

THE DUCTILE IRON CAST PIPE SYSTEM
FOR DIFFICULT TERRAIN

ALPINAL

english



TECHNOALPIN®



A large photograph of a mountainous landscape. In the foreground, a yellow construction vehicle, possibly a trencher or a similar machine, is visible on a dirt path. The background shows a steep, rocky mountain with patches of green forest and a clear blue sky.

SAFETY IS PARAMOUNT

COMPLETE SYSTEM FOR HIGH SAFETY AT HIGH OPERATING PRESSURES

ALPINAL stands for a complete system that covers all pipeline construction requirements. Developed specifically for use in challenging conditions, this system is the ideal solution for water supplies in mountainous areas and at high pressures. It combines a whole range of advantages:

- › Complete system for the entire pipeline construction
- › Highest degree of safety for high operating pressures up to 100 bar
- › Simple laying without any welding
- › Revolutionary coating system without bisphenol A
- › Highly robust with a long life limit
- › Elastic and durable: ductile iron
- › Sustainably produced in Europe
- › Certified product quality
- › Restrained socket joint
- › Angular deflection of up to 3 degrees



COMPLETE SYSTEM FOR THE ENTIRE PIPELINE CONSTRUCTION – HIGHEST SAFETY TO 100 BAR

The ALPINAL system program includes all pipes and fittings required for pipeline construction on alpine terrain. All components have been developed specifically to meet the high demands in these conditions and are available in various dimensions and pressure ratings.

The ALPINAL system offers maximum flexibility in the planning phase and during implementation. The system components are available from DN 80 PFA 100 to DN 300 PFA 100 and from DN 400 PFA 85 to DN 500 PFA 75.



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SIMPLE LAYING WITHOUT ANY WELDING

On alpine terrain, a pipe system has to withstand extreme conditions. At the same time, it must be possible to carry out the work quickly, easily and safely. The ALPINAL system combines high tensile strength and high operating pressures with simple laying. Thanks to the push-fit socket technology, the pipes can be laid easily, quickly and even by semi-skilled personnel. Assembly is achieved using an excavator and the appropriate tool.

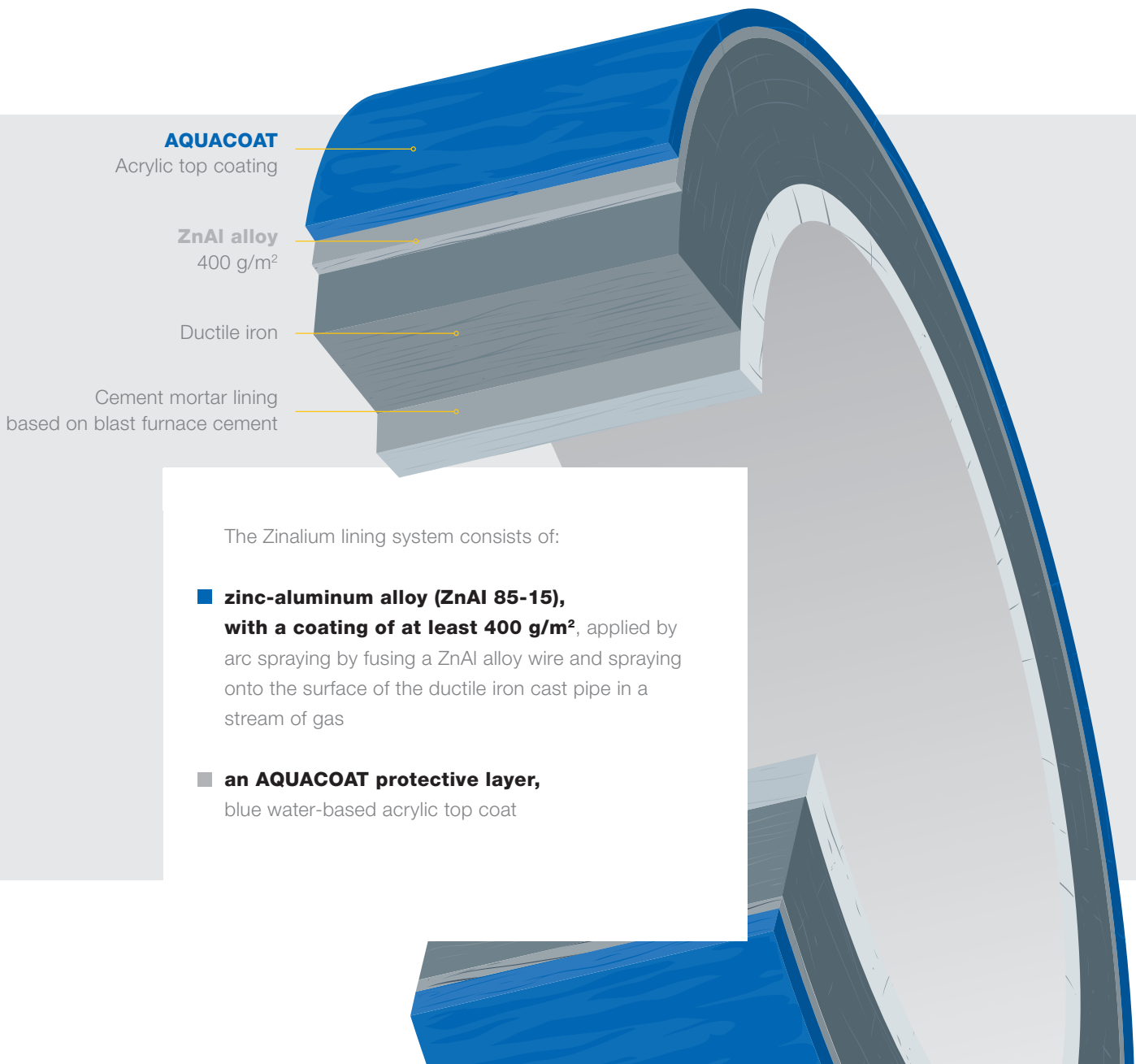


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ZINALIUM

REVOLUTIONARY COATING SYSTEM WITHOUT BISPHENOL A

The Zinalium coating system combines environmental friendliness and durability. The coating plays a crucial role in product quality: it is responsible for 84% of the product's longevity, while just 16% is down to the wall thickness of the ductile iron.



The Zinalium lining system consists of:

- **zinc-aluminum alloy (ZnAl 85-15), with a coating of at least 400 g/m²,** applied by arc spraying by fusing a ZnAl alloy wire and spraying onto the surface of the ductile iron cast pipe in a stream of gas
- **an AQUACOAT protective layer,** blue water-based acrylic top coat

HIGH ROBUSTNESS AND LONG LIFE LIMIT

The Zinalium coating system consists of a zinc-aluminum alloy (ZnAl 85-15), which generally has twice the layer thickness than that required by the standard (400 g/m²). The AQUACOAT water-based acrylic protective layer is applied on top.

The two-phase structure (aluminum and zinc) increases the resistance of the coating and extends its life limit even in aggressive soils. Any minor damage is rectified by the self-repairing effect of the protective layer.

ENVIRONMENTAL AND HEALTH PROTECTION

The Zinalium coating system is free from solvents and bisphenol A. The use of this harmful substance is increasingly restricted by legal regulations, and the ALPINAL system offers a preventive solution.



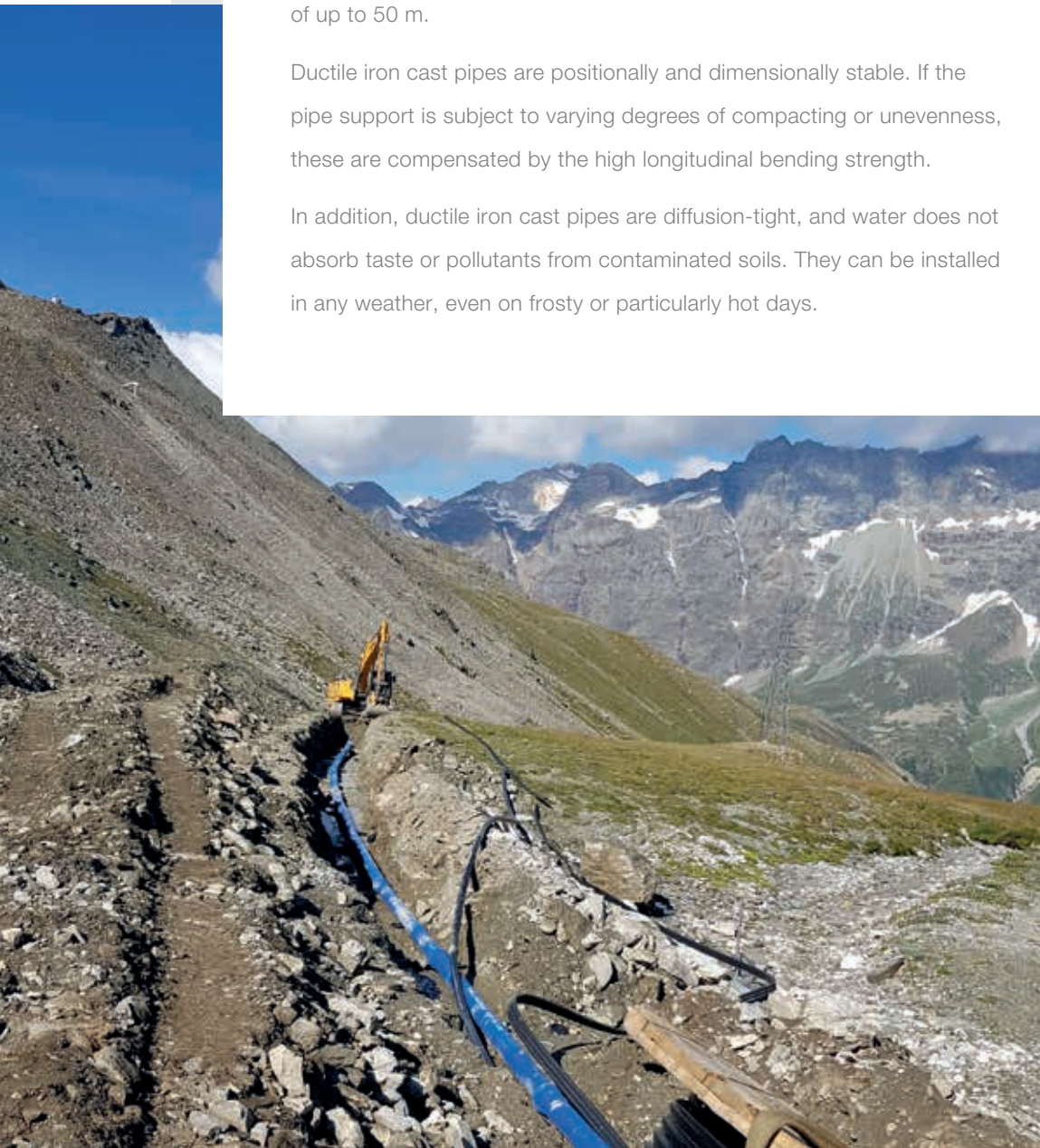


ELASTIC AND DURABLE DUCTILE IRON

Ductile iron cast pipes are elastic and can be deformed under load. This makes them resistant to pressure points caused by stones, for example. They absorb high static loads from internal pressure, traffic loads and earth loads and have high pressure reserves. Depending on the soil rigidity, ductile iron cast pipes can be used with very shallow coverings of just 30 cm, including traffic loads of SLW 60, or with embankments of up to 50 m.

Ductile iron cast pipes are positionally and dimensionally stable. If the pipe support is subject to varying degrees of compacting or unevenness, these are compensated by the high longitudinal bending strength.

In addition, ductile iron cast pipes are diffusion-tight, and water does not absorb taste or pollutants from contaminated soils. They can be installed in any weather, even on frosty or particularly hot days.





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SUSTAINABLY PRODUCED IN EUROPE

The ALPINAL system is produced by PAM Saint Gobain, the leading supplier of ductile pipeline systems. Just like TechnoAlpin, Saint Gobain attaches great importance to the sustainable development of its products as well as to durability through the highest quality. Saint-Gobain has committed to the UN Global Compact "Business Ambition for 1.5° C" initiative, the aim being to achieve the goal of "net zero emissions" by 2050.

CERTIFIED PRODUCT QUALITY

The company has attained the following ISO certifications

- › ISO 5001 Energy Management Systems
- › ISO 14001 Environmental Management System
- › ISO 9001 Quality Management System
- › ISO 45001 Occupational Health and Safety Management System
- › The Zinalium coating system meets all the requirements of the European standard DIN EN 545:2010 and the international standard ISO 2531.





RESTRAINED SOCKET JOINT

ANGULAR DEFLECTION UP TO 3 DEGREES

The ALPINAL system uses NOVO-SIT and TIS-K restrained socket joints, which combine a number of advantages.

- › They are rated for very high pressures of up to 100 bar.
- › No concrete thrust blocks are required.
- › Assembly is quick, easy and can be done whatever the weather.
- › Even in inhospitable mountain conditions, the excavated material can be used to backfill the pipe trench; this is environmentally friendly and cost-effective.
- › High angularity (3°) of the socket joint. This reduces the number of fittings, and cuts down the excavation and blasting work required.





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UNIVERSAL NOVO-SIT TO DIN EN 545

Pipes and fittings from DN 80 PFA 100 to DN 125 PFA 100



UNIVERSAL TIS-K TO DIN EN 545

Pipes and fittings from DN 150 PFA 100 to DN 500 PFA 75



360° FORM-LOCKING

Full form-locking joints to 360°. Ductile iron cast pipe from the ALPINAL system have TIS-K restrained socket joints. The retaining ring does not work on just one or two sides of the pipe but around the full 360°. Consequently, the stress is distributed evenly along the joint.

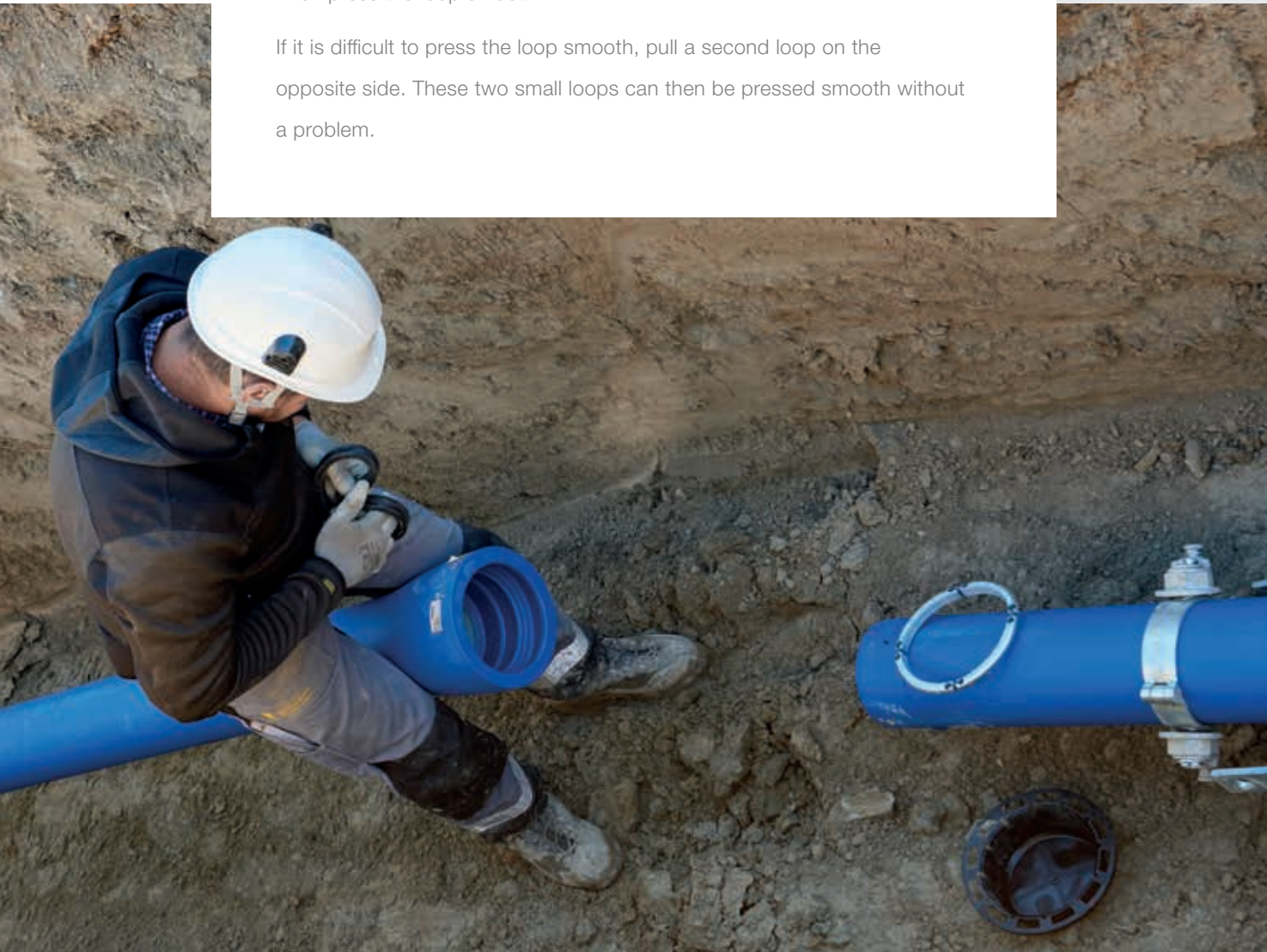
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INSTALLATION TECHNOLOGY SEAL AND LUBRICANT

INSERTING THE SEAL

The seal must be compressed in a heart shape. Insert it into the socket so that the retaining collar engages in the retaining groove of the socket. Then press the loop smooth.

If it is difficult to press the loop smooth, pull a second loop on the opposite side. These two small loops can then be pressed smooth without a problem.





LUBRICANT

The approximate requirement for 100 m of pipeline is calculated according to this formula: Lubricant quantity Q (g) = $2.5 \times DN$

Example: 250 m DN 200: $Q = 250 \times 2.5 \times 200 = 1250$ g

Neutrex T lubricant is available in 250 g tubes.

In water supply systems, lubricants must comply with DVGW test specification VP 641. EUTREX T is certified according to test specification DVGW VP 641.





INSTALLATION TECHNOLOGY SHORTENING PIPES

One advantage of ductile iron cast pipes is that they can be shortened on the construction site if necessary. All pipes $< \text{DN } 700$ can be cut to $2/3$ of the construction length, measured from the insertion end, and have no marking. Cut pipes $> \text{DN } 700$ are supplied on special order. The weld bead required for the restrained socket joint has to be reapplied using the electrode specified by the supplier.

Various grinders can be used for cutting, provided that both cutting and roughing disks can be used to round-off the cut edges. Best suited for ALPINAL pipes are cutting and roughing disks for stone (e.g.: cutting disks type C24R-BF, roughing disks type RS 66). Diamond chain saws with galvanic diamond impregnation on the cutting chain can be used as an alternative.

Ductile iron cast pipes are to be cut only in the cutting area provided for this purpose. The pipe should be placed on flat ground or on square timber so that the cutting disk does not jam and the remaining pipe wall does not tear off while it is being cut. Personal protective equipment is mandatory.

Work steps



CUTTING

A marking line around the pipe makes it easier to make a straight cut. The line is marked along a steel band placed around the pipe. The cutting disk used to pierce the pipe wall at a particular point. The pipe is cut along the marking line in one operation.

CHAMFERING AND RECOATING

For assembly in sockets, the new push-in end is chamfered. This is the only way to insert the push-in end into the socket without damaging the seal or pushing it out of its seat. The chamfering is done with a roughing disk. The bare metal surface is then re-coated with a varnish matching the external protection of the pipe.



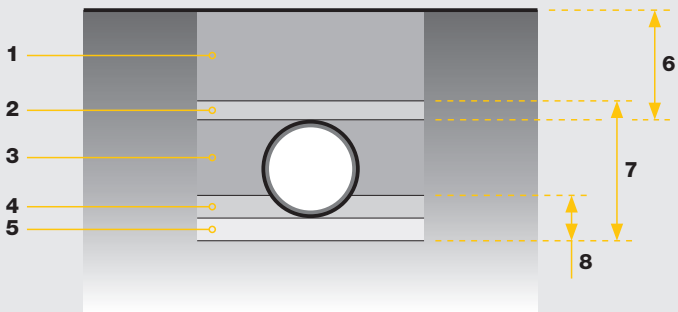
MARKING THE PUSH-IN DEPTH

For correct assembly, the pointed end marking must be applied to the push-in end. An oil chalk is included in the assembly sets for this purpose. The marking of the push-in depth depends on the type of joint. Further assembly is carried out in accordance with the respective assembly instructions, taking into account the maximum angularity.

INSTALLATION TECHNOLOGY: PIPE BEDDING

PIPELINE AND BEDDING ZONES TO DIN EN 805

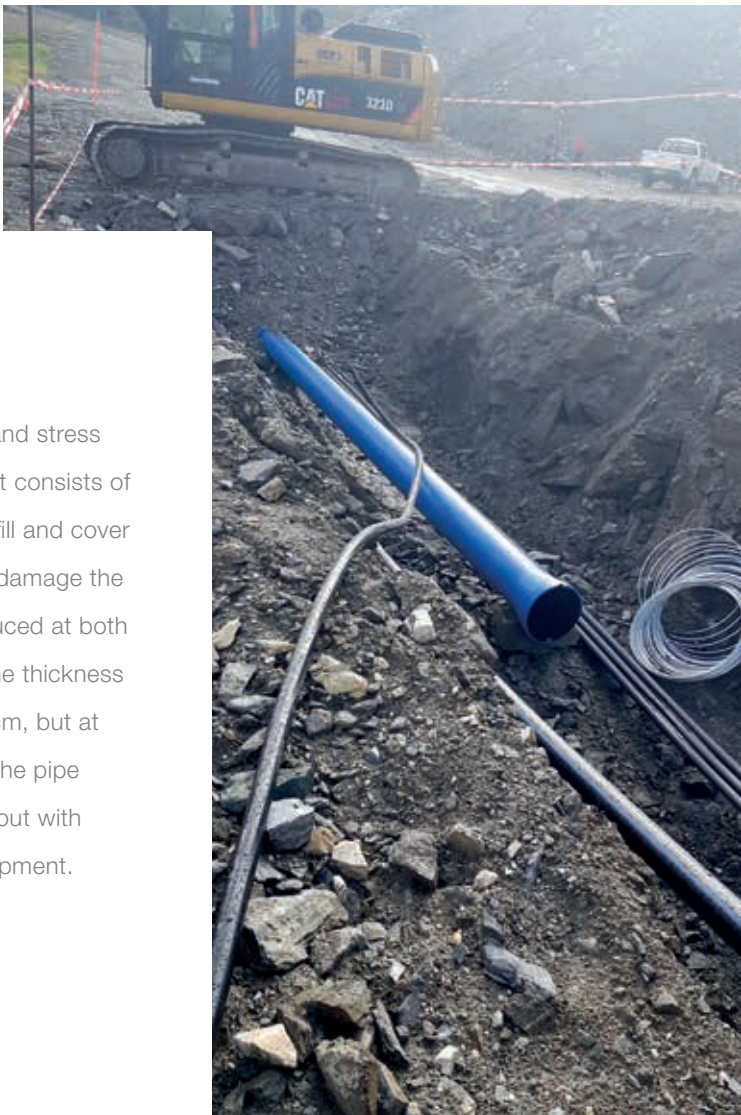
- 1 Main fill
- 2 Cover zone
- 3 Side fill
- 4 Top bedding zone
- 5 Bottom bedding zone
- 6 Covering zone
- 7 Pipeline zone
- 8 Bedding zone



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PIPE TRENCH AND PIPELINE ZONE

The pipeline zone essentially determines the load and stress distribution around the circumference of the pipe. It consists of the bedding, side fill and the cover. Bedding, side fill and cover are often made together. Suitable soil that will not damage the pipeline components or the casing must be introduced at both ends of the pipeline and sufficiently compacted. The thickness of the cover over the pipe should generally be 30 cm, but at least 15 cm above the pipe shaft or 10 cm above the pipe joint. Compacting in this area may only be carried out with hand rams or suitable lightweight compacting equipment.



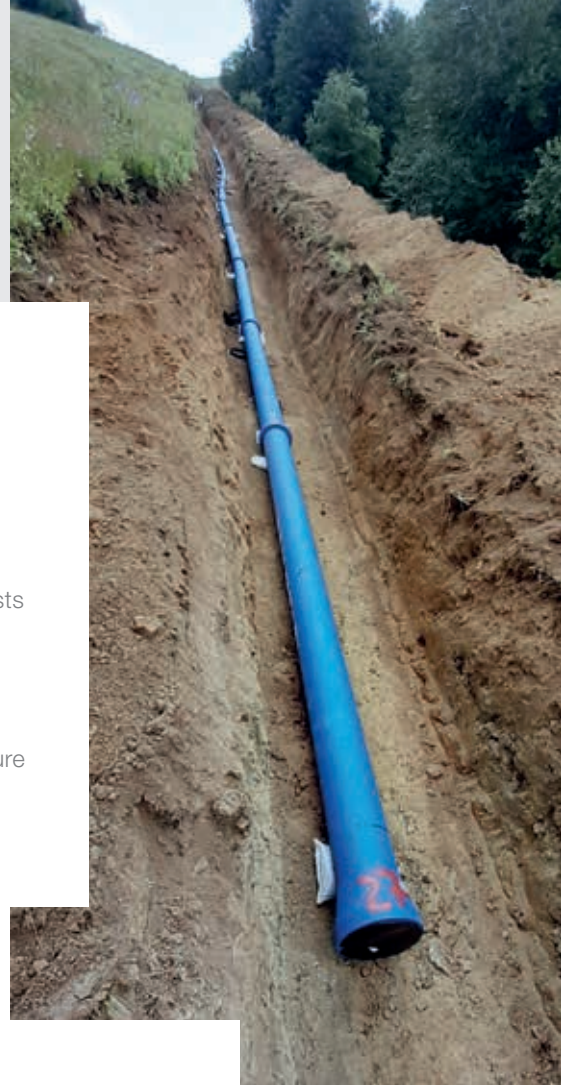
PIPE TRENCH AND PIPE BEDDING

Trench bottom

According to DIN EN 805, the bottom of the trench must be constructed in such a way that the pipeline rests flush along its entire length.

Head holes

Sufficiently large head holes must be excavated to ensure proper assembly of the pipe joint.



BEDDING

As a rule, the existing soil is suitable for bedding ductile iron pipes. In this case, the bottom of the trench becomes the bottom bedding. Stones, rock, non-load-bearing or loosened and uncompacted soil are not suitable for bedding the pipeline. In rocky and stony subsoil, the pipe trench should be excavated slightly deeper. The height of the top and bottom bedding depends on the type of pipe cladding and on the outside diameter of the pipe. If the existing soil is unsuitable as bedding material, the bedding is made of compactable sand, gravel sand or sieved soil in accordance with DIN EN 805 (but no slag or other aggressive materials); any timbers used as installation or assembly aids must be removed before the pipeline zone is infilled.



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THE DUCTILE IRON CAST PIPE SYSTEM
FOR DIFFICULT TERRAIN





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FITTINGS FOR PIPELINE CONSTRUCTION ON ALPINE TERRAINS

HIGHEST SAFETY TO 100 BAR,
MAXIMUM FLEXIBILITY



NOVO-SIT
with frictionally engaged joint



DN	pressure class	usable length [m]	theoretical weight [kg/m]	max. PFA restraint [bar]
80	C100	6	15.8	100
100	C100	6	18.6	40
100	C145	6	21.3	100
125	C64	6	23.6	40
125	C100	6	27.3	100

TIS-K
with form engaged joint

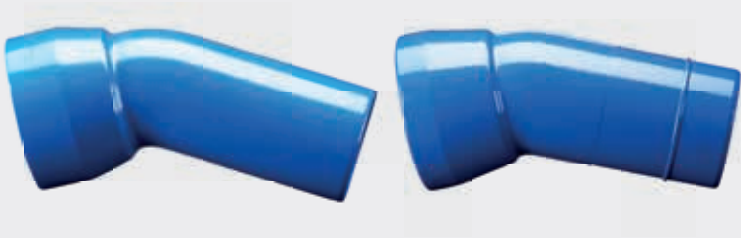


DN	üressure class	usable length [m]	theoretical weight [kg/m]	max. PFA restraint	
				TIS-K	for cut pipes without weld bead NOVO-SIT
150	C64	6	29.1	40	40
150	C64	6	29.1	63	40
150	C100	6	33.5	100	63
200	C64	6	37.8	40	40
200	C64	6	37.8	63	40
200	C100	6	47.5	100	40
250	C50	6	50.5	40	40
250	C85	6	63.1	63	40
250	C100	6	76.9	100	40
300	C50	6	63.5	63	40
300	C75	6	80.3	63	40
300	C85	6	93.3	80	40
300	C100	6	105.5	100	40
400	C40	6	97.1	35	20
400	C64	6	122.7	63	on request
400	C100	6	178.0	85	on request
500	C40	6	135.0	30	16
500	C50	6	176.0	50	on request
500	C75	6	221.8	75	on request
600	C40	6	166.0	30	16
700	C30	7	265.83	27	16

Other fittings & pressures on request. TechnoAlpin does not guarantee the availability of molded parts.
The actual availability can be guaranteed only when the order is placed.

ALPINAL fittings

MK
single socket bend

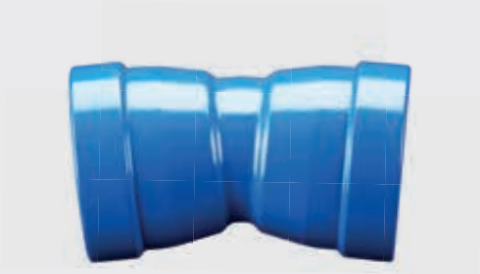


DN	weight [kg]	max. PFA restraint	
		NOVO-SIT	TIS-K
MK 11°			
80	6.0	100	
100	8.6	100	
125	10.6	100	
150	21.0		100
200	34.0		100
250	50.0		100
300	66.4		100
400	159.0		100
500	168.0		100
MK 22°			
80	6.0	100	
100	8.6	100	
125	10.6	100	
150	21.0		100
200	35.0		100
250	80.0		100
300	92.4		100
400	159.0		100
500	186.0		45
MK 30°			
150	22.5		100
200	53.0		100
250	83.0		100
300	110.0		100
400	165.0		on request
500	192.0		on request
MK 45°			
150	22.5		100
200	53.0		100
250	83.0		100
300	130.0		100
400	168.0		on request
500	195.0		on request

Fitting coating to DIN EN 545 with GSK epoxy powder coating with min. 250 µm to EN 14901.
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MMK
double socket bend

- › Angles:
- 1/8 = 45°
 - 1/12 = 30°
 - 1/16 = 22°
 - 1/32 = 11°



DN	weight [kg]	max. PFA restraint	
		NOVO-SIT	TIS-K
MMK 11°			
80	9.7	100	
100	14.5	100	
125	16.4	100	
150	22.0		100
200	34.1		100
250	46.6		100
300	66.4		63
400	127.0		63
500	212.0		45
MMK 22°			
80	9.9	100	100
100	14.9	100	100
125	14.9	100	100
150	22.8		100
200	35.6		100
250	49.2		100
300	70.3		63
400	132.0		63
500	233.0		45
MMK 30°			
80	10.1	100	100
100	15.1	100	100
125	17.6	100	100
150	23.4		100
200	36.7		100
250	50.9		63
300	72.6		63
400	141.0		63
500	250.0		45
MMK 45°			
80	10.4	100	100
100	15.6	100	100
125	17.7	100	100
150	24.5		100
200	38.8		100
250	54.4		100
300	78.2		63
400	147.0		63
500	265.0		45

Fitting coating to DIN EN 545 with GSK epoxy powder coating with min. 250 µm to EN 14901.
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ALPINAL fittings

MMQ 90°
double socket bend



DN	weight [kg]	max. PFA restraint	
		NOVO-SIT	TIS-K
80	10.4	60	
100	15.5	40	
125	18.0	40	
150	22.0		63
200	40.0		63
250	60.0		40

MMR
double socket taper

› Outlets in NOVO-SIT
DN 2 DN 80 - DN 125 always up to PFA 100



DN 1	DN 2	weight [kg]	max. PFA restraint	
			NOVO-SIT	TIS-K
100	80	12.5	100	
125	80	14.0	100	
125	100	14.7	100	
150	80	18.3		100
150	100	20.0		100
150	125	19.3		100
200	80	26.1		100
200	100	29.0		100
200	125	26.9		100
200	150	30.2		100
250	100	39.3		100
250	150	40.5		100
250	200	42.7		100
300	150	55.5		63
300	200	57.8		63
300	250	60.8		63
400	300	110.0		63
500	400	185.0		45

Fitting coating to DIN EN 545 with GSK epoxy powder coating with min. 250 µm to EN 14901.
Other fittings & pressures on request. TechnoAlpin does not guarantee the availability of molded parts.
The actual availability can be guaranteed only when the order is placed.

MMB all socket tee
with 90° bench

› Outlets in NOVO-SIT
from DN 80 - DN 125 always up to PFA 100



DN 1	DN 2	weight [kg]	max. PFA restraint	
			NOVO-SIT	TIS-K
80	80	17.3	100	
100	80	21.4	100	
100	100	24.2	100	
125	80	24.8	100	
125	100	26.1	100	
125	125	28.0	100	
150	80	29.7		100
150	100	32.8		100
150	125	35.2		100
150	150	36.1		100
200	80	42.7		100
200	100	46.1		100
200	150	52.0		100
200	200	60.4		100
250	80	56.2		63
250	100	59.6		63
250	150	66.4		63
250	200	75.2		63
250	250	85.0		100
300	80	74.8		63
300	100	78.6		63
300	150	85.4		63
300	200	94.8		63
300	250	108.1		63
300	300	150.6		63
400	200	180.0		63
400	250	200.0		63
400	300	220.0		63
400	400	260.0		63
500	200	280.0		45
500	250	300.0		45
500	300	310.0		45
500	400	320.0		45
500	500	340.0		45

Fitting coating to DIN EN 545 with GSK epoxy powder coating with min. 250 µm to EN 14901.
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ALPINAL fittings

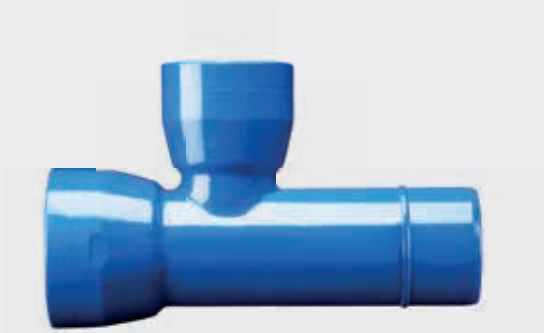
MMA double socket bends T-piece with flange outlet



DN 1 SOCKETS	DN 2 FLANGED OUTLET	weight [kg]	max. PFA restraint	
			NOVO-SIT	TIS-K
80	80	17.3	10-40	
100	80	21.4	10-40	
100	100	24.2	10-16	
125	80	24.8	10-40	
125	100	26.1	10-16	
125	125	28.0	10-16	
150	80	29.7		10-40
150	100	32.8		10-16
150	150	35.2		10-16
200	80	42.7		10-40
200	100	46.1		10-16
200	150	52.0		10-16
200	200	60.4		16
250	80	56.2		10-40
250	100	59.6		10-16
250	150	66.4		10-16
250	200	75.2		16
250	250	85.0		16
300	80	74.8		10-40
300	100	78.6		10-16
300	150	85.4		10-16
300	200	94.8		16
300	300	150.6		16

MB-Socket pipe pointed end piece with 90° bench

› Outlets in NOVO-SIT
DN 80 always up to PFA 100



DN 1	DN 2	weight [kg]	max. PFA restraint
			[bar]
150	80	40.2	100
200	80	46.0	100
250	80	106.0	100
300	80	85.4	100
400	80	200.5	100

Fitting coating to DIN EN 545 with GSK epoxy powder coating with min. 250 µm to EN 14901.
Other fittings & pressures on request. TechnoAlpin does not guarantee the availability of molded parts.
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GDR
smooth pressure pipes

- › DN 80 - DN 125: length 500 mm
- › DN 150 - DN 500: length 800 mm



DN	weight [kg]	max. PFA restraint	
		NOVO-SIT	TIS-K
80	8.9	100	
100	10.9	100	
125	13.6	100	
150	32.0		100
200	48.0		100
250	71.8		100
300	74.0		100
400	113.7		63
500	157.0		45

U-collar
with clamping rings



DN	length [m]	weight [kg]	max. PFA restraint [bar]
80	370	14.7	100
100	445	18.7	100
125	445	23.5	100
150	470	30.8	100
200	490	44.4	100
250	525	62.6	100
300	565	82.8	100
400	555	141.0	85
500	625	220.6	85

Fitting coating to DIN EN 545 with GSK epoxy powder coating with min. 250 µm to EN 14901.
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ALPINAL hydrant connection options

IN snow hydrant duck-foot bends
with 2" female thread + NOVO-SIT or TIS-K sockets



DN	weight [kg]	max. PFA restraint	
		NOVO-SIT	TIS-K
80	25	100	
80	25		100

PO snow hydrant duck-foot bend
with 2" female thread + NOVO-SIT or TIS-K pointed end



DN	weight [kg]	max. PFA restraint	
		NOVO-SIT	TIS-K
80	25	100	
80	25		100

EN-piece
for hydrants



DN	weight [kg]	max. PFA restraint	
		NOVO-SIT	TIS-K
80	14	16	
100	19	16	

Fitting coating to DIN EN 545 with GSK epoxy powder coating with min. 250 µm to EN 14901.
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ALPINAL hydrant connection options

A-piece service connection
with 2" outlet female thread



DN	weight [kg]	max. PFA restraint	
		NOVO-SIT	TIS-K
80	15.1	100	
100	18.0	100	
125	22.5	100	
150	30.0		100
200	40.0		100
250	56.0		100
300	71.0		100
400	95.0		63
500	250.0		45

P-socket plug
with 2" outlet female thread

› Please use steel plugs
to seal the 2" GAS connection



DN	weight [kg]	max. PFA restraint
		TIS-K
80	2.5	100
100	3.8	100
125	5.7	100
150	8.9	100
200	13.2	100
250	45.0	100
300	55.0	100
400	80.0	85
500	208.0	75

Fitting coating to DIN EN 545 with GSK epoxy powder coating with min. 250 µm to EN 14901.
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ALPINAL hydrant connection options

XG-plate with 2" female thread

- › Flange dimensions
PN 10 to 40: NF EN 1092-2, ISO 7005-2
PN 63: NF EN 1092-2
PN 100: NF EN 1092-1
- › Please use steel plugs
to seal the 2" GAS connection



DN	PN 16	PN 40	PN 63	PN 100
	[kg]	[kg]	[kg]	[kg]
80	3.5	3.5	6.9	9.4
100	4.3	4.8	10.1	14.3
125	5.6	7.9	18.7	27.0
150	7.2	11.4	28.6	42.0
200	10.8	20.0	49.0	75.0
250	16.5	33.5	68.0	89.0
300	25.5	52.0	80.0	118.0
400	30.5	75.0	98.0	150.5
500	102.0	172.0	210.0	

Saddle clamp with 2" female thread

- › Accessories: Bolts, nuts + O-rings
- › Main body in ductile cast iron



DN	weight	PFA
	[kg]	[bar]
80	5.4	100
100	6.0	100
125	6.6	100
150	7.2	100
200	8.0	100
250	8.5	100
300	11.7	100
350	13.7	100
400	18.3	100

Fitting coating to DIN EN 545 with GSK epoxy powder coating with min. 250 µm to EN 14901.
Other fittings & pressures on request. TechnoAlpin does not guarantee the availability of molded parts.
The actual availability can be guaranteed only when the order is placed.

ALPINAL flange connection options

EU-piece

› to DIN EN 545 according to B2597



DN	PN 16	PN 25	PN 40	PN 63	PN 100
	[kg]	[kg]	[kg]	[kg]	[kg]
80	8.6	8.6	8.6	14.3	14.3
100	11.8	11.8	12.3	16.7	21.9
125	15.9	16.4	20.1	25.0	26.5
150	18.0	20.7	21.5	31.6	40.9
200	27.1	28.9	34.6	49.5	69.9
250	37.8	41.0	51.7	67.1	228.8
300	51.9	56.5	73.6	104.0	267.0
400	78.1	90.1	150.5	164.5	280.0
500	110.0	128.0	182.0	260.0	

F-piece

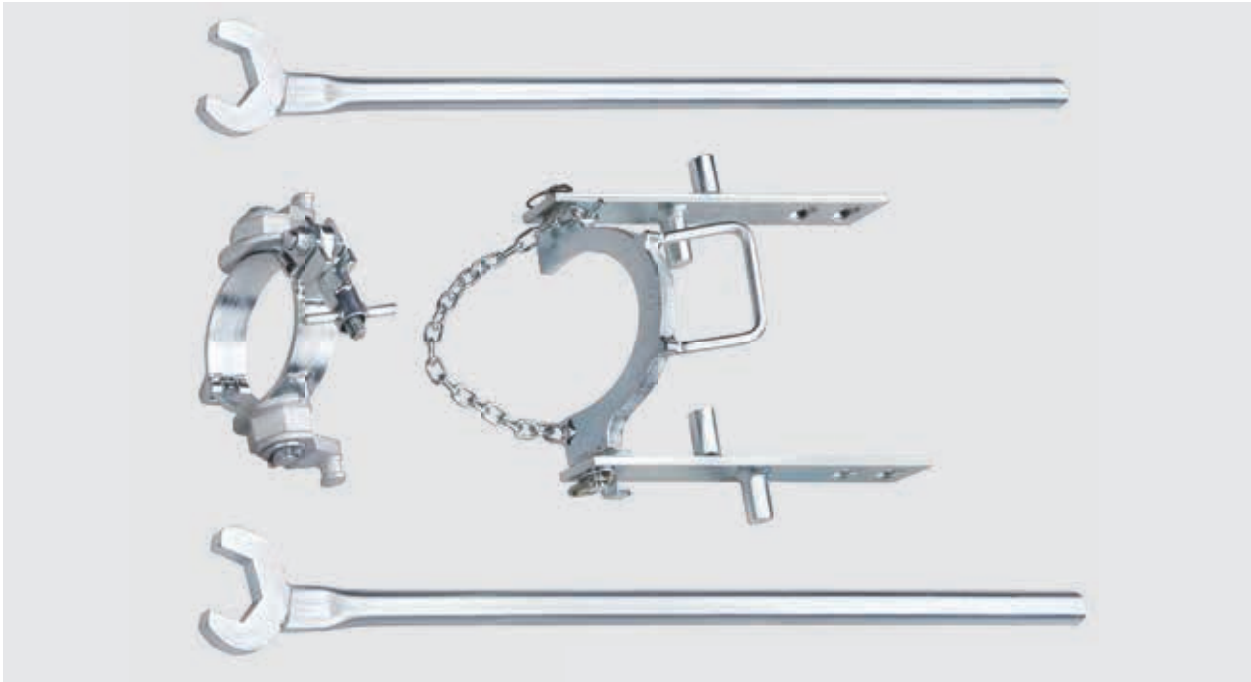
› to DIN EN 545 according to B2597



DN	PN 16	PN 25	PN 40	PN 63	PN 100
	[kg]	[kg]	[kg]	[kg]	[kg]
80	8.0	8.0	8.0	10.6	13.1
100	10.0	10.0	10.0	14.2	18.4
125	12.5	13.5	14.5	20.6	26.3
150	15.5	15.5	16.5	28.8	37.6
200	23.0	25.0	30.0	46.2	64.3
250	32.0	35.5	46.0	61.0	91.0
300	43.0	48.0	63.5	82.8	150.5
400	70.0	81.0	115.0	154.0	220.5
500	104.0	122.0	155.0	190.0	

Fitting coating to DIN EN 545 with GSK epoxy powder coating with min. 250 µm to EN 14901.
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The actual availability can be guaranteed only when the order is placed.

ASSEMBLY DEVICE FOR PIPES AND FITTINGS NOVO-SIT AND TIS-K, DN 80 - DN 500



Tyton sealing ring for pipes and fittings DN 80 - DN 500



Lubricant 250 g



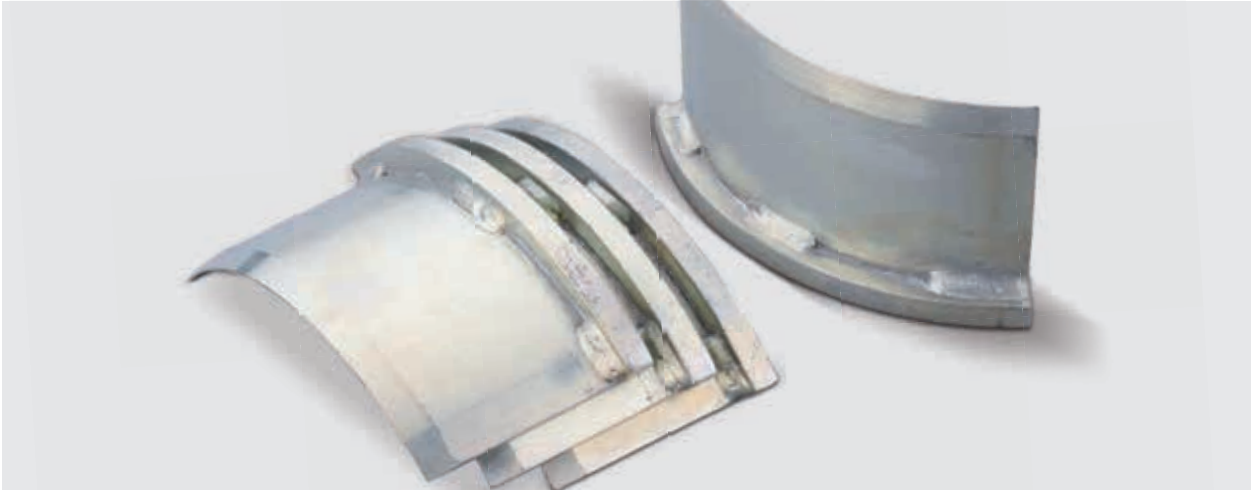
Assembly wedges for TIS-K joint



Release plates for NOVO-SIT joint



Release clamps for TIS-K joint





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