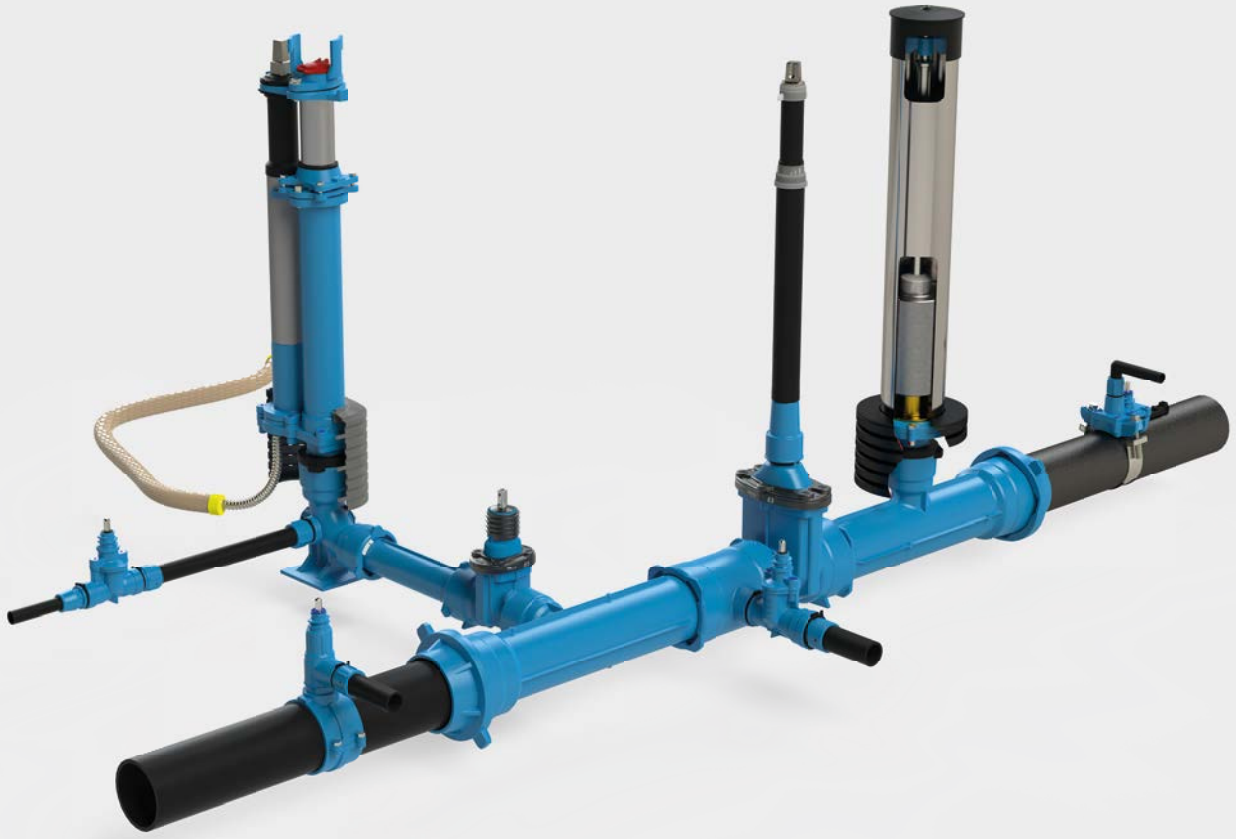


BAIO®-System & ZAK®-System

Simple and Time-saving Technology in Pipeline Construction and Service Connections

06/2023

Explanations

The scope of medium can be restricted within the product data sheets. In case of any inquiry or order point out the medium of each project.

In case of any questions, don‘t hesitate to contact our application engineers.

	potable water products
	sewage water products
	gas products (according to DVGW G 260)
hawle 10 JAHRE Qualitätsgarantie	further information of „10 years quality warranty“ for potable water products: **www.hawle.de/en/10-years-quality-warranty/**

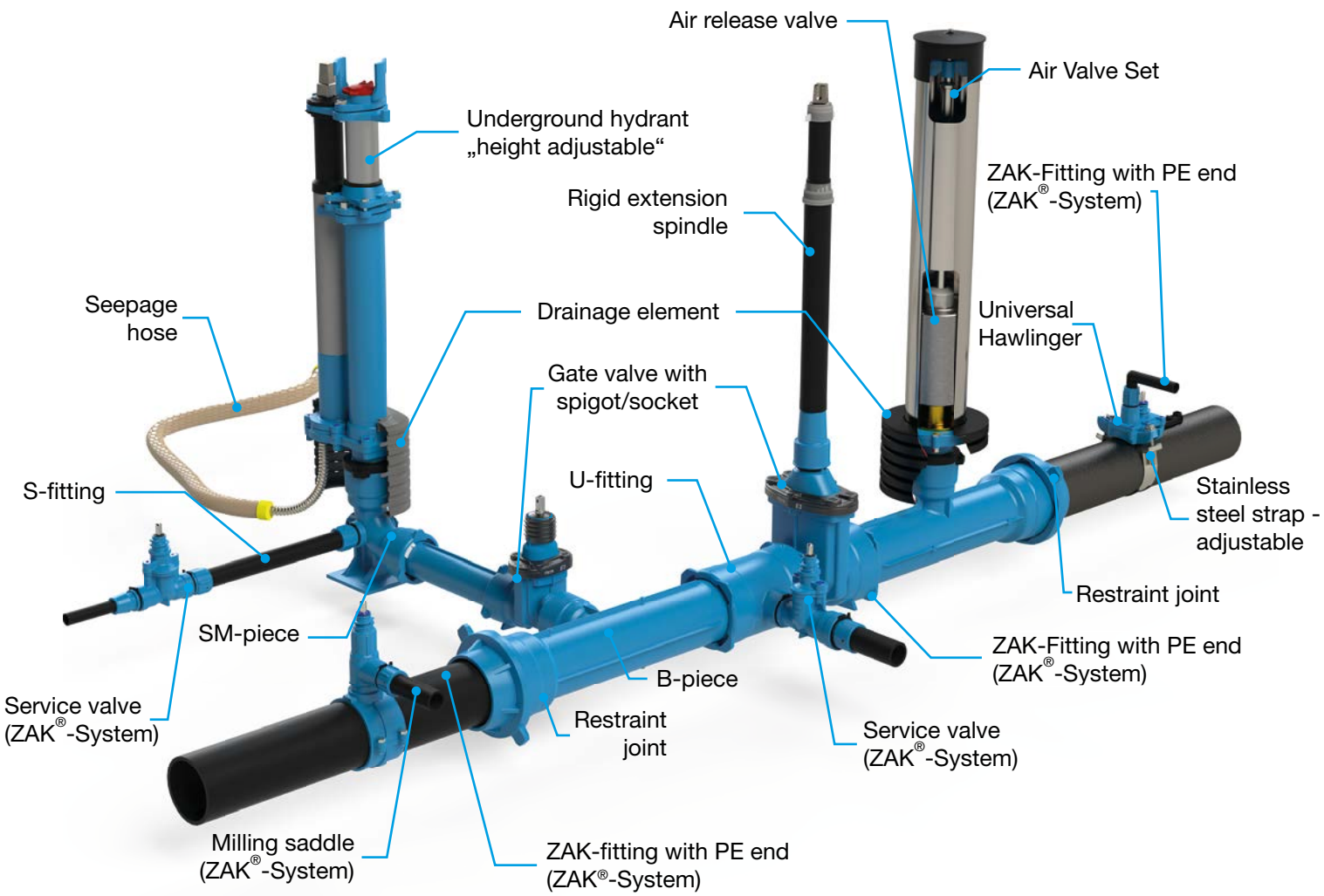
Significant Advantages of Threadless Connection Technology

For decades flangeless connections have been used for joining pipes and fittings in the construction of underground supply lines as this connection technology offers technical and economic advantages compared to conventional flange and welded connections. In the past, threaded connections were used in the construction of domestic supply lines. With this type of connection, contact corrosion frequently occurred on the bare transition areas, permanently damaging the connection or sealing through incrustation.

For this reason, we developed the Hawle BAIO® system at the beginning of the 1980s with the aim of providing the customer with a simple and stressless installation of pipeline parts and fittings, while at the same time guaranteeing a long service life of the system through integrated corrosion protection.

This idea evolved into the Hawle ZAK® system for the service connection sector in order to develop a long life for the service connection system. Both connection technologies have now become established and are state of the art.

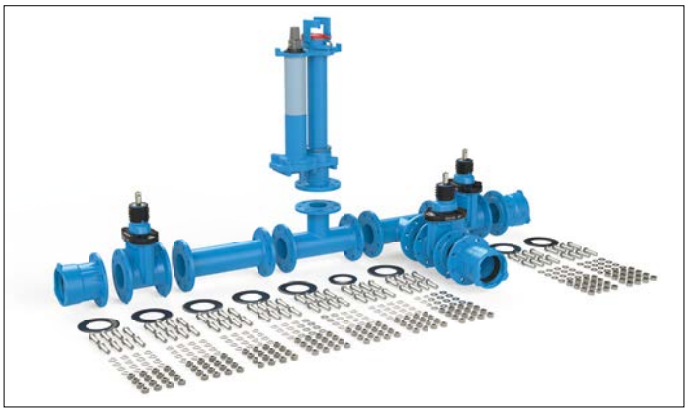
These generally accepted advantages can be transferred without restriction to the connection between pipelines and valves, as well as between the valves themselves.
In addition to the technical advantages of this threadless connection system, the economic efficiency of the sleeve technology should also be mentioned. The compact design of the Hawle BAIO® system results in savings in storage and transport as well as in installation due to considerably shorter assembly times compared to conventional flange and welded joints (see diagram on pages 5 - 7).



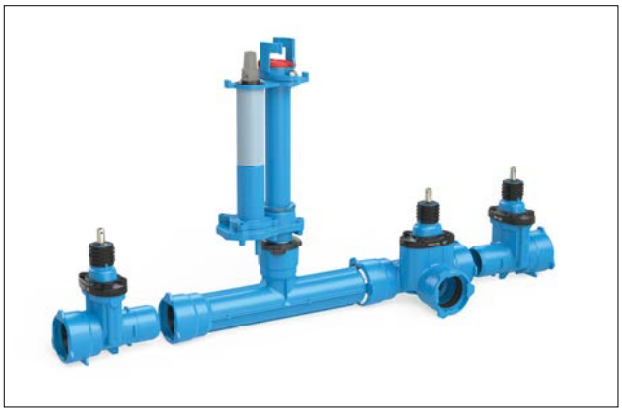
System Comparison: BAIO®-System or Flange-System

A Comparison of the BAIO®-System with flanged fittings

Flange-System: 307 components



BAIO®-System: 7 components



Technical features of the BAIO®-System:

- Medium: drinking water, sewage and gas
- Nominal widths DN 80 – DN 300
- Maximum operating pressure 16 bar
- Simple and fast installation
- A small number of components and connections*
- All-round flexible plug-in sleeve connection (up to 3° per spigot-end socket connection)
- Stress-free installation conditions
- Low storage costs
- Non-earthed Hawle-Stop restraint joint
- Integrated, robust corrosion protection through Hawle epoxy powder coating
- Universal use with cast iron, steel**, PE****, PVC and AC*** pipes

Twist lock device: When installing BAIO® fittings (spigot-end socket connection), we generally recommend using the BAIO® twist lock device 529-05 to prevent subsequent unlocking of the components.

**with steel weld-in end 452-01
*** with cut-in socket fitting with multi-joint 530-01
****Support liners must be used when connecting PE pipes.

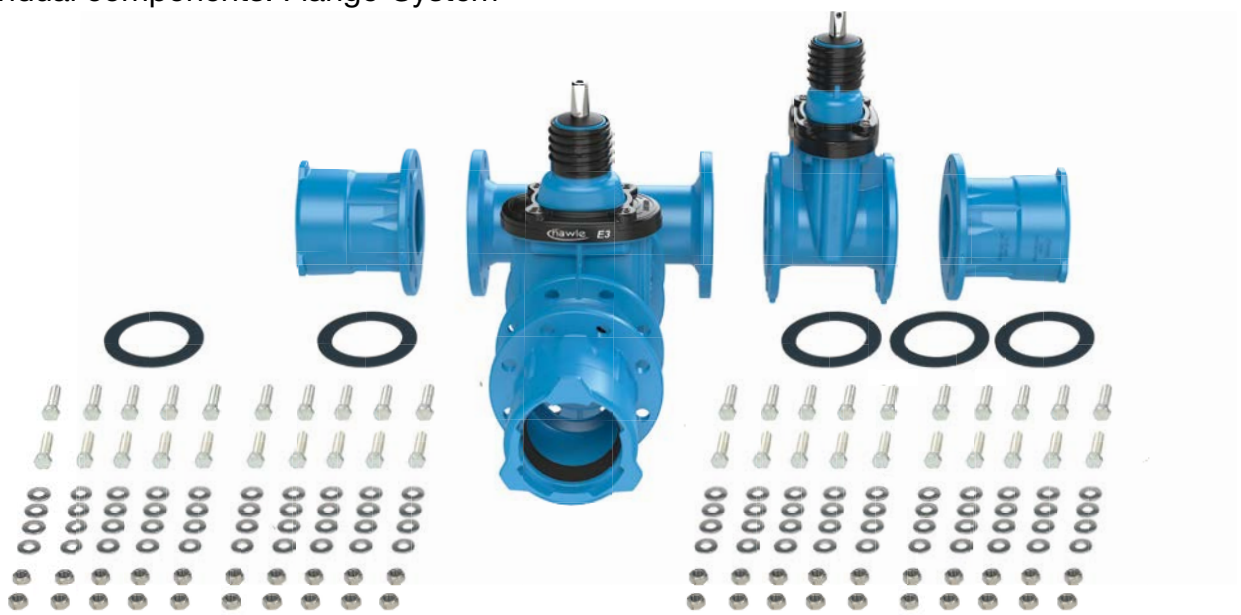
ONE socket - FOUR pipe types: cast iron, PVC, PE and steel (use 452-01 steel weld-in ends). Depending on the type of pipe, different seals and restraining joints are to be used for force locking pipes longitudinally and compactly in BAIO® sockets. Please note the following overview.

System Comparison: BAIO®-System or Flange-System

2 individual components: BAIO®-System

1 x MMB Combi-T gate valve “E3” (Order-no. 437-00)	1 x Gate valve “E3” with spigot/socket (Order-no. 451-00)

171 individual components: Flange-System



1 x T-fitting (Order-no. 851-00)	40 x Bolts
2 x Gate valves (Order-no. 470-00)	40 x Nuts
3 x EU-fitting (Order-no. 535-00)	80 x Washers
5 x Flat gaskets	

System Comparison: BAIO®-System or Flange-System

5 individual components: BAIO®-System

1 x Combi-T gate valve “E3” (Order-no. 437-00)	1 x Underground hydrant (Order-no. 490-00)
1 x Standard tee (Order-no. 537-00)	2 x Gate valve “E3” with spigot/socket (Order-no. 451-00)

307 individual components: Flange-System

2 x T-fitting (Order-no. 851-00)	9 x Flat gasket
1 x Flanged pipe fitting (Order-no. 850-01)	72 x Bolts
3 x Gate valves (Order-no. 470-00)	72 x Nuts
3 x EU-fitting (Order-no. 535-00)	144 x Washes
1 x Underground hydrant (Order-no. 490-00)	

One Push-fit Socket - four Types of Pipes

BAIO®-socket

Seal	Grip ring	Locking ring	Pipe-type
BLD®	Grip ring PE	Hawle-Stop	ductile iron pipe DN 80 - DN 200
BLD®	express ring	BAIO®-Sit	ductile iron pipe DN 250 - DN 300
GKS	grip ring „Corundum“	Hawle-Stop	PVC-pipe DN 80 - DN 200
GKS	brass ring, sliding ring	BAIO®-Sit	PVC-pipe DN 250 - DN 300
GKS	grip ring	Hawle-Stop	support liner; PE/PEX-pipe DN 80 - DN 200
GKS	grip ring	BAIO®-Sit	support liner; PE/PEX-pipe DN 250 - DN 300
GKS	electrofusion socket	BAIO®-E-Stop	support liner; PE-pipe
BBD	Blutop-grip ring	Hawle-Stop	Blutop-pipe

BAIO®-System: Valves

437-00
Combi-T gate valve „E3“

438-00
Combi III gate valve „E3“

439-00
Combi IV gate valve„E3“

450-00*
Gate valve „E3“ with sockets

451-00*
Gate valve „E3“ with spigot/ socket

480-00
Sewage water knife gate valve with sockets

No.	Description	Operating pressure max.			Dimension
437-00	Combi-T gate valve „E3“	16 bara	-	-	DN 80 - DN 200
438-00	Combi III gate valve „E3“	16 bara	-	-	DN 100 - DN 200; *2 x ZAK 46; *2 x IG 1 1/2“; **BAIO® DN 80; **spojnica DN 100 (*horizontal outlet, **vertical outlet)
439-00	Combi IV gate valve„E3“	16 bara	-	-	DN 100 - DN 200 vertical outlet: BAIO® DN 80 or flange DN 100
450-00	Gate valve „E3“ with sockets	16 bara	-	-	DN 80 - DN 300
451-00	Gate valve „E3“ with spigot/socket	16 bara	-	-	DN 80 - DN 300
480-00	Sewage water knife gate valve with sockets	-	10 bara	-	DN 80 - DN 100

* (Gas on demand - model gate valve „E2“)

BAIO®-System: Valves & Pipe Fittings

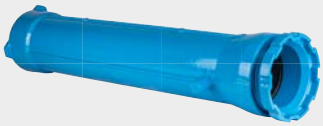
483-00
Sewage water knife gate valve spigot/socket

452-00
PE fusion end incl. lock ring

452-01
Steel fusion end incl. lock ring

530-00
Cut-in socket fitting with screw socket

530-01
Cut-in socket fitting with WAGA-Multi/Joint® multirange socket



530-02
Transition fitting with screw socket

No.	Description	Operating pressure max.			Dimension
483-00	Sewage water knife gate valve spigot/socket	-	10 bara	-	DN 80 - DN 150
452-00	PE fusion end incl. lock ring	10-16 bara	10-16 bara	5-10 bara	DN 80 - DN 300
452-01	Steel fusion end incl. lock ring	-	-	16 bara	DN 80 - DN 200
530-00	Cut-in socket fitting with screw socket	16 bara	16 bara	-	DN 80 - DN 300
530-01	Cut-in socket fitting with WAGA-Multi/Joint® multirange socket	16 bara	16 bara	-	DN 80 - DN 200
530-02	Transition fitting with screw socket	16 bar	16 bar	-	DN 80 - DN 200

BAIO®-System: Pipe Fittings

530-03
Cut-in socket fitting with BAIO® spigot end and Synoflex socket

531-00
S-fitting (spigot end fitting)

532-00
SM-fitting (spigot end / socket fitting)

532-01
SM-fitting with ZAK® outlets

532-02
SM-fitting with PE end

533-00
Socket fitting with steel tail

No.	Description	Operating pressure max.			Dimension
530-03	Cut-in socket fitting with BAIO® spigot end and Synoflex socket	16 bar	16 bar	-	DN 200 - DN 300
531-00	S-fitting (spigot end fitting)	16 bara	16 bara	16 bara	DN 80 - DN 300
532-00	SM-fitting (spigot end / socket fitting)	16 bara	16 bara	16 bara	DN 80 - DN 200
532-01	SM-fitting with ZAK® outlets	16 bara	16 bara	-	DN 80 - 300, ZAK 46, ZAK 69 (samo DN 250, DN 300)
532-02	SM-fitting with PE end	16 bara	16 bara	5 bara	DN 80, d 90
533-00	Socket fitting with steel tail	16 bara	-	5 bara	DN 80

BAIO®-System: Pipe Fittings

535-00
Flanged spigot fitting

536-00
Concentric tapers
(R reduced socket /
RU reduced spigot end)

537-00
B-fitting,
upper outlet: BAIO®-socket

537-01
A-fitting,
upper outlet: Flange connection

538-00
Double tee cross

538-01
Double tee cross with vertical outlet

No.	Description	Operating pressure max.			Dimension
		💧	〰	🔥	
535-00	Flanged spigot fitting	16 bar	16 bar	16 bar	DN 80 - DN 300
536-00	Concentric tapers (R reduced socket / RU reduced spigot end)	16 bar	16 bar	16 bar	DN 80 - DN 300
537-00	B-fitting (BAIO®-socket)	16 bar	16 bar	-	DN 80, DN 100, DN 150, DN 200; upper outlet DN 80
537-01	A-fitting (Flange connection)	16 bar	16 bar	-	DN 100, DN 150; upper outlet 80
538-00	Double tee cross	16 bar	16 bar	16 bar	DN 80 - DN 200
538-01	Double tee cross with vertical outlet	16 bar	-	-	DN 80 - DN 200

BAIO®-System: Pipe Fittings

359-00
Double strap pipe drilling saddle
with BAIO® socket

540-00
EU-fitting (flanged socket)

horizontal outlet:
DN 80 - DN 200:
1 x 2“, 2 x 2“, 2 x ZAK 46

DN 100, DN 125,
DN 150: DN 200, DN 300
ZAK, 69

541-00
U-fitting (collar)

542-00
All socket tee

543-00
Double socket bend 90°

543-01
MSQ-fitting 90°

No.	Description	Operating pressure max.			Dimension
359-00	Double strap pipe drilling saddle with BAIO® socket	16 bar	16 bar	5 bar	DN 80
540-00	EU-fitting (flanged socket)	16 bar	16 bar	on request	DN 80 - DN 300
541-00	U-fitting (collar) - BAIO® system Optional with female thread or ZAK® outlet	16 bar	16 bar	16 bar	DN 80 - DN 300
542-00	All socket tee	16 bar	16 bar	16 bar	DN 80 - DN 300
543-00	Double socket bend 90°	16 bar	16 bar	16 bar	DN 80 - DN 200
543-01	MSQ-fitting 90°	16 bar	16 bar	16 bar	DN 80

BAIO®-System: Pipe Fittings

544-00
Double socket bend 45°

544-01
Spigot socket bend 45°

545-00
Double socket bend 30°

546-00
Double socket bend 22°

546-01
Spigot socket bend 22°

547-00
Double socket bend 11°

No.	Description	Operating pressure max.			Dimension
544-00	Double socket bend 45°	16 bar	16 bar	16 bar	DN 80 - DN 300
544-01	Spigot socket bend 45°	16 bar	16 bar	16 bar	DN 80 - DN 300
545-00	Double socket bend 30°	16 bar	16 bar	16 bar	DN 80 - DN 300
546-00	Double socket bend 22°	16 bar	16 bar	16 bar	DN 80 - DN 300
546-01	Spigot socket bend 22°	16 bar	16 bar	16 bar	DN 80 - DN 200
547-00	Double socket bend 11°	16 bar	16 bar	16 bar	DN 80 - DN 300

BAIO®-System: Pipe Fittings

548-00
Duckfoot bend

549-00
EN-fitting

806-00
Socket end cap

807-00
Spigot end cap

532-03
Synoflex Transition piece to BAIO®-System (SM-piece)

No.	Description	Operating pressure max.			Dimension
548-00	Duckfoot bend	16 bar	16 bar	-	DN 80 - DN 100 Optional outlets: 2x F 1½“; 2x ZAK 46; 3 x ZAK 46
549-00	EN-fitting	16 bar	16 bar	-	DN 80 - DN 150 Optional outlets: 2x F 1½“; 2x ZAK 46; 3x ZAK 46
806-00	Socket end cap	16 bar	16 bar	16 bar	DN 80 - DN 200
807-00	Spigot end cap	16 bar	16 bar	5 bar	DN 80 - DN 300
532-03	Synoflex Transition piece to BAIO®-System (SM-piece)	16 bar	16 bar	-	DN 80 - DN 300

BAIO®-System: Restraint Joints, Accessories

527-00
Restraint joint BAIO®-SIT

528-00
Hawle-Stop restraint joint for DCI, PE and PVC pipes

528-01
Hawle-E-Stop Restraint joint with electrofusion socket for PE pipes

490-05
Dirt cover and locking ring for BAIO®-spigot ends

529-05
Twist lock device for BAIO® spigot end - socket connections

No.	Description	Operating pressure max.			Dimension
527-00	Restraint joint BAIO®-SIT	16 bar	16 bar	on request	DN 250 - DN 300
528-00	Hawle-Stop restraint joint for DCI, PE and PVC pipes	16 bar	16 bar	on request	DN 80 - DN 200
528-01	Hawle-E-Stop Restraint joint with electrofusion socket for PE pipes	16 bar	16 bar	10 bar	DN 80 - DN 200
490-05	Dirt cover and locking ring for BAIO® spigot ends	16 bar	16 bar	-	DN 80
529-05	Twist lock device for BAIO® spigot end - socket connections	16 bar	16 bar	16 bar	DN 80 - DN 300

BAIO®-System: Accessories

529-00
BAIO® lip gasket
(BLD®)

529-01
GKS gasket

529-02
BAIO®-BLUTOP-gasket

529-03
DCI pipe gasket for gas

529-04
Dirt gasket for sockets

No.	Description	Operating pressure max.			Dimension
529-00	BAIO® lip gasket (BLD®)	16 bar	16 bar	-	DN 80 - DN 300
529-01	GKS gasket	16 bar	16 bar	1 bar	DN 80 - DN 300
529-02	BAIO®-BLUTOP-gasket	16 bar	16 bar	-	DN 80 - DN 150
529-03	DCI pipe gasket for gas	-	-	16 bar	DN 80 - DN 300
529-04	Dirt gasket for sockets	-	-	-	DN 80 - DN 200

Additional Products with BAIO®-System

490-00 490-01

Freeflow underground hydrant / Freeflow underground hydrant with duckfoot bend

492-00
Tele-Hydrant®
2 x B or
2 x C outlets

494-00
Freeflow underground hydrant „height adjustable“

519-00
Above ground hydrant with predetermined breaking point

No.	Description	Operating pressure max.			Dimension
490-00	Freeflow underground hydrant	16 bar	-	-	DN 80 pipe cover depth: 0,77 m*, 1,00 m; 1,25 m; 1,50 m; 1,80 m; 2,20 m; 2,40 m *not available with duckfoot bend
490-01	Freeflow underground hydrant * with duckfoot bend				
492-00	Tele-Hydrant® * 2 x B or 2 x C outlets	16 bar	-	-	DN 80 pipe cover depth: 1,00 m; 1,25 m; 1,50 m
494-00	Freeflow underground hydrant * „height adjustable“	16 bar	-	-	DN 80 pipe cover depth: 1,00 - 1,30 m; 1,25 - 1,55 m; 1,50 - 2,05 m; 2,00 - 2,55 m (with flange-connection DN 100 on request)
519-00	Above ground hydrant with predetermined breaking point	16 bar	-	-	DN 80 pipe cover depth: 1,00 m; 1,25 m; 1,50 m

*(Special pipe cover and other connection tipes on demand

Additional Products with BAIO®-System

985-00
Air valve set
for sewage water and
potable water

992-02
Air valve set 2“ for
potable water

993-00
Air valve set for
potable water

No.	Description	Operating pressure max.			Dimension
985-00	Air valve set for sewage water and potable water	16 bar	16 bar	-	DN 80 pipe cover depth: 1,00 m, 1,25 m; 1,50 m
992-02	Air valve set 2“ for potable water	16 bara	-	-	DN 50, DN 80 pipe cover depth: 1,00 m; 1,25 m; 1,50 m; 1,75 m
993-00	Air valve set for potable water	16 bar	-	-	DN 80 pipe cover depth: 1,00 m; 1,25 m; 1,50 m; 1,75 m

Technical Features of the ZAK®-System

ZAK®-System threadless connection

Locking and Sealing
When installing, only the ZAK® spigot end is inserted into the ZAK® socket fitting, locked by turning 90° clockwise and fully retracted. In order to lock the ZAK® spigot end in the ZAK® socket fitting, the connection must then be secured against unintentional disconnection by means of an anti-twist device.
The bayonet connection, consisting of a corrosion-resistant socket fitting with an internal bayonet locking mechanism and a corrosion-resistant spigot end with locking lugs and double O-ring sealing, guarantees that the connection is reliably sealed.

Technical features

- Medium: drinking water, sewage water and gas
- Nominal diameters:
  ZAK 34 corresponds to a dimension of 1”
  ZAK 46 corresponds to a dimension of 1 ½“
  ZAK 69 corresponds to a dimension of 2”
  (ZAK 69 is not suitable for gas)
- Maximum operating pressure: drinking water 16 bar, sewage water 16 bar (gas upon request)
- Simple and fast installation
- Threadless connection technology
- Reduced tension through flexible connection
- Safe double O-ring sealing of the connection
- Long service life through integral corrosion protection
- No tools required for installation

Drilling in the ZAK®-System

The Hawle pipe drilling fitting allows the pipeline to be tapped under-pressure up to a maximum operating pressure of 16 bar.

The Hawle Hawlomat pipe drilling device (please see Chapter 7) enables you to drill cast iron, steel, PVC, PE and AC pipelines using a drilling saddle, for example in the ZAK® system. Drilling can be carried out in the areas of both drinking water and sewage water. The ZAK 69 system has been specially developed for the waste water sector. It is also possible to drill a retrofitted Hawle free-flow underground hydrant by means of an extra-long drilling spindle with a claw adapter. (Please refer to Chapter 2 for more information on Hawle drilling saddles.).

Application example in the drinking water sector
Drilling an existing PE supply line using HAKU-Hawlinger ZAK 46

Application example in the waste water sector
Drilling a waste pipeline using a ZAK 69 service gate valve for sewage water with a HAKU pipe drilling saddle

Further information on our Hawlomat pipe drilling device or our rental drilling devices can be found in the Internet at www.hawle.de.

ZAK®-System: Pipe Drilling Saddles

226-00
Hawlinger with upper vertical ZAK® socket and lower tapered male thread or lower ZAK® spigot end

227-00
Hawlinger with upper horizontal ZAK® socket in pipe direction

228-00
Hawlinger with horizontal ZAK® socket 90° to pipe direction

229-03
Hawlinger with upper vertical ZAK® socket

229-04
Hawlinger with upper horizontal ZAK® socket in pipe direction

229-05
Hawlinger with upper horizontal ZAK® socket 90° to pipe direction

No.	Description	Operating pressure max.			Dimension
226-00	Hawlinger with upper vertical ZAK® socket and lower tapered male thread or lower ZAK® spigot end	16 bar	-	5 bar	lower outlet: M 1 1/4“ conical, M 2“ conical, ZAK 46 upper outlet: ZAK 34, ZAK 46
227-00	Hawlinger with upper horizontal ZAK® socket in pipe direction and lower tapered male thread or lower ZAK® spigot end	16 bar	-	5 bar	lower outlet: M 1 1/4“ conical, M 1 1/2“ conical, ZAK 46, M 2“ conical upper outlet: ZAK 34, ZAK 46
228-00	Hawlinger with horizontal ZAK® socket 90° to pipe direction	16 bar	-	5 bar	lower outlet: M 1 1/4“ conical, M 1 1/2“ conical, M 2“ conical upper outlet: ZAK 34, ZAK 46
229-03	Hawlinger with upper vertical ZAK® socket	16 bar	-	5 bar	lower outlet: d 63 upper outlet: ZAK 34, ZAK 46
229-04	Hawlinger with upper horizontal ZAK® socket in pipe direction	16 bar	-	5 bar	lower outlet: d 63 upper outlet: ZAK 34, ZAK 46
229-05	Hawlinger with upper horizontal ZAK® socket 90° to pipe direction	16 bar	-	5 bar	lower outlet: d 63 upper outlet: ZAK 34, ZAK 46

ZAK®-System: Pipe Drilling Saddles

236-00
HAKU Hawlinger
with vertical ZAK® socket

237-00
HAKU Hawlinger with horizontal
ZAK® socket in pipe direction

237-02
HAKU Hawlinger slewable with
horizontal ZAK® outlet

238-00
HAKU Hawlinger with
horizontal ZAK® socket 90°
to pipe direction

239-00
Hawlinger with upper
vertical ZAK® socket

239-01
Hawlinger with upper
horizontal ZAK® socket in
pipe direction

No.	Description	Operating pressure max.			Dimension
236-00	HAKU Hawlinger with vertical ZAK® socket	16 bar	-	1 bar (only PVC)	outlet: ZAK 34, ZAK 46 pipe: d 63, d 75, d 90, d 110, d 125, d 140, d 160, d 180, d 225, d 250, d 280, d 315
237-00	HAKU Hawlinger with horizontal ZAK® socket in pipe direction	16 bar	-	1 bar (only PVC)	outlet: ZAK 34, ZAK 46 pipe: d 63, d 75, d 90, d 110, d 125, d 140, d 160, d 180, d 225, d 50, d 280, d 315
237-02	HAKU Hawlinger slewable with horizontal ZAK® outlet	16 bar	-	-	outlet: ZAK 46 pipe: d 90, d 110, d 125, d 140, d 160, d 180, d225, d 250, d 280, d 315
238-00	HAKU Hawlinger with horizontal ZAK® socket 90° to pipe direction	16 bar	-	1 bar (only PVC)	outlet: ZAK 34, ZAK 46 pipe: d 63, d 75, d 90, d 110, d 125, d 140, d 160, d 180, d 225, d 250, d 280, d 315
239-00	Hawlinger with upper vertical ZAK® socket	16 bar	-	10 bar	outlet: ZAK 34, ZAK 46 pipe: d 63, d 90, d 110, d 125, d 160, d 180, d 200, d 225
239-01	Hawlinger with upper horizontal ZAK® socket in pipe direction	16 bar	-	10 bar	outlet: ZAK 34, ZAK 46 pipe: d 63, d 90, d 110, d 125, d 160, d 180, d 200, d 225

* (samo ZAK 34)

ZAK®-System: Pipe Drilling Saddles

239-02
Hawlinger with upper horizontal ZAK® socket 90° to pipe direction

239-03
Weld-on Hawlinger for PE pipes d 250 - 315 mm with ZAK® socket(s)

243-00
Universal Hawlinger with vertical ZAK® socket

243-00G
Universal Hawlinger with vertical ZAK® socket for gas

244-00
Universal Hawlinger with horizontal ZAK® socket in pipe direction

244-01
Universal Hawlinger with slewable horizontal ZAK® outlet

No.	Description	Operating pressure max.			Dimension
239-02	Hawlinger with upper horizontal ZAK® socket 90° to pipe direction	16 bar	-	10 bar	outlet: ZAK 34, ZAK 46 pipe: d 63, d 90, d 110, d 125, d 160, d 180, d 200, d 225
239-03	Weld-on Hawlinger for PE pipes d 250 - 315 mm with ZAK® socket(s)	16 bar	-	10 bar	outlet: ZAK 34, ZAK 46 pipe: d 250 - 315
243-00	Universal Hawlinger with vertical ZAK® socket	16 bar	-	5 bar	outlet: ZAK 34, ZAK 46 pipe: DN 65 - 500
243-01	Universal Hawlinger with vertical ZAK® socket for gas	-	-	5 bar	ZAK 34, ZAK 46 DN 65 - 500
244-00	Universal Hawlinger with horizontal ZAK® socket in pipe direction	16 bar	-	5 bar	outlet: ZAK 34, ZAK 46 pipe: DN 65 - 500
244-01	Universal Hawlinger with slewable horizontal ZAK® outlet	16 bar	-	-	outlet: ZAK 46 pipe: DN 65 - 500

* (samo ZAK 34)

ZAK®-System: Pipe Drilling Saddles

245-00
Universal Hawlinger with horizontal ZAK® socket 90° to pipe direction

245-01
Universal Hawlinger slewable with horizontal ZAK® socket 90° to pipe direction

245-02
Universal Hawlinger for later drilling with vertical and horizontal ZAK® outlet 90° to pipe direction

270-01
Valve saddle with ZAK® outlet

313-00
HAKU milling valve with horizontal ZAK® socket

313-01
HAKU milling saddle for PE pipes with horizontal ZAK® outlet

No.	Description	Operating pressure max.			Dimension
245-00	Universal Hawlinger with horizontal ZAK® socket 90° to pipe direction	16 bar	-	5 bar	outlet: ZAK 34, ZAK 46 pipe: DN 65 - 500
245-01	Universal Hawlinger slewable with horizontal ZAK® socket 90° to pipe direction	16 bar	-	-	outlet: ZAK 46 pipe: DN 65 - 500
245-02	Universal Hawlinger for later drilling with vertical and horizontal ZAK® outlet 90° to pipe direction	16 bar	-	-	outlet: ZAK 46 pipe: DN 65 - 500
270-01	Valve saddle with ZAK® outlet	16 bar	-	5 bar	outlet: ZAK 46 pipe: DN 65 - 500
313-00	HAKU milling valve with horizontal ZAK® socket	16 bar	-	-	outlet: ZAK 46 pipe: d 63, d 75, d 90, d 110, d 125, d 140, d 160, d 180, d 225, d 250, d 280, d 315
313-01	HAKU milling saddle for PE pipes with horizontal ZAK® outlet	16 bar	-	-	outlet: ZAK 46 pipe: d 63, d 90, d 110, d 125, d 140, d 160, d 180, d 225, d 250, d 280, d 315

ZAK®-System: Pipe Drilling Saddles

352-00
Universal pipe drilling saddle with ZAK® socket

371-00
Universal pipe saddle with integrated shut-off function

372-01
Shut-off adaptor with ZAK® outlets

522-00
HAKU pipe saddle with ZAK® outlet and auxiliary shut-off device

524-00
HAKU pipe saddle with 45° ZAK® outlet

525-01
HAKU pipe saddle with ZAK® outlet

No.	Description	Operating pressure max.			Dimension
352-00	Universal pipe drilling saddle with ZAK® socket	16 bar	16 bar	5 bar	outlet: ZAK 46, ZAK 69* pipe: DN 65 - 500
371-00	Universal pipe saddle with integrated shut-off function	16 bar	16 bar	5 bar	outlet: ZAK 46 pipe: DN 65 - 500
372-01	Shut-off adaptor with ZAK® outlets	16 bar	16 bar	5 bar	ZAK 46, ZAK 69*
522-00	HAKU pipe saddle with ZAK® outlet and auxiliary shut-off device	16 bar	-	1 bar (only PVC)	outlet: ZAK 34, ZAK 46 pipe: d 90, d 110, d 140, d 160, d 225
524-00	HAKU pipe saddle with 45° ZAK® outlet	16 bar	16 bar	-	outlet: ZAK 69 pipe: d 75, d 90, d 110, d 140, d 160, d 225
525-01	HAKU pipe saddle with ZAK® outlet	16 bar	16 bar	1 bar (only PVC)	outlet: ZAK 46, ZAK 69* pipe: d 63, d 75, d 90, d 110, d 125, d 140, d 160, d 180, d 225

ZAK®-System: Pipe Drilling Saddles / Service Valves

526-00
HA-WELD® electrofusion saddle with ZAK® outlet

253-00
Service valve with ZAK® spigot end and ZAK® socket

253-01
Service valve with ZAK® sockets

255-00
Service valve with ZAK® socket and flange

281-00
Service valve with ZAK® spigot end and push fit socket

312-00
Angled service valve with ZAK® spigot end and push-fit socket

No.	Description	Operating pressure max.			Dimension
526-00	HA-WELD® electrofusion saddle with ZAK® outlet	16 bar	-	10 bar	outlet: ZAK 46 pipe: d 90, d 110, d 125, d 160, d 225
253-00	Service valve with ZAK® spigot end and ZAK® socket	16 bar	-	5 bar	ZAK 46, ZAK 69
253-01	Service valve with ZAK® sockets	16 bar	-	5 bar	ZAK 46, ZAK 69
255-00	Service valve with ZAK® socket and flange	16 bar	-	5 bar	ZAK 46 flange DN 40, DN 50
281-00	Service valve with ZAK® spigot end and push fit socket	16 bar	-	-	ZAK 34, ZAK 46, d 25, d 32, d 40, d 50, d 63
312-00	Angled service valve with ZAK® spigot end and push-fit socket	16 bar	-	-	ZAK 34, ZAK 46, d 25, d 32, d 40, d 50

ZAK®-System: Service Valves / Fittings

312-01
Angled service valve swivel type with ZAK® spigot-end and ZAK® socket

312-02
Angled service valve swivel type with ZAK® spigot and ZAK® socket-end

483-01
Service valve for sewage water with ZAK® spigot end and ZAK® socket

536-01
Transition fitting BAIO® spigot end / ZAK® socket

551-00
Adaptor with flange and ZAK® socket

616-00
Push-fit fitting with ZAK® spigot end

No.	Description	Operating pressure max.			Dimension
312-01	Angled service valve swivel type with ZAK® spigot-end and ZAK® socket	16 bar	-	-	ZAK 46
312-02	Angled service valve swivel type with ZAK® spigot-end and ZAK® socket	16 bar	-	-	ZAK 46
483-01	Service valve for sewage water with ZAK® spigot end and ZAK® socket	-	10 bar	-	ZAK 69
536-01	Transition fitting BAIO® spigot end / ZAK® socket	16 bar	16 bar	10 bar	ZAK 46, ZAK 69*, DN 80
551-00	Adaptor with flange and ZAK® socket	16 bar	16 bar	10 bar	ZAK 46, ZAK 69*, DN 40 - 80
616-00	Push-fit fitting with ZAK® spigot end	16 bar	16 bar	-	ZAK 34, ZAK 46, ZAK 69 pipe: d 25, d 32, d 40, d 50, d 63, d 75

*ZAK 69 not for gas

ZAK®-System: Fittings

616-01
Push-fit fitting with detachable taper ring and ZAK® spigot end

616-02
Rehabilitation fitting with detachable taper ring and ZAK® spigot end

616-04
ZAK-Press-FIT®

616-05
ZAK-Press-FIT®, rehabilitation version

618-00
ZAK® PE fusion end

618-01
Transition fitting with ZAK® socket and male thread

No.	Description	Operating pressure max.			Dimension
616-01	Push-fit fitting with detachable taper ring and ZAK® spigot end	16 bar	16 bar	-	ZAK 46 pipe: d 32, d 40, d 50
616-02	Rehabilitation fitting with detachable taper ring and ZAK® spigot end	16 bar	16 bar	-	ZAK 34, ZAK 46 pipe: d 32, d 40, d 50, d 63
616-04	ZAK-Press-FIT®	16 bar	-	-	ZAK 46 pipe: d 32, d 40, d 50, d 63
616-05	ZAK-Press-FIT®, rehabilitation version	16 bar	-	-	ZAK 46 pipe: d 32, d 40
618-00	ZAK®-PE fusion end	see operating instructions			ZAK 34, ZAK 46, ZAK 69* pipe: d 32, d 40, d 50, d 63
618-01	Transition fitting with ZAK® socket and male thread	16 bar	16 bar	10 bar	ZAK 34, ZAK 46, ZAK 69* M: 1“, 1 1/4“, 1 1/2“, 2“, 3“

*ZAK 69 not for gas

ZAK®-System: Fittings

618-02
Adaptor ZAK® socket / screw socket

618-03
ZAK® end cap

618-04
Transition fitting ZAK® (ZAK 46) to male thread

618-05
Transition fitting with ZAK® spigot-end and female thread

618-06
ZAK® transition adaptor for separable ZAK fittings

626-00
Transition fitting with ZAK® socket

No.	Description	Operating pressure max.			Dimension
618-02	Adaptor ZAK® socket / screw socket	16 bar	16 bar	-	ZAK 34, ZAK 46, DN 40 - DN 50
618-03	ZAK® end cap	16 bar	16 bar	5 bar	ZAK 46, ZAK 69*
618-04	Transition fitting ZAK® (ZAK 46) to male thread	16 bar	-	-	ZAK 46 M: 1“, 1 1/4“
618-05	Transition fitting with ZAK® spigot end and female thread	16 bar	16 bar	5 bar	ZAK 46 F: 1 1/4“, 1 1/2“
618-06	ZAK® transition adaptor for separable ZAK fittings	16 bar	16 bar	-	ZAK 46
626-00	Transition fitting with ZAK® socket	16 bar	16 bar	-	ZAK 69 d 75

*ZAK 69 not for gas

ZAK®-System: Fittings

630-00
Connector (S-fitting, short) with two ZAK® spigot ends

630-01
Connector (S-fitting) with two ZAK® spigot ends

630-02
Connector (S-fitting, rotating-type) with two ZAK® spigot ends

630-03
Transition piece with two ZAK® sockets

630-04
Rotatable junction with ZAK® spigot end/ socket

630-05
Reduction fitting with ZAK® spigot end and ZAK® socket, reduced

No.	Description	Operating pressure max.			Dimension
630-00	Connector (S-fitting, short) with two ZAK® spigot ends	16 bar	16 bar	10 bar	ZAK 46, ZAK 69*
630-01	Connector (S-fitting) with two ZAK® spigot ends	16 bar	16 bar	10 bar	ZAK 46
630-02	Connector (S-fitting, rotating-type) with two ZAK® spigot ends	16 bar	16 bar	10 bar	ZAK 46
630-03	Transition piece with two ZAK® sockets	16 bar	16 bar	10 bar	ZAK 46, ZAK 69*
630-04	Rotatable junction with ZAK® spigot end/ socket	16 bar	16 bar	10 bar	ZAK 46
630-05	Reduction fitting with ZAK® spigot end and ZAK® socket, reduced	16 bar	16 bar	10 bar	ZAK 34, ZAK 46, ZAK 69*

*ZAK 69 not for gas

ZAK®-System: Fittings

630-08
Transition from ZAK spigot end to ZAK socket

637-00
Transition fitting DCI pipe / ZAK® socket

646-00
Rotating push-fit fitting 90° with ZAK® spigot end and ZAK® socket

646-01
Rotating push-fit elbow 90° with ZAK® spigot end

646-02
Rotating push-fit elbow 90° with detachable taper ring and ZAK® spigot end

647-00
Elbow 90° with ZAK® spigot end and ZAK® socket

No.	Description	Operating pressure max.			Dimension
630-08	Transition from ZAK spigot end to ZAK socket	16 bar	-	5bar	ZAK 34, ZAK 46
637-00	Transition fitting DCI pipe / ZAK® socket	16 bar	16 bar	-	ZAK 46 DN 40
646-00	Rotating push-fit fitting 90° with ZAK® spigot end and ZAK® socket	16 bar	16 bar	10 bar	ZAK 46
646-01	Rotating push-fit elbow 90° with ZAK® spigot end	16 bar	16 bar	-	ZAK 34, ZAK 46 pipe: d 25, d 32, d 40, d 50, d 63
646-02	Rotating push-fit elbow 90° with detachable taper ring and ZAK® spigot end	16 bar	16 bar	-	ZAK 34, ZAK 46 pipe: d 32, d 40, d 50
647-00	Elbow 90° with ZAK® spigot end and ZAK® socket	16 bar	16 bar	10 bar	ZAK 46

ZAK®-System: Fittings

647-01
Elbow 90° with ZAK® spigot end and push-fit socket

647-04
Elbow 90° with ZAK® spigot end and PE fusion end

647-05
ZAK-Press-Fit®, elbow 90° with swivel-type outlet

649-00
Elbow 45° with ZAK® spigot end and push-fit socket

649-01
Rotating push-fit elbow 45° with ZAK® spigot end

651-00
Tee branch fitting with ZAK® sockets at all ends

No.	Description	Operating pressure max.			Dimension
647-01	Elbow 90° with ZAK® spigot end and push-fit socket	16 bar	16 bar	-	ZAK 34, ZAK 46 pipe: d 25, d 32, d 40, d 50, d 63
647-04	Elbow 90° with ZAK® spigot end and PE fusion end	16 bar	16 bar	10 bar	ZAK 34, ZAK 46 pipe: d 32, d 40, d 50, d 63
647-05	ZAK-Press-Fit®, elbow 90° with swivel-type outlet	16 bar	-	-	ZAK 46 pipe: d 32, d 40, d 50, d 63
649-00	Elbow 45° with ZAK® spigot end and push-fit socket	16 bar	16 bar	-	ZAK 69 pipe: d 50, d 63
649-01	Rotating push-fit elbow 45° with ZAK® spigot end	16 bar	16 bar	-	ZAK 46 pipe: d 32, d 40, d 50
651-00	Tee branch fitting with ZAK® sockets at all ends	16 bar	16 bar	10 bar	ZAK 46, ZAK 69*

*ZAK 69 not for gas

ZAK®-System: Fittings and Accessories

651-01
Tee branch fitting with ZAK® sockets and ZAK® spigot end

651-02
ZAK TT piece 46/46

651-03
Connector with ZAK® outlet (ZAK 69), 45°

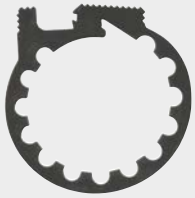
740-01
Synoflex Transition piece to ZAK®-System

859-00
Wafer type tee piece with ZAK® outlets

No.	Description	Operating pressure max.			Dimension
651-01	Tee branch fitting with ZAK® sockets and ZAK® spigot end	16 bar	16 bar	10 bar	ZAK 46
651-02	ZAK TT piece 46/46	16 bar	16 bar	10 bar	ZAK 46
651-03	Connector with ZAK® outlet (ZAK 69), 45°	16 bar	16 bar	-	ZAK 69 d 63
740-01	Synoflex Transition piece to ZAK®-System	16 bar	16 bar	-	ZAK 46, ZAK 69 pipe: d 46 - 58, d 56 - 71
859-00	Wafer type tee piece with ZAK® outlets	16 bar	-	-	outlet: ZAK 46, ZAK 69 pipe: DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 200, DN 250, DN 300, DN 400

ZAK®-System: Accessories, water meter chamber

249-00
ZAK® plug



616-03
Locking ring for ZAK® sockets

298-00
Hawle
water meter chamber

No.	Description	Operating pressure max.			Dimension
249-00	ZAK®-plug	16 bar	16 bar	10 bar	ZAK 34, ZAK 46, ZAK 69*
616-03	Locking ring for ZAK® sockets	-	-	-	ZAK 34, ZAK 46, ZAK 69
298-00	Hawle water meter chamber	16 bar	-	-	pipe cover depth 1,00, 1,25, 1,50 m outlet ZAK 46

*ZAK 69 *not for gas

Notes

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