stored under construction site conditions. The special structure of the formwork makes resistance characteristics satisfying as well. The catalogue includes information, which shall simplify the choice of proper formwork for you.

Formwork available at our company is manufactured out of two steel sheet types: corrugated and trapezoidal. The standard thickness of corrugated sheets is 0.50 mm, with trapezoidal sheets having 0.75 m. Trapezoidal sheets can also be manufactured with a thickness of 0.6 mm, 1.0 mm and 1.5 mm. Formwork made of wavy and trapezoidal steel sheets are additionally reinforced by spans or crosswise embossing.

### The Vario 50 corrosion protected system



The Vario 50 system is composed of wavy sheet steel with a thickness of 0,5 mm, galvanically protected against corrosion. The steel sheets have lateral cuts every 50 mm, permitting the forming of formwork for such a module by hand. An additional goal of the crosswise cuts is the option of breaking the sheets to suit the relevant size, through repeated sideways bends of the sheet at the cut spot. The standard length of the formwork sheet is 6000 mm, and its height is given as between 140 mm and 550 mm. Formwork sheets of the Vario 50 system can be connected with each other as overlays, for at least 50 minutes, using steel sheet screws.



Symbol	Height H [mm]	Length L [mm]	Retail unit	Package [roll/pallet]	Mass [kg/roll]	Art. no.
AS 140	140	6000	roll	60	3,23	AS-TR-KT-0-20137
AS 180	180	6000	roll	48	4,15	AS-TR-KT-0-20138
AS 192	192	6000	roll	48	4,42	AS-TR-KT-0-20139
AS 210	210	6000	roll	42	4,84	AS-TR-KT-0-20140
AS 220	220	6000	roll	42	5,10	AS-TR-KT-0-20141
AS 235	235	6000	roll	42	5,41	AS-TR-KT-0-20142
AS 250	250	6000	roll	42	5,76	AS-TR-KT-0-20143
AS 260	260	6000	roll	36	6,00	AS-TR-KT-0-20144
AS 277	277	6000	roll	36	6,40	AS-TR-KT-0-20145
AS 305	305	6000	roll	36	7,03	AS-TR-KT-0-20146
AS 330	330	6000	roll	30	7,60	AS-TR-KT-0-20147
AS 355	355	6000	roll	30	8,18	AS-TR-KT-0-20148
AS 385	385	6000	roll	24	8,87	AS-TR-KT-0-20149
AS 415	415	6000	roll	24	9,56	AS-TR-KT-0-20150
AS 440	440	6000	roll	24	10,14	AS-TR-KT-0-20151
AS 470	470	6000	roll	18	10,83	AS-TR-KT-0-20152
AS 500	500	6000	roll	18	11,52	AS-TR-KT-0-20153
AS 525	525	6000	roll	18	12,10	AS-TR-KT-0-20154
AS 550	550	6000	roll	18	12,67	AS-TR-KT-0-20155



### Vario 100 system



The Vario 100 system is composed of wavy sheet steel with a thickness of 0,5 m. The sheets have lateral cuts every 100 mm, and this permits the forming of formwork for such a module by hand. An additional goal of the sideways cuts is the option of breaking the sheets to size by repeated lateral bending at the cut spot. As standard, the formwork plate is 4000 mm in length, with its height contained between 600 mm to 900 mm. The Vario 100-system formwork sheets can be connected with each other as overlay of at least 100 mm using steel sheet screws.



Symbol	Height H [mm]	Length L [mm]	Retail unit	Package [roll/pallet]	Mass [kg/roll]	Art. no.
AS 600	600	4000	roll	18	11,28	AS-TR-KT-0-20156
AS 700	700	4000	roll	12	13,16	AS-TR-KT-0-20157
AS 800	800	4000	roll	12	15,04	AS-TR-KT-0-20158
AS 900	900	4000	roll	12	16,92	AS-TR-KT-0-20159

## Simple FKF formwork



The structure of such formwork consists of steel sheets with a thickness of 0,5 mm. Formwork slabs are delivered to the construction site on a pallet, and at the construction side all that one needs is to put them together into formwork, this is permitted by the crosswise cuts. After completion of setup, execute an overlay of approx. 50 mm, to be tightened by selfthreading screws. The maximum plate size amounts to 1000 mm. The formwork is characterised by a small mass and simplicity of assembly. The permanency of plates is done as overlay protected by self-threading screws.



Goods available upon order. Please provide number and dimensions (A, B, H).

Remark<sup>1</sup>

Symbol	Height H [mm]	Length A [mm]	Retail unit	Package [r.m./pallet]	Mass [kg/m²]	Art. no.
FKF simple	max 1000	max 8000	r.m.	80	3,60	-

### FKVF formwork



This formwork system is composed rather of trapezoid plates with a thickness of 0,75 mm. The formwork slabs are provided on pallets, and under the conditions of manufacture they just need to be put together into formwork, a task permitted by a Russian operator. It is important that after assembly, an overlay of approx. 50 mm must be made, tightened by selfpriming screws. The maximum slab width is 1000 mm. This formwork type is characterised by lightness and simplicity of assembly. Plates are extended as overlay and protectedm if possible, using hexagonal head screws. Remark



Goods available upon order. Please provide number and dimensions (A, B, H).

Symbol	Height H [mm]	Length A [mm]	Retail unit	Package [r.m./pallet]	Mass [kg/m²]	Art. no.
FKVF	1000	max 8000	r.m.	80	4,60	-

### FS 2001 system



FS 2001



FS 2001 G

Like the majority of our systems, this type is also composed of two units, which are formwork plates made of trapezoidal steel sheets, with a thickness of 0.75 mm, additionally reinforced with bars. The height of formwork slabs is 1000 mm, the length is 3100 mm, whereby the usable length is 3005 mm. The slabs are assembled using connector rods inserted between the bars and the formwork slab. Thanks to this, one can maintain the proper spacing between slabs during their joining. Assembly is done using overlay, and one needs to care to protect the ends using spacer rods. The overlay spot needs to be joined by self-threading screws. Assembly at an angle is done by making cuts in the bars and bending the slabs.

The system is also available in the G version, whereby the formwork slabs are covered with smooth steel sheets. The dimensions and assembly basics remain the same as with the FS 2001 system. The sole difference is the presence of a connector corner unit in this version, which is screwed to the formwork using self-threading screws. An advantage of this solution is not only the assembly simplicity, but also the possibility of reuse of the formwork slabs. The smooth surface of the concrete upon formwork removal is very even, simplifying insulation adhesion.

Goods available upon order. Please provide number and







FS 2001 G

Symbol	Height H [mm]	Length L [mm]	Retail unit	Package [pcs./pallet]	Mass [kg/m²]	Art. no.
FS 2001	500 - 1000	3100	pcs.	20	8	-
FS 2001 G	500 - 1000	3100	pcs.	20	14	-

## FS 2001 system, light type



The light type of the FS 2001 system is composed of two parts. The first is a corrugated sheet slab fused with bars, with the second component being connector rods slid between the slab and the bars. The task of the connector rods is the maintenance of the required slab distance as is the case of formwork tie rods in case of standard formwork slabs. Assembly is done using overlay, with connections made using self-threading screws. Assembly at an angle is done by making cuts in the bars and bending the slabs. There exists the possibility of formwork removal, however, the customers often decide for the formwork to be stay-in-place. An advantage of the FS 2001 light system is the speed of assembly. The total formwork slab length is 3500, with the usable length being 3450 mm. The slab heights start at 400 mm (at such a height, the formwork is self-supporting), higher components need to be protected against concrete stress, eg. by packing with soil. The maximum slab height is 1000 mm. The formwork is characterised by lightness and simplicity of assembly.

### Remark:

dimension (H).

Goods available upon order. Please provide number and dimension (H).

Symbol	Height H [mm]	Length L [mm]	Retail unit	Package [pcs./pallet]	Mass [kg/m²]	Art. no.
FS 2001 light	500 - 1000	3500	pcs.	20	5	-



## PASS-THROUGH PIPES – GENERAL INFORMATION

Drill-through pipes are counted among light formwork, and their main area of use are concrete components, through which electric cabling, water pipes, sewage pipes or other media need to be routed.

The pipes are watertight, thanks to which, during concreting or packing, the concrete mix does not penetrate them. The pass-through AR-flex type pipes are flexible, and compared to standard AR-type pass-through pipes can be bent. They are placed in formwork and protected against shifting that could occur during concreting.

## AR-FLEX pipes – flexible pipes



The AR-FLEX-type pass-through pipes are spiral pipes made of cold-rolled steel bands, and screw-twisted to the left. The twist creates grooves with a height of approx. 3 mm. As the name suggests, the AR-FLEX pass-through pipe is flexible. The maximum bend radius is 1.5 of the pipe diameter. The AR-FLEX pass-through pipe is made out of a sheet band with a thickness of 0.2 mm to 0.4 mm, depending on the pipe diameter. Different sheet thicknesses are available upon request.

The pass-through pipes are categorised as light formwork, and their main use is in concrete components, through which electric cabling, water piping, sewage piping or other media need to be routed. R

The advantage of rigid pipes is high resistance, straightness, lightness and ease of installation.

Symbol	Dimer	nsions	Retail unit	Package	Mass	Art. no.
	D[mm]	L[mm]	[3 r.m.]	[pcs.]	[kg/pcs.]	
AR-FLEX 40-3000	40	3000	pcs.	1	1,11	AS-TR-RP-0-18998
AR-FLEX 50-3000	50	3000	pcs.	1	1,41	AS-TR-RP-0-19045
AR-FLEX 60-3000	60	3000	pcs.	1	1,65	AS-TR-RP-0-19001
AR-FLEX 65-3000	65	3000	pcs.	1	1,80	AS-TR-RP-0-19003
AR-FLEX 70-3000	70	3000	pcs.	1	1,95	AS-TR-RP-0-19009
AR-FLEX 80-3000	80	3000	pcs.	1	2,19	AS-TR-RP-0-19014
AR-FLEX 90-3000	90	3000	pcs.	1	2,40	AS-TR-RP-0-19018
AR-FLEX 100-3000	100	3000	pcs.	1	2,70	AS-TR-RP-0-19021
AR-FLEX 120-3000	120	3000	pcs.	1	3,15	AS-TR-RP-0-19022
AR-FLEX 135-3000	135	3000	pcs.	1	3,48	AS-TR-RP-0-19023
AR-FLEX 150-3000	150	3000	pcs.	1	3,96	AS-TR-RP-0-19025

### Formwork accessories LIGHT FORMWORK SYSTEM

### AR pipes – rigid pipes



The standard version of the pass-through pipe is the AR pipe – a rigid one. It is made of cold-rolled steel band. The AR pipe is formed by right-hand twisting of the steel band. In course of the twisting, reinforcement grooves are created that are about 3.0 mm in height. The standard thickness of the steel band is 0.2 to 0.4 mm, depending on the pipe diameter. Thicker bands may be manufactured upon request. The pass-through pipes are categorised as light formwork, and their main use is in concrete components, through which electric cabling, water piping, sewage piping or other media need to be routed.



The advantage of rigid pipes is high resistance, straightness, lightness and ease of installation.

Symbol	Dimens	sions	Retail unit	Package	Mass	Art. no.
	D[mm]	L[mm]	[3 r.m.]	[pcs.]	[kg/pcs.]	
AR 40-3000	40	3000	pcs.	1	0,90	AS-TR-RP-0-00829
AR 50-3000	50	3000	pcs.	1	1,20	AS-TR-RP-0-00830
AR 60-3000	60	3000	pcs.	1	1,50	AS-TR-RP-0-00831
AR 65-3000	65	3000	pcs.	1	1,80	AS-TR-RP-0-19405
AR 70-3000	70	3000	pcs.	1	2,10	AS-TR-RP-0-00832
AR 80-3000	80	3000	pcs.	1	2,40	AS-TR-RP-0-00833
AR 100-3000	100	3000	pcs.	1	3,30	AS-TR-RP-0-10285
AR 120-3000	120	3000	pcs.	1	4,20	AS-TR-RP-0-00041
AR 125-3000	125	3000	pcs.	1	4,50	AS-TR-RP-0-14485
AR 150-3000	150	3000	pcs.	1	5,10	AS-TR-RP-0-23273
AR 180-3000	180	3000	pcs.	1	6,30	AS-TR-RP-0-23274
AR 200-3000	200	3000	pcs.	1	6,90	AS-TR-RP-0-23275
AR 250-3000	250	3000	pcs.	1	8,70	AS-TR-RP-0-23276
AR 280-3000	280	3000	pcs.	1	9,90	AS-TR-RP-0-23277
AR 300-3000	300	3000	pcs.	1	10,5	AS-TR-RP-0-23278
AR 350-3000	350	3000	pcs.	1	14,7	AS-TR-RP-0-23279
AR 400-3000	400	3000	pcs.	1	16,8	AS-TR-RP-0-23280
AR 450-3000	450	3000	pcs.	1	18,9	AS-TR-RP-0-23281
AR 500-3000	500	3000	pcs.	1	21,0	AS-TR-RP-0-23282
AR 550-3000	550	3000	pcs.	1	23,1	AS-TR-RP-0-23283
AR 600-3000	600	3000	pcs.	1	25,2	AS-TR-RP-0-23284
AR 650-3000	650	3000	pcs.	1	27,3	AS-TR-RP-0-23285
AR 700-3000	700	3000	pcs.	1	29,4	AS-TR-RP-0-23286
AR 750-3000	750	3000	pcs.	1	41,1	AS-TR-RP-0-23287
AR 800-3000	800	3000	pcs.	1	43,8	AS-TR-RP-0-23288
AR 850-3000	850	3000	pcs.	1	46,5	AS-TR-RP-0-23289
AR 900-3000	900	3000	pcs.	1	49,2	AS-TR-RP-0-23290
AR 950-3000	950	3000	pcs.	1	51,9	AS-TR-RP-0-23291
AR 1000-3000	1000	3000	pcs.	1	67,2	AS-TR-RP-0-23292
AR 1050-3000	1050	3000	pcs.	1	70,5	AS-TR-RP-0-23293
AR 1100-3000	1100	3000	pcs.	1	73,8	AS-TR-RP-0-23294
AR 1150-3000	1150	3000	pcs.	1	77,1	AS-TR-RP-0-23295
AR 1200-3000	1200	3000	pcs.	1	98,4	AS-TR-RP-0-23296
AR 1250-3000	1250	3000	pcs.	1	102,6	AS-TR-RP-0-23297
AR 1300-3000	1300	3000	pcs.	1	106,8	AS-TR-RP-0-23298
AR 1400-3000	1400	3000	pcs.	1	114,9	AS-TR-RP-0-23299
AR 1500-3000	1500	3000	pcs.	1	123,3	AS-TR-RP-0-23300
AR 1600-3000	1600	3000	pcs.	1	131,4	AS-TR-RP-0-23301
AR 1800-3000	1800	3000	pcs.	1	147,9	AS-TR-RP-0-23302
AR 2000-3000	2000	3000	pcs.	1	164,4	AS-TR-RP-0-23303



## ASSEMBLY INSTRUCTIONS – VARIO 100 SYSTEM

- 1. Initial component supplied to construction site
- 2. Manually conducted forming of the formwork





- 3. Installation of formwork in the reinforcement mesh
- 4. Stabilisation of steel formwork in a reinforcement mesh



- 6. End result



5. Concreting of the foundation slab



### ASSEMBLY INSTRUCTIONS – FS 2001 SYSTEM



3. Mode of joining of the formwork slabs

4. Mode of execution of corners using steel formwork.



5. Pouring of the formwork – foundation execution





6. End result - ready component





## ASSEMBLY INSTRUCTIONS – FKVF FORMWORK

- 1. Initial component supplied to construction site
- 2. Manually conducted forming of the formwork



3. Installation of formwork in the reinforcement mesh



5. Concreting of the foundations



4. Packing of the concrete component with outside formwork slabs



6. End result





### GENERAL INFORMATION

Cardboard formwork are a single-use formwork type for the erection of reinforced concrete pillars

The advantages of cardboard formwork are:

 simplicity of execution of reinforced concrete pillars with their use (easy assembly and removal)

very light as compared to steel formwork

• water-resistant, can be stored in the open at the construction site, however, the support plane should be as large as possible, otherwise the formwork surface can be crushed

environmentally friendly (anti-adhesive agents are not required)

 $\blacksquare$  as the formwork is made of cardboard, they are single-use, need not be cleaned or stored after formwork removal

available diameter range 152 to 1200 mm

 standard length three and four metres (other lengths upon request – through joining of two sections)

smoothness of the concrete surface after formwork removal

#### Assembly:

The cardboard formwork is assembled very easily. One only needs to note some activities during assembly. The formwork pipes need not be pressed with an excessive force or into excessively bent rebar, as the cardboard formwork may be damaged. Furthermore, set the form on the foundation at an axis and fix it with a wooden crosspiece in its bottom part, and in the top part stabilise by supports. Protect against upthrust.

#### Concreting:

The concrete should be introduced via a concrete pump through a pipe at spacing values of approx. 50 cm, to be appropriately packed. The packing may take place using a vibratory probe. Note for the pipe hose and vibrator not to touch the interior surface of the formwork pipe during these works. The drop height of concrete into the formwork, in case of assembly without embedded pipes or hoses, should be limited to the values recommended by norms.

#### Removal:

Fast and simple removal of the formwork thanks to an embedded tear string. The formwork is removed from the concrete pillar without the use of large amounts of force. The inlay may stay on the pillar until the construction works are completed, to serve as protection. The used formwork is disposed of thermally.





Structural concrete pillars.







## Spiral formwork pipe



Spiral formwork is a kind of formwork for reinforced concrete pillars. A spiral trace is left on the hardened concrete surface.

Usage:

For pillars, the outer surface of which shall undergo finishing work.



Cumbel	Dimen	sions		Retail	Package	Mass				
Symbol	Diameter [mm]	Leng	th [m]	unit	[pcs.]	[kg/r.m.]	Art. no.			
Spiral formwork pipe D152	152	3	4	r.m.	pcs.	1,3	AS-TR-KT-0-00798			
Spiral formwork pipe D202	202	3	4	r.m.	pcs.	1,7	AS-TR-KT-0-00799			
Spiral formwork pipe D250	250	3	4	r.m.	pcs.	2,1	AS-TR-KT-0-00800			
Spiral formwork pipe D300	300	3	4	r.m.	pcs.	2,5	AS-TR-KT-0-00801			
Spiral formwork pipe D350	350	3	4	r.m.	pcs.	3,6	AS-TR-KT-0-00802			
Spiral formwork pipe D400	400	3	4	r.m.	pcs.	4,1	AS-TR-KT-0-00803			
Spiral formwork pipe D450	450	3	4	r.m.	pcs.	4,6	AS-TR-KT-0-00804			
Spiral formwork pipe D500	500	3	4	r.m.	pcs.	5,1	AS-TR-KT-0-00805			
Spiral formwork pipe D550	550	3	4	r.m.	pcs.	6,3	AS-TR-KT-0-00806			
Spiral formwork pipe D600	600	3	4	r.m.	pcs.	6,9	AS-TR-KT-0-00807			
Spiral formwork pipe D650	650	3	4	r.m.	pcs.	7,5	AS-TR-KT-0-00808			
Spiral formwork pipe D700	700	3	4	r.m.	pcs.	8,0	AS-TR-KT-0-00809			
Spiral formwork pipe D750	750	3	4	r.m.	pcs.	8,5	AS-TR-KT-0-00810			
Spiral formwork pipe D800	800	3	4	r.m.	pcs.	9,3	AS-TR-KT-0-00811			
Spiral formwork pipe D900	900	3	4	r.m.	pcs.	10,5	AS-TR-KT-0-00812			
Spiral formwork pipe D1000	1000	3	4	r.m.	pcs.	11,5	AS-TR-KT-0-00796			
Spiral formwork pipe D1200	1200	3	4	r.m.	pcs.	13,7	AS-TR-KT-0-00797			

## Smooth formwork pipe



Smooth formwork is a kind of formwork for round reinforced concrete pillars. Thanks to the use of such formwork, one can achieve a smooth hardened concrete surface.

Usage:

For pillars, the outer surface of which shall be visible.



Sumbol	Dimer	sions		Retail	Package	Mass	Art no
Symbol	Diameter [mm]	Leng	th [m]	unit	[pcs.]	[kg/r.m.]	Art. no.
Smooth formwork pipe D202	202	3	4	r.m.	pcs.	1,7	AS-TR-KT-0-00782
Smooth formwork pipe D250	250	3	4	r.m.	pcs.	2,1	AS-TR-KT-0-00783
Smooth formwork pipe D300	300	3	4	r.m.	pcs.	2,5	AS-TR-KT-0-00784
Smooth formwork pipe D350	350	3	4	r.m.	pcs.	3,6	AS-TR-KT-0-00785
Smooth formwork pipe D400	400	3	4 r.m. pcs.		pcs.	4,1	AS-TR-KT-0-00786
Smooth formwork pipe D450	450	3	4	r.m.	pcs.	4,6	AS-TR-KT-0-00787
Smooth formwork pipe D500	500	3	4	r.m.	pcs.	5,1	AS-TR-KT-0-00788
Smooth formwork pipe D550	550	3	4	r.m.	pcs.	6,3	AS-TR-KT-0-00789
Smooth formwork pipe D600	600	3	4	r.m.	pcs.	6,9	AS-TR-KT-0-00790
Smooth formwork pipe D650	650	3	4	r.m.	pcs.	7,5	AS-TR-KT-0-00791
Smooth formwork pipe D700	700	3	4	r.m.	pcs.	8,0	AS-TR-KT-0-00792
Smooth formwork pipe D750	750	3	4	r.m.	pcs.	8,5	AS-TR-KT-0-00793
Smooth formwork pipe D800	800	3	4	r.m.	pcs.	9,3	AS-TR-KT-0-00794
Smooth formwork pipe D900	900	3	4	r.m.	pcs.	10,5	AS-TR-KT-0-00795
Smooth formwork pipe D1000	1000	3	4	r.m.	pcs.	11,5	AS-TR-KT-0-00781

## CHOSEN REALIZATIONS

### MUSEUM OF SILESIA IN KATOWICE

Supply of formwork accessories for wall and ceiling slab formwork

**General contractor:** Budimex SA, Ferrovial Agroman

## UPGRADE OF THE RAIL LINE, SECTION KRAKÓW-ZAKOPANE, ZEMBRZYCE VIADUCT

Supply of formwork accessories for wall and ceiling slab formwork

### **General contractor:**

Skanska S.A.

### LNG TERMINAL (GAS PORT) IN ŚWINOUJŚCIE

Supply of formwork accessories for wall and ceiling slab formwork

### **General contractor:**

Consortium of companies: Saipem S.p.A. (Italy) – Saipem SA (France) – Techint Compagnia Technica Internazionale S.p.A. (Italy) – Snamprogetti Canada Inc. (Canada) – PBG SA (Poland) – PBG Export Sp. z o. o. (Poland).

### KAPONIERA ROUNDABOUT IN POZNAŃ

Supply of formwork accessories for wall and ceiling slab formwork

**General contractor:** Obrascon Huarte Lain S.A.













## Formwork accessories GALLERY







## Formwork accessories GALLERY







## Formwork accessories GALLERY







### NOTES

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