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PRODUCT CATALOG 2016

KEEPING THE CITY FLOWING

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PSI-Icons to help organize!

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Selection via the
PSI Calculation Program

Tender Specifications

Certificates

PSI ORIGINAL LINK-SEAL®
MODULAR SEALS

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GENERAL INFORMATION

Fields of Application

Link-Seal® Modular Seals are designed for a wide range of applications. Link-Seal® Modular Seals can be used wherever annular spaces need to be reliably sealed.
Main fields of application:

- Wall penetrations
- Tank embedding
- Casing pipe seals

Advantages

- High quality rubber parts ensure longest lifetime
- Potable water-, oil-, fuel-, solvent-, and high temperature-resistant versions available upon request
- Safe positioning inside walling
- Perfect even for retrofitting
- Easy and quick installation thanks to pre-assembled modules
- Choice of zinc-plated or S316 (V4A) stainless steel bolts
- Different colors for different rubber qualities
- Electrically isolating
- Hydrostatic sealing against pressing water
- Original product with longest lifetime experience on the market

The Principle

The radial expansion of the rubber ensures a permanently pressure tight and secure sealing of the annular space.

For very thin-walled plastic pipes e.g. pre-insulated, flexible and corrugated pipe systems, a PSI Compakt seal type FW is recommended.

Recommendation

The inside of the core drilling should be coated in order to protect the reinforcement. Therefore we recommend using core hole sealing respectively epoxy resin (see p. 31-34).

More content can be found at
www.psi-products.com

TECHNICAL DATA

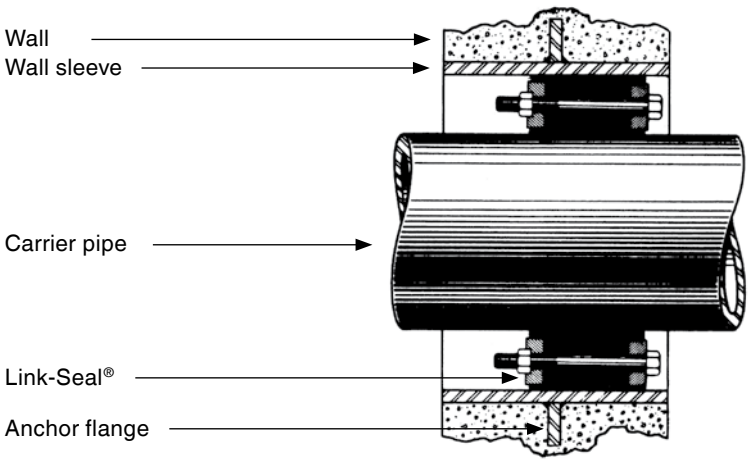
Material Properties

Temperature resistance	Standard version black Type T, grey Type O, green* KTW/W270**	-40 °C up to +80 °C from -55 °C to +204 °C from -40 °C to +70 °C from -40 °C to +80 °C
Oil, fuel and solvent resistant	Type O **(not UV-resistant)**	
Especially for plastic pipes	blue version	Shore 40 ± 5
Pressure tight	up to 5 bar (TÜV, Lloyd's Register) Original Link-Seal® up to 3 bar (Lloyd's Register) Original Link-Seal Type BC and BS316	
Electrical insulation	Dielectric strength 500 V/mm	

* LS 440 and LS 650 Nitrile rubber black with green marking. The values specified for the pressure tightness are valid at 23 °C. For different, in particular higher permanent operating temperatures, it might be necessary to fit an ejection safety device.

** The KTW/W270 version is used whenever the seal comes into contact with potable water.

Sectional drawing of a wall penetration sealed with Link-Seal® Modular Seals ring seal



Wall Sleeves

PSI offers wall sleeves in PVC, galvanized steel, S304 (V2A) or asbestos free fibre cement with an inner diameter of 50 mm up to 2350 mm.

TECHNICAL DATA

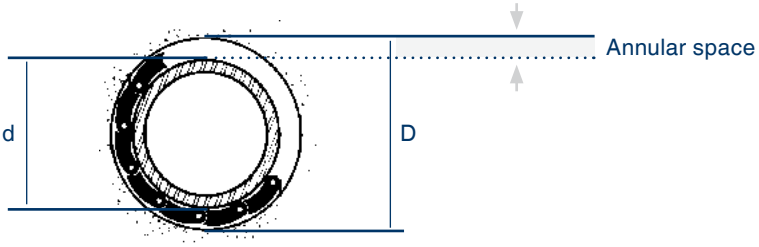
Type	Version	Sealing element	Pressure plates	Nuts and Bolts	Temperature range	Application
C	Standard	EPDM rubber black	fibre reinforced polyamide	strength class 8.8 galvanized	-40 °C up to +80 °C	General application in a normal atmosphere, water, or a humid environment. Suitable for electrical isolation and cathodic corrosion protection.
S 316	Standard stainless steel	EPDM rubber black	fibre reinforced polyamide	Material A 4-70 stainless steel	-40 °C up to +80 °C	High level of water-resistance, resistant against most inorganic substances (acids and alkalis) and most organic substances (acetic acid and acetone)
BC	Shore 40 ± 5	EPDM rubber blue	fibre reinforced polyamide	strength class 8.8 galvanized	-40 °C up to +80 °C	See type "C", but particular for plastic pipes
BS 316	Shore 40 ± 5	EPDM rubber blue	fibre reinforced polyamide	Material A 4-70 stainless steel	-40 °C up to +80 °C	See type "S 316", but particular for plastic pipes
O*	Oil resistant	Nitrile rubber green	fibre reinforced polyamide	strength class 8.8 galvanized	-40 °C up to +70 °C	Good resistance against oils, aromatic fuels, solvents and other mineral oil based products
OS 316*	Oil resistant	Nitrile rubber green	fibre reinforced polyamide	Material A 4-70 stainless steel	-40 °C up to +70 °C	Good resistance against oils, aromatic fuels, solvents and other mineral oil based products
KTW/ W270**	Shore 50 ± 5	EPDM rubber black, with a KTW stamp	fibre reinforced polyamide natural color	Material A 4-70 stainless steel	-40 °C up to +80 °C	Suitable for applications in potable water
T***	High and low temperature resistant	Silicon rubber grey	St 37 galvanized	strength class 8.8 galvanized	-55 °C up to +204 °C	No isolating properties, especially suitable for extreme temperatures

* LS 440 and LS 650 black nitrile rubber with green markings
** Elastomer tested in accordance with KTW and W270
*** available upon request

TYPE SELECTION

01. Which type?

The suitable Link-Seal® for the application results from the thickness of the annular space between casing pipe (wall sleeve/core drilling) and media pipe. The perfect Link-Seal® is smaller than the annular space in a non-tensioned condition and larger in tensioned condition. The annular space is calculated as follows:



Casing pipe inside (D) - **Carrier pipe outside (d)** = **Annular space**

2

The calculated value must lie between the values in the table for “non-tensioned condition” and “tensioned condition”. Simply enter the calculated value in the right place in the “annular space thickness“ column and determine the right type

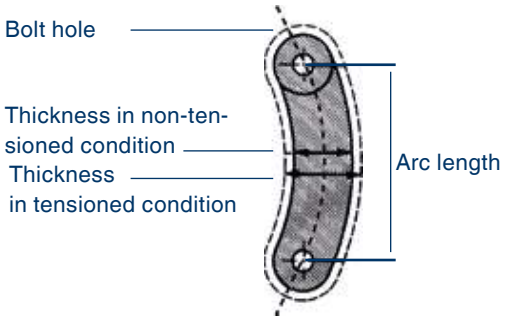
Type	Thickness without tension	Annular space is	Thickness with tension	Required wall thickness
LS 200	12.7 mm		15.7 mm	75 mm
LS 265	16.0 mm		20.0 mm	75 mm
LS 275	16.0 mm		20.0 mm	75 mm
LS 300	18.0 mm		22.5 mm	100 mm
LS 310	18.0 mm		22.5 mm	100 mm
LS 315	21.1 mm		26.0 mm	100 mm
LS 325	23.2 mm		30.0 mm	120 mm
LS 340	25.5 mm		34.0 mm	120 mm
LS 360	32.0 mm		42.0 mm	120 mm
LS 400	36.3 mm		46.0 mm	140 mm
LS 410	37.0 mm		48.5 mm	140 mm
LS 425	28.4 mm		37.0 mm	140 mm
LS 440	44.0 mm		55.0 mm	140 mm
LS 475	41.3 mm		48.5 mm	140 mm
LS 500	60.3 mm		71.5 mm	150 mm
LS 525	55.4 mm		63.5 mm	150 mm
LS 575	48.0 mm		58.0 mm	150 mm
LS 615[3]	81.6 mm		98.0 mm	150 mm
LS 625	83.0 mm		98.0 mm	150 mm
LS 650	69.0 mm		84.0 mm	150 mm
LS 700	95.0 mm		110.0 mm	200 mm

Type:

TYPE SELECTION

02. How many elements?

After the type definition the required number of elements needs to be calculated. Determine the bolt circle by using the formula below and divide the value by the arc length of the chosen type (see table). The result, rounded up or down, shows the required number of elements.



Casing pipe inside (D) + **Carrier pipe outside (d)** / **2** **x 3.14** = **Bolt hole** : **Arc length** = **Number**

Type	Arc length	Outer diameter of Pipe	Outer diameter of Pipe	Minimum no. of Segments
LS 200	30.0 mm	from 21.3 mm	to 323.9 mm(1	4
LS 265	41.0 mm	from 50.0 mm	to 406.4 mm(1	5
LS 275	25.6 mm	from 0.0 mm	to 90.0 mm	4
LS 300	41.0 mm	from 44.5 mm	to 250.0 mm	5
LS 310	57.5 mm	from 60.3 mm	to 406.4 mm(2	5
LS 315	38.4 mm	from 37.0 mm	to 315.0 mm	5
LS 325	79.8 mm	from 133.0 mm	to 711.0 mm	6
LS 340	41.4 mm	from 30.0 mm	to 323.9 mm	4
LS 360	55.1 mm	from 40.0 mm	to 406.4 mm	5
LS 400	93.1 mm	from 139.7 mm	to 1220.0 mm	6
LS 410	67.6 mm	from 60.3 mm	to 323.9 mm	5
LS 425	93.1 mm	from 144.0 mm	to 1220.0 mm	6
LS 440	99.0 mm	from 139.7 mm	to 1220.0 mm	6
LS 475	68.6 mm	from 60.3 mm	to 1220.0 mm	5
LS 500	99.8 mm	from 100.0 mm	to 1220.0 mm	5
LS 525	99.8 mm	from 133.0 mm	to 1220.0 mm	6
LS 575	79.5 mm	from 130.0 mm	to 1220.0 mm	5
LS 615(3	155.5 mm	from 219.0 mm	to 3000.0 mm	6
LS 625	106.7 mm	from 133.0 mm	to 2000.0 mm	5
LS 650	106.7 mm	from 160.0 mm	to 2000.0 mm	7
LS 700	155.5 mm	from 219.6 mm	to 3000.0 mm	6

IMPORTANT:

(1
From an outer diameter of DA 150 we recommend to enlarge the borehole to be able to use at least Link-Seal® Type LS 310.

(2
From an outer diameter of DA 300 we recommend to enlarge the borehole to be able to use at least Link-Seal® Type LS 325.

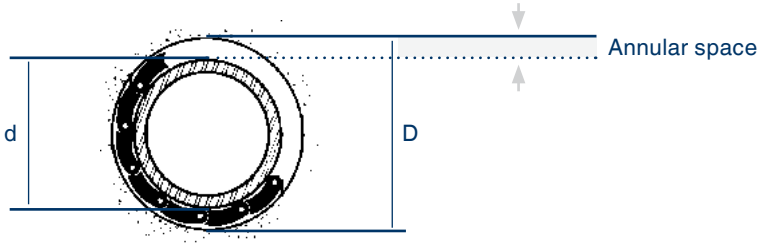
(3
The LS 615 is not suitable for PE pipes.

Quantity:

TYPE SELECTION

01. Which type?

The Link-Seal® ring seal suitable for the application depends on the annular distance between the casing pipe (wall sleeve) and carrier pipe. The optimal type is smaller than the annular space when in free state, and larger when in expanded state. The annular space is calculated from:



Casing pipe inside (D) - **Carrier pipe outside (d)** = **Annular space**

2

The calculated value must lie between the values in the table for "thickness in free state" and "thickness expanded". Simply enter the calculated value in the right place in the "annular space thickness" column and determine the type.

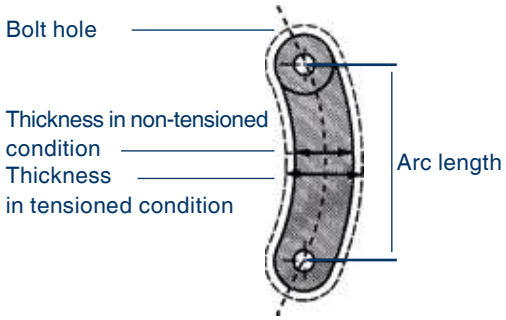
Type	Thickness without tension	Annular space is	Thickness with tension	Required wall thickness
LS 200	12.7 mm		15.7 mm	70 mm
LS 275	16.0 mm		20.0 mm	70 mm
LS 300	17.5 mm		22.5 mm	100 mm
LS 315	20.5 mm		26.0 mm	100 mm
LS 325	24.0 mm		30.0 mm	120 mm
LS 340	24.5 mm		34.0 mm	120 mm
LS 360	31.5 mm		42.0 mm	120 mm
LS 400	35.5 mm		46.0 mm	140 mm
LS 410	36.5 mm		48.5 mm	140 mm
LS 425	28.6 mm		37.0 mm	140 mm
LS 440	44.0 mm		55.0 mm	140 mm
LS 475	41.3 mm		48.5 mm	140 mm
LS 500	61.0 mm		71.5 mm	150 mm
LS 525	53.0 mm		63.5 mm	150 mm
LS 575	48.0 mm		58.0 mm	150 mm
LS 625	83.0 mm		98.0 mm	150 mm
LS 650	69.0 mm		84.0 mm	150 mm

Type:

TYPE SELECTION

02. How many elements?

After the type definition the required number of elements needs to be calculated. Determine the bolt circle by using the formula below and divide the value by the arc length of the chosen type (see table). The result, rounded up or down, shows the required number of elements.



Casing pipe inside (D) + **Carrier pipe outside (d)** / **2** **x 3.14** = **Bolt hole** : **Arc length** = **Number**

Type	Arc length	Outer diameter of Pipe	Outer diameter of Pipe	Minimum no. of segments
LS 200	30.5 mm	from 21.3 mm	to 323.9 mm(1	4
LS 275	25.0 mm	from 0.0 mm	to 90.0 mm	4
LS 300	40.5 mm	from 44.5 mm	to 406.4 mm(2	5
LS 315	38.4 mm	from 37.0 mm	to 315.0 mm	5
LS 325	79.0 mm	from 133.0 mm	to 711.0 mm	6
LS 340	42.0 mm	from 30.0 mm	to 323.9 mm	4
LS 360	55.5 mm	from 40.0 mm	to 406.4 mm	5
LS 400	93.0 mm	from 139.7 mm	to 1220.0 mm	6
LS 410	68.0 mm	from 60.3 mm	to 323.9 mm	4
LS 425	93.0 mm	from 144.0 mm	to 1220.0 mm	6
LS 440	99.0 mm	from 139.7 mm	to 1220.0 mm	6
LS 475	68.0 mm	from 60.3 mm	to 1220.0 mm	5
LS 500	99.0 mm	from 100.0 mm	to 1220.0 mm	5
LS 525	99.0 mm	from 133.0 mm	to 1220.0 mm	6
LS 575	79.0 mm	from 130.0 mm	to 1220.0 mm	5
LS 625	106.7 mm	from 133.0 mm	to 2000,0 mm	5
LS 650	106.7 mm	from 160.0 mm	to 2000.0 mm	7

Quantity:

IMPORTANT:

(1 From an outer diameter of DA 150 we recommend to enlarge the borehole to be able to use at least Link-Seal® Type LS 300.

(2 From an outer diameter of DA 150 we recommend to enlarge the borehole to be able to use at least Link-Seal® Type LS 325.

PSI CRAFTSMAN SETS

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GENERAL INFORMATION

Pre-assembled Link-Seal® rings for most common dimensions.

Blue soft rubber Link-Seals® are shipped inside a box suitable for all pipe types.

With especially thin-walled plastic pipes like plastic casing pipes and flexible casing and corrugated pipe systems, we recommend using Compakt type FW.

- High quality EPDM rubber
- Galvanized or stainless steel bolts
- Suitable for retrofitting
- Special sizes available at short notice
- Minimum annular gap 13 mm
- Against pressing water
- Oil resistant rubber upon request

Core hole (mm)	Carrier pipe from	to
50	1	18
50	18	25
80	22	27
80	40	48
100	32	43
100	48	57
100	55	64
125	42	61
125	57	72
125	80	89
150	53	76
150	66	78
150	82	99
150	105	115
200	103	117
200	116	133
200	132	149
200	148	157
200	156	164
250	106	129
250	130	154
250	153	163
250	158	177
250	176	193
300	184	204
300	203	217
300	216	236
350	207	229
350	230	254
350	253	274
350	266	286

More content can be found at
www.psi-products.com

PSI COMPAKT SEAL

- COMPAKT STANDARD
- COMPAKT VARIA
- COMPAKT KTW/W270
  FOR POTABLE WATER
- COMPAKT FW

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GENERAL INFORMATION

Sealing with a system

The PSI Compakt seal is the perfect complement to the original Link-Seal®. Ideal sealing for wall penetrations for gas, water and sewage pipes as well as for cables against pressing and non-pressing water. Pressure plates are always made of stainless steel.

Principle

The 40 mm wide rubber element is compressed by means of two metal discs. PSI Compakts seal the annular space between carrier pipe and casing pipe/core hole against water and gas.

Accessories

PVC, steel and asbestos-free fibre cement wall sleeves, rubber support rings with lip seals, Epoxy Resin for core hole coating.

Compakt FW

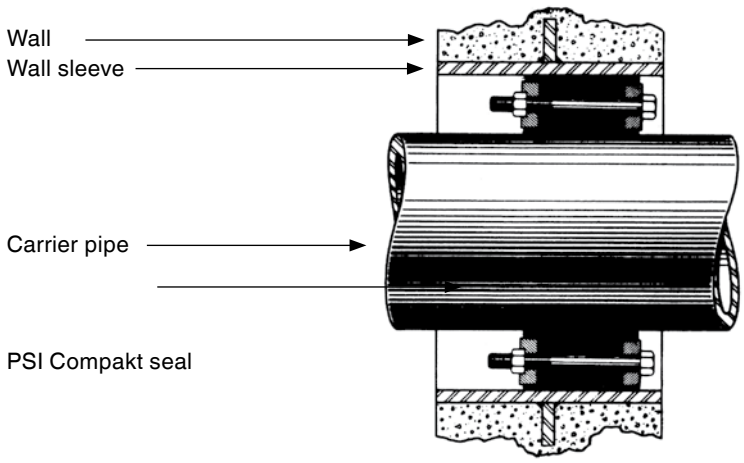
For district heating pipe wall penetrations subject to an expected water pressure of greater 1 bar, we recommend using Compakt FW, especially with pre-insulated or corrugated pipes.

	Compakt Standard	Compakt FW for pre-insulated district heating pipes	Compakt Standard with NBR rubber	Compakt Standard with KTW/W270 approval*
Pressure plate material	S304 (V2A)	S304 (V2A)	S304 (V2A)	S304 (V2A)/VA4 upon request
Closed	Standard	Standard	Standard	Standard
split/open version	available	upon request	available	available
Pressure-tightness	3.0 bar in secure position up to 5.0 bar	3.0 bar in secure position up to 5.0 bar	3.0 bar in secure position up to 5.0 bar	3.0 bar in secure position up to 5.0 bar
KTW/W270	no	no	no	yes
Rubber thickness	40 mm	2 x 40 mm	40 mm	40 mm
Rubber material	EPDM	EPDM	NBR	EPDM
UV-resistance	good	good	poor	good
Temperature range	-30 °C to +120 °C	-30 °C to +120 °C	-30 °C to +70 °C	-30 °C to +120 °C
Hardness, shore A	43 ± 5°	43 ± 5°	40 ± 5°	50 ± 5°
Core drilled hole min./ max	50 - 400 mm	125 - 400 mm	80 - 250 mm	50 - 400 mm

The values specified for the pressure tightness are valid at 23 °C. For different, in particular higher permanent operating temperatures, it might be necessary to fit an ejection safety device.

* Elastomer tested in accordance with KTW and W 270

Sectional drawing of an installed Compakt seal



General Information: The use of PSI Compakt seal type Varia is flexible: as a temporary blind plug against non-pressing water or as a single lead-through for pressing water. The sealing range of the Varia 1.5 for a core hole ID 100 mm is continuous from 18 mm - 65 mm because of the small steps (5 mm) per ring. The type Varia 1.0 for core drilled hole ID 100 mm is especially applicable for retrofitting service line wall penetrations. Varia DN 150 and DN 200 e.g. seals a core drilled hole ID 150 mm and 200 mm and can be used for four different carrier pipe sizes. Due to the soft rubber quality the seals are specifically suited for plastic pipes.

Compakt Varia 1.5 DN 80: The Compakt seal type Varia 1.5 DN 80 is made for a core drilled hole/wall sleeve ID 80 mm and can be used for carrier pipes or cables continuously from 18 up to 45 mm.

Compakt Varia 1.5 DN 100: The Compakt seal type Varia 1.5 DN 100 is made for a core drilled hole/wall sleeve ID 100 mm and can be used for carrier pipes or cables continuously from 18 up to 65 mm.

Compakt Varia 1.0 DN 100: The Compakt seal type Varia 1.0 DN 100 is designed as a split version for a core drilled hole/wall sleeve ID 100 mm for retrofitting. It can be used for carrier pipe ODs 20 mm, 25 mm, 32 mm, 40 mm, 50 mm and 63 mm.

Compakt Varia 1.5 DN 100 LWL: The Compakt seal type Varia DN 100 is designed for a core drilled hole/wall sleeve ID 100 mm and can be used for carrier pipes as well as fibre optic cables up to OD 14 mm (core drilled hole inside the pressure plate).

Compakt Varia 1.5 DN 110: The Compakt seal type Varia 1.5 DN 110 can be used like type Varia 1.5 DN 100 but for a core drilled hole/wall sleeve ID 110 mm.

Compakt Varia DN 150: The Compakt seal type Varia DN 150 is made for a core drilled hole/wall sleeve ID 150 mm and can be used for carrier pipes OD 60.3-63 mm, 75-76.1 mm, 88.9-90 mm and 110 mm.

Compakt Varia DN 200: The Compakt seal type Varia DN 200 is made for a core drilled hole/wall sleeve ID 200 mm and can be used for carrier pipes OD 110 mm, 125 mm, 139.7-140 mm and 160 mm.

More content can be found at
www.psi-products.com

Varia 1.5 DN 80

Varia 1.5 DN 100

Varia 1.5 with large flange DN 100

Varia 1.0 split version

Varia DN 150

Varia 1.5 DN 100 LWL

	Varia 1.5 DN 80	Varia 1.5		Varia 1.0 DN 100 split version	Varia 1.5 DN 100 LWL cable	Varia DN 150	Varia DN 200
		DN 100	DN 110				
Pressure Plates	S304 (V2A) closed	S304 (V2A) closed		S304 (V2A) split	S304 (V2A) closed	S304 (V2A) closed	
Tightness as a blind plug	1.5 bar	1.5 bar		1.0 bar	1.0 bar	against non-pressing water	
Tightness with carrier pipe						1.0 bar	
KTW/W270	no	no		no	no	no	
Rubber thickness	40 mm	40 mm		40 mm	40 mm	40 mm	
Rubber material	NBR	NBR		NBR	NBR	EPDM	
UV-resistance	poor	poor		poor	poor	good	
Temperature range	-30 °C up to +70 °C	-30 °C up to +70 °C		-30 °C up to +70 °C	-30 °C up to +70 °C	-30 °C up to +120 °C	
Hardness, shore A	50° ± 5°	50° ± 5°		50° ± 5°	50° ± 5°	43° ± 5°	
Carrier pipe dimensions	18 mm - 45 mm	18 mm - 65 mm		20 mm, 25 mm 32 mm, 40 mm 50 mm, 63 mm	32 mm, 40 mm, 50 mm, up to 14 mm LWL	60.3-63 mm 75-76.1 mm 88.9-90 mm 110 mm	110 + 125 mm 139.7-140 mm 160 mm
Core drilled hole/wall sleeve	80 mm	100 mm I 110 mm		100 mm	100 mm	150 mm	200 mm

The values specified for the pressure tightness are valid at 23 °C. For different, in particular higher permanent operating temperatures, it might be necessary to fit an ejection safety device.

PSI COMPAKT DUO
ANNULAR SPACE SEALING SYSTEM

- 5 BAR
  PRESSURE TIGHT
- HARMONIZED SYSTEM
  WITH ADDITIONAL SAFETY
- EASY HANDLING

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PSI COMPAKT DUO
ANNULAR SPACE SEALING SYSTEM

• APPLICATION

PSI annular space sealing system Compakt DUO is ideally suited to seal gas, water, waste water pipe wall penetrations and cables against pressing water. Through tightening the hexagon bolts, the elastomer is compressed by the pressure plates, thus permanently sealing the annular space between wall and pipe. Hereby a safe and permanent sealing under water pressure is achieved, which can be released at any time if needed. The advantage of this system is the easy application of one seal each on building‘s in and outside.

• YOUR ADVANTAGES

- Easy installation
- Overlapping large-diameter flange for better adjustment
- Double seal-tightening compresses both elastomeres at once
- Sealing on building‘s in- and outside
- Absolutely gas and pressure water tight up to 5 bar
- Stainless steel pressure plates (S304 or S316)
- EPDM (standard) and NBR (on request) available
- Customizations available on request

• TECHNICAL DATA

- Pressure plate material: S304 (S316 on request)
- Closed version: Standard
- Pressure-tight: 5 bar
- Rubber thickness: 40 mm each
- Rubber material: EPDM (standard)
- NBR (on request)
- Temperature range: EPDM -30 C° to +120 C°
- NBR -30 C° to +70 C°
- UV-resistance: EPDM (given)
- Shore hardness: EPDM standard 50 +/-5°
- NBR 50 +/-5°

Wall opening (ID)	Outer diameter of Carrier pipe in mm		Length	S304 pressure plate S304 bolts closed large flange rubber with 2x40mm rubber quality EPDM
mm	from	to	mm	Art.-no.
80	25	32	240	4-025-00017
80	25	32	300	4-025-00018
100	25	32	240	4-025-00019
100	25	32	300	4-025-00020
100	32	40	240	4-025-00021
100	32	40	300	4-025-00022
100	46	56	240	4-025-00023
100	46	56	300	4-025-00024

PSI MULTICABLE

- PRESSURE-TIGHT UP TO 1 BAR
- MULTIPLE PIPE AND CABLE WALL PENETRATION SEAL
- EASY HANDLING AND QUICK INSTALLATION ALSO POSSIBLE FOR PIPES AND CABLES ALREADY IN PLACE
- HIGH QUALITY DESIGN

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GENERAL INFORMATION

The configuration of the lead-throughs of pipes/cables with an outer diameter from 4 to 32; 40 or 50 mm can be chosen freely. The sealing is pressure tight up to 1 bar. The system is split and therefore suitable for retrofitting. For each opening we deliver blind plugs which can be taken out when inserting the pipe/cable, so that unused openings remain sealed pressure-tight with a blind plug. Therefore it is also possible to install other pipes and cables later. For the installation no special tools besides a torque wrench are required.

Overview Multicable flex (freely configurable)

Core hole mm	Example number Cable / Carrier pipe	Example number outer diameter of Cable / Carrier pipe in mm	Art. No.
50 (22 PS)	5	4	4-032-00006
	4	6	
70 (43 PS)	4	7	4-032-00014
	4	8	
80 (43 PS)	4	10	4-032-00001
	4	12	
100 (58 PS)	4	15	4-032-00002
	5	12	
125 (82 PS)	4	20	4-032-00003
	5	15	
150 (112 PS)	4	30	4-032-00004
	5	25	

PS = penetration size, please ask for configuration options!

Multicable fix (pre-selected)

Core drilled hole mm	Configuration outer diameter of Cable / Carrier pipe in mm	Art. No.
100	8; 2x10; 12; 14; 16; 18 mm	4-032-00012

Retrofitting:
Remove the split pressure plates and cut the holes vertically and diagonally to the circumference with a knife. In that way you can put the already installed pipes/cables into the seal. Fix the pressure plates back on the rubber element and finish the installation.

Technical data

Pressure plate:	S304 (V2A) split
Pressure tightness:	1 bar
Rubber thickness:	1 x 40 mm
Rubber material:	EPDM
Temperature range:	-30 up to +120 °C
Shore:	43 ± 5

The values specified for the pressure tightness are valid at 23 °C.
For different, in particular higher permanent operating temperatures, it might be necessary to fit an ejection safety device.

PSI SPECIAL COMPAKT SEALS

SPECIAL COMPAKT SEALS ALSO ACCORDING TO W270 FOR POTABLE WATER

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GENERAL INFORMATION

Sealing system

The PSI Ring seal Compakt special version is ideal for sealing wall penetrations for gas, water, sewage pipes and cables against pressing and non-pressing water.

Versions

PSI Special Compakt Seals are made upon customer request. Here, almost all versions are possible: Oval pipes, square recesses, eccentric positioning, lead-throughs of several pipes or cables either as split/open or closed version.

Material

The rubber materials available are EPDM standard, NBR for applications such as: Methane gas (biogas facilities), Viton and EPDM with W270** approval for pota-ble water. For the pressure plates, S304 (V2A) stainless steel is used as the standard. S316 (V4A) and epoxy coated pressure plates upon request.

	Special Compakt models
Pressure plate material	upon request
Closed	Standard
Split/open version	Available
Pressure-tight	1.5 bar*
KTW/W270	upon request
Rubber thickness	Up to core drilled hole 800 mm - 40 mm From core drilled hole 800 mm - 2 x 40 mm
Rubber material	EPDM Standard Available upon request: EPDM with W270**, Viton, NBR
Temperature range	EPDM -30 °C up to +120 °C NBR -30 °C up to 70 °C Viton -20 °C up to +200 °C
UV-resistance	EPDM good NBR poor Viton good
Shore hardness A	EPDM Standard 50 ± 5° NBR 50 ± 5° EPDM with W270 50 ± 5° Viton 55 ± 5°
Core drilled hole min/max	30 - 3000 mm

* The values specified for the pressure tightness are valid at 23 °C
For other in particular higher permanent operating temperatures, an ejection safety device should be fitted if necessary. This also applies to annular spaces ≥100 mm.

** Elastomer tested in accordance with W 270 for potable water.

More content can be found at
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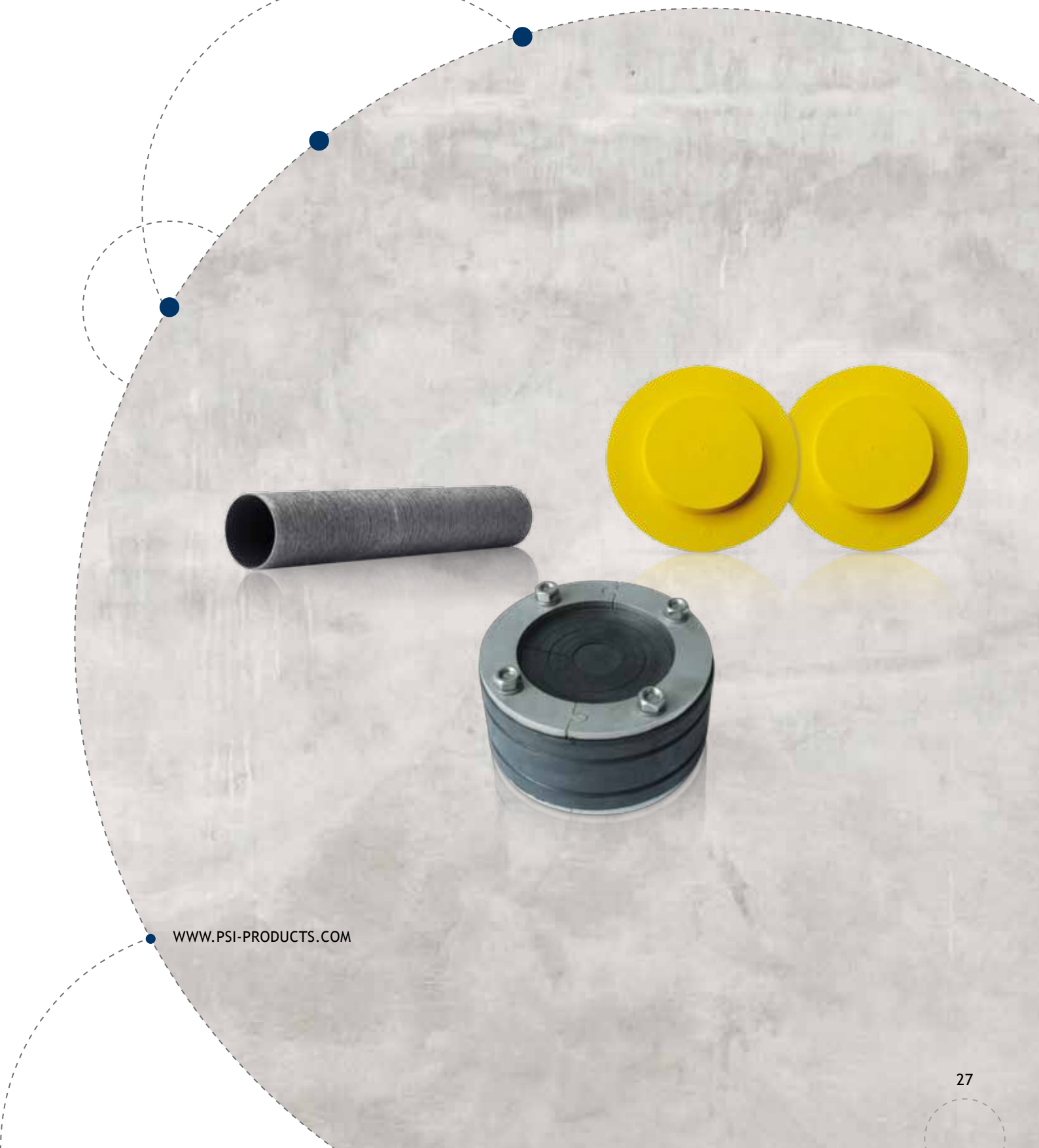
PSI HOUSE CONNECTION SETS



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HOUSE CONNECTION SETS

PSI House Connection Sets offer users a comprehensive sealing system for house connections:

- PVC wall sleeve with roughened surface
- Casing aids for wall sleeves with extra large flange for fixing to the formwork
- Compakt seals with closed/split stainless steel pressure plates, suitable for use against pressing water - SKZ and MFPA certified.

Combination with PSI Compakt

Set Art. No.	Casing aids	Wall sleeve	Compakt seal	Rubber ring
4-024-S00000 1/2" up to 2"	 2 pieces DN 100 Art. No. 4-014-22713	 1 piece ID 100/400 mm Art. No. 4-014-22705	 2 pieces Compakt Varia S304 (V2A) Closed 100/18-65 mm Art. No. 4-023-22439	
4-024-S00006 1/2" up to 2"	 2 pieces DN 100 Art. No. 4-014-22713	 1 piece ID 100/250 mm Art. No. 3-029-00120	 2 pieces Compakt Varia S304 (V2A) Closed 100/18-65 mm Art. No. 4-023-22439	
4-024-S00001 1/2" up to 2"	 2 pieces DN 100 Art. No. 4-014-22713	 1 piece ID 100/400 mm Art. No. 4-014-22705	 1 piece Compakt Varia S304 (V2A) Closed 100/18-65 mm Art. No. 4-023-23439	 1 piece 100/25-40 Art. No. 4-012-22805
4-024-S00007 1/2" up to 2"	 2 pieces DN 100 Art. No. 4-014-22713	 1 piece ID 100/250 mm Art. No. 3-029-00120	 1 piece Compakt Varia S304 (V2A) Closed 100/18-65 mm Art. No. 4-023-23439	 1 piece 100/25-40 Art. No. 4-012-22805
4-024-S00008 1/2" up to 2"	 2 pieces DN 100 Art. No. 4-014-22713	 1 piece ID 100/400 mm Art. No. 4-014-22705	 2 pieces Compakt Varia S304 (V2A) split 100/20;25;32;40;50;63 mm Art. No. 4-023-22451	
4-024-S00009 1/2" up to 2"	 2 pieces DN 100 Art. No. 4-014-22713	 1 piece ID 100/400 mm Art. No. 4-014-22705	 1 piece Compakt Varia S304 (V2A) split 100/20;25;32;40;50;63 mm Art. No. 4-023-22451	 1 piece 100/25-40 Art. No. 4-012-22805
4-024-S00011	 2 pieces DN 100 Art. No. 4-014-22713	 1 piece ID 100/400 mm Art. No. 4-014-22705	 2 pieces Multicable fix S304 (V2A) for subsequent splitting 100/8; 2x10;12;14;16;18 mm Art. No. 4-032-00012	
4-024-S00010	 2 pieces DN 100 Art. No. 4-014-22713	 1 piece ID 100/400 mm Art. No. 4-014-22705	 1 piece Multicable fix S304 (V2A) for subsequent splitting 100/8; 2x10;12;14;16;18 mm Art. No. 4-032-00012	

The listed sets are available from stock. Further combinations available upon request.

HOUSE CONNECTION SETS

Combination with PSI Compakt

Set Art. No.	Casing support	Wall sleeve	Compakt seal
4-024-S00002 Duct 110	 2 pieces DN 150 Art. No. 4-014-22715	 1 piece ID 150/400 mm Art. No. 4-014-22707	 2 pieces Compakt seals S304 (V2A) 150/98-110 mm Art. No. 4-024-22339
4-024-S00003 Duct 125	 2 pieces DN 200 Art. No. 4-014-22716	 1 piece ID 200/400 mm Art. No. 4-014-22712	 2 pieces Compakt seals S304 (V2A) 200/116-126 mm Art. No. 4-024-22341
4-024-S00005 Duct 160	 2 pieces DN 200 Art. No. 4-014-22716	 1 piece ID 200/400 mm Art. No. 4-014-22712	 2 pieces Compakt seals S304 (V2A) 200/150-160 mm Art. No. 4-023-22652
4-024-S00004 Duct 160	 2 pieces DN 250 Art. No. 4-014-22717	 1 piece ID 250/400 mm Art. No. 4-014-22711	 2 pieces Compakt seals S304 (V2A) 250/157-162 mm Art. No. 4-024-22343

Combination with Original Link-Seal®

Set Art. No.	Casing support	Wall sleeve	Link-Seal®
2-020-S00001 Duct 110	 2 pieces DN 150 Art. No. 4-014-22715	 1 piece ID 150/400 mm Art. No. 4-014-22707	 1 Link-Seal® ring 7 LS 310 S316 core drilled hole 150 mm pipe DO 110 mm 7 x Art. No. 2-025-00187
2-020-S00002 Duct 160	 2 pieces DN 200 Art. No. 4-014-22716	 1 piece ID 200/400 mm Art. No. 3-029-00122	 1 Link-Seal® ring 10 LS 310 S316 core drilled hole 200 mm pipe DA 160 mm 10 x Art. No. 2-025-00187
2-020-S00003 Duct 110	 2 pieces DN 150 Art. No. 4-014-22715	 1 piece ID 150/250 mm Art. No. 4-014-22712	 1 Link-Seal® ring 7 LS 310 S316 core drilled hole 150 mm pipe DO 110 mm 7 x Art. No. 2-025-00187
2-020-S00004 Duct 160	 2 pieces DN 200 Art. No. 4-014-22716	 1 piece ID 200/250 mm Art. No. 3-029-00123	 1 Link-Seal® ring 10 LS 310 S316 core drilled hole 200 mm pipe DA 160 mm 10 x Art. No. 2-025-00187

The listed sets are available from stock. Further combinations available upon request.

PSI CORE HOLE SEALANT

KB EPOXY RESIN

KB SEALING-SET

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GENERAL INFORMATION

Description:

The epoxy resin is a two component system. The material was especially developed to seal concrete e.g. walls in which a hole was drilled. The coating can be used indoors and outdoors as a non-porous protective coating for concrete, fibre cement, steel, wood and other materials. As soon as the white coating is fully hardened the surface is smooth and viscoplastic and insensitive to shocks. In Addition, the material is highly resistant to many alkalines and acids as well as to seawater.

How to use:

The core hole sealant is supplied as a set with a brush (40 cm long) and a pair of latex gloves. You can use the resin at ambient temperatures of 5 °C upwards. Please clean the surface and dry it carefully by pre-heating the surface. Smooth surfaces should be treated with an abrasive cloth (grain size 60 or rougher) and then remove the abrasive dust. Mix the curing agent in the tin with the liquid plastic and stir well. Then use the brush supplied to apply the coating. The thickness of one layer should be approx. 0.25 mm. If necessary you can apply up to three layers.

TECHNICAL DATA

Pot life at 20 °C:	approx. 90 min., higher temperatures shorten the pot life
Drying at 20 °C ambient temp.:	min. 12 hours
Max. working temperature:	max. 70 °C
Total weight (Content):	1.1 kg, suitable for approx. 3.5 sqm
Color:	white

Delivery forms	Art. No.
KB epoxy resin set	4-015-S22005

GENERAL INFORMATION

The Core Hole Sealant is delivered as a set consisting of a primer and a special paint each containing 0.33 litres.

The colorless primer creates a perfect adhesion base, closing small pores and capillaries in the concrete. The special paint used is a chlorinated rubber paint in pebble grey which, when combined with the primer, creates optimal sealing for core drilled holes and protects any exposed rebars from corrosion. The coating is suitable for indoor and outdoor use as a non-porous protective coating for annular space seals. As soon as the coating is fully hardened, the surface is smooth and insensitive to knocks and shocks.

How to use:

The system can be used at an ambient temperature between +5 °C and +30 °C. Please clean the surface to be coated and dry it carefully by pre-heating it. Smooth surfaces need to be roughened beforehand with an abrasive cloth, corn size 60 or rougher. The abrasive dust needs to be removed afterwards. Stir the contents of the container well before use. Apply the primer with the supplied brush evenly. After the primer has cooled off for ca. 1 hour the coating can be applied.

The thickness of a layer of special paint should be approx. 0.1 mm per layer - up to three layers can be applied as required. After application, carefully close the container. If properly stored as instructed, the paint can be reused.

TECHNICAL DATA

Base coat, Contents:	0.33 Litre, suitable for approx. 1.5 sqm
Color:	clear
Drying at 20 °C:	Can be painted over after approx. 1 hour
Special paint, Contents:	0.33 Litre, suitable for approx. 1 sqm2
Color:	pebble grey
Drying at 20 °C:	Seal can be installed after approx. 12 hours
Working temperature:	min. -10 °C up to max. +50 °C

Delivery forms	Art. No.
KB sealing set	4-015-S22004

PSI STOPAQ® 2100 SEALING SYSTEMS

THE ORIGINAL • STOPAQ® •

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STOPAQ® 2100

Advantages

- STOPAQ® is a soft pasty compound that does not harden and also allows for cables and pipes being inserted retrospectively.
- STOPAQ® is particularly suitable for highly complicated sealing situations, such as multiple penetrations, eccentrically positioned pipes or irregularly shaped core holes.

Properties

- When it comes into contact with water, STOPAQ® expands approx. 20%, thus able to seal wall penetrations permanently after movement or settlement has occurred, or after retrospective cable installation.
- STOPAQ® is environmentally neutral and not toxic (test reports available upon request).
- STOPAQ® is gas and watertight according to NEN 2768.
- STOPAQ® does not damage plastic pipes.

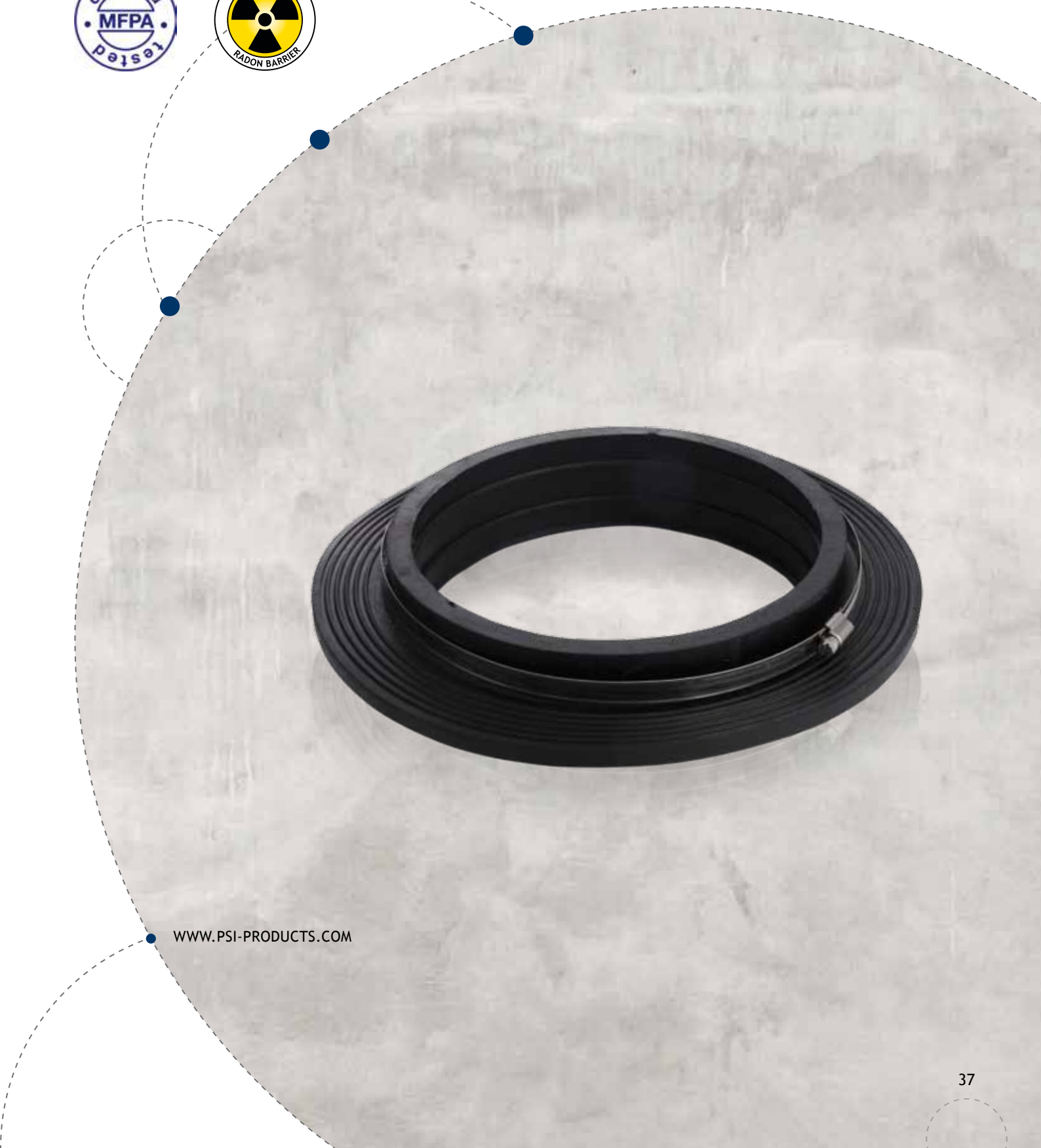
Use

STOPAQ® can also be processed on humid surfaces. Simply remove basic dirt. The manual pistol and nozzle included in the delivery make processing very easy. STOPAQ® can be used without taking further measures up to a depth of 1.0 m and an annular space of min. 10 mm and max. 50 mm. For deeper installations mortar is needed as filler material. STOPAQ® should be injected at least 100 mm deep into the wall. It is recommended to preheat the cartridge when processing in temperatures below 15 °C. Since STOPAQ® does not cure, the cartridge and nozzle can be used several times.

Delivery sets	Art. No.
STOPAQ® FN 2100 0.33 kg cartridges	4-015-22820
STOPAQ® FN 2100 0.53 kg cartridges	4-015-22821
Hand gun for 0.33 kg cartridge	4-015-22823
Hand gun for 0.53 kg cartridges	4-015-22822
Foam tape, 5 m roll	4-015-22824
STOPAQ® mortar 0.5 kg bag as wall closure for STOPAQ® FN 2100	4-015-22825

More content can be found at
www.psi-products.com

PSI WALL COLLARS



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GENERAL INFORMATION

An economical and reliable method of hydrostatic sealing

PSI wall collars are used for the hydrostatic sealing of pipes made of steel, cast iron, copper, plastic, fibre reinforced concrete, concrete and vitrified clay that pass through walls, ceilings, floors, shaft openings, swimming pools and groundwater tanks.

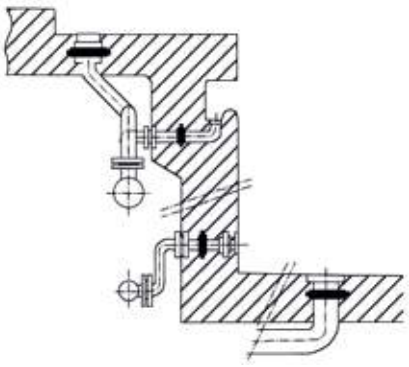
PSI wall collars are the ideal solution wherever it is not possible to retrofit wall sleeves or drill holes.

- Groundwater and pressing water tight
- For pipe OD 32 to OD 315 tested up to 5 bar
- From pipe OD 355 tested up to 4 bar

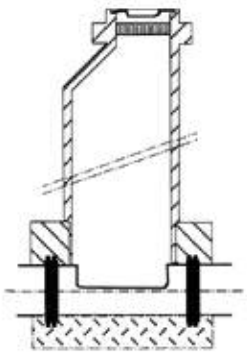
Material high quality rubber	Value/unit
Tensile strength	9.5 N/mm²
Elongation at break	500.0 %
Shore hardness A	45 ± 5°
Service temperature max.	80 °C
Minimum temperature	- 40 °C

Note: **The PSI wall collar is not an anchoring point for pipes.**

Application examples



Swimming pool



Man hole opening

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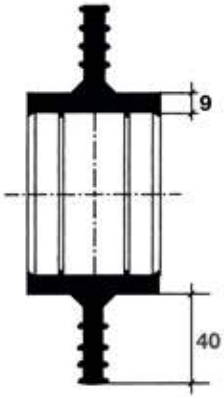
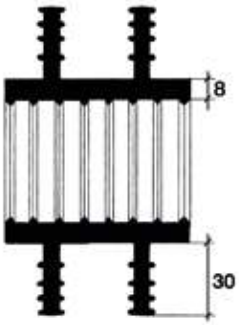
DIMENSIONS AND INSTALLATION INSTRUCTIONS





Outer diameter of pipe in mm	Clamping range from outer diameter of pipe	Clamping range to outer diameter of pipe
32	29	32
40	38	42
50	48	53
63	60	64
75	71	80
90	84	92
110	105	116
125	120	130
140	135	148
160	154	166
180	175	190
200	195	210
225	215	230
250	245	260
280	275	290
315	310	327
355	350	365
400	395	410
450	440	460
500	495	515
560	555	580
630	625	650
710	705	735
800	795	830
900	895	930
1000	995	1030
1200	1195	1240
1400	1395	1450

Dimensions in mm (without warranty)

Installation instructions

1. Clean the pipe surface to be cast in concrete with a piece of cloth or something similar.

2. Slide the wall collar on the pipe until it reaches the centre of the concrete or the wall.

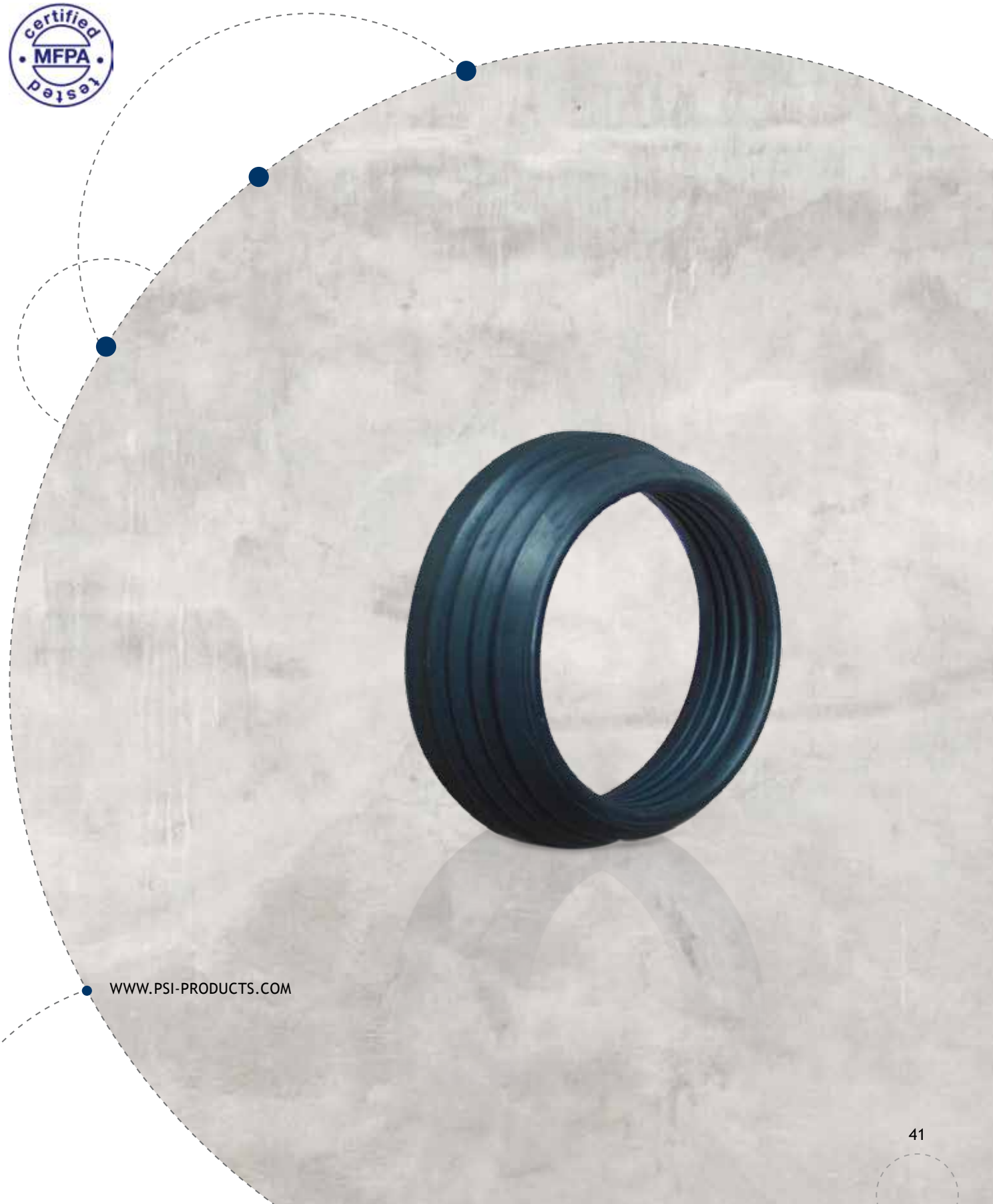
3. Attach the fastening straps:
   For wall collar up to Ø 315: Fit one strap on each side of the flange
   For wall collar above Ø 355: Fit one strap on each side of the flanges and one in between.

4. Put the fastening strap around the wall collar and insert the end of the strap into the slot of the turnbuckle.

5. Use a screw driver or hexagon wrench to turn the turnbuckle to the right and then slightly press the locking device until it fits tightly.

Certificates see page 241

PSI WALL COLLARS FOR PRE-INSULATED PIPES



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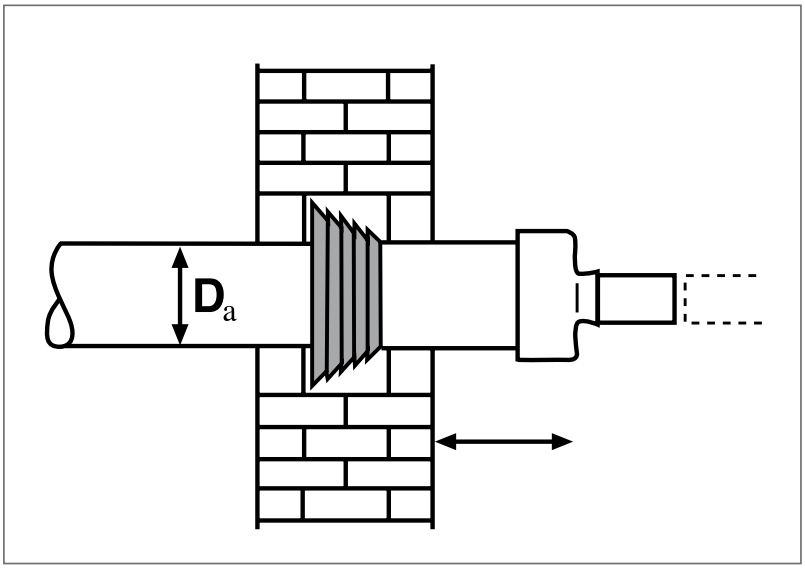
GENERAL INFORMATION

PSI Wall Collars for pre-insulated Pipes for wall penetrations are a waterproof barrier against non-pressing water for wall penetrations where pipelines pass through. The standard application is pre-insulated pipes, particularly PE-jacket and flexible pipes for district heating systems. The sealing rings are made of high-quality rubber and are molded from one piece up to size DN 200. Thanks to its conical shape, the ring fits tightly on to the pipe, eliminating any need for additional fastening straps.

The PSI Labyrinth sealing ring is pushed on to the pipe and cast into the centre of the wall.

PSI Labyrinth wall sealing rings are tested by the MFPA Leipzig up to a water pressure of 0.5 bar and certified accordingly. If water pressure of more than 0.1 bar is expected, we recommend using Compakt FW against pressing water in wall penetrations for district heating pipelines.



Outer diameter pre-insulated Pipe size	Art. No.
65	4-023-17116
75	4-023-17090
90	4-023-17091
110	4-023-17092
125	4-023-17093
140	4-023-17094
160	4-023-17095
180	4-023-17096
200	4-023-17097
225	4-023-17100
250	4-023-17101
280	4-023-17102
315	4-023-17103
355	4-023-17104
400	4-023-17105
450	4-023-17106
500	4-023-17107
560	4-023-17108
630	4-023-17109
670	4-023-17110
710	4-023-17111
800	4-023-17112
900	4-023-17113
1000	4-023-17114

A copy of the complete test report is obtainable on request from:
vertrieb@psi-products.de

More content can be found at
www.psi-products.com

PSI COMPENSATING WALL SEAL

TYPE VDW

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TECHNICAL SPECIFICATIONS

The PSI Compensating Wall Seal Type VDW has been especially developed to absorb large radial and axial movements of pipelines. The dynamic VDW seal made of Rottolin is the ideal pipe movement compensator and is particularly suitable for pre-insulated pipe wall penetrations for constructions without sealing sheeting.

Advantages at a glance:

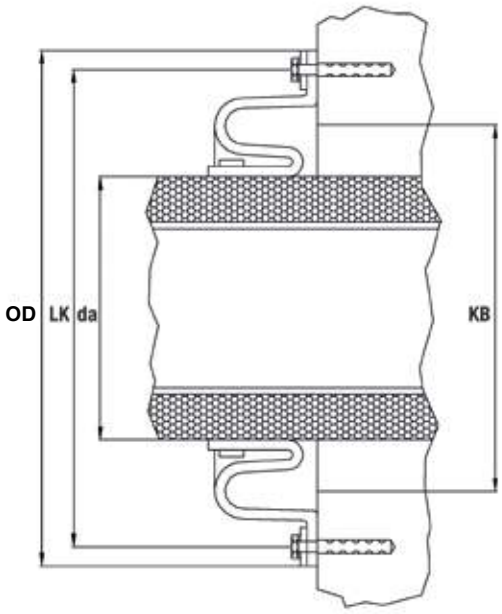
1. Supports axial and radial load changes up to +/-25 mm
2. Compensates pipe settlement up to 40 mm depending on outer diameter of pipe and core hole size
3. Leak-proof against pressing water up to 0.5 bar, MFPA tested
4. Including sealant and fixing material (screws with anchor dowels)

Selection table

Outer diameter of pipe in mm	max. Core hole in mm	Outer diameter of Collar/Plate in mm	Bolt Circle Plate/Sleeve in mm
75	150	292	265
90	150	292	265
110	200	340	305
125	200	340	305
140	250	389	360
160	250	389	360
200	300	450	410
225	300	450	410
250	350	500	460
280	350	500	460
315	400	550	510
355	450	600	560
400	500	650	610
450	550	700	660
500	600	750	710
560	650	800	760
630	700	850	810

TECHNICAL DATA:

Sleeve Material:	Rottolin
Material Thickness:	6-8 mm
Color:	red
Shore Hardness A:	ca. 50°
Tensile Strength:	11 N/mm²
Elongation:	400%
Tear Stength:	27 N/mm²
Max. continuous operating temperature:	55 °C
Material pressure plate:	V2A



More content can be found at
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PSI SAFETY STOPPER

PIPE SHUTDOWN

PRESSURE TESTING

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GENERAL INFORMATION

Fields of Application

Safety Stopper is a new generation of sealing plugs for reliably, quickly and securely sealing pipe ends. The Safety Stopper should be used wherever open pipe-ends have to be closed for inspection, for flushing, repair or pressure tests with air or water up to 0,5 bar. Safety Stopper can be installed up to 1000 times, it will resist falls from up to 3 m with out taking damage and is much quicker to install and remove than conventional pipe stoppers.

The advantages

- Easy and safe to use
- Reusable
- Robust construction for a long service life
- Secure pressure test with air and water
- Safety Stopper can be opened remotely and risk free
- Quick installation of Safety Stopper through quick-release mechanism with the cam lever
- Being able to "remote control" the Safety Stopper means that the safety rules of the Trade Association (BGR 126) are being complied with

The principle

The radial expansion of the sealing rubber triggered by activating the cam lever, ensures that the end of the pipe is securely sealed and pressure-tight.

Pressing down the clamping lever allows the Safety Stopper to be installed quickly. The clamp can easily be released by pulling it up with a rope or the installation tool without having to enter the shaft.

Optional tool

With the telescopic tool it is possible to open and close the Safety Stopper without entering the shaft.

More content can be found at
www.psi-products.com

TECHNICAL DATA

	Version	Inner diameter of pipe or core hole in mm from	to	Pressure tight* max. in bar	Connection thread (inches)
 Safety Stopper with plastic pressure plates and plastic lever	completely made of plastic CAM90	90	97	0.5	1/2
	completely made of plastic CAM100	96	103	0.5	1/2
	completely made of plastic CAM105	102	107	0.5	1/2
	completely made of plastic CAM110	108	112	0.5	1/2
	completely made of plastic CAM120	116	123	0.5	1/2
	completely made of plastic CAM130	125	132	0.5	1/2
	completely made of plastic CAM140	136	142	0.3	1/2
	completely made of plastic CAM145	144	149	0.3	1/2
	completely made of plastic CAM150	149	153	0.3	1/2
	completely made of plastic CAM160	157	162	0.3	1/2
 Safety Stopper with aluminium pressure plates and epoxy resin coated steel lever	Steel lever, aluminium pressure plate PRO200W	177	205	0.5	1
	Steel lever, aluminium pressure plate PRO225W	208	235	0.5	1
	Steel lever, aluminium pressure plate PRO250W	220	250	0.5	1
	Steel lever, aluminium pressure plate PRO270W	244	270	0.5	1
	Steel lever, aluminium pressure plate PRO300W	284	310	0.5	1
	Steel lever, aluminium pressure plate PRO315W	298	323	0.5	1
	Steel lever, aluminium pressure plate PRO350W	327	350	0.3	1
	Steel lever, aluminium pressure plate PRO375W	356	382	0.3	1
	Steel lever, aluminium pressure plate PRO400W	377	400	0.3	1
	Steel lever, aluminium pressure plate PRO420W	403	425	0.3	1
	Steel lever, aluminium pressure plate PRO470W	453	474	0.3	1
	Steel lever, aluminium pressure plate PRO520W	500	521	0.3	1

* For max. pressure load it is necessary to anchor the stopper in place.
Safety Stopper for special sizes from 195 mm to 1425 mm upon request.

PSI Safety Stopper installation tools

Name	Version	Art. No.	max. length	Comment
Installation Tool	Installation/removal tool for CAM100-CAM150	4-018-00050	3323 mm	telescopic version

PSI SEALING PLUGS

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PRODUCT DESCRIPTION

The PSI sealing plug is a sealing device consisting of two half shells. It is specially designed to seal cables and pipes passing through walls and ceilings. Due to the large variety of sizes and rubber qualities, you can use this sealing plug for almost any pipe or cable.

Installation is fast and simple and can be done without the use of special tools as the plug is just hammered into the annular space. The profiled design of the plug makes installation easy and ensures pressure tightness up to 3 bar - relevant test certificates are available. The sealing plugs are manufactured from high quality rubber and are highly resistant to abrasion. We can supply plugs with five different rubber qualities to ensure suitability for different industry sectors such as construction, marine, power and offshore. Extremely fire-resistant sealing plug material is also available.

Advantages

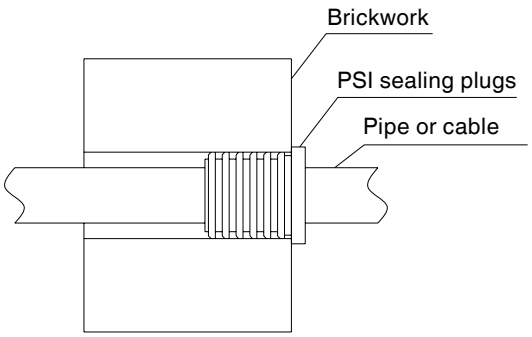
- Pressure tight up to 3 bar
- Easy installation
- Wide range of applications
- Noise-absorbing
- Fire-safe material available
- Vibration absorbing
- No electrical conduit
- High abrasion resistance
- Can be installed horizontally and vertically
- Various chemically resistant materials

More content can be found at
www.psi-products.com

APPLICATION RANGE

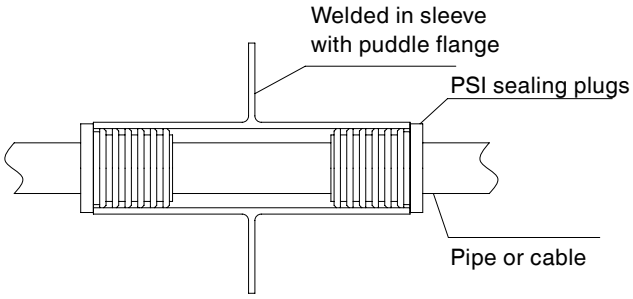
Use in a wall penetration

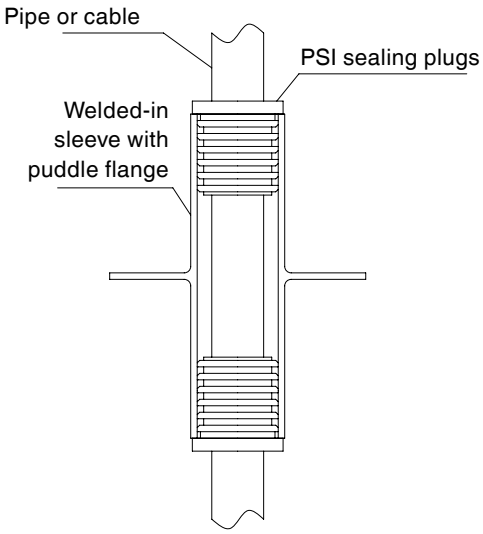
The plug can be used in a core drilled hole if the surface is in a good shape. The plug is hammered into the annular space from the outside of the wall. Pressure tightness of 3 bar can be achieved. The plug can also be used in wall sleeves.



Use in ship building

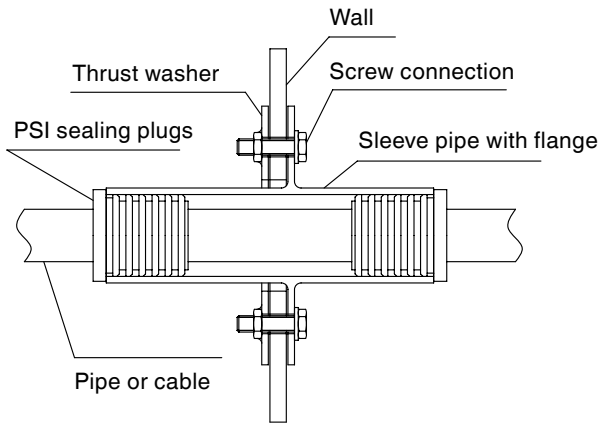
The sealing plug is hammered into the welded liner sleeve in the wall or deck penetration from both sides. In these cases you will use the high fire retardant rubber FS. Fire resistant for 1 hour, tested and certified according to IMO Fire Test Procedures Code, Annex 1, Part 3. The welded sleeve is then covered with rock wool.

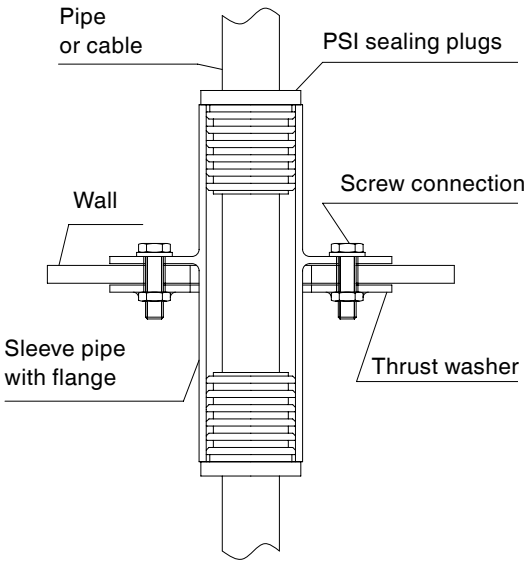




Use in yacht building

In the case of materials which cannot be welded, e.g. glass fibre reinforced plastics, the sleeve pipe is screw-mounted to a wall or the deck with the flange and a thrust washer. The sealing plug can then be easily hammered in.





SELECTION OF TYPES AND RUBBER QUALITIES

Inner diameter in mm	Outer diameter in mm	Material
40	16	EPDM
43.6	12	EPDM
50	without hole	EPDM
50	15	EPDM
50	28	EPDM
50	32	EPDM
54.5	18	EPDM
54.5	32	EPDM
60	32	EPDM
60	40	EPDM
70	40	EPDM
70	50	EPDM
80	30	EPDM
80	32	EPDM
80	32	NBR
80	40	EPDM
80	44	EPDM
94	32	EPDM
94	40	EPDM
94	50	EPDM
100	32	EPDM
100	40	EPDM
100	50	EPDM
100	54	EPDM
100	62	EPDM
102.3	40	EPDM
103.6	32	EPDM
103.6	40	EPDM
103.6	50	EPDM
125	74	EPDM
150	90	EPDM
150	110	EPDM
150	114	EPDM
200	160	EPDM

Rubber qualities

	Material	Color	Temperature range	Characteristics
	EPDM	black	-25 °C/+110 °C	Standard rubber for gas and water tight sealings (among others, for heating and water pipes etc.)
	Nitrile	blue	-25 °C/+110 °C	Resistant to oils and greases (among others for hydrocarbons)
	FS	red	-30 °C/+120 °C	Highly fire retardant rubber (among others, fire retardant, gas and water tight sealing of pipes)
	Silicone	brown	-60 °C/+200 °C	Resistant at high temperature differences (among others in cooling and steam vapour pipes, etc.)
	Viton	green	-25 °C/+200 °C	Resistant to chemicals (among others, in laboratories etc.)

HOW TO FIND THE RIGHT TYPE

5 steps to find the right PSI sealing plug

1. Find out which kind of wall penetration you have

Through which pipe (core hole) will a single cable or pipe be passed through?
The PSI sealing system offers you four options here:

- PVC sleeve
- Core drilled hole / Aluminium sleeve (DH-AP)
- DIN steel sleeve
- ASTM steel sleeve

2. Determine the inner diameter of the opening

The inner diameter of the opening needs to be determined accurately.
It corresponds to the outer diameter of the PSI sealing plug.
Example: PVC Ø 110 mm (with a wall thickness of 3.2 mm).
The inner diameter is 103.6 mm.
This equals the outer diameter of the suitable sealing plug.

3. Determine the outer diameter of the cable or pipe to be passed through

The outer diameter of the cable or pipe corresponds to the inner diameter of the seal. Round down the diameter to full millimetres, for example 20.6 mm = 20 mm. This will ensure the seal fits correctly. PSI Sealing Plug systems show a minimum to maximum opening range per diameter. These ranges show which is the smallest and which is the largest penetration. For example, with an inner diameter of 103.6 mm, the smallest penetration is 30 mm, whereby the largest cable or pipe which can be passed through has a diameter of 74 mm.

4. Determine the required rubber material

PSI Sealing Plugs are available in five different rubber qualities. For example, there is the EPDM rubber quality for a standard seal against gas and water. If chemical resistance is also required, then Viton rubber quality is used.

5. Total

The description of the PSI Sealing Plug consists of three elements:

01. Inner diameter of the core hole or sleeve = Dimension indicated on the plug
02. Outer diameter of the cable or pipe to be pulled through
03. Rubber material

Example: You have a pipe with an OD of 50 mm and a PVC sleeve (diam. 110 mm).
The sealing shall be gas and water tight: 103.6/50 EPDM

PSI COMPAKT SEALS AND WALL SLEEVES WITH FIXED/LOOSE FLANGE

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GENERAL INFORMATION

Constructions with Sealing Sheeting

For constructions with sealing sheeting, seals or wall sleeves with fixed/loose flanges are required in accordance with DIN 18195 T9. A difference is made between pressing water and non-pressing water.

PSI Products offers, depending on the application, the appropriate solution: Seal with fixed/loose flange, wall sleeve with fixed/loose flange or on wall-face sleeve with fixed/loose flange. As standard quality, these products are delivered in galvanized steel, but if requested, can also be supplied in S304 (V2A) or S316 (V4A) stainless steel.

For Subsequent Mounting for Constructions without Sealing Sheeting

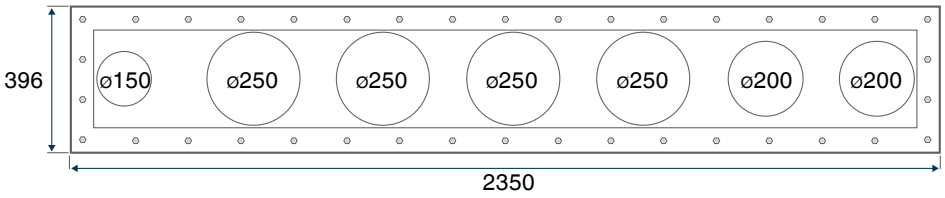
Wall penetrations with an eccentric position, wrongly dimensioned core drills/wall sleeves, or when the pipes or the building have subsided, always cause problems for seals. For constructions without sealing sheeting, PSI provides on-wall face sleeves. They can of course also be manufactured in split/open version for retrofit installation. As standard quality, these products are delivered in galvanized steel, at the request of the customer they can be supplied in S304 (V2A) or S316 (V4A) stainless steel.

Wall sleeve with fixed/loose flange

On wall-face sleeve

Seal with fixed/loose flange

Example of an individual solution for wall sleeves with fixed/loose flange based on a drawing:



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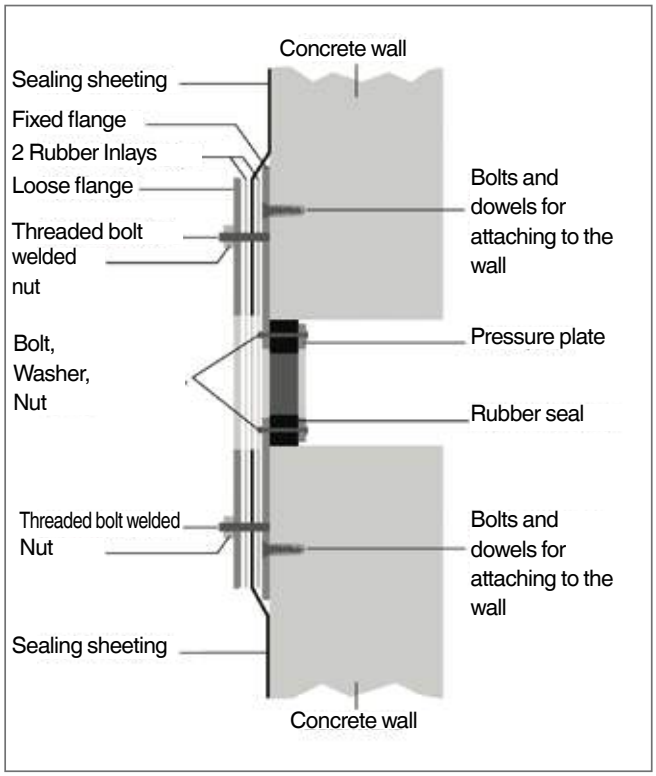
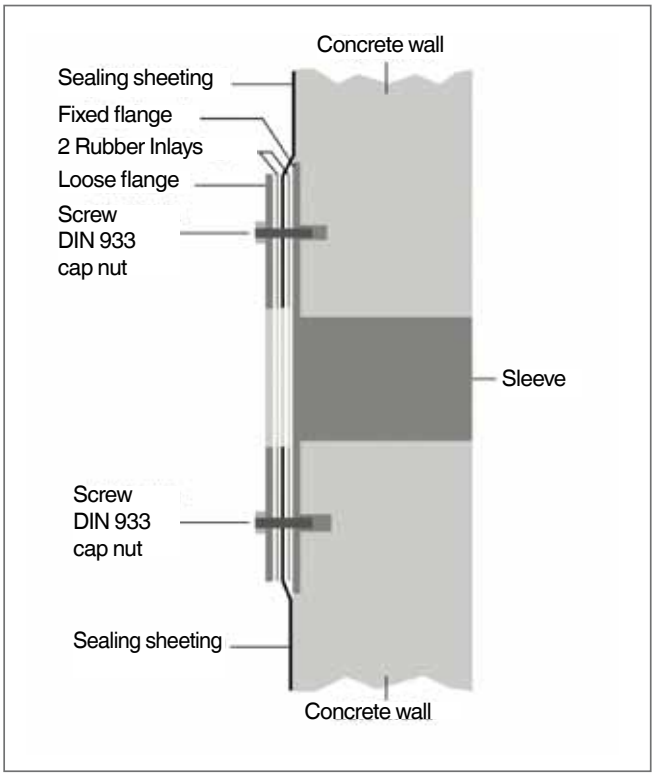
SECTIONAL VIEW

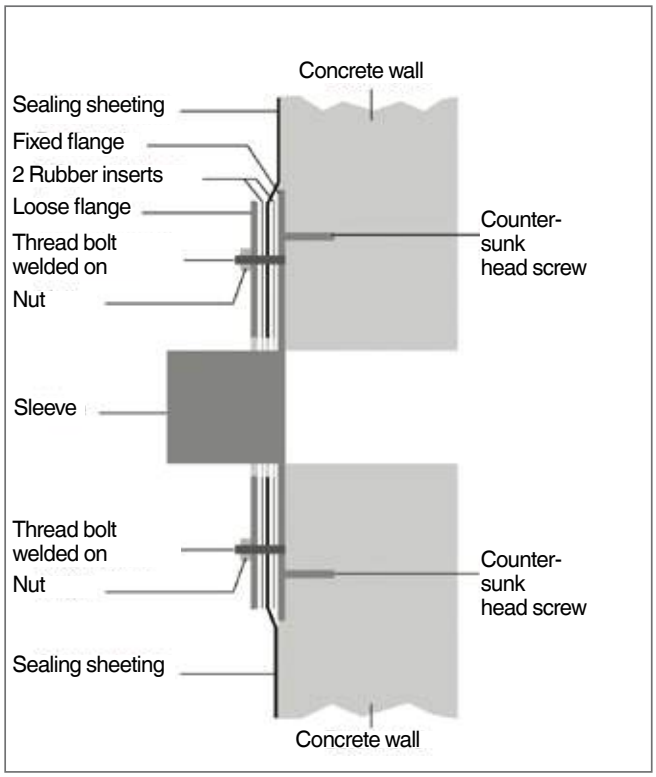
Seal with fixed/loose flange according to DIN 18195 T9 galvanized steel parts or stainless steel



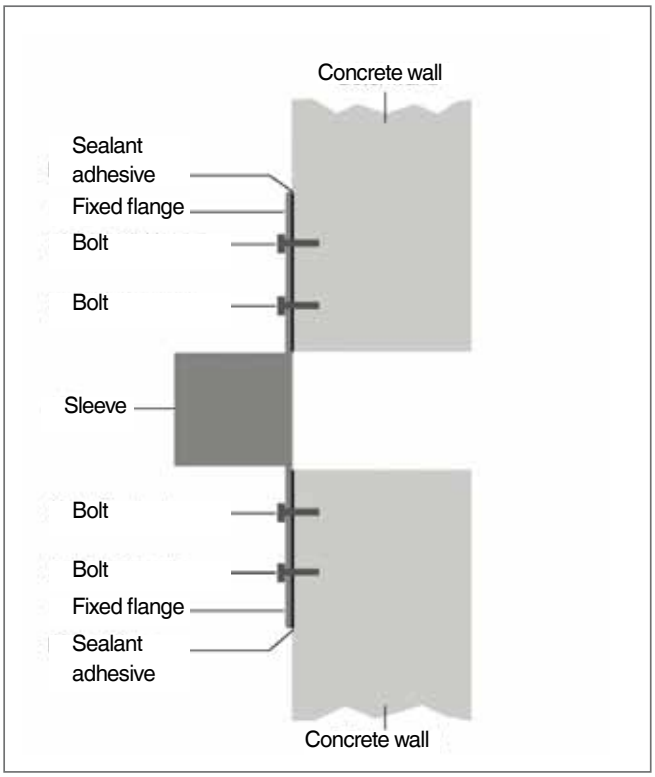
Wall sleeve with fixed/loose flange according to DIN 18195 T9 galvanized steel parts or stainless steel



On wall-face sleeve with fixed/loose flange according to DIN 18195 T9 galvanized alternatively stainless steel



On wall-face sleeve in closed and split version, galvanized or alternatively stainless steel



TECHNICAL DATA

Seals with fixed/loose flange
according to DIN 18195 T9 for constructions with sealing sheeting. Order appropriate inlays (elastomer inlay) between the flanges if required.

Seal with fixed/loose flange
galvanized against non-pressing water, alternatively stainless steel S304 (V2A)

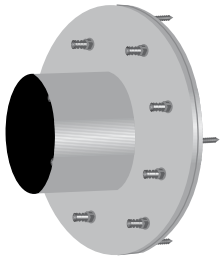
Outer diameter of pipe in mm	Core drilled hole or wall sleeve	Outer diameter fixed flange
20-40	80	224
15-65	100	244
55-78	125	269
46-110	150	294
88-144	200	344
135-187	250	396
178-226	300	446
224-282	350	496
270-330	400	548
300-400	500	648
400-500	600	748
500-600	700	848
600-700	800	948
700-800	900	1050
800-900	1000	1150

Seals with fixed/loose flange
according to DIN 18195 T9 for constructions with sealing sheeting. Order appropriate inlays (elastomer inlay) between the flanges if required.

Seals with fixed/loose flange
galvanized against pressing water, alternatively stainless steel S304 (V2A)

Outer diameter of pipe in mm	Core drilled hole or wall sleeve	Outer diameter fixed flange
20-40	80	404
15-65	100	424
55-78	125	449
46-110	150	474
88-144	200	524
135-187	250	576
178-226	300	626
224-282	350	676
270-330	400	728
300-400	500	828
400-500	600	928
500-600	700	1028
600-700	800	1128
700-800	900	1230
800-900	1000	1330

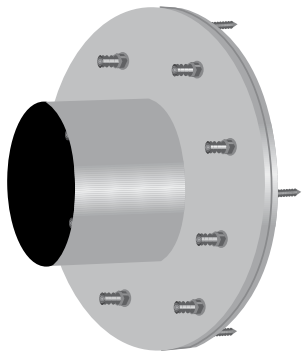
On wall-face sleeve with fixed/loose flange
according to DIN 18195 T9 for constructions with sealing sheeting. Order appropriate inlays (elastomer inlay) between the flanges if required.



On wall-face sleeve with fixed/loose flange
galvanized against non-pressing water

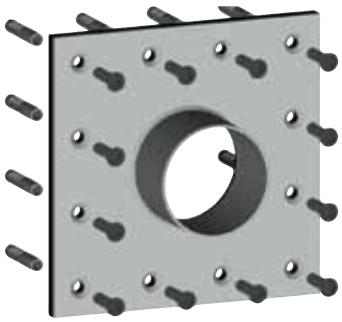
Outer diameter of pipe in mm	Inner diameter sleeve	Outer diameter fixed flange	Standard lengths of wall sleeves
20-40	80	224	100
15-65	100	244	
55-78	125	269	
46-110	150	294	
88-160	200	344	
135-210	250	396	
178-226	300	446	
224-282	350	496	
270-330	400	548	
300-400	500	648	
400-500	600	748	
500-600	700	848	
600-700	800	948	
700-800	900	1050	
800-900	1000	1150	

TECHNICAL DATA



On wall-face sleeve with fixed/loose flange
galvanized against pressing water

Outer diameter of pipe in mm	Inner diameter sleeve	Outer diameter fixed flange	Standard lengths of wall sleeves
20-40	80	404	100
15-65	100	424	
55-78	125	449	
46-110	150	474	
88-160	200	524	
135-210	250	576	
178-226	300	626	
224-282	350	676	
270-330	400	728	
300-400	500	828	
400-500	600	928	
500-600	700	1028	
600-700	800	1128	
700-800	900	1230	
800-900	1000	1330	

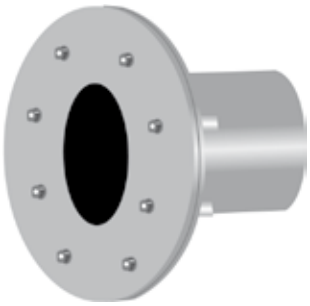


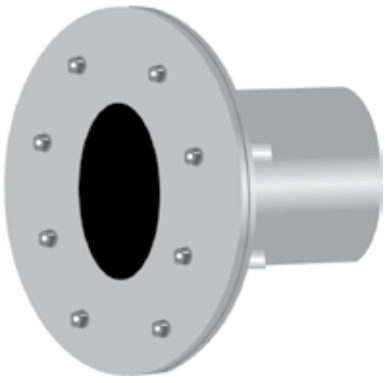
On wall-face sleeves
galvanized in closed and split version, alternatively stainless steel S304 (V2A). For installation in front of wall or beneath a ceiling including sealing compound and fastening material

Outer diameter of pipe in mm	Inner diameter sleeve	Edge length of fixed flange	Length of Wall sleeve
20-40	80	280	60 mm
15-65	100	300	
55-78	125	325	
46-110	150	350	
88-160	200	400	
135-210	250	450	
178-226	300	500	
224-282	350	550	
270-330	400	600	
300-400	500	700	
400-500	600	800	
500-600	700	900	
600-700	800	1000	100 mm
700-800	900	1100	
800-900	1000	1200	

TECHNICAL DATA

Wall sleeve with fixed/loose flange
according to DIN 18195 T9 for constructions with sealing sheeting.
Order appropriate inlays* (elastomer inlay) between the flanges if required.





Other sizes and versions in stainless steel S304 (V2A) or alternatively S316 (V4A) upon request.

*PSI inlays are elastomer gaskets which are inserted between fixed and loose flanges. With sealing sheeting made of very thin or very hard material, the seal with a steel surface is inadequate. This means that an elastomer gasket is required here. The following sealing sheeting materials require an inlay according to the standard: ECB, PIB, PVC-P, EPDM, EVA. We recommend inserting inlays also for sealing sheeting made of PE, PE-HD and PVC.

Different versions of mounting the wall sleeves with fixed/loose flange:

· Anchoring using concrete anchors or cap nuts to embed in concrete
· Anchoring using dowels for subsequent installation in a core drilled hole

Please specify accordingly when making an inquiry or placing an order.

Wall sleeves with fixed/loose flange
galvanized against non-pressing water, alternatively stainless steel S304 (V2A)

Outer diameter of pipe in mm	Inner diameter sleeve	Outer diameter fixed flange	Standard lengths of wall sleeves
20-40	80	224	200 250 300 350 400 500
15-65	100	244	
55-78	125	269	
46-110	150	294	
88-160	200	344	
135-210	250	396	
178-226	300	446	
224-282	350	496	
270-330	400	548	
300-400	500	648	
400-500	600	748	
500-600	700	848	
600-700	800	948	
700-800	900	1050	
800-900	1000	1150	

Wall sleeves with fixed/loose flange
galvanized against pressing water, alternatively stainless steel S304 (V2A)

Outer diameter pipe in mm	Inner diameter sleeve	Outer diameter fixed flange	Standard lengths of wall sleeves
20-40	80	404	200 250 300 350 400 500
15-65	100	424	
55-78	125	449	
46-110	150	474	
88-160	200	524	
135-210	250	576	
178-226	300	626	
224-282	350	676	
270-330	400	728	
300-400	500	828	
400-500	600	928	
500-600	700	1028	
600-700	800	1128	
700-800	900	1230	
800-900	1000	1330	

WALL PENETRATION SYSTEM COMPAKT SOLUTION®

STANDARD / WC (WATER CHAMBER)

- COMPREHENSIVE PRESSURE TIGHT WALL PENETRATION SYSTEM
- DESIGNED FOR DRINKING WATER TANKS
- INTEGRATED SHEAR-PROTECTION

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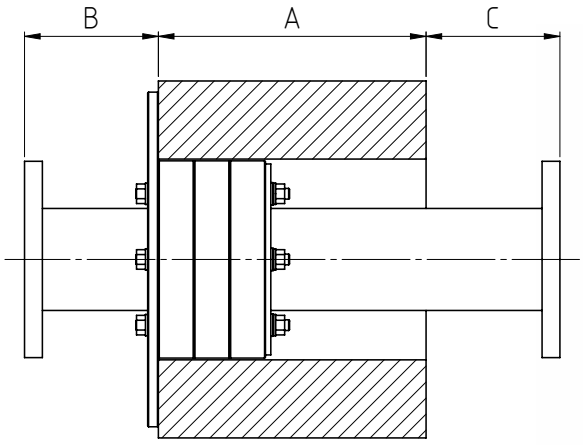
WALL PENETRATION SYSTEM COMPAKT SOLUTION©
STANDARD / WC (WATER CHAMBER)

• APPLICATION

COMPAKT SOLUTION STANDARD

Media carrying pressure tight wall penetration system specially designed for drinking water tanks.

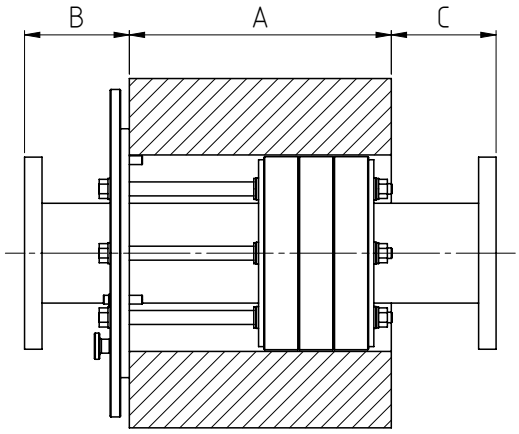


Building-inside

Building-outside

COMPAKT SOLUTION WC (WATERCHAMBER)

Media carrying pressure tight wall penetration system specially designed for drinking water tanks.
Suitable for single and double walls.



Machine Room

Water Chamber

More content can be found at
www.psi-products.com

• ADVANTAGES

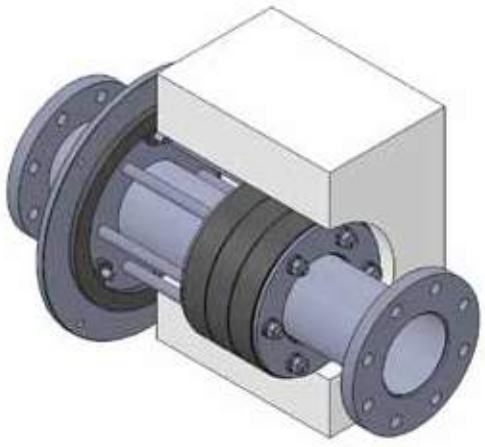
- Seals pressure tight up to 5 bar
- No drinking water approved core drill coating required
- 3x40 mm potable water Compakt Seal
- DVGW W 270 certified
- The forces acting on the media pipe are redirected into the wall by the fixture plate, thus decoupling the seal and avoiding any movement
- Fixture plate provides a clean finish to the wall.
- The integrated center bolts ensure a concentric installation
- Integrated pipe support (shear-protection)
- Re-adjustable sealing elements

Additionally with Type WC:
Flush installation inside the water chamber. No creation of dead space, thus microbacterially uncritical. Subsequent tightening of the seal from outside the water chamber is possible at any time

Optional: Lapped pipe end on one side and split loose-type flange available

• TECHNICAL DATA

- Material 1.4301 (S304) or 1.4571(S316)
- Other materials on request ISO Pipe Series 1
- Diameters from DN 65 to DN 500
- Pressure classes from PN 6 to PN 25
- Elastomer EPDM, DVGW W 270 certified
- Seals pressure tight up to 5 bar (MFPA tested)



SELECTION QUESTIONNAIRE

1) **Use as building wall penetration: Model Compakt Solution Standard**
Use in a water chamber: Model Compakt Solution WC (Water Chamber)

Model _____

2) **Material: 1.4301 (A2) or 1.4571 (A4) Selection:** _____

3) **Inner diameter core drilling / wall collar:** _____ **mm**

4) **Nominal width:** _____ **DN size**

5) **Pressure rate:** _____ **PN**

6) **Operating pressure:** _____ **bar**

7) **Wall thickness:** _____ **mm**

8) **Component length**
(min. Wall thickness + 2x stick out according to customer mm): _____ **mm**
Recommended stick out (Measure B / C):

- up to including DN150: min. 150 mm
- up to including DN 300 min. 250 mm
- up to including DN 500 min. 300 mm

9) **Concrete grade:** _____

10) **Occuring forces (Max. male pulling on the wall duct):** _____

11) **Flange type: smooth flange, slip-on flange, split loose flange, etc.:**

Inside / Machine Room _____

Outside / Water Chamber_____

PSI WALL SLEEVES

PVC
WALL SLEEVES

STEEL
WALL SLEEVES

FIBRE CEMENT
WALL SLEEVES

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GENERAL INFORMATION

An economic method to seal hydrostatically

When penetrating steel, cast iron, copper or plastic pipes through walls, ceilings or floors, PSI wall sleeves are the best method to create a perfect hole inside the wall and provide best conditions for a seal to work.

Wherever the Link-Seal® modular seal is used to seal the annular space between the carrier pipe and the wall penetration, it makes sense to use PSI wall sleeve.

PSI wall sleeves are made of welded or seamless steel pipes. They are galvanized to protect them against corrosion. Other corrosion protection measures are available upon request (e.g. electrostatic powder coating).

The standard PSI sleeve is supplied with a welded-on anchor flange.It acts as an annular water-stop plate which provides a 100 % seal around the outer diameter and also serves as a wall anchor.

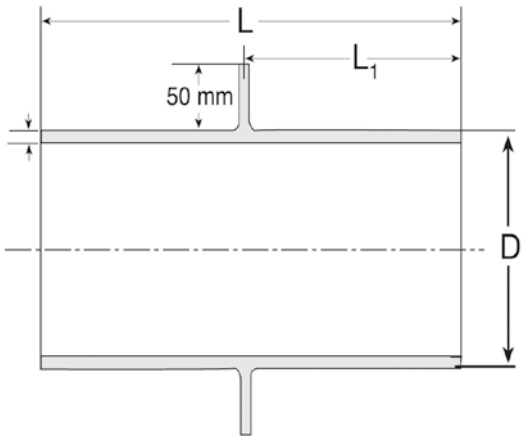
Important ordering information

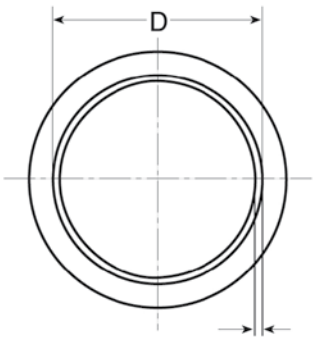
Wall sleeve diameters need to be selected to accurately fit the respective pipe and corresponding Original PSI Link-Seal® modular seal. When ordering PSI wall sleeves, please specify dimensions for D, L, L1, the outer diameter of the carrier pipe to be passed through, and the desired Original Link-Seal® modular seal type.

Example: PSI wall sleeve
168.3 x 4 (D = Sleeve outer diameter)
300 (L = Length of sleeve in mm)
150 (L1 = Arrangement of flange)

Order description: PSI wall sleeve, 168.3 x 4 - 300 - 150

You will find the available dimension in the price list, split version upon request.





More content can be found at
www.psi-products.com

GENERAL INFORMATION

An economic and secure method to seal hydrostatically

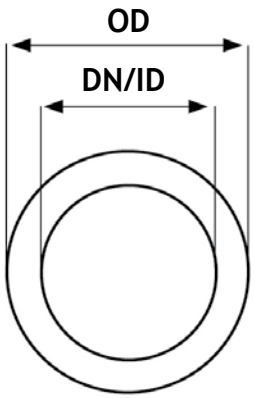
PSI asbestos-free fibre cement wall sleeves are - in connection with PSI Link-Seal® or Compakt seals - the right accessory whenever steel, cast iron, copper or plastic pipes pass through walls, ceiling or floors.

Material
Asbestos-free fibre cement, consisting of cement and fibreglass, color light grey. Material class A1 according to DIN EN13501-1.

Specifications
Corrosion resistant, leak-proof against pressing water, electrically insulating, non-inflammable, high stability, good connection with concrete, can be coated, circumferential grooves, smooth inner walls, high dimensional stability, split version available for retrofitting, all lengths from DN 80-800 sizes up to max. 1,200 mm available.

The sleeve can either be set in concrete, walled in or be plastered into a wall penetration to be water-tight. The circumferential grooves on the outside provide a water tight and homogeneous bonding with the building. For usage in a concrete pool or container, the wall sleeve can be backed with a coating of the concrete construction. Function and compound of the wall sleeve with the concrete is certified by the MFPA-Leipzig up to 5 bar.

In connection with our original PSI Link-Seal® or Compakt seals, an absolutely pressure and water tight sealing of the annular space between fibre cement wall sleeve and pipe will be achieved.



Technical data

Dimensions			
Size	Inner diameter (ID in mm)		Outer diameter (OD in mm)
	Nominal size	Tolerance	
DN 80	80	+2/-1	120
DN 100	100	+2/-1	140
DN 125	125	+2/-1	165
DN 150	150	+2/-1	190
DN 200	201	+2/-1	250
DN 250	250	+2/-1	300
DN 300	300	+2/-1	350
DN 350	350	+2/-1	400
DN 400	400	+2/-1	460
DN 450	450	+2/-1	510
DN 500	500	+2/-1	570
DN 600	600	+3/-2	670
DN 700	700	+3/-2	780
DN 800	800	+3/-2	880

Order description

Fibre-cement wall sleeve, DN size, length.

Version: closed/split. For split version additional putty is necessary. Available as a set with spacer, container at 1kg.

Consumption about 125 g. per 100 mm sleeve length.

Subject to technical changes, further sizes upon request.

TECHNICAL DATA

PVC wall sleeve suitable for concreting or bricking in. They are supplied in standard lengths of 40 mm and can be easily trimmed to the wall thickness on site.

Descriptions	Inner diameter in mm	Outer diameter in mm	Length* in mm	Art. No.
Wall sleeve PVC	50	54	400	4-014-22700
	60	65	400	4-014-22701
	70	75	400	4-014-22702
	80	85	400	4-014-22703
	90	95	400	4-014-22704
	100	106	400	4-014-22705
	125	131	400	4-014-22718
	150	160	400	4-014-22707
	200	210	400	4-014-22712
Reinforced wall thickness	82	90	400	4-014-22708
	100	110	400	4-014-22709
	250	280	400	4-014-22711
	Inner diameter in mm	**Inner diameter socket in mm**	**Length in mm**	**Art. No.**
 Wall sleeve with shaped socket and lip seal	100	110	500	4-014-22699
	100	110	800	4-014-22741
	100	110	1000	4-014-22745
	100	110	110	4-014-23000
	150	160	110	4-014-23001
	100	110	250	4-014-23002
	125	131	250	4-014-23003
	150	160	250	4-014-23004
	100	110	300	4-014-23005
	125	131	300	4-014-23006
	150	160	300	4-014-23007

*Other lengths upon request

Accessories

Casing support made of PE-LD	Ø ID PVC wall sleeve in mm	Art. No.
	60	on demand
	80	on demand
	100	4-014-22713
	125	4-014-22714
	150	4-014-22715
	200	4-014-22716
	250	4-014-22717

Further sizes upon request

PSI CASING SPACERS

INSULATORS FOR PIPE-IN-PIPE SYSTEMS

WWW.PSI-PRODUCTS.COM

GENERAL INFORMATION

Polypropylen casing spacers are universally applicable in the installation of pipelines when a media pipe runs through a casing pipe.

Plastic insulators provide many advantages for these applications:

- Easy penetration of carrier pipe. The insulator's friction coefficient is reduced to a minimum because they are made of plastic.
- The minimized friction prevents the media pipe from taking damage inside the casing pipe.
- A wide range of skid heights ensures concentricity of the media pipe inside the casing pipe.
- Excellent insulation characteristics. All requirements of cathodic pipe protection are met.

Plastic insulators are suitable for all pipe diameters from 25 mm upwards and many skid heights are available to suit specific requirements.

More content can be found at
www.psi-products.com

TECHNICAL DATA

Materials

Polypropylene has a good friction coefficient due to its waxy surface with good sliding properties. The sliding friction coefficient is approx. 0.2 for PP on steel. In comparison to this, steel on steel is approx. 0.5. Therefore the abrasion is reduced to a minimum. The material is strong and yet flexible and is therefore resistant to stress cracking. Flexibility of the body, stability of the skid form and excellent dielectric insulation are some more of the good characteristics of this material.

Installation notes

Plastic insulator rings are normally installed with the following spacing in between the rings:

- Pipe diameter up to 300 mm in 2.5 m support distance
- Pipe diameter 301 - 600 mm in 2.0 m support distance
- Pipe diameter of more than 600 mm in 1.5 m support distance

In particular cases, the ring distance may be modified after having examined the installation situation.

Load capacity

Type	max. static load per ring
PA/PE 0.75 - PA/PE 1.5	85 kg
PA/PE 2.0 - PA/PE 3.0	100 kg
PA/PE 4.0	200 kg
PA/PE 6.0 - PA/PE 12.0	250 kg
AZ/AC 1 / AZ/AC 2	200 kg
GKO-mK	250 kg
MA	650 kg
RGV	1.000 kg
GKO-gl	4.000 kg
GKO-gs	14.200 kg

The load capacity data is applicable for a skid height of up to 75 mm. For skid heights above 75 mm, these values need to be multiplied with a factor of 0.75.

All values are calculated for standard pipes. To determine the correct distance for your individual application many other factors have to be taken into consoderation, such as carrier pipe wall thickness, pipe length and type of media. For further assistance please get in contact with us.

If you cannot determine the type according to our tables please specify:

- Outer diameter of carrier pipe (inclusive coating) in mm
- Inner diameter of casing pipe

GENERAL INFORMATION

Outer diameter of Pipe from 25 mm to 336 mm

Type PA/PE insulators are available for outer diameter of Pipes from 25 mm to 336 mm. PA/PE consist of two half shells. The nuts and bolts required for assembly are included in every delivery.

The type code indicates the outer diameter of carrier pipe in inch and the skid height in mm (e.g. PA/PE 4-38 = carrier pipe 4", skid height 38 mm).

The skid height is calculated from the difference in diameter of carrier pipe and casing pipe. It is important to consider the actual dimensions, including coatings and sockets, rather than the nominal sizes.

Example:

- PE-coated carrier pipe with PE coating DN 100
- Outer diameter (117.9 x 5.2 mm)
- Steel casing DN 200 (219.1 x 6.3)
- Inner diameter 206.5 mm minus outer diameter of carrier pipe 117.9 mm = 88.6
- 88,6 : 2 = 44.3 mm skid height
- Suitable type: PA/PE 4-38

This means the suitable type of insulator is PA/PE 4-38.

After determining the skid height, the next lower height is selected from the table (e.g. 44.3 mm, ideal skid height = 38 mm). The segments can be assembled with the corrosion protected steel bolts DIN 912 and nuts DIN 562 included.
Up to type PA/PE 4 the insulator rings have 4 skids; from type PA/PE 6 up to 6 skids are provided. The following table gives the technical details on available sizes, skid heights of the various types and carrier pipe diameters.

More content can be found at
www.psi-products.com

SELECTION TABLE

Nominal width		Outer diameter of Pipe in mm		Type PA/PE	Skid height in mm including basic element	Width mm	Number of segments	Number of skids	Bolts DIN 912 Qty/Size	Art. No.
mm	inch	min.	max.							
20	0.75	25.0	32.0	PA/PE 0.75-12.5	12.5	80	2	4	4 M 4 x 30	3-001-02400
				PA/PE 0.75-21	21.0					3-001-01001
				PA/PE 0.75-25	25.0					3-001-01002
				PA/PE 0.75-36	36.0					3-001-01003
25	1.0	32.0	40.0	PA/PE 1-13	13.0	80	2	4	4 M 4 x 30	3-001-01004
				PA/PE 1-19	19.0					3-001-01005
				PA/PE 1-25	25.0					3-001-01006
				PA/PE 1-34	34.0					3-001-01007
32	1.25	42.0	48.3	PA/PE 1.25-11	11.0	80	2	4	4 M 4 x 30	3-001-01008
				PA/PE 1.25-17.6	17.5					3-001-01009
				PA/PE 1.25-29	29.0					3-001-01010
				PA/PE 1.25-40	40.0					3-001-01011
40	1.5	48.0	54.0	PA/PE 1.5-11	11.0	80	2	4	4 M 4 x 30	3-001-01069
				PA/PE 1.5-14.5	14.5					3-001-01012
				PA/PE 1.5-26	26.0					3-001-01013
				PA/PE 1.5-36	36.0					3-001-01014
				PA/PE 1.5-48	48.0					3-001-01015
				PA/PE 1.5-70	70.0					3-001-01039
50	2.0	60.0	67.0[1)]	PA/PE 2-16	16.0	100	2	4	4 M 6 x 40	3-001-01016
				PA/PE 2-25	25.0					3-001-01017
				PA/PE 2-36	36.0					3-001-01018
				PA/PE 2-48	48.0					3-001-01019
				PA/PE 2-55	55.0					3-001-01085
				PA/PE 2-70	70.0					3-001-01086
				PA/PE 2-90	90.0					3-001-01087
				PA/PE 2-110	110.0					3-001-01088
65	2.5	76.1	82.5[2)]	PA/PE 2.5-16	16.0	100	2	4	4 M 6 x 40	3-001-01020
				PA/PE 2.5-25	25.0					3-001-01021
				PA/PE 2.5-36	36.0					3-001-01022
				PA/PE 2.5-48	48.0					3-001-01023
				PA/PE 2.5-55	55.0					3-001-01095
				PA/PE 2.5-70	70.0					3-001-01096
				PA/PE 2.5-90	90.0					3-001-01097
				PA/PE 2.5-105	105.0					3-001-01098
80	3.0	88.9	96.0[3)]	PA/PE 3-16	16.0	100	2	4	4 M 6 x 40	3-001-01024
				PA/PE 3-25	25.0					3-001-01025
				PA/PE 3-36	36.0					3-001-01026
				PA/PE 3-48	48.0					3-001-01027
				PA/PE 3-55	55.0					3-001-01100
				PA/PE 3-70	70.0					3-001-01101
				PA/PE 3-90	90.0					3-001-01102
100	4.0	106.6	120.0[4)]	PA/PE 4-16	16.0	130	2	4	4 M 6 x 55	3-001-01028
				PA/PE 4-25	25.0					3-001-01029
				PA/PE 4-38	38.0					3-001-01030
				PA/PE 4-55	55.0					3-001-01031
				PA/PE 4-75	75.0					3-001-01032
				PA/PE 4-90	90.0					3-001-01033
125		See list for AZ/AC Ø 125 mm Type AZ/AC 1								

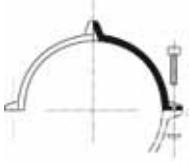
[1)] up to max. outer diameter of Pipe 75.0 mm with 4x M 6 x 55 bolts
[2)] up to max. outer diameter of Pipe 88.9 mm with 4x M 6 x 55 bolts
[3)] up to max. outer diameter of Pipe 101.6 mm with 4x M 6 x 55 bolts
[4)] up to max. outer diameter of Pipe 127.0 mm with 4x M 6 x 70 bolts

SELECTION TABLE

Nominal width		Outer diameter of Pipe in mm		Type PA/PE	Skid height in mm including basic element	Width mm	Number of segments	Number of skids	Bolts DIN 912 Qty/Size	Art. No.
mm	inch	min.	max.							
150	6	160.0	178.0	PA/PE 6-16	16	130	2	6	4 M 6 x 70	3-001-01036
				PA/PE 6-25	25					3-001-01037
				PA/PE 6-36	36					3-001-01038
				PA/PE 6-55	55					3-001-01040
				PA/PE 6-75*	75			4		3-001-01041
				PA/PE 6-90*	90					3-001-01042
200		193.7	210.0	PA/PE 7-16	16	175	2	6	4 M 6 x 70	3-001-01110
				PA/PE 7-25	25					3-001-01111
				PA/PE 7-36	36					3-001-01112
				PA/PE 7-55	55					3-001-01113
				PA/PE 7-75	75					3-001-01114
				PA/PE 7-90	90					3-001-01115
				PA/PE 7-110	110					3-001-01116
200	8	221.0	239.0	PA/PE 8-16	16	130	2	6	4 M 6 x 70	3-001-01043
				PA/PE 8-25	25					3-001-01044
				PA/PE 8-36	36					3-001-01045
				PA/PE 8-55*	55			6		3-001-01046
				PA/PE 8-75*	75					3-001-01047
				PA/PE 8-90*	90					3-001-01048
250		244.5	260.0	PA/PE 9-16	16	175	2	6	4 M 6 x 70	3-001-01120
				PA/PE 9-25	25					3-001-01121
				PA/PE 9-36	36					3-001-01122
				PA/PE 9-55	55					3-001-01123
				PA/PE 9-75	75					3-001-01124
				PA/PE 9-90	90					3-001-01125
				PA/PE 9-110	110					3-001-01126
250	10	276.0	295.0	PA/PE 10-16	16	130	2	6	4 M 6 x 70	3-001-01049
				PA/PE 10-25	25					3-001-01050
				PA/PE 10-36	36					3-001-01051
				PA/PE 10-55*	55			4		3-001-01052
				PA/PE 10-75*	75					3-001-01053
				PA/PE 10-90*	90					3-001-01054
315		298.5	315.0	PA/PE 11-16	16	175	2	6	4 M 6 x 70	3-001-01130
				PA/PE 11-25	25					3-001-01131
				PA/PE 11-36	36					3-001-01132
				PA/PE 11-55	55					3-001-01133
				PA/PE 11-75	75					3-001-01134
				PA/PE 11-90	90					3-001-01135
				PA/PE 11-110	110					3-001-01136
300	12	326.0	336.0	PA/PE 12-16	16	130	2	6	4 M 6 x 70	3-001-01055
				PA/PE 12-25	25					3-001-01056
				PA/PE 12-36	36					3-001-01057
				PA/PE 12-55*	55			4		3-001-01058
				PA/PE 12-75*	75					3-001-01059
				PA/PE 12-90*	90					3-001-01060

Shear-secure-tape against slipping of spacers, see next page

* Plug-in skid



Sectional drawing of segment.
PA/PE 0.75 to PA/PE 4
Ring with a total of 4 skids

Sectional drawing of segment.
PA/PE 6 to PA/PE 12
Ring with a total of 6 skids

ACCESSORIES

Accessory Shear-Secure-Tape	
	Art. No. 4-002-S20088 = width 50 mm, length 15 m
	Art. No. 4-002-S20089 = width 100 mm, length 15 m

Material: PE-tape with butyl rubber mixture

Application:

On a smooth pipe surface (e.g. PE, PVC, steel/cast or PE-coated or stoneware) we recommend wrapping shear-secure-tape where there is contact between the pipe and insulator to guarantee optimum security against slipping.

GENERAL INFORMATION

Outer diameter of pipe from 98 mm to 385 mm

AZ/AC insulator rings are used for pipe ODs from 98 to 385 mm and consist of several segments. This type of Insulator is made out of several segments. The number of segments depends on the carrier pipe's outer diameter. The nuts and bolts required for assembly are included.

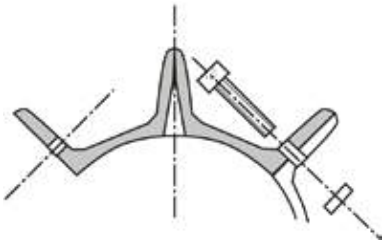
The universal applicability of type AZ/AC provides two special advantages:

- variable ring diameter, which is especially important for thick-walled pipes whose outer diameter substantially deviates from the nominal size (e.g. AZ/AC pressure pipe DN 16, vitrified clay pipes);
- only two segment sizes are required to assemble DN 100 to DN 350 insulator rings - a decisive edge in stock-keeping.

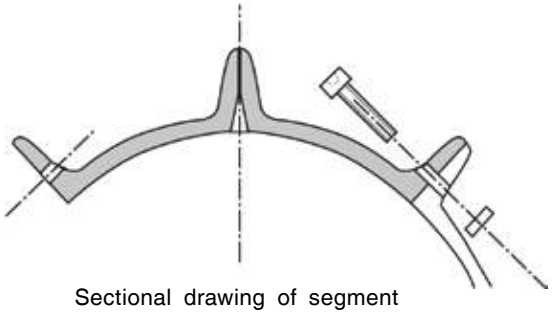
The skid height is calculated from the difference in diameter of the carrier pipe and the casing pipe. It is important to consider the actual dimensions, including coatings and sockets, rather than the nominal sizes. For an example calculation refer to type PA/PE.

The segments can be assembled with the corrosion protected steel bolts according to DIN 912 and nuts according to DIN 562.

The following table gives the technical details on available sizes and skid heights of the various types and carrier pipe diameters.



Sectional drawing of AZ/AC 1



Sectional drawing of segment AZ/AC 2

More content can be found at
www.psi-products.com

SELECTION TABLE

Type	Skid height	Width	Number of bolts per segment	Art. No.
AZ/AC-1	16	130	2 M6 x70	3-002-00085
AZ/AC-1	25	130	2 M6 x70	3-002-00086
AZ/AC-1	36	130	2 M6 x70	3-002-00087
AZ/AC-1	55	130	2 M6 x70	3-002-00088
AZ/AC-1	75	130	2 M6 x70	3-002-00089
AZ/AC-1	90	130	2 M6 x70	3-002-00083
AZ/AC-1	110	130	2 M6 x70	3-002-00097
AZ/AC-2	16	130	2 M6 x70	3-002-00090
AZ/AC-2	25	130	2 M6 x70	3-002-00091
AZ/AC-2	36	130	2 M6 x70	3-002-00092
AZ/AC-2	55	130	2 M6 x70	3-002-00093
AZ/AC-2	75	130	2 M6 x70	3-002-00094
AZ/AC-2	90	130	2 M6 x70	3-002-00095
AZ/AC-2	110	130	2 M6 x70	3-002-00096

Shear-secure-tape see below

Outer diameter of carrier pipe in mm		Number of segments per ring		Bolts Qty/Size
min.	max.	AZ/AC 1	AZ/AC 2	
98	130	3		6 M 6x70
130	172	4		8 M 6x70
173	202	5		10 M 6x70
203	230		3	6 M 6x70
234	268	1	3	8 M 6x70
269	310		4	8 M 6x70
302	350	1	4	10 M 6x70
350	385		5	10 M 6x70

Accessory Shear-Secure-Tape	
	Art. No. 4-002-S20088 = width 50 mm, length 15 m
	Art. No. 4-002-S20089 = width 100 mm, length 15 m

Material: PE-tape with butyl rubber mixture

Application:

On smooth pipe surface which are in contact with the spacers (e.g. PE, PVC, steel/cast on PE-coated or stoneware) wrap a shear-secure-tape to guarantee an optimum security against slipping.

GENERAL INFORMATION

GKO-mk is the latest PSI casing spacer generation. Due to the bolt less wedge system the installation can be achieved quickly and easily . The flexible design ensures suitability for all pipe diameters > 150 mm. If required, an additional support for cable ducts can be installed on the segments.

- Flexible construction
- Non-metallic connection for simple and fast installation
- New wedge connection technology

PSI shear-secure-tape or similar products can be used to improve adhesion on smooth surfaces, or to balance pipe tolerances.

Subject to technical changes.

More content can be found at
www.psi-products.com

SELECTION TABLE

Type	Skid height	Width	Art. No.
GKO mk	25	130	3-002-04101
GKO mk	36	130	3-002-04102
GKO mk	50	130	3-002-04103
GKO mk	65	130	3-002-04104
GKO mk	75	130	3-002-04105
GKO mk	90	130	3-002-04106
GKO mk	110	130	3-002-04107
GKO mk	125	130	3-002-04108

Shear-secure-tape see below

Outer diameter of carrier pipe in mm		Number of segments per ring
min.	max.	
150	180	4
181	230	5
231	280	6
281*	330*	7
331*	380*	8
381*	430*	9

* from outer diameter of carrier pipe 281 mm only still suitable for plastic pipes

Accessory Shear-Secure-Tape	
	Art. No. 4-002-S20088 = width 50 mm, length 15 m
	Art. No. 4-002-S20089 = width 100 mm, length 15 m

Material: PE-tape with butyl rubber mixture

Application:

On smooth pipe surfaces which get in contact with the spacers (e.g. PE, PVC, steel/cast on PE-coated or stoneware) wrap a shear-secure tape to guarantee optimum security against slipping.

GENERAL INFORMATION

Outer diameter of Pipe from 400 mm

Starting with a pipe OD of 402 mm, MA insulator rings, consisting of two segment sizes (MA and MA 2) and various skid heights, are used to suit large pipe ODs.

The special advantage of these insulators is their universal applicability. The following rule is used to determine the composition of suitable insulator rings:

For every 100 mm of Outer diameter of Pipe 1 MA segment
For every 50 mm of Outer diameter of Pipe 1 MA 2 segment

Example:

Outer diameter of carrier pipe 559 = 5 MA segments
+ 1 MA 2 segment.

The skid height of the segments is calculated from the difference in diameter of the carrier pipe and the casing pipe. For an example calculation refer to type PA/PE.

The segments can be assembled with the included corrosion protected steel bolts according to DIN 912 and nuts according to DIN 562.

The following table gives the technical details on available sizes, skid heights of the various types and carrier pipe diameters.

More content can be found at
www.psi-products.com

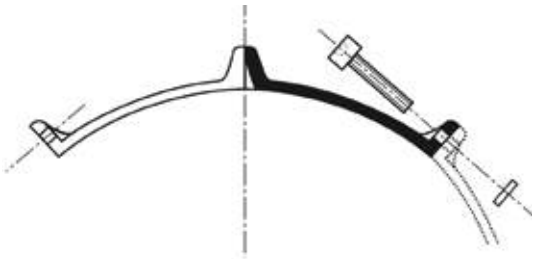
SELECTION TABLE

Type	Skid height in mm	Width in mm	Number of skids	Number of bolts per segment	Art. No.
MA 25	25	160	3	2 M 8 x 70	3-002-00050
MA 36	36	160	3	2 M 8 x 70	3-002-00051
MA 50	50	160	3	2 M 8 x 70	3-002-00053
MA 65	65	160	3	2 M 8 x 70	3-002-00064
MA 75	75	160	3	2 M 8 x 70	3-002-00054
MA 2/25	25	160	2	2 M 8 x 70	3-002-00055
MA 2/36	36	160	2	2 M 8 x 70	3-002-00056
MA 2/50	50	160	2	2 M 8 x 70	3-002-00057
MA 2/65	65	160	2	2 M 8 x 70	3-002-00063
MA 2/75	75	160	2	2 M 8 x 70	3-002-00058
MA 2 as half a segment					

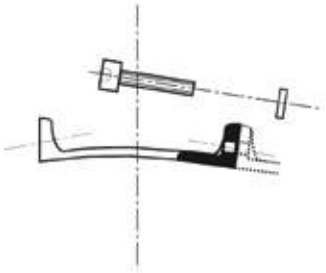
Shear-secure-tape against slipping see below

Nominal width		Outer diameter of carrier pipe in mm		Number of segments per ring		Bolts Qty/size - length
DN	inch	min.	max.	MA	MA 2	
400	16	402	420	4		8 M 8 x 70
		420*	426*	4		6 M 8x70 + 2 M 8x90
		426*	432*	4		4 M 8x70 + 4 M 8x90
450	18	450	485	4	1	10 M 8x70
		485*	494*	4	1	8 M 8 + 2 M 8x90
500	20	500	530	5		10 M 8 x 70
		530*	544*	5		8 M 8 + 2 M 8x90
550	22	548	599	5	1	12 M 8 x 70
600	24	600	653	6		12 M 8 x 70
650	26	654	699	6	1	14 M 8 x 70
700	28	700	749	7		14 M 8 x 70
750	30	750	799	7	1	16 M 8 x 70
800	32	800	849	8		16 M 8 x 70
850	34	850	899	8	1	18 M 8 x 70
900	36	900	949	9		18 M 8 x 70
950	38	950	994	9	1	20 M 8 x 70
1000	40	995	1044	10		20 M 8 x 70
1050	42	1045	1097	10	1	22 M 8 x 70
1100	44	1098	1149	11		22 M 8 x 70
1150	46	1150	1199	11	1	24 M 8 x 70
1200	48	1200	1249	12		24 M 8 x 70

Caution: Install bolt length as specified for the corresponding segments.
For larger nominal diameter upon request.
* Please contact our inside sales department



Sectional drawing of MA segment



Sectional drawing of MA 2 segment

Accessory Shear-Secure-Tape	
	Art. No. 4-002-S20088 = width 50 mm, length 15 m
	Art. No. 4-002-S20089= width 100 mm, length 15 m

Material: PE-tape with butyl rubber mixture

Application:

On smooth pipe surfaces which are in contact with the spacers (e.g. PE, PVC, steel/cast on PE-coated or stoneware), wrap a shear-secure-tape to guarantee optimal security against slipping.

GENERAL INFORMATION

For high load capacity and pipe ODs starting from 500 mm.

RGV insulator rings are used for pipes with outer diameter > 500mm. They differ from MA types in having two reinforced load-carrying solid skids per segment. The fastening skids (36 mm high) are for connection only. To match the required outer diameter, RGV segments are combined with RGV 2 segments.

High static-load bearing capacity and versatility are the particular advantages of the RGV casing spacers. The following simple method is used to determine the composition of suitable insulator rings:

For every 100 mm outer diameter of pipe = 1 RGV segment
For every 50 mm outer diameter of pipe = 1 RGV half segment

Example:

outer diameter of carrier pipe 559 = 5 RGV segments
+ 1 RGV half segment.

The skid height of the segments is calculated from the difference in diameter of the carrier pipe and the casing pipe. For an example calculation refer to type PA/PE.

The segments can be assembled with the included corrosion protected steel bolts according to DIN 912 and nuts according to DIN 562.

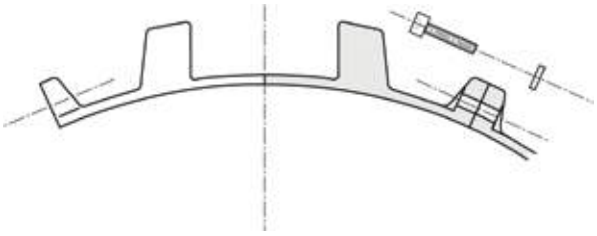
The following table gives the technical details on available sizes, skid heights of the various types and carrier pipe diameters.

More content can be found at
www.psi-products.com

SELECTION TABLE

Type	Skid height	Width	Number of bolts	Art. No.
RGV	50	210	2 M 8 x 70	3-002-00074
	75	210	2 M 8 x 70	3-002-00075
	90	210	2 M 8 x 70	3-002-00076
	125	210	2 M 8 x 70	3-002-00073
RGV half	50	210	2 M 8 x 70	3-002-00274
	75	210	2 M 8 x 70	3-002-00275
	90	210	2 M 8 x 70	3-002-00276
	125	210	2 M 8 x 70	3-002-00273

Shear-secure-tape see below



Sectional drawing of a RGV segment

Nominal width		Outer diameter of pipe in mm		Number of segments		Bolts Quantity/ Size
DN	inch	min.	max.	RGV	RGV half	
500	20	500	535	5		10 M 8 x 70
550	22	547	595	5	1	12 M 8 x 70
600	24	596	645	6		12 M 8 x 70
650	26	646	699	6	1	14 M 8 x 70
700	28	700	750	7		14 M 8 x 70
750	30	751	799	7	1	16 M 8 x 70
800	32	800	850	8		16 M 8 x 70
850	34	851	899	8	1	18 M 8 x 70
900	36	900	950	9		18 M 8 x 70
950	38	951	999	9	1	20 M 8 x 70
1000	40	1000	1075	10		20 M 8 x 70
1100	44	1090	1180	11		22 M 8 x 70
1200	48	1190	1290	12		24 M 8 x 70
1300	52	1291	1390	13		26 M 8 x 70
1400	56	1391	1490	14		28 M 8 x 70
1500	60	1491	1590	15		30 M 8 x 70
1600	64	1591	1690	16		32 M 8 x 70
1700	68	1691	1790	17		34 M 8 x 70
1800	72	1791	1890	18		36 M 8 x 70
1900	76	1891	1990	19		38 M 8 x 70
2000	80	1991	2100	20		40 M 8 x 70

Larger nominal diameters upon request.

Shear-Secure-Tape	
	Art. No. 4-002-S20088 = width 50 mm, length 15 m
	Art. No. 4-002-S20089= width 100 mm, length 15 m

Material: PE-tape with butyl rubber mixture

Application:

On smooth pipe surfaces which are in contact with the spacers (e.g. PE, PVC, steel/cast on PE-coated or stoneware), wrap a shear-secure-tape to guarantee optimal security against slipping.

GENERAL INFORMATION

Due to the bolt less wedge system and half segments GKO gh, the installation can be achieved easily and quickly. Owing to various diameter ranges and type GKO gh half segments, continuous use for an outer diameter exceeding 400 mm is possible. If required additional cable ducts can be attached with cable binders to the segment.

- Flexible construction
- Non-metallic connection for simple and fast installation
- New wedge connection technology

PSI shear-secure-tape or similar products can be used to improve adhesion on smooth surfaces or to balance pipe tolerances.

Subject to technical changes.

More content can be found at
www.psi-products.com

SELECTION TABLE

Type	Skid height	Width	Art. No.
GKO-gl	36	225	3-002-02200
	50	225	3-002-02201
	65	225	3-002-02202
	75	225	3-002-02203
	90	225	3-002-02204
	110	225	3-002-02205
	125	225	3-002-02206
GKO-gs	36	225	3-003-03207
	50	225	3-003-03208
	65	225	3-003-03209
	75	225	3-003-03210
	90	225	3-003-03211
	110	225	3-003-03212
	125	225	3-003-03213
GKO-gh	36	225	3-003-03200
	50	225	3-003-03201
	65	225	3-003-03202
	75	225	3-003-03203
	90	225	3-003-03204
	110	225	3-003-03205
	125	225	3-003-03206

Shear-secure-tape see below

Outer diameter of carrier pipe in mm		Number of segments	
min.	max.	GKO gl/gs	GKO gh
400	440	3	1
441	490	4	
491	540	4	1
541	625	5	
626	659	5	1
660	749	6	
750	854	7	
855	959	8	
960	1067	9	
1068	1199	10	
1200	1330	11	
1331	1440	12	
1441	1540	13	
1541	1660	14	
1661	1800	15	
1801	1910	16	
1911	2042	17	
2043	2150	18	
2151	2270	19	
2271	2400	20	
2401	2500	21	

Accessory Shear-Secure-Tape	
	Art. No. 4-002-S20088 = width 50 mm, length 15 m
	Art. No. 4-002-S20089 = width 100 mm, length 15 m

Material: PE-tape with butyl rubber mixture

GKO-gl

GKO-gs

GKO-gh

Application:

On smooth pipe surfaces which are in contact with the spacers (e.g. PE, PVC, steel/cast on PE-coated or stoneware), wrap a shear-secure-tape to guarantee optimum security against slipping.

SELECTION TABLE

Pipe DN			Outer diameter of pipe in mm		No. of elements		Position of wedges per Insulator element			
PE/PVC	Steel	GGG	from	to	Whole GKO	Half GKO	1	2	3	4
DN 400			397	402	3	1			3	1
	DN 400		406	411	3	1		1	3	
		DN 400	429	439	3	1	1	3		
DN 450			448	452	4				3	1
			456	462	4			1	3	
DN 500			498	504	4	1			2	3
	DN 500		508	513	4	1			4	1
		DN 500	532	542	4	1		3	2	
			538	542	5					5
			559	564	5				4	1
	DN 600		610	615	5		2	3		
DN 600			630	635	5	1			6	
		DN 600	635	645	5	1		1	5	
			660	665	6				3	3
	DN 700		711	716	6			5	1	
		DN 700	738	748	6		4	2		
			762	767	7				2	5
DN 800			796	802	7				7	
	DN 800		813	819	7			3	4	
		DN 800	842	852	7		1	6		
			864	870	8				1	7
	DN 900		914	920	8			1	7	
		DN 900	945	955	8			6	2	
	DN 1000		1016	1022	9				7	2
		DN 1000	1048	1058	9			4	5	
			1057	1063	9			6	3	
			1118	1125	10				6	4
	DN 1200		1219	1226	11				6	5
			1321	1328	11		1	10		
	DN 1400		1422	1430	12			9	3	
			1524	1532	13			7	6	
	DN 1600		1626	1634	14			5	9	
			1727	1736	15			3	12	
	DN 1800		1829	1838	16			1	15	
			1930	1939	17				16	1
	DN 2000		2032	2041	17			16	1	
			2134	2144	18			14	4	
	DN 2200		2235	2245	19			12	7	
			2337	2347	20			10	10	
	DN 2400		2438	2448	21			8	13	

The position specified for the wedges per insulator element are guideline values and can deviate by one or two slots, depending on the outside temperature.

GKO Insulators example application:

For a pipe outer diameter of 429 mm, select 3 whole segments and 1 half segment. Insert a wedge in position 1 and 3 wedges in position 2.

PSI CASING SPACERS FOR PIPE BUNDLING

WWW.PSI-PRODUCTS.COM

TECHNICAL DATA

Non-metallic insulators (System PSI Ranger) are highly suitable for pipelines requiring cathodic protection. With just six different segment sizes - micro, mini, midi, medi, maxi and maxi 0.5 - all pipe diameters from DN 15 upwards are covered.

Segment sizes and skid heights

micro
For pipe diameters from 21 mm to approx. 80 mm

mini
For pipe diameters from 40 mm to approx. 140 mm

midi
For pipe diameters from 110 mm to approx. 460 mm

medi
For pipe diameters from 400 to mm DN 650

maxi
For pipe diameters from approx. 400 mm to ∞

maxi 0.5 (half segment of maxi)
For intermediate sizes 390-550 mm

Diameter table

No. of segments	Diameter in mm						
	micro	mini	midi	medi	maxi	maxi + maxi 0.5	maxi 0.5
3	**21-29**	46-62	104-141		325-395		195-235
3 + 1 x 0.5						390-460	
4	**29-40**	62-83	**138-188**	**390-494**	426-546		235-300
4 + 1 x 0.5						450-550	
5	**38-49**	**77-104**	**172-235**	**495-625**	532-682		275-365
6	**46-60**	**92-125**	**207-282**	**600-750**	**638-819**		
7	**55-69**	**107-145**	**241-329**	700-890	**745-955**		
8	**61-80**	123-166	**276-376**	800-1000	**851-1092**		
9		138-187	310-423	900-1140	957-1228		
10		153-205	344-470	1000-1290	**1064-1365**		
11		169-228	379-517		1170-1502		
12		184-249	413-564		**1276-1838**		
13					1383-1775		
14					**1489-1911**		
15					1595-2048		
16					**1702-2184**		
17					1808-2321		
18					**1914-2457**		
19					2020-2594		
20					**2127-2731**		
21					2233-2867		

Standard dimensions are printed in **bold**

PLUG-IN CONNECTION WITHOUT BOLTS

PSI Insulators with boltless plug-in connection are suitable for pipe bundles and individual solutions. The flexibility of the insulator allows for extreme bends, and the high number of skids provides the bearing and load distribution inside the casing pipe.

Advantages:

- Significant cost savings compared to constructions with steel insulators
- Quick and easy assembly
- Individual solutions

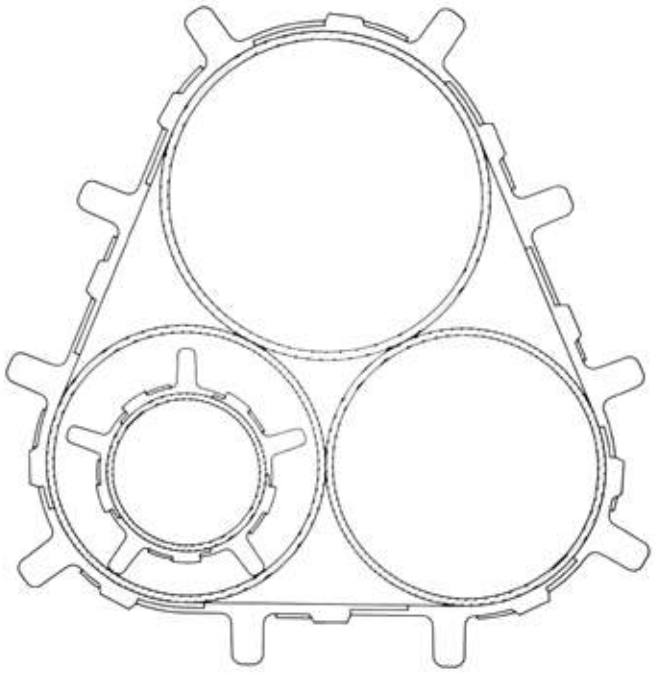
PSI will calculate individual solutions for your projects.
Use our experience.

Give us a call. We will tell you ...

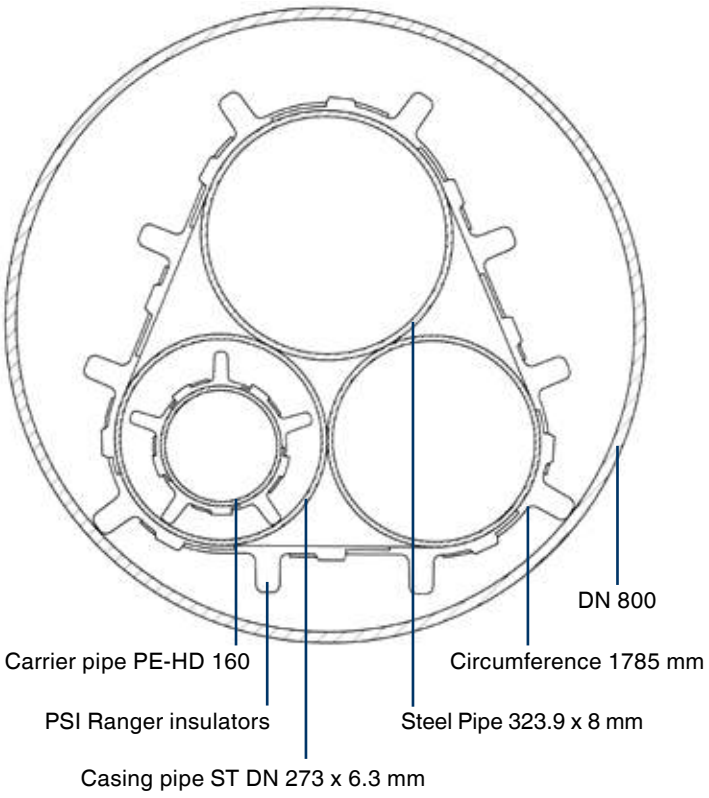
- ... which type of insulator,
- ... how many elements and
- ... which skid heights

... you will need for your application.

Example



Example



PSI STEEL SOLUTIONS

STEEL ROLLER RINGS, STEEL INSULATORS AND PIPE SUPPORT

WWW.PSI-PRODUCTS.COM

INDIVIDUAL STEEL SOLUTIONS

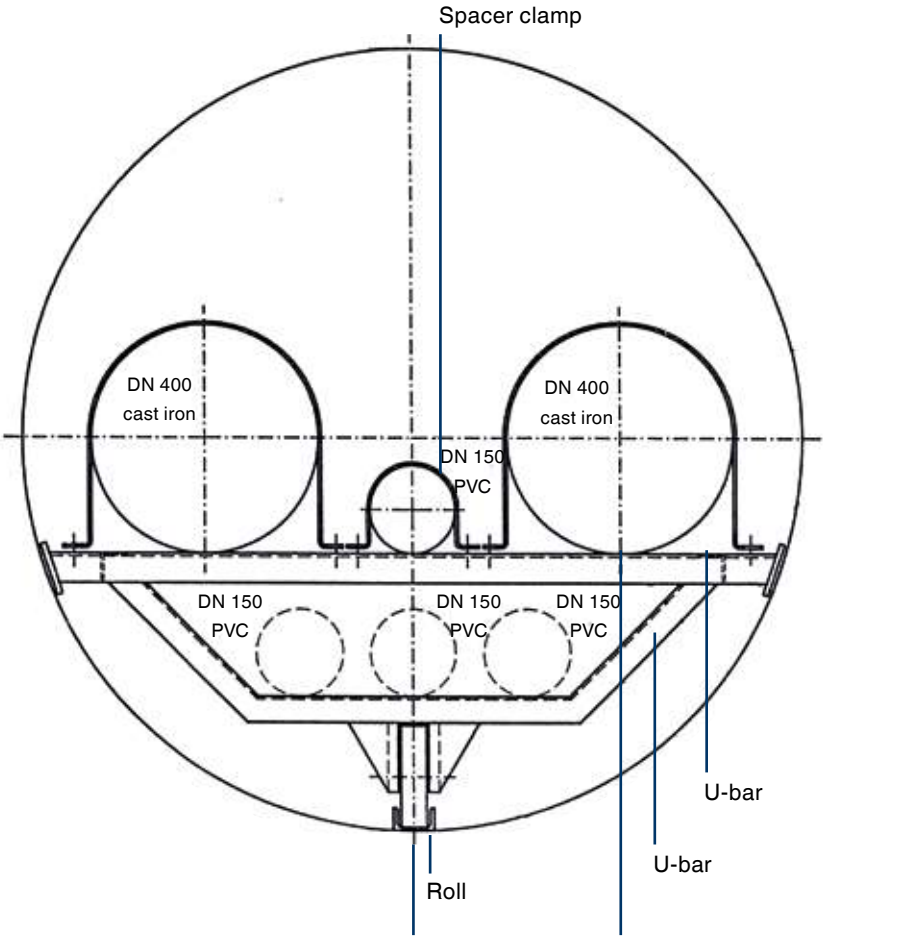
Large pipe-in-pipe projects like street, river or rail track crossings demand for higher material properties which exceed the ones plastic casing spacers can offer.

Examples:

- Multiple pipes in exact defined position
- Long distances
- Permanent pipe-movement
- High temperature
- Heavy weight
- Integrated tensile protection
- Hanging construction
- Rollers for rough casing pipe surfaces

PSI also offers customized solutions made of steel.
Use our experience!

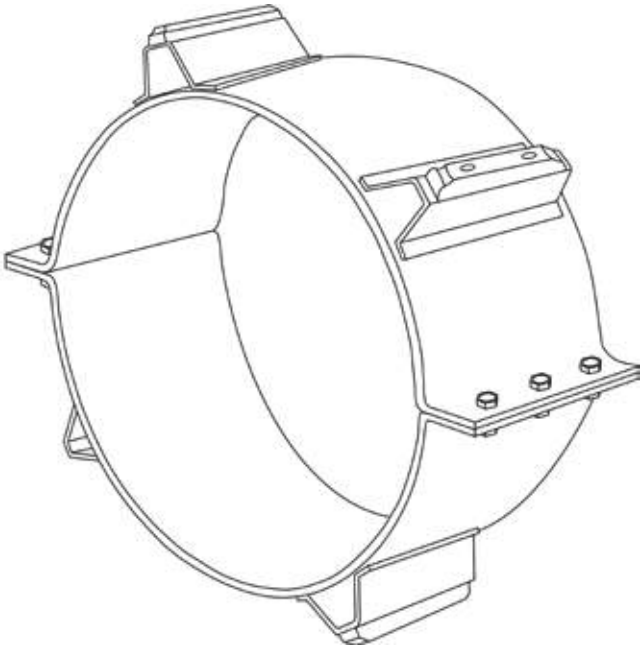
Example



More content can be found at
www.psi-products.com

GENERAL INFORMATION

Often it is not possible to lay pipes in open ditches. For example, for rail or road crossings it is first necessary to drive casings underground. By using PSI steel insulators or roller rings, the carrier pipe can be inserted into the casing sleeve safely and efficiently.



Steel roller rings or steel insulator ...

- ... facilitate pipe installation by reducing friction between the carrier pipe and the casing,
- ... provode support for the carrier pipe,
- ... act as spacers between pipe and casing pipes and can thus be placed in concentric or eccentric positions
- ... ensure electrical isolation of both pipes, since the skid material can be made out of plastic.

Steel insulators or steel roller rings

Strong steel constructions are preferred over plastic insulators in the following cases:

- High medium temperatures
- High pressure in large pipe diameters (load-bearing capacity!)
- Wide or narrow difference in diameter between casing and carrier pipe
- Long distances
- Rough casing pipe surfaces

Typical steel insulator assembly

Each ring consists of two halves which are clamped together by hexagonal nuts and bolts. The ring halves are manufactured individually.

Note

Performance data and technical information provided herein is intended for guideline purposes only. Suitability of product configurations for specific applications should be determined by the end-user.

TECHNICAL DATA

Material

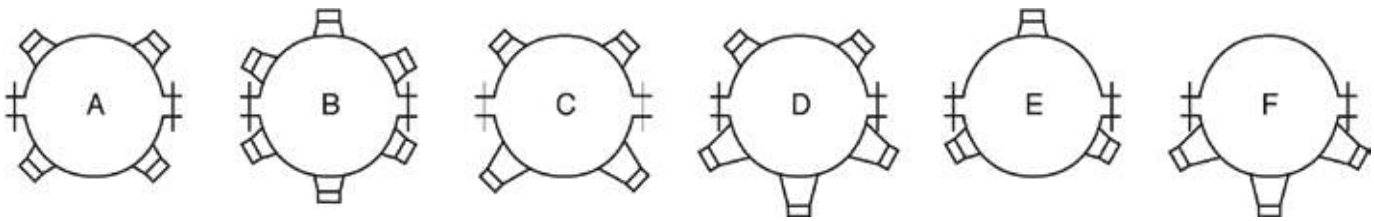
Ring halves and skids are made of steel. The surfaces are available without corrosion protection (black), or bitumen coated, plastic coated, hot-galvanized or in stainless steel (S304 (V2A)/S316 (V4A)).

Wheels made of polyamide, steel or stainless steel. Sliding parts made of PP, steel, brass etc. Screws made of galvanized, high-strength steel or stainless steel.

Varying skid heights on both, the upper and the lower ring halves allow for any media pipe position inside the casing. With long distances we recommend using guiding rails in order to avoid pipe rotation during installation (torsion protection).

Subject to technical changes.

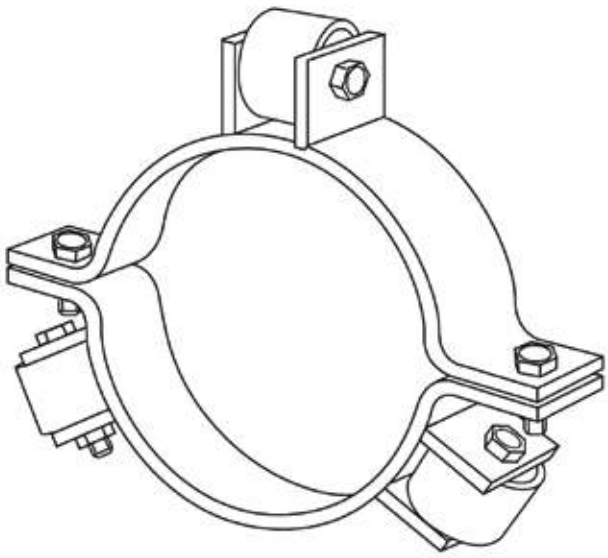
Examples



TECHNICAL DATA

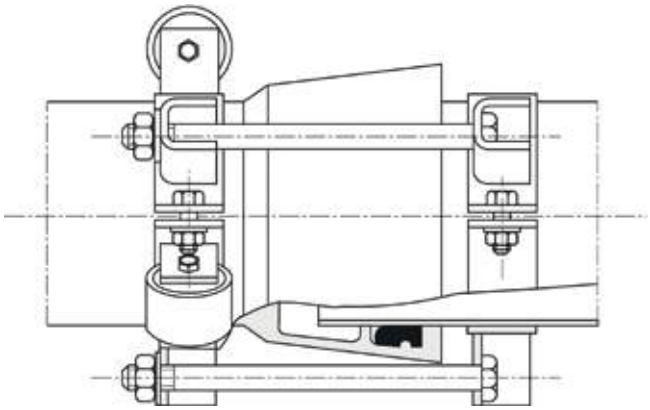
Steel roller rings for single or multiple pipes

The ring consists of two halves which are held together by bolts. The welded skids hold rolls which have the same purpose as the sliding skids of the casing spacers.



Roller ring with holding clamp for socket joints.

To ensure that socket joints remain tight, we can offer a tie bar system which consists of a roller ring fixed to one side of the socket and a clamping ring to the other side. The two are joint by tie bars.



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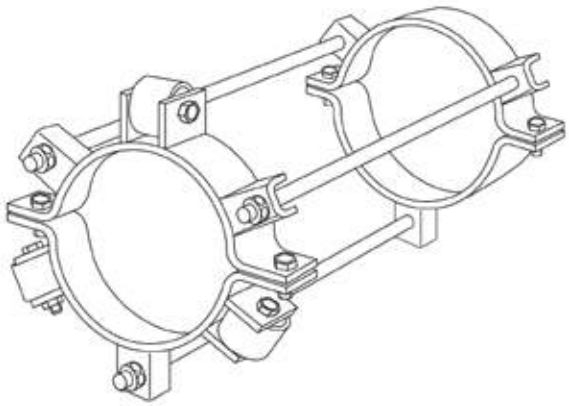


TECHNICAL DATA

Multiple clamping

PSI steel constructions are customized to suit customer requirements.

Execution

Customized. We will be pleased to assist you in selecting a suitable type.

Important ordering information

Please provide following information along your enquiry/order:

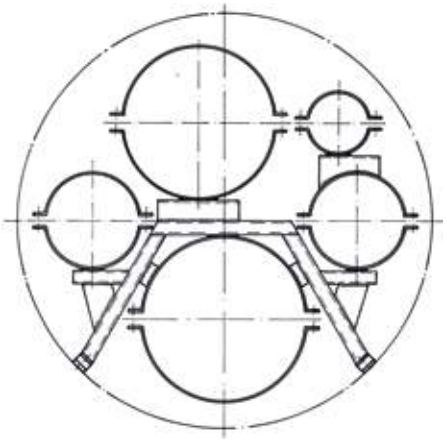
- Insertion length
- Outer diameter of pipe
- Socket outer diameter
- Weight of carrier pipe
- Casing pipe inner diameter
- Sketch of carrier pipe position
- Type of media
- Type of connection between carrier pipe segments
- Length of individual carrier pipe segments
- Information if uplift protection if required
- Information if rotation protection is required

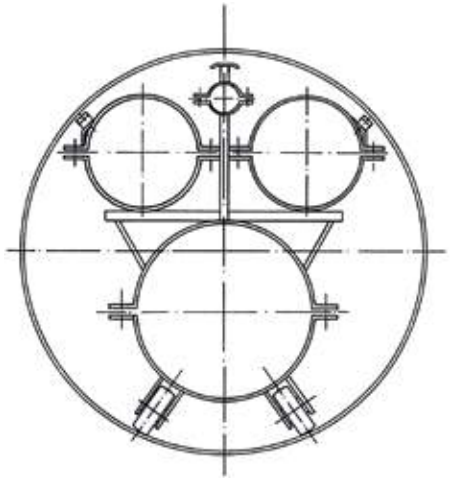
or ask for the PSI inquiry form "Steel Roller Rings / Steel Insulators"

Prices upon request.

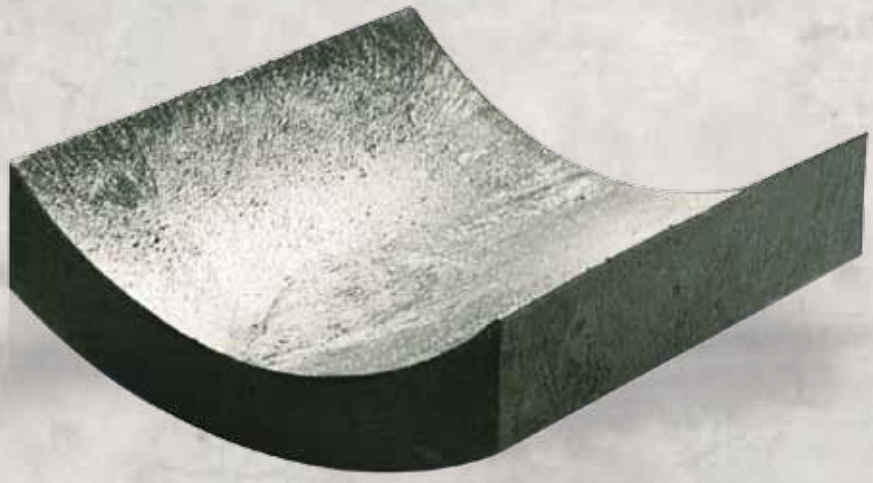
Subject to technical changes.

Examples





PSI PIPE SUPPORT SADDLES



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GENERAL INFORMATION

To support very heavy carrier pipes

Extremely long carrier pipes can be supported with these polyethylene components. PSI pipe support saddles are adapted to PSI casing spacers and reliably prevent contact between the carrier pipe and the casing - even when there is an extreme load of soil on the pipe.

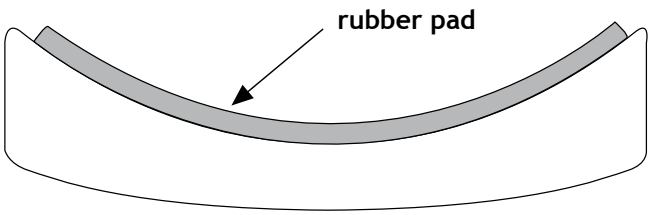
Material

Black polyethylene has the same strength characteristics as the polyethylene coating of steel pipes, thus preventing damage to the insulation.

Compressive strength: 500 N/cm^2
Density: 0.82 g/cm^3

Special version with rubber pad

Material and dimensions as described above, however with glued on rubber pad. Thickness of pad upon request.
Price and delivery time upon request.



Subject to technical changes.

More content can be found at
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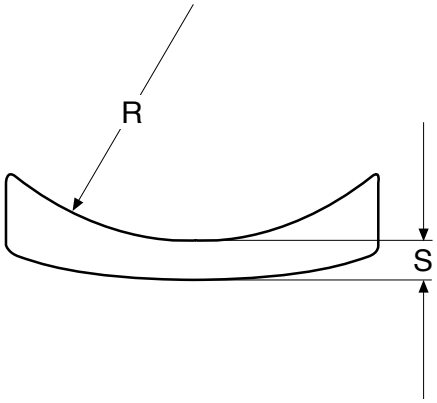
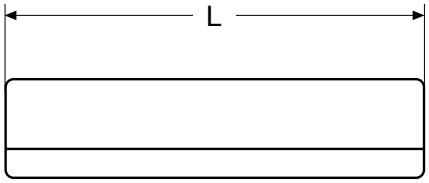
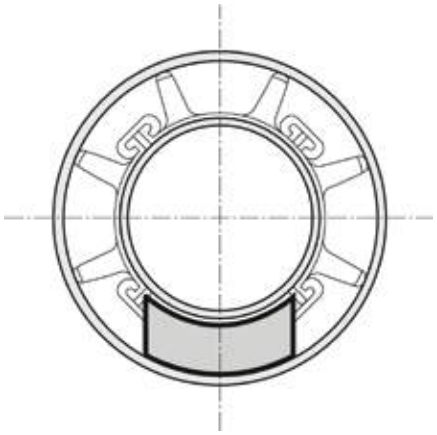
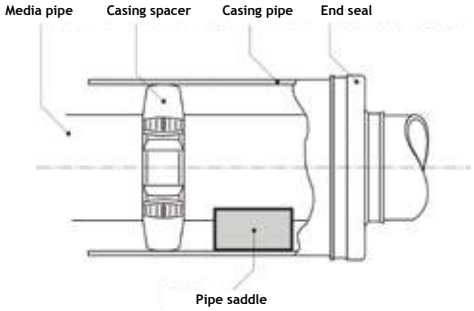
DIMENSIONS









Carrier pipe diameter in mm	Pipe support dimensions in mm			Weight approx.	Art. No.
	Radius	Height	Length	in kg	
up to 150	90	16	130	0.1	3-007-01100
		25		0.2	3-007-01101
		36		0.3	3-007-01102
175 - 300	160	16	250	1.1	3-007-01006
		25		1.3	3-007-01000
		35		1.8	3-007-01001
		55		2.5	3-007-01002
		75		3.5	3-007-01003
		90		4.0	3-007-01004
		110		5.0	3-007-01005
350 - 500	260	25	300	2.2	3-007-01010
		35		3.0	3-007-01011
		42		3.5	3-007-01009
		50		4.0	3-007-01012
		65		5.5	3-007-01013
		75		6.5	3-007-01014
		90		8.0	3-007-01015
550 - 700	360	25	300	3.0	3-007-01020
		35		4.0	3-007-01021
		42		4.5	3-007-01019
		50		5.5	3-007-01022
		65		7.0	3-007-01023
		75		7.5	3-007-01024
		90		10.5	3-007-01025
750 - 900	460	25	500	5.9	3-007-01030
		35		8.0	3-007-01031
		42		9.3	3-007-01029
		50		11.0	3-007-01032
		65		13.5	3-007-01033
		75		14.7	3-007-01034
		90		18.5	3-007-01035
950 - 1100	570	25	500	7.6	3-007-01040
		35		9.5	3-007-01041
		42		11.8	3-007-01039
		50		13.0	3-007-01042
		65		17.0	3-007-01043
		75		19.0	3-007-01044
		90		26.0	3-007-01045
1150 - 1400	710	25	600	12.0	3-007-01050
		35		18.0	3-007-01051
		42		19.2	3-007-01049
		50		21.0	3-007-01052
		65		26.7	3-007-01053
		75		29.0	3-007-01054
		90		37.0	3-007-01055

PSI CASING END SEALS

- TYPE KT
- TYPE DU
- TYPE KG/KO
- TYPE HA
- TYPE STM

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GENERAL INFORMATION

Pipes carrying media (e.g. gas pipes, water pipes, sewage pipes, etc.) below motorways, main roads, rail tracks, etc. are often laid in casing pipes. Casing end seals serve to protect the annular space between carrier pipe and casing pipe from moisture, dirt and animals. PSI casing end seals are available for new installations and pipes already in place.

Description / Technical data

Type KT casing end seal (only for new installation)
Advantages of the PSI type KT casing end seals are, in particular, low storage costs, because of only five different KT sizes suitable for casing pipe sizes from DN 100 to DN 600. Two casing pipe sizes per type are already pre-molded for installation convenience as a collar. The stainless steel straps included in the delivery can be used for all diameters.

Material:	EPDM
Thickness:	approx. 3-4 mm
Shore hardness A:	60 ± 5
Carrier pipe sizes:	10-508 mm (see current price list for precise dimensions)
Casing pipe sizes:	110-610 mm (see current price list for precise dimensions)
Compensation for eccentric Pipe position:	yes
Fastening strap material:	stainless steel

Type DU casing end seal (only for new installation)
Casing end seals type DU are always supplied in a suitable size for the carrier pipe / casing pipe combination. Further adaptation on the construction site is no longer necessary.

Material:	EPDM
Thickness:	approx. 5-6 mm
Shore hardness A:	50 ± 5
Carrier pipe sizes:	20-762 mm (see current price list for precise dimensions)
Casing pipe sizes:	90-965 mm (see current price list for precise dimensions)
Fastening strap material:	stainless steel

Type KG/KO casing end seal (KG for for new installation, KO for retrofitting)
The type KG/KO casing end seals are manufactured in a conical shape. Due to individual production of the casing seals, they are available for nearly all pipe sizes and carrier pipe/casing pipe combinations. If the opening is a bit too small for the carrier pipe, it can be adjusted on site (see installation instructions).

Standard material:	neoprene rubber
Material on request:	Silicone and NBR approx. 2-3 mm
Thickness:	65 ± 5
Shore hardness A:	32-1320 mm
Carrier pipe sizes:	(see current price list for precise dimensions) 48.3-2000 mm
Casing pipe sizes:	(see current price list for precise dimensions) upon request
Special sizes:	stainless steel
Fastening strap material:	

GENERAL INFORMATION

Type HA casing end seal (only for new installation)
HA - casing end seals are used when installing new house service lines.

Material:	EPDM
Thickness:	approx. 2-3 mm
Shore hardness A:	50 ± 5
Carrier pipe sizes:	25-50 mm (see current price list for precise dimensions)
Casing pipe sizes:	50-90 mm (see current price list for precise dimensions)
Fastening strap material:	stainless steel

Type STM casing end seal
(only for new installation, split version upon request, installation service available)
Seamless STM casing seals are manufactured according to special requirements. They are available for nearly all pipe sizes. This sealing sleeve is the appropriate type especially for extreme eccentricities or if several openings are required, e.g. for additional cable ducts. This sealing sleeve is also available in a reinforced version (type STMV) for higher mechanical loads.

Material:	Rottolin
Thickness:	STM approx. 6-8 mm, STMV approx. 9-11 mm
Shore hardness A:	approx. 50 ± 5
Carrier pipe sizes:	50-1200 mm (see current price list for precise dimensions)
Casing pipe sizes:	200-1600 mm (see current price list for precise dimensions)
Compensation for eccentric pipe positioning:	yes
Special sizes:	upon request
Fastening strap material:	stainless steel

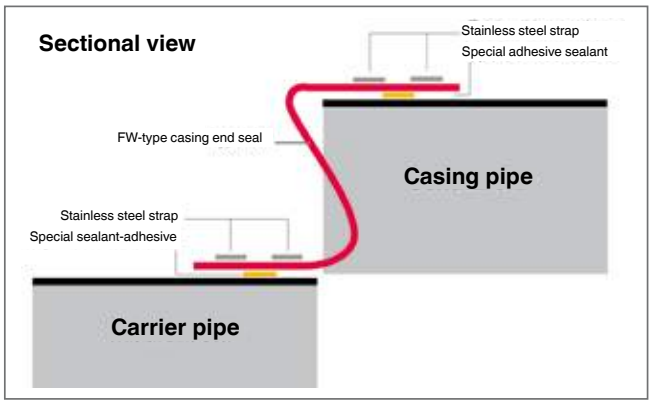
More content can be found at
www.psi-products.com

GENERAL INFORMATION

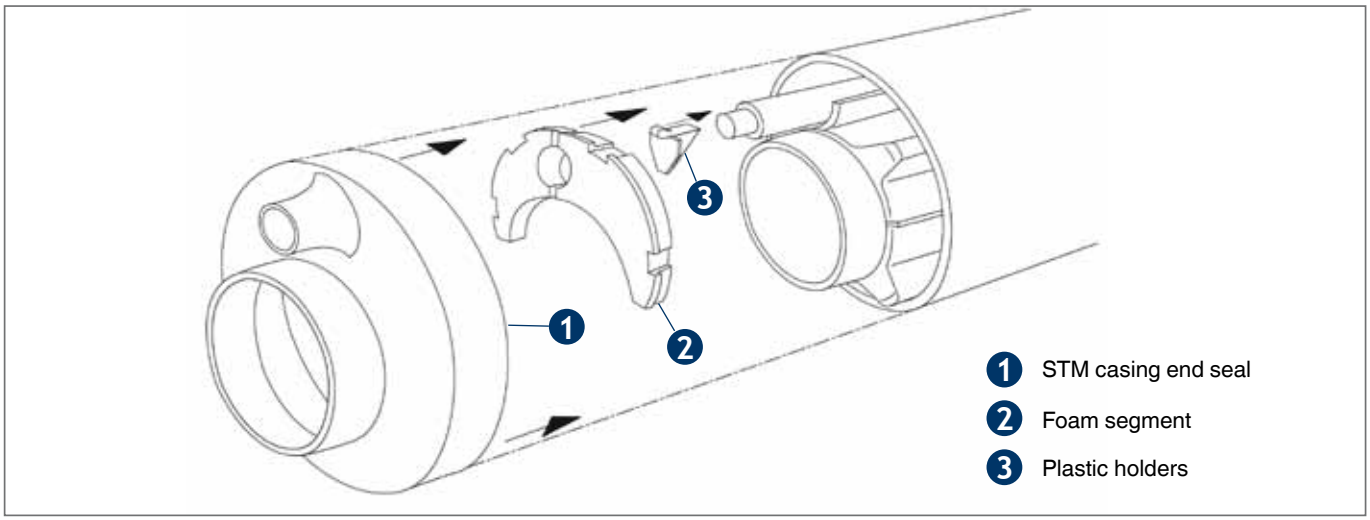
PSI casing end seals type FW were specially developed to provide a pressure-tight seal between carrier and casing pipes. The casing end seal is made of high-quality Rottolin and, thanks to its 9-11 mm thickness, it is particularly dimensionally stable and pressure-tight up to 0.5 bar. As a result of its exceptional flexibility, the casing seal allows axial and radial movement between casing and carrier pipe. To ensure tightness, the annular space should be no larger than 70 mm. A special, permanently elastic adhesive sealant is sprayed from a cartridge on to the underside of the collar of the sealing sleeve, which is then secured over the casing and carrier pipe with two stainless steel fastening straps. Before backfilling, the casing end seal needs to be covered with foam pads.

TECHNICAL DATA:

Material:	Rottolin
Material thickness:	9-11 mm
Color:	red
Shore hardness:	approx. 50°
Tensile strength:	11 N/mm²
Elongation at breaking point:	400%
Tear strength:	27 N/mm
Max. continuous operating temp.	55 °C

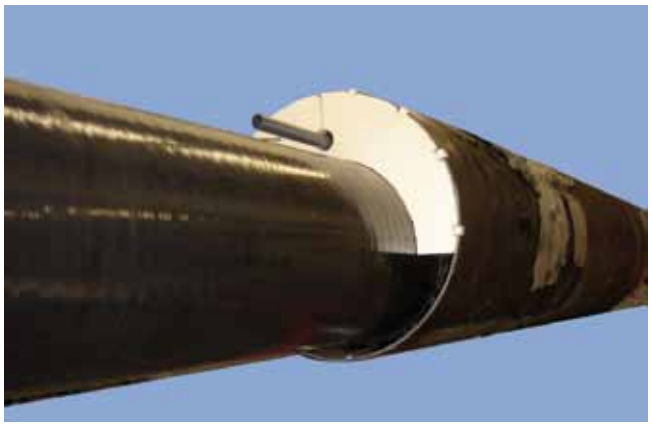


GENERAL INFORMATION



Fix plastic holders with clip on the inner wall of the casing pipe. Cut to suitable length if necessary. The distance must be chosen according to the recesses of the support segments.

Place foam segments on the carrier pipe and insert into casing pipe. Hereby the raised flange rests on the outer front of the casing pipe. This means that secure support is guaranteed.



The cable duct has to be pulled through between the semi-circular recesses. If the recesses are too small, they can be slightly enlarged by cutting them out further with a knife.

Pull casing end seal over the pipe and fit fastening straps (included).

APPLICATION RECOMMENDATION

Penetration through casing pipes
"Casing pipe - Carrier pipe"

1. One layer of foam pads (width selected so that it lays up to at least 50 cm in front of the sealing sleeve on the carrier pipe) has to be laid on the sealing sleeve (carrier pipe) and by adhesive tape, fastening straps, cable ties, etc. it is fixed so that moving or opening the layer when backfilling is not possible.
2. Step 1 is repeated (layers of foam pads on top of each other) until the circumference of the top layer of expanding padding nearly reaches the circumference of the casing pipe.
3. Afterwards at least one layer of foam pads is laid and fixed over the entire installation.

Penetration through the wall
"PSI Compensating Wall Seal Type VDW"

1. One layer of foam pads (width selected so that it lays up to at least 50 cm in front of the sealing sleeve on the carrier pipe) has to be laid on the sealing sleeve (carrier pipe) and by adhesive tape, fastening straps, cable ties, etc. it is fixed so that moving or opening the layer when backfilling is not possible.
2. Another layer is applied on the foam pads after step 1 with a width selected so that the expanding padding touches the dynamic seal and is flush with the previous layer.
3. Step 2 is repeated (foam pad layers on top of each other) until the top layer of foam pads is flush with the wall above the dynamic seal.
4. Finally another layer is laid over the top layer and is fixed in place.

GENERAL INFORMATION

Foam pads are state of the art technology in district heating systems. They are used to reduce the pressure from the earth created by heat expansion of plastic casing pipes underground. Around bends, foam pads are attached to the inside (protection from longitudinal reduction) and outside (protection from longitudinal increase) of the bend.

As a general rule, depending on manufacturer and type, they are made of uncured PE or PUR foams.

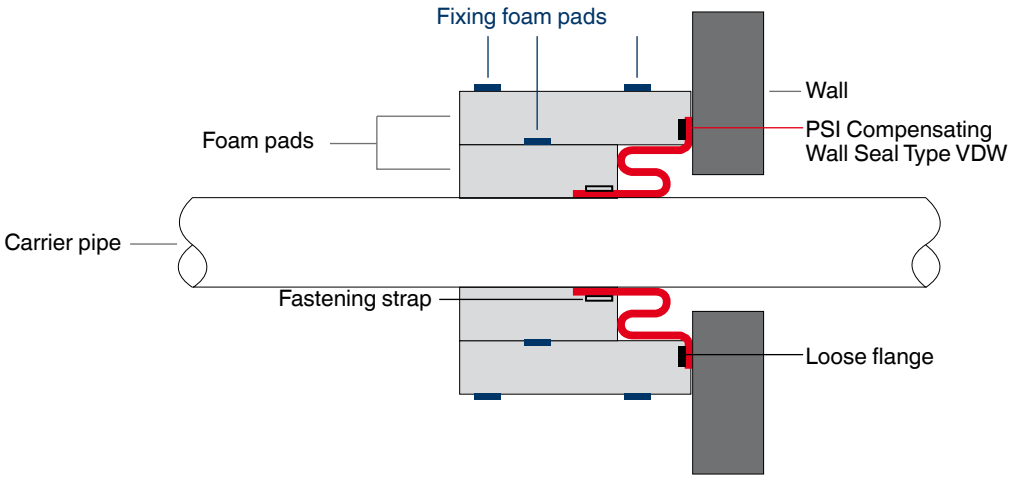
This means that important material properties such as being rot-proof, low water absorption, excellent mechanical, chemical and physical resistance and contour stability are given. This ensures a long service life and great functionality.

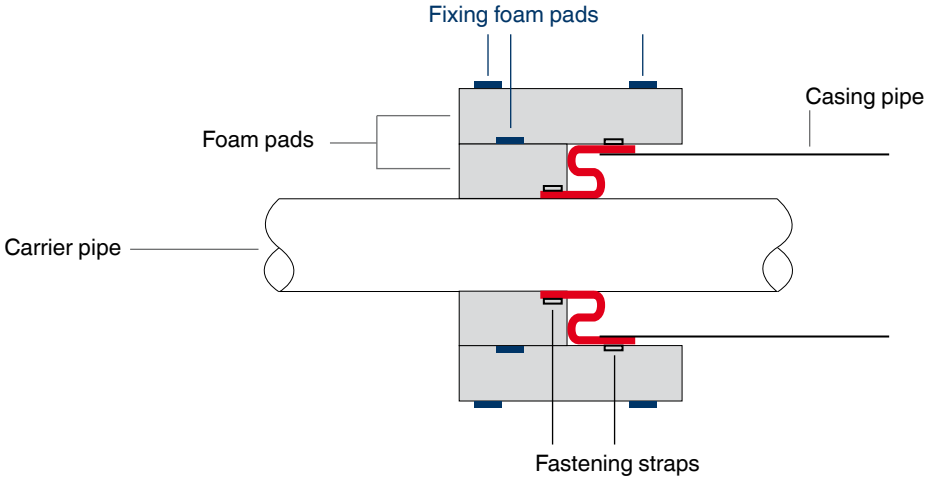
As casing end seals for district heating pipes have to deal with pipe movement, space for movement needs to be available around the casing end seal.

Foam pads therefore offer two advantages at the same time:

1. First they provide protection for the casing end seals when backfilling the trench and hold back the pressure while the material compresses
2. They ensure room for movement of up to 25 mm

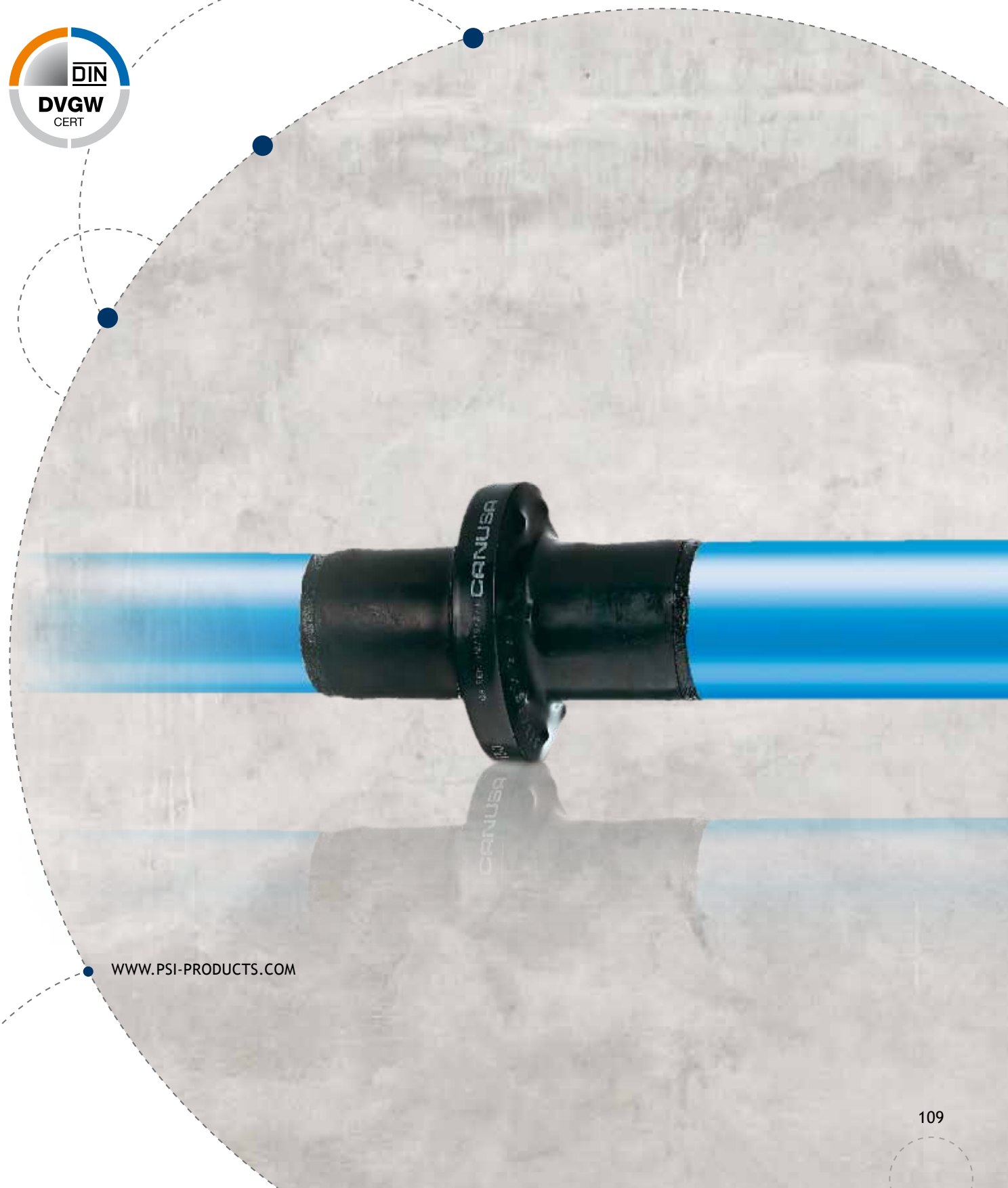
Using foam pads is generally recommended.





PSI HEAT SHRINK PRODUCTS -

CORROSION PROTECTION AND SEALING (SYSTEM CANUSA)



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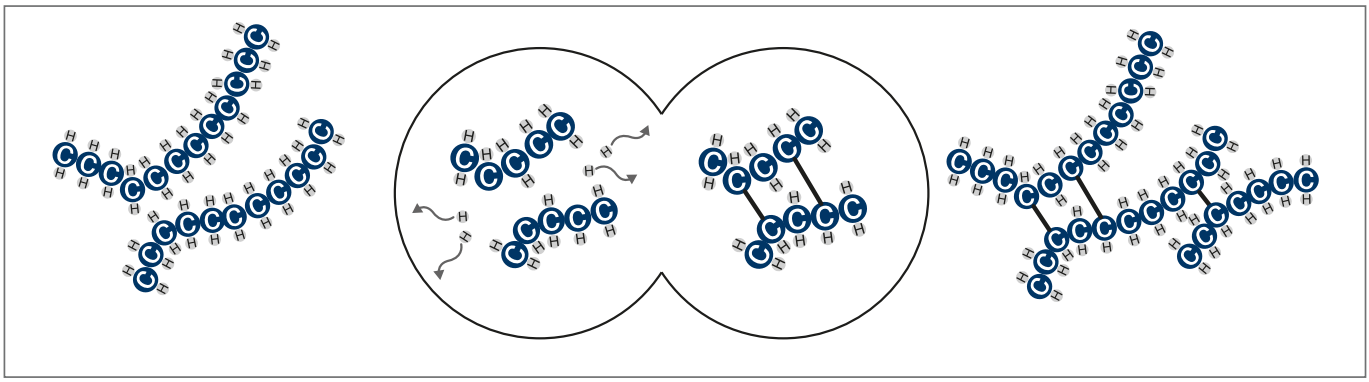
GENERAL INFORMATION



What does heat shrink technology mean? What principle is it based on?

The starting material for creating the heat shrinkable backing material is polyethylene (PE). PE withstands high mechanical loads and is resistant to aggressive chemicals. The molecular structure of PE consists of numerous long hydrocarbon chains which are held together by relatively weak forces. If the PE in this state was heated to approx. 120 °C, then this would cause the material to melt and flow.

By adding energetic electron radiation, the individual hydrocarbon chains link up with each other by splitting off hydrogen atoms. This creates a stable, three-dimensional network.

This change in the molecular structure has no effect on the appearance of the material, but it does affect its properties: It is now infusible. The high bond forces in the C-C bonds prevent flowing and melting even when heated to approx. 120 °C. The plastic becomes elastic like an elastomer (rubber).

Above the normal melting temperature, the crosslinked polyethylene (polyolefin) is now easily malleable. It is mechanically stretched for later use and fixed in this state by being rapidly cooled. If the stretched material is heated to approx. 120 °C again, then it tries to retract back into the original state it was originally bonded in (elastic shape memory).

The heat shrink backing (Tubular or Wrapid Sleeve) is coated with a hot melt adhesive in the last production step. This is the actual corrosion protection medium for the surface to be subsequently coated.

The hot melt adhesive is also responsible for subsequent insulation of sleeve joints for district heating pipes.

GENERAL INFORMATION

How are heat shrinkable products processed?

Under normal conditions priming is not necessary for PSI heat shrinkable products. As with all corrosion protection systems, the surface to be coated or subsequently insulated needs to be clean, free of grease and dry. With heat shrinkable corrosion protection systems, it is particularly important to pay attention to complying with the specified pre-heating temperatures. The more precisely the pre-heating temperatures are kept to, the better and longer lasting the peel and shearing resistance of the hot-melt adhesives.

The hot melt adhesive liquefies during the shrink process onto the pipe (using a propane gas flame).

The liquefied hot melt adhesive then completely moistens the surface to be coated or subsequently insulated, sticking in any unevenness and fills any small cavities (e.g. transition from steel to factory coating or edges of welded seam). This process is supported by the shrink tension in the retainer material which occurs during processing.

The shrinkage stress of the backing which is in the retainer material which is permanently present, and the adhesion of the hot-melt adhesive fix the shrinking tube or the shrink sleeve in place, even if the pipe moves and if there are active shearing forces at the given point.

The backing material which solidifies after cooling down offers the relatively soft hot-melt adhesive optimal mechanical protection.

A non-destructive, optical quality control is possible:

1. The heat shrink product needs to be smooth and bubble-free.
2. The hot-melt adhesive must have been pressed out at the edges all around the circumference of the pipe.
3. The required overlap to the factory coating needs to be at least 50 mm on both sides.

GENERAL INFORMATION

Most important applications

Subsequent coating of:
- Welded seams
- Connecting sockets (Type Tyton, Fuchs etc.)
- Flanges
- Couplings and screw connections
- Pipe bends
- Damaged factory coatings
- Weld-on electrodes
- Welded seams on pipes for HDD processes

Subsequent insulating of:
- District heating pipes

Sealing:
- Casing pipes
- Vitrified clay pipe
- Packed and screw gland sockets

Product properties

- Backing material made of infusible, heat shrinkable bonded polyolefin
- Coating with hot-melt adhesive, high adhesion, moisture-proof
- Impact and abrasion resistant material, remains flexible and free of cracks even under continuous stress
- Quick and simple installation by shrinking on with gentle propane gas flame without additional adhesive or primer
- Tubes and sleeves have a yellow temperature indicator
- Provides protection against creepage
- Resistant against rotting and UV
- Compatible with all common pipeline coatings
- Easy to install
- Easy to use on construction site

Manufacturer

Canusa is one of the leading producers of heat shrink products worldwide. Many years of international experience and innovative products identify the Canadian company. PSI Products is the distributor of Canusa heat shrink products for corrosion protection and sealing. A separate specialist department provides customers with advice and support on all questions with specific know-how. Canusa and PSI – Expertise for sophisticated solutions.

Standards

PSI heat shrink products are tested according to DIN 30672-1/EN 12068 and approved for subsequent coating of underground pipelines.

More content can be found at
www.psi-products.com

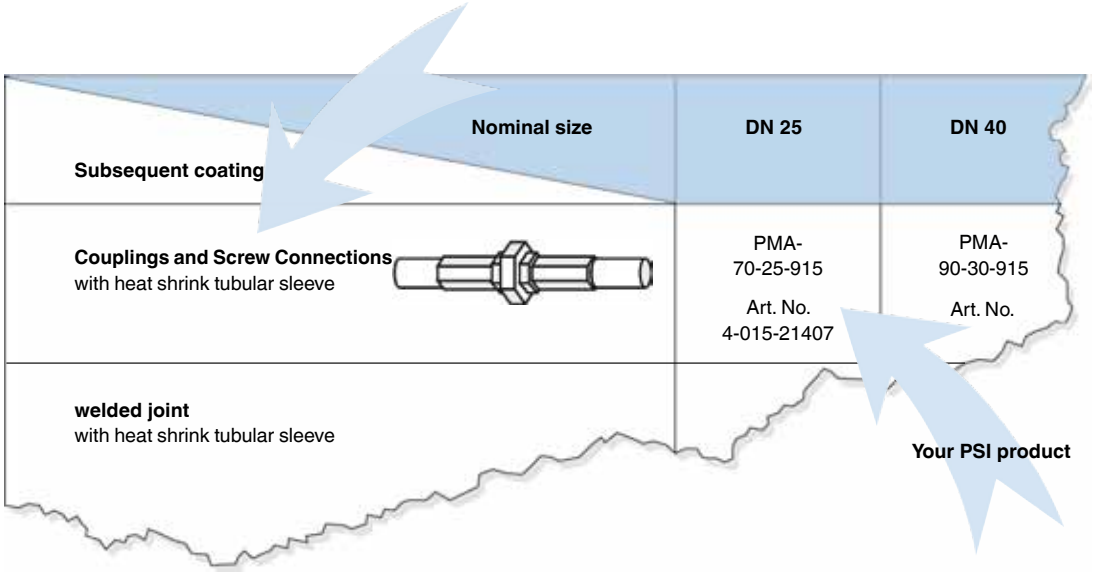
APPLICATIONS

Optimal subsequent coating or insulation requires a product which fits precisely. Depending on the use, PSI Products offers a number of configurations to accommodate your specific project application. Important factors: specific application and nominal size.

PSI has developed a **Product Application Matrix** to help you quickly find the right product. You can quickly and easily find the right product for the respective application here.

Example:

You need to subsequently coat a bolted connection with a pipe diameter of DN 25. To do this, in the "Subsequent coating" column of the matrix, select the application "Couplings and Screw Connections", then define the nominal size, there may be several products for one application, e.g. tubing or sleeves. At the intersection point you will find the name and article number of the suitable PSI heat shrink product.

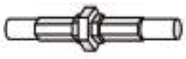
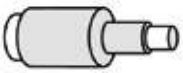
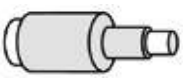


At a glance

Subsequent insulation of

Couplings and screw connections	Heat shrink tubular sleeve DN 25 to DN 100 (PMA)
Welded seams	Heat shrink tubular sleeve up to DN 300 (PLA) Shrink sleeve, ready-made, DN 80 to DN 1200 (K-60 B/GTS-50) Shrink sleeve, rolled goods, from DN 80 upwards (K-60 B/GTS-50)
Flange	High shrink sleeve, ready-made, DN 50 to DN 200 (K-60 HS200) rolled goods, high shrinking, from DN 250 (K-60 HS70)
Connecting sockets (Type Tyton, Fuchs etc.)	High shrink sleeves, DN 80 to DN 400 (K-60 HS150) Rolled goods, high shrinking, from DN 150 (K-60 HS70)
Pipe bends	Heat shrink wrapid tape, DN 25 to DN 300 (WrapidTape HCA) Rolled goods, high shrinking, from DN 300 (K-60 HS70)
Casing pipe end	High shrink sleeve, ready-made (K-60 HS200) Shrink sleeves, rolled goods (K-60 HS70)
Repair of factory coating	Repair plasters (CRPN), Filler material (CRPN-Filler), hot-melt stick
Vitrified clay pipe sealing	rolled goods, high shrinking, from DN 100 (K-60 HS70)

PRODUCT APPLICATION MATRIX
(subsequently coating gas, water, waste water and oil pipelines)

Subsequent coating	Nominal size DN 25	Nominal size DN 32/40	Nominal size DN 50/65	Nominal size DN 80	Nominal size DN 100
Couplings and Screw Connections with heat shrink shrinking tube 	PMA-70/25-1500 Art. No. 4-015-21436	PMA-90/30-1500 Art. No. 4-015-21437	PMA-120/40-1500 Art. No. 4-015-21453	PMA-170/80-450 Art. No. 4-015-21421	PMA-200/100-450 Art. No. 4-015-21422
Welded seam with heat shrink shrinking tube 	PMA-40/15-450 Art. No. 4-015-S21410	PMA-70/25-370 Art. No. 4-015-S21402	PMA-90/30-370 Art. No. 4-015-S21403	PLA-90-450 Art. No. • 4-015-21414 • 4-015-21404	PLA-115-450 Art. No. • 4-015-21415 • 4-015-21405
Welded seam with shrink sleeve, ready-made 				Cut K-60 B-450-400 Art. No. • 4-015-S21381 • 4-015-S21371	Cut K-60 B-450-500 Art. No. • 4-015-S21382 • 4-015-S21372
Welded seam with shrink sleeve, rolled goods (can be cut to length) 				K-60 B/ GTS 50-450-30 req. length 400 mm	K-60 B/ GTS 50-450-30 req. length 500 mm
				K-60 B Art. No. • 4-015-21332 • 4-015-21342	
Flange with shrink sleeve, ready-made or high shrinking product rolled goods 			K60 HS 200-65-660-300 Art. No. 4-015-21440	K-60 HS200-65-760-300 Art. No. 4-015-21442	K-60 HS200-65-760-300 Art. No. 4-015-21442
Sockets (Type Tyton, Fuchs etc.) with shrinking tube 				K-60 HS150-170/85-300 Art. No. 4-015-21423	K-60 HS150-230/110-300 Art. No. 4-015-21424
Sockets (Type Tyton, Fuchs etc.) with shrink sleeve ready-made 					
Pipe bends with Shrink tape (WrapidTape HCA) 	WrapidTape HCA-37-15 Art. No. 4-015-21515	WrapidTape HCA-37-15 Art. No. 4-015-21515	WrapidTape HCA-37-15 Art. No. 4-015-21515	WrapidTape HCA-50-15 Art. No. 4-015-21513	WrapidTape HCA-50-15 Art. No. 4-015-21513
Casing pipe end with wrapid sleeve, ready-made 	maximum outer diameter casing pipe 185 mm Diameter diff. max. 60%: K-60 HS200-65-660-300 Art. No. 4-015-21440				
Socket restoration up to 100 mbar on lead packed and screw sockets 			LRKN DN 50/65 Art. No. 4-015-21460	LRKN DN 80 Art. No. 4-015-21461	LRKN DN 100 Art. No. 4-015-21462
Casing pipe end with shrink sleeve, rolled goods (can be cut to length) 	Diameter difference between casing pipe and carrier pipe, max. 40%: K-60 HS70-650-30, 650 mm Art. No. 4-015-21334				
Repair of factory coating with repair plasters and fillers  **Hot-melt stick** for small damages	CRPN-150-15 independent of pipe dimension Art. No. • 4-015-21484, • 4-015-21499 Hot-melt stick Art. No. 4-015-21488				

• = yellow • = black

PRODUCT APPLICATION MATRIX
(subsequently coating gas, water, waste water and oil pipelines)

Nominal size DN 150	Nominal size DN 200	Nominal size DN 250	Nominal size DN 300	Nominal size DN 400	Nominal size DN 500	Nominal size > DN 500
PLA- 170-450 Art. No. • 4-015-21416 • 4-015-21406	PLA- 230-450 Art. No. • 4-015-21507 • 4-015-21510	PLA- 280-450 Art. No. • 4-015-21508 • 4-015-21511	PLA- 315-450 Art. No. • 4-015-21509 • 4-015-21512			
Cut K-60 B-450-700 Art. No. • 4-015-S21383 • 4-015-S21373	Cut K-60 B-450-700 Art. No. • 4-015-S21384 • 4-015-S21374	Cut K-60 B-450-700 Art. No. • 4-015-S21385 • 4-015-S21375	Cut K-60 B-450-700 Art. No. • 4-015-S21386 • 4-015-S21376	Cut K-60 B-450-700 Art. No. • 4-015-S21387 • 4-015-S21377	Cut K-60 B-450-700 Art. No. • 4-015-S21388 • 4-015-S21378	Cut K-60 B-450- ...
K-60 B/GTS 50-450-30 required length 700 mm	K-60 B/GTS 50-450-30 required length 800 mm	K-60 B/GTS 50-450-30 required length 1000 mm	K-60 B/GTS 50-450-30 required length 1200 mm	K-60 B/GTS 50-450-30 required length 1500 mm	K-60 B/GTS 50-450-30 required length 1800 mm	K-60 B/GTS 50-450-30 required length ... mm
K-60 B Art.-no. • 4-015-21332 • 4-015-21342						
K-60 HS200- 65-970-300 Art. No. 4-015-21444	K-60 HS200- 65-1200-300 Art. No. 4-015-21445	Cut K-60 HS70-450-1400 Art. No. 4-015-S21315	Cut K-60 HS70-450-1600 Art. No. 4-015-S21316	Cut K-60 HS70-450-2100 Art. No. 4-015-S21318	Cut K-60 HS70-450-2300 Art. No. 4-015-S21319	Cut K-60 HS70-650-...
K-60 HS70- 270/160-300 Art. No. 4-015-21425	K-60 HS150- 335/165-300 Art. No. 4-015-21426	K-60 HS150- 395/255-300 Art. No. 4-015-21427	K-60 HS150- 455/285-300 Art. No. 4-015-21428	K-60 HS150- 550/380-300 Art. No. 4-015-21417		
Cut K-60 HS70-300-800 Art. No. 4-015-S21305	Cut K-60 HS70-300-1000 Art. No. 4-015-S21306	Cut K-60 HS70-300-1200 Art. No. 4-015-S21307	Cut K-60 HS70-300-1400 Art. No. 4-015-S21308	Cut K-60 HS70-300-1800 Art. No. 4-015-S21310	Cut K-60 HS70-300-2100 Art. No. 4-015-S21311	Cut K-60 HS70-300-...
WrapidTape HCA- 75-15 Art. No. 4-015-21506	WrapidTape HCA- 75-15 Art. No. 4-015-21506	WrapidTape HCA- 100-15 Art. No. 4-015-21514	WrapidTape HCA- 100-15 Art. No. 4-015-21514	K-60 B/GTS-50-450-...		
maximum outer diameter casing pipe 340 mm Diameter diff. max. 60%: K60 HS 70-1200-300 Art. No. 4-015-21445						
LRKN DN 150 Art. No. 4-015-21463	LRKN DN 200 Art. No. 4-015-21464	LRKN DN 250 Art. No. 4-015-21465	LRKN DN 300 Art. No. 4-015-21466	LRKN DN 400 Art. No. 4-015-S21468	LRKN DN 500 Art. No. 4-015-S21470	
Diameter difference between casing pipe and carrier pipe, max. 40%: K-60 HS70-650-30, 650 mm Art. No. 4-015-21334						
CRPN-150-15 independent of pipe dimension Art. No. • 4-015-21484, • 4-015-21499 Hot melt stick Art. No. 4-015-21488						

• = yellow • = black

TECHNICAL DATA

		Test standard	Unit	K-60 B/L	K-60 HS70	K-60 HS150	K-60 HS200
Adhesive	Softening point	ASTM E28	°C	87	87	87	87
	Shear strength	EN12068/ DIN 30672	N/cm²	35	35	35	35
Backing	Tear resistance	ASTM D 638	Mpa	20	20	20	20
	Elongation at break	ASTM D 638	%	600	600	600	600
	Nominal hardness	ASTM D 2240	Shore D	46	46	46	46
	Specific Coating resistance	ASTM D 257	ohm-cm	10^{17}	10^{17}	10^{17}	10^{17}
	Dielectric strength	ASTM D 149	kV/mm	27	27	27	27
Heat shrink system	Indentation resistance	EN12068/ DIN 30672	Class	C-passed	C-passed	C-passed	C-passed
	Impact resistance	EN12068/ DIN 30672	Class	C-passed	C-passed	C-passed	C-passed
	Peel resistance (100mm/min)	ISO 21809-3	N/cm	60	60	60	60
	Cathodic disbonding	ISO 21809-3	mm rad	8	8	8	8
	Water absorption	ASTM D 570	%	0,05	0,05	0,05	0,05
	Brittle point	ASTM D 2671	°C	-20	-20	-20	-20
	DIN registration	EN12068/ DIN 30672	Class	C/30	C/30	C/30	C/30
	Continuous operating temperature pipeline		°C	60	60	60	60
	minimum pre-heating temperature		°C	65	65	65	65
	Resistance to tangential forces			good	good	good	good
	Resistance to sand friction			good	good	good	good
	Resistance to axial pipe movements			good	good	good	good
	Adhesive compatibility with factory coatings			1,2,3,4,5,6	1,2,3,4,5,6	1,2,3,4,5,6	1,2,3,4,5,6

Factory coatings: 1.PE, 2.PP, 3.FBE, 4.Tar, 5.Bitumen, 6.PU

		Test standard	Unit	GTS 50	GTS 65	GTS 80	PLA	PMA	HCA
Adhesive	Softening point	ASTM E28	°C	72	94	124	72	72	72
	Shear strength	EN12068/ DIN 30672	N/cm²	60	245	365	60	60	50
Backing	Tear resistance	ASTM D 638	Mpa	20	24	22	20	20	20
	Elongation at break	ASTM D 638	%	600	700	600	600	600	600
	Nominal hardness	ASTM D 2240	Shore D	46	50	55	46	46	46
	Specific Coating resistance	ASTM D 257	ohm-cm	10^{17}	10^{17}	$2{,}5x10^{18}$	10^{17}	10^{17}	10^{17}
	Dielectric strength	ASTM D 149	kV/mm	20	27	39	20	20	27
Heat shrink system	Indentation resistance	EN12068/ DIN 30672	Class	C-passed	C-passed	C-passed	B-passed	C-passed	C-passed
	Impact resistance	EN12068/ DIN 30672	Class	C-passed	C-passed	C-passed	B-passed	C-passed	C-passed
	Peel resistance (100mm/min)	ISO 21809-3	N/cm	35	86	55	35	10	35
	Cathodic disbonding	ISO 21809-3	mm rad	13	3	3	13	13	13
	Water absorption	ASTM D 570	%	0,05	0,05	0,05	0,05	0,05	0,05
	Brittle point	ASTM D 2671	°C	-32	-32	-26	-32	-32	-32
	DIN registration	EN12068/ DIN 30672	Class	C/50	C/60	C/80	B/50	C/50 (C/50)	C/30
	Continuous operating temperature pipeline		°C	55	65	80	55	50	55
	minimum pre-heating temperature		°C	60	90	110	60	60	90
	Resistance to tangential forces			very good	very good	excellent	excellent	very good	good
	Resistance to sand friction			very good	very good	excellent	excellent	very good	good
	Resistance to axial pipe movements			very good	very good	excellent	excellent	very good	good
	Adhesive compatibility with factory coatings			1,3	1,2,3	1,3,6	1,3,6	1,3,6	1,3,6

Factory coatings: 1.PE, 2.PP, 3.FBE, 4.Tar, 5.Bitumen, 6.PU

PRODUCT DESCRIPTIONS / TYPES

Heat shrinking tubes

PSI offers heat shrinking tubes in two versions: low shrinking and high shrinking. Low shrinking tubes are particularly suitable for subsequent coating welded seams on pipes with a nominal diameter from DN 25 to DN 300. High shrinking tubes can be optimally used for subsequently coating couplings and screw connections, connecting sleeves and from parts with extreme differences in diameters.

Please note:
It is not possible to subsequently install tubular sleeves. Here you need to use the shrink sleeves from PSI.

Coating welded seams with heat shrinking tubes
Material thickness after complete shrinkage PMA 3.2 mm, PLA 2.3 mm

Nominal size	Type	Shrinking range in mm	Width in mm	Shrink rate approx.	Art. No. black	Art. No. yellow	DIN 30672 EN 12068
DN 25	PMA-40-15-450	45-12	450	65%	4-015-S21410	-	C/50
DN 32, DN 40	PMA-70/25-370	70-25	370	65%	4-015-S21402	-	C/50
DN 50, DN 65	PMA-90-30-370	90-30	370	65%	4-015-S21403	-	C/50
DN 80	PLA-90-450	120-81	450	33%	4-015-21404	4-015-21414	B/50
DN 100	PLA-115-450	145-98	450	33%	4-015-21405	4-015-21415	B/50
DN 125	PLA-125-450	160-110	450	33%	4-015-21517	-	B/50
DN 150	PLA-170-450	205-140	450	33%	4-015-21406	4-015-21416	B/50
DN 200	PLA-230-450	260-180	450	33%	4-015-21510	4-015-21507	B/50
DN 250	PLA-280-450	315-211	450	33%	4-015-21511	4-015-21508	B/50
DN 300	PLA-315-450	360-245	450	33%	4-015-21512	4-015-21509	B/50

For sizes above DN 300 shrink sleeves (ready-made K-60 B/GTS-50 rolled goods) are available.
Other lengths upon request. Subject to changes. DVGW approved.

PRODUCT DESCRIPTIONS / TYPES

Heat shrink tubular sleeve, high-shrinking

for couplings, screw connections and much more.

Nominal size	Type	Shrinking range in mm	Width in mm	Shrink rate approx.	Art. No. black	DIN 30672 EN 12068
DN 20 + coupling	PMA-40-15	45-12	1500	65%	4-015-21472	C/50
	PMA-55-20	55-20	1500	65%	4-015-21474	C/50
DN 25 + coupling	PMA-70-25	70-25	1500	65%	4-015-21436	C/50
DN 32/40 + coupling	PMA-90-30	90-30	1500	65%	4-015-21437	C/50
DN 50/65 + coupling	PMA-120-40	120-40	1500	65%	4-015-21453	C/50
DN 80 + coupling	PMA-170-80	170-70	450	65%	4-015-21421	C/50
DN 100 + coupling	PMA-200-100	200-100	450	50%	4-015-21422	C/50
DN 150 + coupling	PMA-255-130	255-130	450	50%	4-015-21439	C/50

Other lengths upon request. Subject to changes. DVGW approved.

Socket coating (Type Tyton, Fuchs etc.)

with heat shrinking tubes

Nominal size	Type	Shrinking range in mm	Width in mm	Shrink rate approx.	Art. No. black	DIN 30672 EN 12068
DN 80	K-60 HS150-170-85	170-85	300	50%	4-015-21423	C/30-M
DN 100/125	K-60 HS150-230-110	230-110	300	50%	4-015-21424	C/30-M
DN 150	K-60 HS150-270-160	270-160	300	41%	4-015-21425	C/30-M
DN 200	K-60 HS150-335-165	335-165	300	50%	4-015-21426	C/30-M
DN 250	K-60 HS150-395-255	395-255	300	33%	4-015-21427	C/30-M
DN 300	K-60 HS150-455-285	455-285	300	33%	4-015-21428	C/30-M
DN 400	K-60 HS150-550-340	550-340	300	40%	4-015-21417	C/30-M

For sizes above DN 80 we also offer shrink sleeves (ready-made K-60 HS70)
Other lengths upon request. Subject to changes. DVGW approved with sleeve testing.

PRODUCT DESCRIPTIONS / TYPES

Shrink Sleeves ready-made

Ready-made sleeves are the most practical solution for large quantities with the same dimensions. Valuable working time is saved because no additional work steps such as cutting to size or applying the closures are required any more. High shrink rates are required when there are extreme changes in the cross-section (such as for flanges and sockets), low shrink rates are required for welded seam coating.

Please note:
Subsequent installation possible!

Subsequent flange coating with
a ready-made shrink sleeve*
from DN 50 to DN 200, width 300 mm,
with integrated closure
DN 250 - 500, width 450 mm; > DN 600 width 650 mm,
K-60 HS70 with a separate closure
Material thickness after complete shrinkage
K-60 HS200 5.9 mm, K-60 HS70 3.5 mm

Nominal size	Type	Shrink rate	Art. No. black	DIN 30672 / EN 12068
DN 50-65	K-60 HS200-65-660-300	65%	4-015-21440	C/30
DN 80-100	K-60 HS200-65-760-300	65%	4-015-21442	C/30
DN 125-150	K-60 HS200-65-970-300	65%	4-015-21444	C/30
DN 200	K-60 HS200-65-1200-300	65%	4-015-21445	C/30
DN 250	K-60 HS70-450-1400	41%	4-015-S21315	C/30
DN 300	K-60 HS70-450-1600	41%	4-015-S21316	C/30
DN 350	K-60 HS70-450-1900	41%	4-015-S21317	C/30
DN 400	K-60 HS70-450-2100	41%	4-015-S21318	C/30
DN 500	K-60 HS70-450-2500	41%	4-015-S21319	C/30
DN 600	K-60 HS70-650-2800	41%	4-015-S21320	C/30
DN 700	K-60 HS70-650-3200	41%	4-015-S21321	C/30
DN 800	K-60 HS70-650-3600	41%	4-015-S21322	C/30
DN 900	K-60 HS70-650-3900	41%	4-015-S21323	C/30
DN 1000	K-60 HS70-650-4300	41%	4-015-S21324	C/30
DN 1200	K-60 HS70-650-5000	41%	4-015-S21325	C/30

For flanges DN 200 and above, shrink sleeves (ready-made K-60 HS70 rolled goods) and separate closures are available.
Other lengths upon request. Subject to changes. DVGW approved.

PRODUCT DESCRIPTIONS / TYPES

Subsequent coating of welded seams

with a ready-made wrapid sleeve
width 450 mm, including a separate closure.

Nominal size	Type	Shrink rate approx.	Art. No. black	Art. No. yellow	DIN 30672 EN 12068
DN 80	K-60 B-450-400	23%	4-015-S21371	4-015-S21381	C/30
DN 100	K-60 B-450-500	23%	4-015-S21372	4-015-S21382	C/30
DN 125-150	K-60 B-450-700	23%	4-015-S21373	4-015-S21383	C/30
DN 200	K-60 B-450-800	23%	4-015-S21374	4-015-S21384	C/30
DN 250	K-60 B-450-1000	23%	4-015-S21375	4-015-S21385	C/30
DN 300	K-60 B-450-1200	23%	4-015-S21376	4-015-S21386	C/30
DN 400	K-60 B-450-1500	23%	4-015-S21377	4-015-S21387	C/30
DN 500	K-60 B-450-1800	23%	4-015-S21378	4-015-S21388	C/30
DN 600	K-60 B-450-2200	23%	4-015-S21379	4-015-S21389	C/30
DN 700	K-60 B-450-2500	23%	4-015-S21380	4-015-S21390	C/30
DN 800	K-60 B-450-2800	23%	4-015-S21430	upon request	C/30
DN 900	K-60 B-450-3100	23%	4-015-S21431	upon request	C/30
DN 1000	K-60 B-450-3400	23%	4-015-S21432	upon request	C/30
DN 1100	K-60 B-450-3700	23%	4-015-S21433	upon request	C/30
DN 1200	K-60 B-450-4100	23%	4-015-S21434	upon request	C/30

For welded seams DN 80 and above shrink sleeves (ready-made K-60 B or GTS-50 rolled goods) and separate closures are available. Also available as rolled goods. Other lengths upon request. Subject to changes. DVGW approved.

Nominal size	Type	Shrink rate approx.	Art. No. black	DIN 30672 EN 12068
DN 80	GTS-50-450-400	23%	4-015-S21391	C/50
DN 100	GTS-50-450-500	23%	4-015-S21392	C/50
DN 125-150	GTS-50-450-700	23%	4-015-S21393	C/50
DN 200	GTS-50-450-800	23%	4-015-S21394	C/50
DN 250	GTS-50-450-1000	23%	4-015-S21395	C/50
DN 300	GTS-50-450-1200	23%	4-015-S21396	C/50
DN 400	GTS-50-450-1500	23%	4-015-S21397	C/50
DN 500	GTS-50-450-1800	23%	4-015-S21398	C/50
DN 600	GTS-50-450-2200	23%	4-015-S21399	C/50
DN 700	GTS-50-450-2500	23%	4-015-S21400	C/50
DN 800	GTS-50-450-2800	23%	4-015-S21440	C/50
DN 900	GTS-50-450-3100	23%	4-015-S21441	C/50
DN 1000	GTS-50-450-3400	23%	4-015-S21442	C/50
DN 1100	GTS-50-450-3700	23%	4-015-S21443	C/50
DN 1200	GTS-50-450-4100	23%	4-015-S21444	C/50

For welded seams DN 80 and above shrink sleeves (ready-made K-60 B or GTS-50 rolled goods) and separate closures are available. Also available as rolled goods. Other lengths upon request. Subject to changes. DVGW approved.

PRODUCT DESCRIPTIONS / TYPES

Subsequent coating welding seams for fibre cement coated steel pipes

with heat shrinking tube type K-60 HS150, width 360 mm.

Nominal size	Type	Shrinking range in mm	Width in mm	Shrink rate approx.	Art. No.	DIN 30672 EN 12068
DN 80/100	K-60 HS150 170/80	170-80	360	60%	4-015-21595	C/30
DN 125/150	K-60 HS150 200/100	200-100	360	50%	4-015-21596	C/30
DN 200	K-60 HS150 260/160	260-160	360	40%	4-015-21597	C/30
DN 250	K-60 HS150 310/195	310-195	360	33%	4-015-21598	C/30
DN 300	K-60 HS150 380/230	380-230	360	40%	4-015-21599	C/30
DN 350	K-60 HS150 420/265	420-265	360	33%	4-015-21600	C/30

Also available shrink sleeves (GTS-50) for retrofitting.
Other lengths upon request. Subject to changes.

Subsequently coating welding seams for fibre cement coated steel pipes

with shrink sleeve type GTS-50, width 370 mm, incl. special sealing tape.

Nominal size	Type	Shrink rate	Art. No. black	DIN 30672 / EN 12068
DN 80	GTS-50-370-400	23%	4-015-S21480	C/50
DN 100	GTS-50-370-500	23%	4-015-S21483	C/50
DN 125-150	GTS-50-370-700	23%	4-015-S21484	C/50
DN 200	GTS-50-370-800	23%	4-015-S21485	C/50
DN 250	GTS-50-370-1000	23%	4-015-S21486	C/50
DN 300	GTS-50-370-1200	23%	4-015-S21487	C/50
DN 400	GTS-50-370-1500	23%	4-015-S21488	C/50
DN 500	GTS-50-370-1800	23%	4-015-S21489	C/50
DN 600	GTS-50-370-2200	23%	4-015-S21494	C/50
DN 700	GTS-50-370-2500	23%	4-015-S21497	C/50
DN 800	GTS-50-370-2800	23%	4-015-S21510	C/50
DN 900	GTS-50-370-3100	23%	4-015-S21511	C/50
DN 1000	GTS-50-370-3400	23%	4-015-S21512	C/50
DN 1100	GTS-50-370-3700	23%	4-015-S21513	C/50
DN 1200	GTS-50-370-4100	23%	4-015-S21514	C/50

For welded seams ≥ DN 80 PSI offers GTS-50 sleeves with a special sealing tape, also available as rolled goods.
Other lengths upon request. Subject to changes. DVGW approved.

PRODUCT DESCRIPTIONS / TYPES

Rolled goods shrink sleeves

Rolled goods shrink sleeves are designed for various applications - and easy to use. PSI offers both, high- and low shrinking material. Simple subsequent coating of welded seams or extreme pipe transitions with changing types of pipes and pipe diameters, ends, sockets or flange connections can be reliably and permanently coated. This requires a separate closure. Rolled goods are suitable from a nominal diameter of DN 80, whereby different shrink rates and widths can be selected. The material can be cut manually off the roll, which gives the user great flexibility. You only need a single material for the various applications and nominal diameters which reduces storage costs considerably.

Rolled goods shrink sleeves
for welded seams 30 m roll, width 370 mm, 450 mm, 600 mm, 900 mm, with separate closures, CLH-100-xxx to DN 400, CLH-100-xxx from DN 400, material thickness with adhesive K-60 B/GTS-50 in delivery state 2.8 mm, after complete shrinkage 3.3 mm.

Rolled goods shrink sleeves
for welded seams with continuous operating temperatures of 65 °C or 80 °C, 30 m roll, width 450 mm, with separate closure, CLH-100-450 to DN 400, CLH-150-450 from DN 400, material thickness with adhesive GTS 65/GTS 80 in delivery state 1.9 mm, after complete shrinkage 2.5 mm. GTS 80 only approved as a three-layer system (Epoxy-Primer-Kit) DIN/DVGW.

	Type	Width in mm	Shrink rate	Art. No. black	Art. No. yellow	DIN 30672 EN 12068
Bulk roll	K-60 B-370-30	370	23%	4-015-21330	-	C/50
Bulk roll	K-60 B-450-30	450	23%	4-015-21332	4-015-21342	C/30
Bulk roll	K-60 B-450-30	450	23%	4-015-21336	-	C/50
Bulk roll	GTS 65-450-30	450	23%	4-015-21340	-	C/60
Bulk roll	GTS 80-450-30	450	23%	4-015-21341	-	C/80
Epoxy primer	Epoxy-Primer-Kit 170 ml	-	-	4-015-21490	-	-
Closure	CLH-100-370	370	-	4-015-21345	-	-
	CLH-150-370	370	-	4-015-21346	-	-
	CLH-100-450	450	-	4-015-21352	4-015-21362	-
	CLH-150-450	450	-	4-015-21358	-	-
Bulk roll	K-60 B-900-15	900	23%	4-015-21344	-	C/30
Bulk roll	K-60 B-600-30	600	23%	4-015-21343	-	C/30
Bulk roll	GTS-50-600-30	600	23%	4-015-21337	-	C/50
Closure	CLH-100-600	600	-	4-015-S21364	-	-
	CLH-150-600	600	-	4-015-S21353	-	-
	CLW-100-900	900	-	4-015-S21357	-	-
Closure can be welded 15 m roll	CLW-100-15	100	-	4-015-21663	-	-

Other lengths upon request. Subject to changes. DVGW approved.

PRODUCT DESCRIPTIONS / TYPES

Socket coating (Type Tyton, Fuchs etc.)

with shrink sleeve, rolled goods,
ready-made, with separate closure
30 m roll, width 300 mm

	Type	Shrink rate	Art. No. black	DIN 30672 / EN 12068
Bulk roll	K-60 HS70-300-30	41%	4-015-21451	C/30-M
Seal ≤ DN 400	CLH-100-300	-	4-015-S21363	-
Seal ≥ DN 400	CLH-150-300	-	4-015-S21359	-

Other lengths upon request. Subject to changes. DVGW approved.

Nominal size	Type	Shrink rate	Art. No. black	DIN 30672 / EN 12068
DN 150	K-60 HS70-300-800	41%	4-015-S21305	C/30
DN 200	K-60 HS70-300-1000	41%	4-015-S21306	C/30
DN 250	K-60 HS70-300-1200	41%	4-015-S21307	C/30
DN 300	K-60 HS70-300-1400	41%	4-015-S21308	C/30
DN 350	K-60 HS70-300-1600	41%	4-015-S21309	C/30
DN 400	K-60 HS70-300-1800	41%	4-015-S21310	C/30
DN 500	K-60 HS70-300-2100	41%	4-015-S21311	C/30

Other lengths upon request. Subject to changes. DVGW approved with sleeve testing.

Shrink sleeve, rolled goods, high-shrinking

for welded seam, flange ≥ DN 200, casing pipe end, vitrified clay pipe, 30m rolled goods with separate closure, width 650 mm, 450 mm

	Type	Width in mm	Shrink rate	Art. no, black	DIN 30672 / EN 12068
Bulk roll	K-60 HS70-650-30	650	41%	4-015-21334	C/30
Closure	CLH-100-650	650	-	4-015-21354	-
	CLH-150-650	650	-	4-015-21355	-
Bulk roll	K-60 HS70-450-30	450	41%	4-015-21450	C/30
Closure	CLH-100-450	450	-	4-015-21352	-
	CLH-150-450	450	-	4-015-21358	-

Other lengths upon request. Subject to changes. DVGW approved.

PRODUCT DESCRIPTIONS / TYPES

Shrink tape rolled goods

Subsequent coating of pipe bends is the primary use of WrapidTape HCA. Pipe bends are coated by wrapping them with tape. This protects pipe bends or welded seams from corrosion by tightly sealing them with only once 50% overlap after shrinking. The shrink tape is also suitable for securely and permanently coating welded seams and pipe branches.

Coating pipe bends

with shrink tape 15 m roll
Width 37 mm, 50 mm, 75 mm or 100 mm

Nominal size	Type	Width in mm	Shrink rate	Art. No. black	DIN 30672 / EN 12068
DN 25-65	WrapidTape HCA-37-15	37	26%	4-015-21515	C/30 (50)
DN 80-150	WrapidTape HCA-50-15	50	26%	4-015-21513	C/30 (50)
DN 200-250	WrapidTape HCA-75-15	75	26%	4-015-21506	C/30 (50)
DN 250-300	WrapidTape HCA-100-15	100	26%	4-015-21514	C/30 (50)
Fixing tape for WrapidTape HCA, 50 x 450 mm				4-015-S21520	-

Other lengths upon request. Subject to changes. DVGW approved.

Material requirements for 3D bends and 5D bends

	3D bend		5D bend	
Nominal size	Type	Tape length	Type	Tape length
DN 25	WrapidTape HCA-37	3.10 m	WrapidTape HCA-37	3.40 m
DN 40	WrapidTape HCA-37	4.80 m	WrapidTape HCA-37	5.40 m
DN 50	WrapidTape HCA-37	6.30 m	WrapidTape HCA-50	7.30 m
DN 80	WrapidTape HCA-50	7.50 m	WrapidTape HCA-50	9.00 m
DN 100	WrapidTape HCA-50	10.60 m	WrapidTape HCA-50	13.20 m
DN 125	WrapidTape HCA-50	16.20 m	WrapidTape HCA-50	21.00 m
DN 150	WrapidTape HCA-50	21.90 m	WrapidTape HCA-50	28.90 m
DN 200	WrapidTape HCA-75	23.00 m	WrapidTape HCA-75	22.90 m
DN 250	WrapidTape HCA-75	25.00 m	WrapidTape HCA-100	30.00 m
DN 300	WrapidTape HCA-100	27.30 m	WrapidTape HCA-100	37.60 m

Larger nominal sizes can be coated with K-60 B/A.
If the welded seams at the bend are also coated with WrapidTape HCA, please add corresponding lengths.

PRODUCT DESCRIPTIONS / TYPES

Repair material for factory coatings

With CRPN repair plasters repairs to PE factory coatings are no longer a problem. Repairs can be carried out selectively and cost-effectively. Fill holes with CRPN filler. Repair work with CRPN only requires one worker, even with large pipe dimensions. You can use the hot-melt stick to fill small areas of damage on the factory coating. CRPN is also highly suitable for coating welded-on electrodes (e.g. PIN bracing or CAD-Weld). This evenly fills the transition from the welded-on electrodes to the pipe with filler.

Repair plasters, ready-made kit

Ø 148 mm with filler and emery cloth

Type	Art. No. black	DIN 30672 / EN 12068
CRPN kit	4-015-21479	C/50

Repair plaster, rolled goods

for repairing factory coating
15 m roll, width 150, 300, 450 mm
Thickness 2.0 mm

Type	Art. No. black	Art. No. yellow	DIN 30672 EN 12068
CRPN-150-15	4-015-21484	4-015-21499	C/50
CRPN-300-30	4-015-21496	-	C/50
CRPN-450-30	4-015-21497	-	C/50

Other lengths upon request. Subject to changes. DVGW approved.

Hot-melt stick

for small repairs on factory coating,
Ø 10 mm, length 300 mm

Type	Art. No. black
Hot-melt Stick	4-015-21488

Subject to changes.

PRODUCT DESCRIPTIONS / TYPES

LRKN shrink tape sealing sleeve

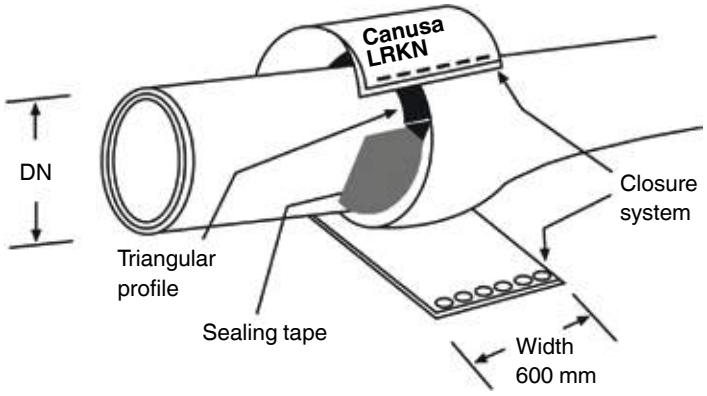
To seal leaky packed and screw gland socket joints up to 100 mbar.

Sleeve for subsequent installation with integrated closure system (width 600 mm).

Including triangular profile and sealing tape for sealing and filling the transition from socket to pipe. LRKN remains flexible after installation, which is important when subject to vibrations caused by traffic loads or temperature fluctuations. An unique closure system provides very easy installation.

DN	Type	Shrinking range in mm	Art. No.
50/60	LRKN-60-450	160/55	4-015-21460
80	LRKN-80-600	185/65	4-015-21461
100	LRKN-100-600	225/80	4-015-21462
125/150	LRKN-150-600	300/110	4-015-21463
200	LRKN-200-600	370/140	4-015-21464
250	LRKN-250-600	450/180	4-015-21465
300	LRKN-300-600	510/200	4-015-21466
350	LRKN-350-600	560/225	4-015-S21467
400	LRKN-400-600	620/250	4-015-S21468
450	LRKN-450-600	675/270	4-015-S21469
500	LRKN-500-600	725/290	4-015-S21470
600	LRKN-600-600	860/340	4-015-S21471

Corresponds to DIN 30658 up to 100 mbar.



PRODUCT DESCRIPTIONS / TYPES

Shrink cap

for sealing cables and pipe ends to be dust and moisture-proof, with inside adhesive

D1
Supply size

L

D2
Size once shrunk

Type	Art. No.	D1 in mm	D2 in mm	L in mm
EK 75/40	4-015-21532	75	40	140
EK 115/75	4-015-21533	115	75	135
EK 145/80	4-015-21534	145	65	170
EK 165/71	4-015-21535	165	71	170
Sealing tape	4-015-21666	Roll 1 mm x 40 mm x 30 metres		

PSI HEAT SHRINK PRODUCTS

FOR DISTRICT HEATING PIPES (SYSTEM CANUSA)

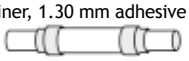
certified EN489 tested

WWW.PSI-PRODUCTS.COM

PRODUCT APPLICATION MATRIX

Pre-insulated pipes/Nominal size →

All widths specified in mm

Application	65	75	90	110	125	140	160	180
Socket coating with SuperSeal heat shrinking tube Delivery state: 0.53 mm retainer, 0.75 mm adhesive Shrink rate: 33% Pipe bedding: Sand 			SuperSeal -90-150 Width 150 Art. No. 4-015-21700	SuperSeal -110-150 Width 150 Art. No. 4-015-21701	SuperSeal -125-150 Width 150 Art. No. 4-015-21702	SuperSeal -140-150 Width 150 Art. No. 4-015-21703	SuperSeal -160-150 Width 150 Art. No. 4-015-21704	SuperSeal -180-150 Width 150 Art. No. 4-015-21705
Socket coating with SuperSeal ready-made shrink sleeve Delivery state: 0.63 mm retainer, 0.87 mm adhesive Shrink rate: 23% Pipe bedding: Sand 			SuperSeal -90-150 Width 150 Art. No. 4-015-21560	SuperSeal -110-150 Width 150 Art. No. 4-015-21561	SuperSeal -125-150 Width 150 Art. No. 4-015-21562	SuperSeal -140-150 Width 150 Art. No. 4-015-21563	SuperSeal -160-150 Width 150 Art. No. 4-015-21564	SuperSeal -180-150 Width 150 Art. No. 4-015-21565
Socket coating with SuperSeal ready-made shrink sleeve Delivery state: 0.90 mm retainer, 1.30 mm adhesive Shrink rate: 23% Pipe bedding: Recycling material or sand with maximum pipe movement 								
Socket coating with SuperSeal shrink sleeve rolled goods Delivery state: 0.63 mm retainer, 0.87 mm adhesive Shrink rate: 23% Pipe bedding: Sand CLW closure 15 m roll, width 100 mm 	SuperSeal-150-30, 30 m roll, width 150 mm, Art. No. 4-015-21590 CLW-100-15 closure rolled goods, Art. No. 4-015-21663							
Socket coating with SuperSeal shrink sleeve rolled goods Delivery state: 0.90 mm retainer, 1.30 mm adhesive Shrink rate: 23% Pipe bedding: Recycling material or sand with maximum pipe movement CLW closure 15 m roll, width 100 mm	SuperSeal-150-30, 30 m roll, width 150 mm, Art. No. 4-015-21650 CLW-100-15 closure rolled goods, Art. No. 4-015-21663							
Socket coating with SuperSeal shrink sleeve rolled goods, special widths Delivery state: 0.90 mm retainer, 1.30 mm adhesive Shrink rate: 23% Pipe bedding: Recycling material or sand with maximum pipe movement CLW closure 15 m roll, width 100 mm 								
Casing pipe end protection sleeve CSS shrink caps 	Steel pipe 17.2/21.3 CSS 10 Art. No. 4-015-21681	Steel pipe 17.2/21.3 CSS 10 Art. No. 4-015-21681	Steel pipe 17.2/21.3 CSS 10 Art. No. 4-015-21681	Steel pipe 17.2/21.3 CSS 20 Art. No. 4-015-21682	Steel pipe 17.2/21.3 CSS 20 Art. No. 4-015-21682	Steel pipe 33.7/42.2/ 48.3 CSS 60 Art. No. 4-015-21686	Steel pipe 33.7/42.2/ 48.3 CSS 60 Art. No. 4-015-21686	Steel pipe 60.3/76.1/ 88.9 CSS 80 Art. No. 4-015-21688
			Steel pipe 26.9/33.7 CSS 30 Art. No. 4-015-21683	Steel pipe 26.9/33.7/ 48.3 CSS 40 Art. No. 4-015-21684	Steel pipe 26.9/33.7/ 42.2/48.3 CSS 50 Art. No. 4-015-21685	Steel pipe 60.3/76.1 CSS 70 Art. No. 4-015-21687	Steel pipe 60.3/76.1/ 88.9 CSS 80 Art. No. 4-015-21688	Steel pipe 88.9/114.3 CSS 90 Art. No. 4-015-21689
					Steel pipe 60.3/76.1 CSS 70 Art. No. 4-015-21687	Steel pipe 60.3/76.1/ 88.9 CSS 80 Art. No. 4-015-21688		Steel pipe 88.9/114.3/ 139.7 CSS 100 Art. No. 4-015-21690
Socket sealing with butyl sealing tape 								
Foam hole closure with CFS foam hole closure 								
Foam hole closure with FP screw cap 								
Socked centering with wedge-shaped tape (foam tight, permeable to gas) 								
Heat shrinking tube for monitoring cable with inside adhesive 1.20 m lengths								

PRODUCT APPLICATION MATRIX

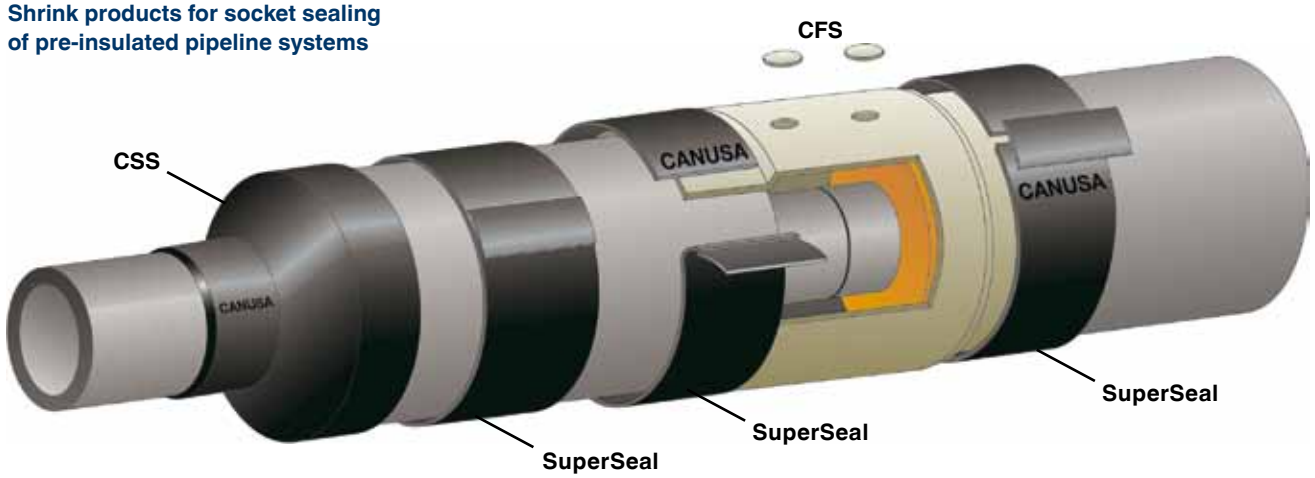
Pre-insulated pipes/Nominal size →

All widths specified in mm

200	225	250	280	315	355	400	450	500	560	630	670	710	800
SuperSeal -200-150 Width 150 Art. No. 4-015-21706	SuperSeal -225-150 Width 150 Art. No. 4-015-21707	SuperSeal -250-150 Width 150 Art. No. 4-015-21708	SuperSeal -280-150 Width 150 Art. No. 4-015-21709	SuperSeal -315-225 Width 225 Art. No. 4-015-21710	SuperSeal -355-225 Width 225 Art. No. 4-015-21711								
SuperSeal -200-150 Width 150 Art. No. 4-015-21566	SuperSeal -225-150 Width 150 Art. No. 4-015-21567	SuperSeal -250-150 Width 150 Art. No. 4-015-21568	SuperSeal -280-150 Width 150 Art. No. 4-015-21569	SuperSeal -315-225 Width 225 Art. No. 4-015-21570	SuperSeal -355-225 Width 225 Art. No. 4-015-21571								
						SuperSeal -400-225 Width 225 Art. No. 4-015-21628	SuperSeal -450-225 Width 225 Art. No. 4-015-21630	SuperSeal -500-225 Width 225 Art. No. 4-015-21632	SuperSeal -560-225 Width 225 Art. No. 4-015-21634	SuperSeal -630-300 Width 300 Art. No. 4-015-21639	SuperSeal -670-300 Width 300 Art. No. 4-015-21640	SuperSeal -710-300 Width 300 Art. No. 4-015-21641	SuperSeal -800-300 Width 300 Art. No. 4-015-21642
									upon request →				
		SuperSeal-225-30, 30 m roll, width 225 mm, Art. No. 4-015-21591 CLW-100-15 closure rolled goods, Art. No. 4-015-21663											
		SuperSeal-225-30, 30 m roll, width 225 mm, Art. No. 4-015-21651 CLW-100-15 closure rolled goods, Art. No. 4-015-21663						SuperSeal-300-30, 30 m roll, width 300 mm, Art. No. 4-015-21654 CLW-100-15 closure rolled goods, Art. No. 4-015-21663					
SuperSeal-450-30, 30 m roll, width 450 mm, Art. No. 4-015-21653 SuperSeal-650-30, 30 m roll, width 650 mm, Art. No. 4-015-21652 SuperSeal-760-30, 15 m roll, width 760 mm, Art. No. 4-015-21655 SuperSeal-900-30, 15 m roll, width 900 mm, Art. No. 4-015-21656 CLW-100-15 closure rolled goods, Art. No. 4-015-21663 SuperSeal-special widths on request													
Steel pipe 88.9/114.3 CSS 90 Art. No. 4-015-21689	Steel pipe 88.9/114.3 CSS 90 Art. No. 4-015-21689	Steel pipe 88.9/114.3/ 139.7 CSS 100 Art. No. 4-015-21690	Steel pipe 139.7/168.3 CSS 110 Art. No. 4-015-21691	Steel pipe 139.7/168.3/ 193.7/219.1/ 244.5 CSS 120 Art. No. 4-015-21692	Steel pipe 219.1/244.5/ 273.0 CSS 130 Art. No. 4-015-21693	Steel pipe 219.1/244.5/ 273.0 CSS 130 Art. No. 4-015-21693	Steel pipe 219.1/244.5/ 273.0/323.9/ 355.6/406.4 CSS 140 Art. No. 4-015-21694	Steel pipe 219/244.5/ 273.0/323.9/ 355.6/406.4 CSS 140 Art. No. 4-015-21694	Steel pipe 273.0/323.9/ 355.6 CSS 150 Art. No. 4-015-21695	Steel pipe 273.0/323.9/ 355.6 CSS 150 Art. No. 4-015-21695			
Steel pipe 88.9/114.3 139.7 CSS 100 Art. No. 4-015-21690	Steel pipe 88.9/114.3 139.7 CSS 100 Art. No. 4-015-21690	Steel pipe 139.7/168.3 CSS 110 Art. No. 4-015-21691	Steel pipe 139.7/168.3/ 193.7/219.1/ 244.5 CSS 120 Art. No. 4-015-21692			Steel pipe 219.1/244.5/ 273.0/323.9/ 355.6/406.4 CSS 140 Art. No. 4-015-21694	Steel pipe 273.0/323.9/ 355.6 CSS 150 Art. No. 4-015-21695	Steel pipe 273.0/323.9/ 355.6 CSS 150 Art. No. 4-015-21695					
						Steel pipe 273.0/323.9/ 355.6 CSS 150 Art. No. 4-015-21695							
Sealing tape 1 x 40 mm x 30 m, Art. No. 4-015-21666													
CFS-1-94, Art. No. 4-015-21670													
Diameter 29-30 mm, Art. No. 4-015-21752													
Thickness 3 mm, Art. No. 4-015-21750 Thickness 5 mm, Art. No. 4-015-21751 Thickness 8 mm, Art. No. 4-015-21749													
CPA-(3/1 mm)-1200 mm, black Art. No. 4-015-21720, clear Art. No. 4-015-21721 CPA-(4/1 mm)-1200 mm, black Art. No. 4-015-21716, clear Art. No. 4-015-21717 CPA-(24/8 mm)-1200 mm, black Art. No. 4-015-21722, clear Art. No. 4-015-21723 CPA-(39/13 mm)-1200 mm, black Art. No. 4-015-21724, clear Art. No. 4-015-21725													

PRODUCT DESCRIPTION

Shrink products for socket sealing of pre-insulated pipeline systems



Canusa-CPS is one of the leading manufacturers of polymerized heat shrink products, which have been used successfully for more than 30 years for sealing or providing corrosion protection in pipe connections, pipe segments and molded parts. All Canusa-CPS products represent high quality materials and are manufactured in compliance with the highest quality standards. This means they effectively support the application and processing of our customers.

Canusa Superseal™ products are particularly high performance, heat shrinkable products for sealing sockets on pre-insulated pipeline systems. They have been especially developed for casing pipes and sockets made of HDPE and for use in pipeline and operating systems (e.g. district heating systems) where strong sand abrasion forces and large pipe movements are to be expected in the ground.

Properties and advantages

Flexible and reliable installation
In terms of flexible application, Canusa Superseal™ products are available in three different configurations:

1 The patented Wrapid Sleeve™ SuperSeal are ready-to-fit shrink sleeves with a closure already integrated. It ensures quick and reliable processing.

2 Canusa Wrap™ SuperSeal are Wrapid Tapes available as rolled goods with a separate closure. The required shrink sleeve length can be directly cut to size on site for any pipe diameter. This flexibility offers the advantages of cost-effective storage and great cost reduction on the construction site.

3 The Canusa Tube™ SuperSeal is a factory-manufactured, closed shrinking tube which can be installed on site quickly and reliably. It is supplied in a dirt and water-tight plastic bag to protect the hot-melt adhesive during construction phase.

Tested performance
All Canusa Superseal™ products have passed tests at independent district heating institutes according to EN 489 and are registered correspondingly. The performance data achieved in these tests by far exceeds the requirements and specifications demanded by the standard. In addition to this, the Canusa Superseal™ products were tested in accordance with EN 489 with increased requirements
• Sandpit: 1,000 cycles
• Water space: 40 °C, 100 kPa, 600 h
They passed the test without any difficulty. The recorded performance data even surpasses these higher requirements.

More content can be found at
www.psi-products.com

TYPE SELECTION

Typical product properties

	Test standard	Unit	Typical value
Softening point	ASTM E28	°C (°F)	85 (185)
Shear strength	DIN 30672	N/cm² (psi)	135 (196)
Specific weight	ASTM D792		0.93
Tensile strength	ASTM D638	MPa (psi)	24 (3480)
Elongation at break	ASTM D638	%	700
Nominal hardness	ASTM D2240	Shore D	48
Wear resistance	ASTM D1044	mg	35
Peel resistance	DIN 30672	N/cm (pli)	85 (49)
Sandpit test	EN 489	100/1000 cycles	passed
water absorption	ASTM D570	%	0.05
Brittle point	ASTM D2671	°C (°F)	-30 (-22)
water pressure testing	EN 489	100 kPa, 40° C, 600h	passed
Thickness - after complete shrinkage	PTP SuperSeal SuperSeal	mm (mils) mm (mils) mm (mils)	1.9 (77) 1.9 (77) 2.8 (111)

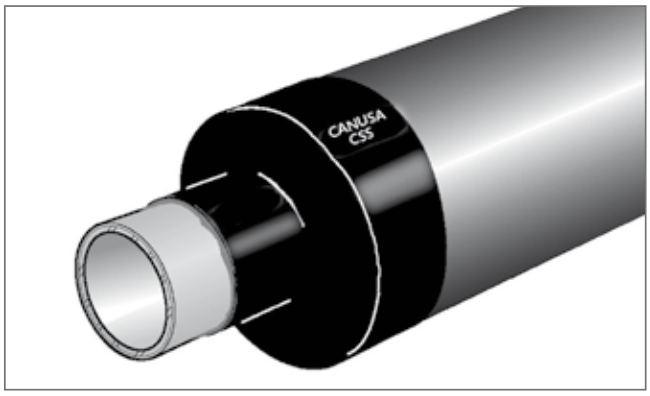
PRODUCT DESCRIPTION

Canusa end caps type CSS and CSS 2 are closed, heat shrinking end caps for pre-insulated pipes (e.g. district heating pipelines). The CSS or CSS 2 made of polymerized HDPE retainer material, which in connection with an extremely heat-resistant adhesive (media temperatures up to 135 °C) offers a very high quality seal of the front end of pipes against humidity or spray water.

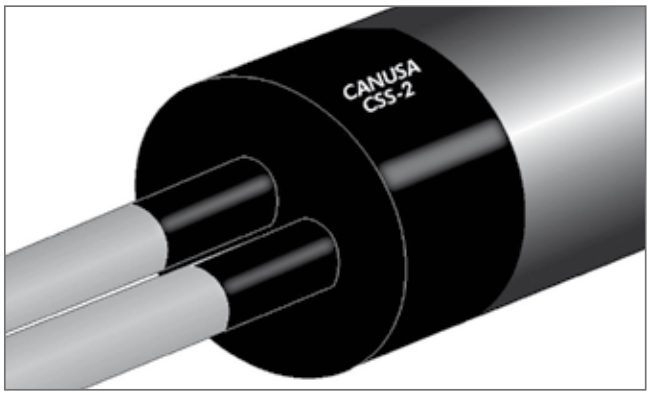
Properties and advantages

The Canusa end caps type CSS and CSS 2 have been developed to seal the front end of pre-insulated pipes or molded parts, to prevent humidity or spray water from penetrating the heat insulation. After pre-treating and preheating the surfaces on the carrier pipe and casing pipe to be sealed, the end cap shrinks under a gentle propane gas flame to the given contour of the front of the pipe. At the same time as the shrink process, the integrated adhesive is activated and an absolutely tight adhesive bond is created between carrier and casing pipe.

End cap type CSS



End cap type CSS 2



Typical product properties

Hot-melt adhesive

	Test standard	Unit	Typical value
Peel resistance	DIN 30672	N/cm	14
Shear resistance	DIN 30672	N/cm²	17

Retainer material PE-HD

	Test standard	Unit	Typical value
Tensile strength at 23 °C, 50 mm/min	ASTM D638	MPa	22
Elongation at break at 23 °C, 50 mm/min	ASTM D638	%	450
Heat ageing – elongation at 150 °C / 7 days	ASTM D638	%	375
Brittle point (25 mm mandrel)	ASTM D3111	°C	-70
Water absorption at 23 °C, 24 hours	ASTM D570	%	< 0.10

PRODUCT DESCRIPTION

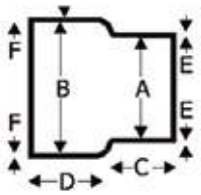
Product selection matrix end cap type CSS

CSS-XX

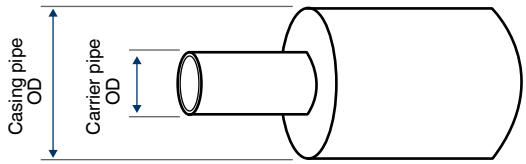
Size
Product name

Standard options

- see production selection table
- Canusa end caps – **CSS**



A = Carrier pipe side
B = Casing pipe side
C = Length
D = Length
E+F = Thickness of retainer material



CSS-Size	supplied		Completely shrunk		Length supplied		Thickness of retainer material supplied		Width Hot-melt adhe-sive
	A	B	A	B	C	D	E	F	
10	30	105	10	47	40	80	2.5	2.5	30
20	30	140	15	75	50	75	2.5	2.5	30
30	40	105	24	75	40	75	2.5	2.5	30
40	55	135	24	75	40	75	2.5	2.5	30
50	60	148	24	75	40	75	2.5	2.5	30
60	60	175	30	135	50	85	2.5	2.5	30
70	90	150	40	90	55	75	2.5	2.5	30
80	95	195	50	130	45	65	2.5	2.5	30
90	145	240	68	145	60	75	2.5	2.5	30
100	150	270	68	145	60	75	2.5	2.5	30
110	180	295	120	220	40	100	2.5	2.5	30
120	255	360	120	220	40	100	2.5	2.5	30
130	280	420	200	340	40	100	2.5	2.5	30
140	415	540	200	340	40	100	2.5	2.5	30
150	360	650	260	530	40	100	2.5	2.5	30

All data in mm

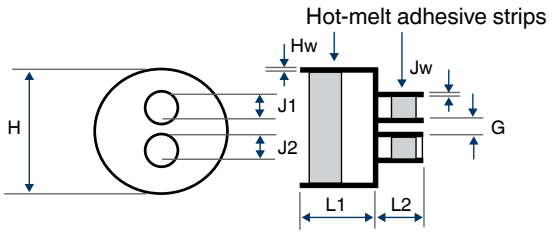
Product selection matrix end cap type CSS 2

CSS2-XX

Size
Product name

Standard options

- see production selection table
- Canusa end caps – **CSS 2**



		CSS 2 -10	CSS 2 -20	CSS 2 -30	CSS 2 -40	CSS 2 -50	CSS 2 -60	CSS 2 -70	CSS 2 -80	CSS 2 -90	CSS 2 -100
H	supplied	135	144	160	185	185	200	235	200	250	260
	shrunk	85	85	105	135	135	135	135	135	175	175
J1	supplied	28	34	60	48	34	48	60	62	85	105
	shrunk	10	19	24	24	24	24	24	50	55	55
J2	supplied	28	21	50	28	34	48	60	34	85	105
	shrunk	10	10	20	14	24	24	24	24	55	55
G	supplied	12	15	15	15	15	15	15	15	15	15
	shrunk	20	20	20	31	22	22	22	35	20	20
L1	shrunk	90	90	90	90	90	90	90	90	90	90
L2	shrunk	52	52	52	52	52	52	52	52	52	52
Hw	shrunk	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Jw	shrunk	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2

All data in mm

PRODUCT DESCRIPTION & TECHNICAL DATA

Properties

- Self-welding
- Good heat resistance
- High aging resistance

Applications

- Sealing tape, especially for pre-insulated pipesocket systems and shrink end caps
- Sealing tape for casing end seals

Technical data

Basis	high quality butyl rubber
Color	black
Density	1.7 (g/cm³) DIN 53479 B
Solids content	> 99 (%) IPM 5003
Peel resistance	approx. 30N/10 mm based on DIN 30672 / EN 12068 (tested under a tubular sleeve without adhesive)
Ageing resistance	very good if not directly exposed to the weather
Temperature resistance	-40 °C to +90 °C, no shrinking, drying out or becoming brittle. The short-term effects of high temperatures, e.g. during a usual shrink or de-aeration and draining process, does not have any effect on the functionality.
Shelf life	24 months
Storage	in original packaging optimally at 10 °C to 25 °C

How to use:

Manual handling	from 5 °C
Machine handling	Extrusion
Adhesive surfaces	the surfaces need to be intact, dry, clean and free of dust and grease, as well as free from any other adhesive-repellent components. **Caution:** for optimal adhesion, the surface needs to be roughened up and preheated to at least 40°C. For porous surfaces, the adhesive surfaces need to be primed with butyl primer.

Delivery sets

Strands	1 x 40 mm x 30 m, 1 x 50 mm x 30 m and 1.5 x 100 mm x 30 m Special profiles and textile inserts possible

Special information

Safety	Avoid contact with skin and eyes. Refer to material safety data sheet for more information. Risk of burns at high application temperatures. No hazard warnings required.
Disposal	As domestic or special waste, taking local regulations into consideration

ACCESSORIES FOR DISTRICT HEATING PIPELINES

PSI Casing End Seal Type FW

- **Allows** radial and axial movement
- **Pressure tight up to max**. 0.5 bar

Wall Penetration Seal Compakt Type FW

- Annular space press-ring seal against pressing water

- Labyrinth wall collar for pre-insulated pipes against non-pressing water

KEBU® PSI ANTI-CORROSION TAPES

WWW.PSI-PRODUCTS.COM

GENERAL INFORMATION

Kebu Petro-Tape A303 is a cold-processed anti-corrosion tape. It consists of polyolefin modified petroleum, a synthetic fibre inlay and laminated PE film.

The tape features good adhesion and elasticity as well as increased drip resistance. The laminated PE film has a high diffusion density, preventing the plastic compound from being rinsed out as a result of changes in the groundwater.

The Kebu Petro-Tape A303 applied in three layers meets the requirements of DIN EN 12068 and DIN 30 672, stress class A and maximum continuous operating temperature up to 30 °C.

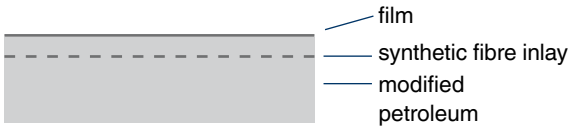
It is suitable for coating steel pipes as well as subsequently coating the area of welded seams on steel pipelines with factory coating. The coating is specified according to DIN EN 10329 Table 2.

By wrapping over the coating already meeting the standards with PE film, like Kebulen film PE 0.25 or Kebulen film PE 0.40, it is possible to significantly increase the mechanical strength regarding stamp impact and impact resistance.

Kebu Petro-Tape A303 is also suitable for coating fittings and flange connections when used with Kebu plast compound and the Kebu Rock Shield Nets PP 500/1000 in accordance with DIN 30 675 section 1 edition 1992, table 2.

Buildup

Kebu Petro-Tape A303
made of modified petroleum,
Synthetic fibre inlay approx. 100 g/m²
and laminated PE film.
No primer is required.



Delivery form

	Weight	Length per roll	Width
Kebu Petro-Tape A303	approx. 1.6 kg/m²	10 m	5 cm 10 cm 15 cm 20 cm 25 cm

More content can be found at
www.psi-products.com

GENERAL INFORMATION

Kebu Bitumen-Tape "Special" is a heat-processed anti-corrosion tape made of modified bitumen with a high softening and low break point.

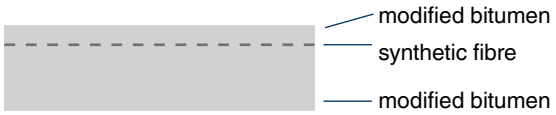
The retainer made of pre-moistened synthetic fibre (approx. 100 g/m²) gives the tape its characteristic high level of elasticity.

The tape is suitable for subsequent coating of factory-coated pipes and pipe fittings with a coating according to DIN EN 10329, Table 2, and also for coating steel pipelines and pipe fittings.

Buildup

Kebusol primer B III
Adhesive primer containing solvent
on the basis of bitumen and unsaponifiable resins.
Consumption: approx. 0.2 litres/m²
Drying time: approx. 3-5 minutes (on pre-heated surface)

Kebu Bitumen-Tape "special"
Warm processed anti-corrosion tape, approx. 4 mm thick with a retainer insert made of man-made fibre fabric.



Delivery form

	Consumption litres/m²	Container litres
Kebusol primer B III	approx. 0.2	1 / 5 / 10

	Weight kg/m²	Length/ Roll	Width
Kebu Bitumen-Tape "special"	approx. 5.2	10 m	10 cm
		10 m	15 cm
		10 m	20 cm
		10 m	25 cm

Fig. 1 **Single-layer coating**

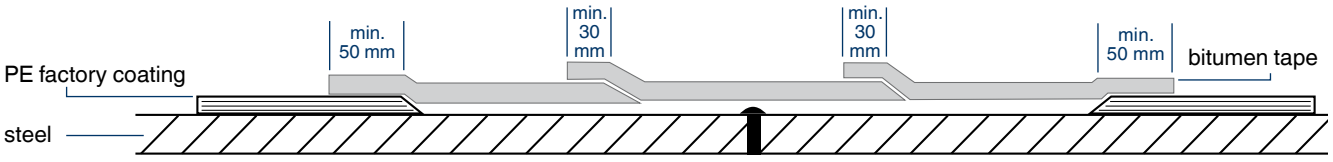


Fig. 2 **Two-layer coating**

GENERAL INFORMATION

The Kebu Bitumen-Tape GW is a warm processable, anti-corrosion tape made of modified bitumen with a high softening and low break point.

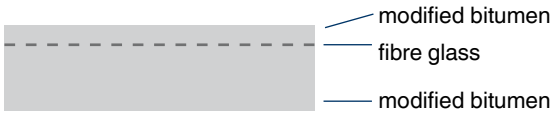
The retainer made of impregnated fibreglass (approx. 120 g/m$^{2)}$ gives the tape its characteristic high-level of strength.

The tape is suitable for subsequent coating of factory-coated pipes and molded pipe parts with a coating specified according to DIN EN 10329, Table 2, and also for coating steel pipelines, pipe fittings and repair spots where mechanical damage to the factory coating has occurred.

Assembly

Kebusol primer B III
Adhesive primer containing solvent
on the basis of bitumen and unsaponifiable resins.
Consumption: approx. 0.2 litres/m^2
Drying time: approx. 3-5 minutes (on pre-heated surface)

Kebu Bitumen-Tape GW
Anti-corrosion tape, approx. 4 mm thick which can be heat processed, with a fibreglass retainer approx. 120 g/m$^{2.}$



Delivery form

	Consumption litres/m^2	Container litres
Kebusol primer B III	approx. 0.2	approx. 1 / 5 / 10

	Weight kg/m^2	Length/ Roll	Width
Kebu Bitumen-Tape GW	approx. 5.2	10 m 10 m	10 cm 20 cm

Fig. 1 **Single-layer coating**

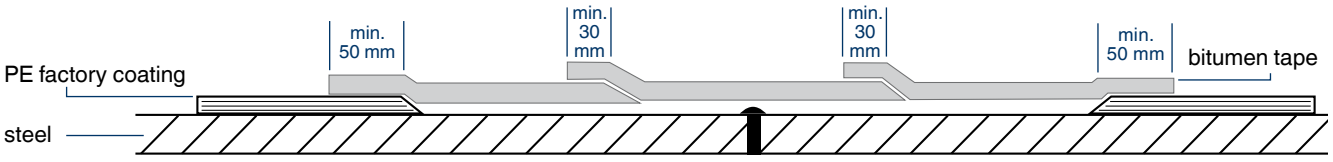
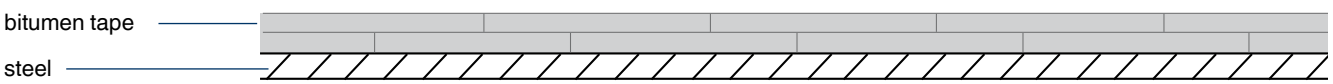


Fig. 2 **Two-layer coating**



GENERAL INFORMATION

The Kebulen Tape B 80-C is a cold-processed three-layer anti-corrosion tape. It is suitable for coating steel pipes as well as subsequently coating the area of welded seams on steel pipelines with factory coating. The coating is specified according to DIN EN 10329 Table 2.

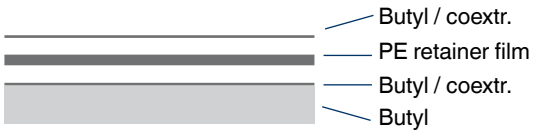
The Kebulen Tape B 80-C is designed asymmetrically so that enough butyl rubber (grey) is on the side facing to the pipe.
This largely eliminates the risk of cavities being formed. For excessively raised welding beads and edges on the factory coating, Kebutyl kit is available to level them out.

The co-extruded contact layer, black or yellow on the side away from the pipe, welds the wrappings together at the overlap areas, in order to create one homogenous layer. Due to its high resistance to water vapour and oxygen diffusion, the Kebulen tape B 80-C offers reliable corrosion protection.

Buildup

Kebutyl primer K III
Adhesive primer containing solvent.
A solution made of butyl rubber and unsaponifiable resins in an organic solvent.
Consumption: approx. 0.2 litres/m²
Drying time: approx. 3-5 minutes (on pre-heated surface)

Kebulen Tape B 80-C
Asymmetric three-layer anti-corrosion tape on a butyl rubber basis with a stabilized PE retainer film and a total thickness of approx. 0.8 mm.



Delivery form

	Consumption litres/m²	Container litres
Kebutyl primer K III	approx. 0.2	approx. 1 / 5

Kebulen Tape B 80-C	Length / Roll	Rolls/ Box	Width
black or yellow three-layer tape, polyethylene film on both sides coated asymmetrically with butyl rubber	15 m	9	30 mm
	15 m	6	50 mm
	15 m	3	100 mm

Material Assessment

To subsequently coat a welded connection with a 300 mm wide steel surface, put 50mm of the inner layer on both sides of the factory coating and create an overlap of inner and outer layer of 25mm.

DN	Outer diameter in mm	Kebutyl primer K III in litres	Kebulen tape B 80-C 2 x 50% overlap	
			Width	m²
200	219.1	0.06	100 mm	1.17
250	273.0	0.07	100 mm	1.46
300	323.9	0.09	100 mm	1.73
350	355.6	0.10	100 mm	1.90
400	406.4	0.11	100 mm	2.17
	419.0	0.11	100 mm	2.24
500	508.0	0.14	100 mm	2.72
	521.0	0.14	100 mm	2.78
600	609.6	0.17	100 mm	3.26
700	711.2	0.20	100 mm	3.80
800	812.8	0.23	100 mm	4.35
900	914.4	0.25	100 mm	4.89
1000	1016.0	0.28	100 mm	5.43
1100	1120.0	0.31	100 mm	5.98
1200	1220.0	0.34	100 mm	6.52

The quantities specified have been determined theoretically.

GENERAL INFORMATION

The Kebulen system B 30 is a cold-processed two-layer corrosion protection system. It is suitable for coating steel pipes as well as subsequently coating the area of the welded seams on steel pipelines with factory coating. The coating is specified according to DIN EN 10329 Table 2.

The Testo® Tape 1.5 (inner layer) welds together to make a homogeneous layer in the overlap area and forms a continuous tube. High plasticity and sufficient material thickness make it possible to create a coating without cavities even on complex molded parts. The mechanical protection (outer layer) is provided by a two-layer wrap with Kebulen film PE 0.40. Alternatively, a three-layer wrap with Kebulen film PE 0.25 can be created. The total thickness of the system in both cases is approx. 3.8 mm.

Due to its good processing characteristics and high steam and oxygen diffusion density, the Kebulen system B 30 offers reliable corrosion protection.

Buildup

Kebutyl primer K III
Adhesive primer containing solvent.
A solution made of butyl rubber and unsaponifiable resins in an organic solvent.
Consumption: approx. 0.2 litres/m²
Drying time: approx. 3-5 minutes (depending on the weather)

Testo® Tape 1.5
Anti-corrosion tape on a butyl rubber basis without PE film insert.

Kebulen film PE 0.40
Polyethylene film self-adhesive on one side

or alternatively

Kebulen film PE 0.25
Polyethylene film self-adhesive on one side

GENERAL INFORMATION

Delivery form

	Consumption per m² area	Container
Kebutyl primer K III	approx. 0.2 litres	approx. 1 / 5 litres

Testo® Tape 1.5	Length / roll	Rolls / box	Width
1.5 mm thick Butyl rubber tape	10 m	9	30 mm
	10 m	6	50 mm
	10 m	3	100 mm
	5 m	14	30 mm
	5 m	8	50 mm

Kebulen film PE 0.40	Length / roll	Rolls / box	Width
0.40 mm thick, black self-adhesive on one side polyethylene film	10 m	12	30 mm
	10 m	8	50 mm
	10 m	4	100 mm

Kebulen film PE 0.25	Length / roll	Rolls / box	Width
0.25 mm thick, black self-adhesive on one side polyethylene film	15 m	12	30 mm
	15 m	8	50 mm
	15 m	4	100 mm

Material Assessment

To subsequently coat a welded connection with a 300 mm wide steel surface, put 50mm of the inner layer on both sides of the factory coating an create an overlap of inner and outer layer of 25mm.

DN	Dimensi-ons Ø	Kebutyl primer K III	Testo® tape 1.5 50% overlap		Kebulen film PE 0.40 50% overlap		Kebulen film PE 0.25 1st wrap 25% overlap 2nd wrap 50% overlap	
			Width	0.40 m	Width	0.45 m	Width	0.45 m
1/2″	21.3 mm	0.006 ltr.	30 mm	0.05 m²	30 mm	0.06 m²	30 mm	0.09 m²
3/4″	26.9 mm	0.008 ltr.	30 mm	0.07 m²	30 mm	0.08 m²	30 mm	0.11 m²
1″	33.7 mm	0.010 ltr.	30 mm	0.09 m²	30 mm	0.10 m²	30 mm	0.14 m²
11/4″	42.4 mm	0.012 ltr.	30 mm	0.11 m²	30 mm	0.12 m²	30 mm	0.18 m²
11/2″	48.3 mm	0.014 ltr.	30 mm	0.12 m²	30 mm	0.14 m²	30 mm	0.20 m²
2″	60.3 mm	0.017 ltr.	30 mm	0.15 m²	30 mm	0.17 m²	30 mm	0.26 m²
100	108.0 mm	0.031 ltr.	50 mm	0.27 m²	50 mm	0.31 m²	50 mm	0.46 m²
	114.0 mm	0.032 ltr.	50 mm	0.29 m²	50 mm	0.33 m²	50 mm	0.48 m²
125	133.0 mm	0.038 ltr.	50 mm	0.34 m²	50 mm	0.38 m²	50 mm	0.56 m²
150	159.0 mm	0.045 ltr.	50 mm	0.40 m²	50 mm	0.45 m²	50 mm	0.67 m²
	168.3 mm	0.048 ltr.	50 mm	0.43 m²	50 mm	0.48 m²	50 mm	0.71 m²
200	219.1 mm	0.062 ltr.	100 mm	0.55 m²	100 mm	0.62 m²	100 mm	0.93 m²
250	273.0 mm	0.077 ltr.	100 mm	0.69 m²	100 mm	0.77 m²	100 mm	1.16 m²
300	323.9 mm	0.092 ltr.	100 mm	0.81 m²	100 mm	0.92 m²	100 mm	1.37 m²

The quantities specified have been determined theoretically.

GENERAL INFORMATION

The **Kebutyl-System A-3-C 50** is a cold processed corrosion protection system. It is used for coating underground and underwater pipes made of low-alloyed ferrous materials, for subsequently coating welded seams and for mending mechanically damaged PE, PP, EP, PUR and bitumen factory coatings. Due to its high mechanical strength and low steam and oxygen diffusion rate the Kebutyl-System A-3-C 50 offers reliable corrosion protection.

Buildup

Kebutyl primer K III
Adhesive primer containing solvent.
A solution made of butyl rubber and
unsaponifiable resins in an organic solvent.
Consumption: approx. 0.2 litres/m2
Drying time: approx. 3-5 minutes (depending on the weather)

Testo® Tape 1.2 H
Anti-corrosion tape on a butyl rubber basis
with PE film insert.

Kebulen film PE 0.40
Polyethylene film self-adhesive on one side

Kebulen film B50-B white
White Polyethylene film self-adhesive on one side

GENERAL INFORMATION

Delivery form

	Consumption per m² area	Container
Kebutyl primer K III	approx. 0,2 litres	approx. 1 / 5 / 10 litres

Testo® Tape 1.2 H	Length / roll	Rolls / box	Width
Butyl rubber tape with PE film inlay	10 m 10 m 10 m	9 6 3	30 mm 50 mm 100 mm

Kebulen film PE 0,40 K	Length / roll	Rolls / box	Width
without separating layer stabilized PE film on one side coated with butyl rubber	15 15 15	33 22 11	30 mm 50 mm 100 mm

Kebulen film B50-B white	Length / roll	Rolls / box	Width
without separating layer stabilized PE film on one side coated with butyl rubber	15 15 15	24 16 8	30 mm 50 mm 100 mm

Further sizes upon request.

Material Assessment

To subsequently coat a welded connection with a 300 mm wide steel surface, put 50mm of the inner layer on both sides of the factory coating an create an overlap of inner and outer layer of 25mm.

ND	Dimensions Ø	Kebutyl primer K III	Testo® tape 1.2 H	Kebulen film PE 0,40 K	Kebulen film B50-B white
200	219,1 mm	0,06 ltr.	0,55 m²	0,62 m²	0,68 m²
250	273,0 mm	0,08 ltr.	0,69 m²	0,77 m²	0,85 m²
300	323,9 mm	0,09 ltr.	0,81 m²	0,92 m²	1,02 m²
350	355,6 mm	0,10 ltr.	0,90 m²	1,00 m²	1,15 m²
400	406,4 mm	0,12 ltr.	1,02 m²	1,15 m²	1,28 m²
450	419,0 mm	0,12 ltr.	1,05 m²	1,19 m²	1,32 m²
500	508,0 mm	0,14 ltr.	1,28 m²	1,44 m²	1,60 m²
550	521,0 mm	0,15 ltr.	1,31 m²	1,47 m²	1,64 m²
600	609,6 mm	0,17 ltr.	1,53 m²	1,73 m²	1,91 m²
700	711,2 mm	0,20 ltr.	1,79 m²	2,01 m²	2,23 m²
800	812,8 mm	0,23 ltr.	2,05 m²	2,30 m²	2,55 m²
900	914,4 mm	0,26 ltr.	2,30 m²	2,59 m²	2,87 m²
1000	1016,0 mm	0,29 ltr.	2,56 m²	2,87 m²	3,19 m²
1200	1220,0 mm	0,34 ltr.	3,07 m²	3,45 m²	3,83 m²
1400	1420,0 mm	0,41 ltr.	3,57 m²	4,01 m²	4,50 m²

The quantities specified have been determined theoretically.

GENERAL INFORMATION

The Repa Tape from Kebu is a multi-purpose sealing tape with exceptional properties. It consists of a self-adhesive coating compound and weather-resistant aluminium film (aluminium-colored). The compound - butyl rubber - is highly plastic-elastic with good adhesion. It allows perfect bonding on virtually any surface. In difficult conditions (e.g. on a dusty surface) adhesion can be increased using a primer. by using a primer.

1. Technical data

Scope of delivery	Sealing material
Type of adhesive layer	Butyl rubber
Surface properties	pore-free, crack-free, pulled straight, free of little bubbles and folds
Lamination	laminated on one side with Alu 0.05
dimensions and mechanical strength properties:	
Width of sheets (cm)	5 / 7,5 / 10 / 15 / 30
Width of adhesive edge	whole width
Length of rolls (m)	10
Thickness of sealing film (mm)	approx. 1.5
Total weight (g/m^2)	approx. 2000
Tensile strength (N)	longitudinally approx. 280, crossways approx.
Elongation at break (%)	280 5

2. Construction relevant information

Reaction to fire	normally flammable, fire classification B2
Properties during and after storage at 80 °C (DIN 16935, 16937, 16938)	no bubble formation
Mechanical strength	does not tear, permanently elastic does not become brittle
S_d-value	practically vapour-proof S_d >>1000 m
Continuous temperature resistance min. / max. (°C)	-20 / +100
Thermal resistance (°C)	+120
Short-term temperature resistance max. (°C)	+140
Resistance to aggressive media	all chemicals which occur in the atmosphere, aggressive gases, bitumen, acids, rotting, decay, aggressive water

3. Pipe laying information

Substrate requirements	solid, dry, dust-free, breaking edges at right angles possible
Pre-treating the substrate	no pre-treatment, primer if required
Primer	To be decided based on substrate
Subsequent treatment of seal	no subsequent treatment
Protective layer	no protective layer required
Pipe laying method	self-adhesive- self-adhesive
Sealing the joints	Adhesion: self-adhesive by pressing on
Carrying out installation	local company, user
Type of material for separation layer	soda kraft paper

GENERAL INFORMATION

4. Functional data

Application	horizontal surfaces, vertical surfaces, sloped surfaces, ceiling surfaces ("over-head"), terraces, wet-rooms, swimming pools, potable water containers, floor seals, underground garages, sealing against non-pressing water
Possible surface material	brickwork, plastering, screed, concrete, wood, steel, glass

Processing instructions

the surface needs to be dry and free from dust or grease. Any loose paint, rusts etc. needs to be removed. After removing the separating layer perfect adhesion is attained by pressing the tape on the well-prepared surface. At low temperatures the compound can be slightly heated up (by propane gas flame). This will improve adhesion.

THE SYSTEM

MonoTop40 one-tape system

System for subsequent coating of welded seams, whole pipelines, especially bends and molded parts up to DN 600. Suitable for manual processing without a wrapping machine due to its great flexibility.

MonoTop40 is a particularly strong self-welding anti-corrosion tape with an extremely flexible outer plastic layer.

MonoTop40, 1 x 50% overlap,
PSI-Primer P27
Total thickness 2.03 mm

Equal to stress class
EN 12068/DIN 30672 B/30

TECHNICAL DATA

PSI Anti-Corrosion Tapes

Property	Test specification	MonoTop40
Adhesive basis		Butyl rubber mix
Retainer tape basis		Polyolefins
Color		black
Total thickness		1.016 mm
Adhesive thickness inside		0.610 mm
Adhesive thickness outside		
Retainer thickness		0.406 mm
Tensile strength	DIN EN 12068	7 N/mm
Elongation at break	DIN 12068	400%
Core diameter	DIN 12068	76 mm
Adhesion on primed steel at 23 °C	DIN 12068	20 N/10 mm
Adhesion on primed steel at 50 °C	DIN 12068	3 N/10 mm
Adhesion to itself	DIN EN 12068	20 N/10 mm
Coating resistance	ASTM D 1000	40 KV/mm
Water absorption*	ASTM D 257	0.60%
Application temperature**		-35 up to 70 °C
Continuous operating temperature		-35 up to 85 °C

* Measurement on steel adherent tape
** Tape temperature min. 10 °C

PSI-Primer

Property	Test specification	Unit	Type PSI P27
Color			black
Density	ASTM 1298	g/cm³	0.83
Solvent content	ISO 1515	%	27
Viscosity (4 mm needle)	ASTM D 1200	sec.	35
Flash point	ABEL IP 170	°C	-12
Consumption		l/m²	approx. 0.2
Application temperature		°C	-30 to 60

GENERAL INFORMATION

The KEBUmat is is a manual winding machine for processing all tapes and films from the proven cold-applied Kebutyl-Systems. Using the KEBUmat allows wrapping our tapes and films smoothly, adhering to the required overlap of the individual layers with constantly adjustable winding tension in a helical manner.

Application

The KEBUmat is suitable for wrapping around straight pipes and welded seam connections from DN 80 and pipe bends starting from DN 100. This applies to pipes with and without factory coating alike. The maximum pipe size should not exceed DN 1400. Tapes and film up to a width of 100 mm can be processed. When using the machine in a pipe trench, the distance between the surface to be wrapped and the pipe trench needs to be at least 25 cm.

Delivery form

The KEBUmat is supplied in a box, preinstalled for tapes and films up to 50 mm wide. The necessary conversion components for a band width of up to 100 mm are attached to the machine. Assembling the KEBUmat is self-explanatory and easy.

How to use:

Before the KEBUmat can be equipped with wrapping material, you need to check whether the distance of the rollers is correct for the intended pipe dimension or whether it needs to be adjusted. The roll to be processed with Kebulen tape, film or Testo tape, is inserted onto the steel core of the drive roller while paying attention to the winding direction. After that, the KEBUmat is placed on the surface which has been treated with Kebutyl primer K III. The tape is placed on the steel pipe and pressed on.

With Testo and Kebulen tapes, the separating film is put into the slit of the wrapping roll. Using the two adjustment screws on the side, as soon as required, the winding tension and the required overlap width can be set. The winding tension needs to be selected in a way that the tape is applied without creasing during winding and is stretched by about 5%. When wrapping around the pipe, make sure that the KEBUmat touches the pipe surface with all 4 runners - even in the area under the pipe which is difficult to access.

PRODUCT DESCRIPTION

Anti-corrosion tape PSI-Flex for irregularly shaped parts

This tape was specially developed to provide effective corrosion protection for irregularly shaped steel pipeline components, such as T-joints and weld-on T-joints.

Anti-corrosion tape PSI-Flex is processed cold, only the pipe preparation is subject to the DVGW data sheet GW 15. High flexibility, especially at the edges and corners, easy to stretch, resistance against to acids and alkalis, mold and micro-organisms are all benefits of the tape.

No primer is required. The tape is self-welding and presses firmly against the pipe due to the high restoring force of the PE layer, which also serves as a vapor barrier. It should be applied with 50% overlap.

Type	Width in mm	Roll-length	Art. No.	Packaging unit
Anti-corrosion tape PSI-Flex 50-5	50	5 metres	4-034-21001	24 pcs.
Anti-corrosion tape PSI-Flex 100-5	100	5 metres	4-034-21002	12 pcs.
Filler 3.5 mm	50	7.5 metres	4-015-21498	24 pcs.

Technical data

Inner layer	Butyl rubber
Outer layer	Polyethylene approx. 80 µ
Application temperature	optimally from +5° C up to +40° C
Electrical resistance	15 kV/mm
For continuous operation temperature	from -30° C to +80° C
Elongation at break	> 300%
Layer thickness in total single	approx. 1.5 mm
Color	aluminium grey

GENERAL INFORMATION

Kebu Plast Mastic is a filling compound based on petrolatum to fill in void areas, for example before wrapping valves and flanges with petrolatum tapes.

Characteristics

Characteristic	Norm	Unit	Typical value
Color	-		brown
Structure	-		Industrial petrolatum, fillers, fibers
Consistency	-		platsicizable, duroplastic
Saponification number	DIN EN 12068	mg KOH / g	max. 2
Congealing point	DIN ISO 2207	°C	> 60
Operating temperature		°C	≤ 30
Processing temperature		°C	5 - 30

Application

The area to be coated must be dry. If necessary, dry it using a propane burner. There is no need to preheat the area. Wire-brush the steel surface thoroughly to remove any traces of rust and dirt. A surface cleanliness of ST 2 according to ISO 8501-1 is sufficient for this application. Remove any traces of oil and grease from the surface using a suitable solvent.

Take the Kebu Plast Mastic from the packing, knead it and plasticize it by hand or with a spatula. It is suitable for the application in void areas like gorges, around screws, nuts as well as for graps between flanges. Subsequently, the plast mastic needs to be coated by a suitable petrolatum tape like the Kebu Petrolatum-Tape A303 with the required layers of coating.

Delivery form

PE bag	0.5 kg	
Box	7.5 kg	12.5 kg

Kebutyl-Kitt is a butyl rubber based mastic. It is permanently plastic and manually deformable.

Application

Kebutyl-Kitt is used to repair damages in the factory polyolefin coating of steel pipelines or to fill up void areas like non-bevelled polyethylene edges, elevated beads, plows and saddles of welded-on T-pieces. It is used in combination with Kebutyl-Systems or Kebulen-Tapes respectively. When coating cable joints and measuring contacts of polyethylene coated steel pipes, it is used in combination with Kebulen-Tape B 80 or Kebu Duplex-Tape.

Delivery form

Rolls	Width 40 mm	Length 2 m	Thickness approx. 5 mm	Package 6 rolls / carton
Bars			Weight 1kg	Package 7 bars / carton

KEBULEN HEAT SHRINK MATERIALS FOR FITTINGS

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GENERAL INFORMATION

Kebulen Heat Shrink System V for Molded Parts is a corrosion protection material which needs to be processed hot. It meets the requirements of DIN EN 12 068 for stress class C and continuous operating temperature up to 30 °C.

Buildup

The Kebulen heat shrink system V consists on the inside of a PE-film coated with a hot-melt adhesive. Included in the scope of delivery are a Kebulen heat shrink molded part, Kebutyl putty tape, a two-part cover and two tubular sleeves for the valve and the connection pipe.

Application

The Kebulen heat shrink system V is used to coat house service lines with safety relief valves.

How to use

Surface preparation

The quality of the subsequent coating decisively depends on the surface being prepared as specified. Effective protection from weather during preparation and when applying the Kebulen shrink wrap must be given.

If there are any salty substances on the surface to be coated (e.g. from welding electrodes) then it needs to be washed with clean water prior to mechanical cleaning. The area to be coated needs to be dry before processing and free of oil, grease, soil and any cement grouting residue - if necessary, it needs to be dried with a propane flame, and oil or grease needs to be removed with a suitable solvent.

Preheating to approx. 50 °C is necessary.

Measures must be taken to ensure that no cavities can form under the subsequent coating. If this can not be ruled out, then the edges need to be processed with suitable tools. A rasp with a semi-circular blade has proven to be useful here. Make sure that during application no damage is dealt to the factory coating.

Delivery form

Kebulen Shrink Molded Part V in a set

Types Name	Kebutyl putty tape 40 x 5 x 200	Cover plate 2-part	Tubular sleeve 105/25 x 166	suitable for
Kebulen heat shrink molded part V Size 4 (SFT-V-4)	2x	1x	2x	House service connection with branch pipe from 1" to 2" (Outer diameter of Pipe from 32 to 59 mm) MANIBS series D 410, D 413V with valve
Kebulen heat shrink molded part V Size 6 (SFT-V-6)	2x	1x	2x	House service connection with branch pipe from 1" to 2" (outer diameter of 32 to 59 mm) Schuck weld-on valve-T, type ATV 544 (DN50)
Kebulen heat shrink molded part V Size 7 (SFT-V-7)	2x	1x	2x	House service connection with branch pipe from 1" to 2" (Outer diameter of Pipe from 32 to 59 mm) Voigt safety weld-on valve-T

GENERAL INFORMATION

The Kebulen Heat Shrink System S for Molded Parts is a corrosion protection material which needs to be hot processed. It meets the requirements of DIN EN 12 068 for stress class C, continuous operating temperature up to 30 °C.

Buildup

The Kebulen heat shrink molded part S on the inside consists of a PE film coated with hot-melt adhesive. Included in the scope of delivery are a Kebulen heat shrink molded part, Kebutyl putty tape, a two-part cover and one tubular sleeve for the connection pipe.

Application

Kebulen Heat Shrink System S for Molded Parts is used to coat house connection valves with plugs.

How to use

Surface preparation

The quality of the subsequent coating significantly depends on the surface being prepared as specified. Effective protection from weather during preparation and when applying the Kebulen shrink parts must be given.

If there are any salty substances on the surface to be coated (e.g. from welding electrodes), then it needs to be washed with clean water prior to mechanical cleaning. The area to be coated subsequently needs to be dry before processing and free of oil, grease, soil and any cement grouting residue - if necessary, it needs to be dried with a propane flame, and oil or grease needs to be removed with a suitable solvent.

Preheating to approx. 50 °C is necessary.

Measures must be taken to ensure that no cavities can form under the subsequent coating. If this can not be ruled out, then the edges need to be processed with suitable tools. A rasp with a semi-circular blade has proven to be useful here. Make sure that during application no damage is dealt to the factory coating.

Delivery form

Kebulen Shrink Molded Part S in a set

Types Name	Kebutyl putty tape 40 x 5 x 200	Cover plate 2-part	Tubular sleeve 105/25 x 166	suitable for
Kebulen heat shrink molded part S Size 4 (SFT-V-4)	2x	1x	1x	House service connection with branch pipe from 1" to 2" (Outer diameter of Pipe from 32 to 59 mm) MANIBS series D 410, with plug
Kebulen heat shrink molded part S Size 6 (SFT-V-6)	2x	1x	1x	House service connection with branch pipe from 1" to 2" (outer diameter of 32 to 59 mm) Schuck weld-on T with plug, type AT 544 (DN50)
Kebulen heat shrink molded part S Size 7 (SFT-V-7)	2x	1x	1x	House service connection with branch pipe from 1" to 2" (Outer diameter of Pipe from 32 to 59 mm) Voigt safety weld-on T with plug

PSI CORROSION PROTECTION COMPOUNDS

SYSTEM STOPAQ® FN 4100/4200/CZ TAPE

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SYSTEM STOPAQ® FN 4100/4200

FN 4100 for underground applications as filler material and corrosion protection compound, FN 4200 for above ground applications between flange joints.

Advantages

- STOPAQ® is a soft, paste-like compound which does not go hard and is therefore still easy to remove years later - particularly important for flanges
- STOPAQ® is water and oxygen-tight, environmentally friendly and not toxic
- STOPAQ® is easy to install with a spray gun and is processed cold which makes it particularly suitable for complex molded shapes. It is also available as anti-corrosion tape for wrapping available in 50 mm and 100 mm width with PVC cover film

Properties

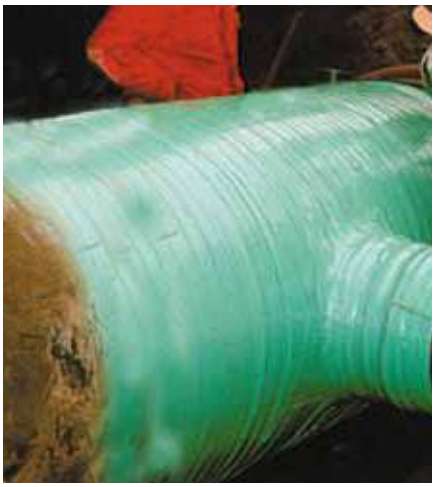
- Sticks to virtually all steel, zinc, aluminium and plastic surfaces
- High electrical resistance: $>10^8$ Ohm/cm
- No surface sand blasting or priming necessary
- FN 4100 can be used at continuous operating temperatures between - 20 °C and + 35 °C, FN 4200 between - 30 °C and + 60 °C
- STOPAQ® meets the corrosion protection requirements e.g. for tank farms according to KIWA BRL U 911/01 (certificate upon request)

How to use:

STOPAQ® FN 4100/FN 4200 can be processed without sand blasting and priming the surface. It is sufficient to clean slightly and remove any rough dirt.

FN 4100 is supplied in a 2 kg PE bag and can easily be kneaded and shaped by hand. FN 4200 is supplied in easy-to-use 0.53 kg cartridges. As STOPAQ® does not harden, the cartridge and nozzle can be reused several times. At outside temperatures < 10 °C we recommend preheating the cartridge to increase the viscosity.

Delivery sets	Art. No.
STOPAQ® FN 4100 2 kg bag	4-034-21526
STOPAQ® FN 4200 0.53 kg cartridge	4-034-21527
STOPAQ® FN 4200 2 kg bag	4-034-21530
Manual spray gun for 0.53 kg cartridge	4-034-22822
Compressed air gun for 2 kg bag	4-015-21539
Kebu repair tape, width 50 mm / length 10 m	4-035-00026
Kebu repair tape, width 100 mm / length 10 m	4-035-00028



SYSTEM STOPAQ® FN 4200

STOPAQ® FN 4200 is a perfect product to prevent corrosion between above ground flange faces. To protect the seal, flange faces and bolts, the space between the flanges is filled with STOPAQ® FN 4200. Dirt, air and moisture cannot get between the flange faces anymore thus preventing corrosion. With insulation flanges, STOPAQ® FN 4200 prevents the cathodic current jumping across, for example if there is moist or residual dirt between the flanges.

Applications for STOPAQ® FN 4200 to protect above ground flanges

- Water and power stations
- (Petro)chemical industry
- Tank farms
- Gas compressor stations

STOPAQ® FN 4200 properties

- Quick and easy to use
- Excellent adhesion on steel and many other surfaces without having to use any special primer
- Permanently plastic (flexible)
- No drying or reaction time
- No toxic components
- Environmentally compatible
- Long service life depending on type of storage and state of packaging
- Manufactured in accordance with NEN-EN-ISO 9001
- Certified according to KIWA BRL-K911

The STOPAQ® FN 4200 system

For use above ground in combination with STOPAQ® wrapping tape CZ and surface layer as mechanical protection or as surface layer with UV protection.

More content can be found at
www.psi-products.com

STOPAQ® CZ TAPE

PSI STOPAQ® CZ tape, anti-corrosion tape for parts with complicated shapes

This tape made of a modified polymer was specially developed to provide effective corrosion protection for steel pipeline components with complicated shapes, such as T-joints, ball and gate valves.

PSI STOPAQ® CZ tape is processed cold, only the pipe preparation is subject to DVGW data sheet GW 15. High flexibility, especially at edges and corners, easy stretching, resistant to acids and alkalis, molds and micro-organisms, these are all benefits of the tape.

No primer is required. The tape is self-sealing and presses firmly against the pipe due to its high restoring force of the PE film, which also serves as a vapor barrier. Fill large transition areas, grooves and cavities with STOPAQ® FN 4100. It can be applied with only 10 mm overlap.

To finish it off, STOPAQ® CZ tape is wrapped over the top to provide mechanical protection with a top coat for underground applications and additional UV protection for above ground applications.

Technical data

Application temperature:	optimal from 0 °C to 50 °C
Dielectric strength:	approx. 20 KV/mm
For continuous operating temperature:	from –30 °C to 50 °C
Total single-layer thickness:	approx. 2.0 mm
Weight	approx. 3.0 kg/m²
Color:	green
Certificate:	EN 12068 / DIN 30672 A30

CZ Tape structure

Type	Width in mm	Roll-length	Art. No.	Packaging unit
PSI STOPAQ® CZ tape 50	50	10 m	4-034-21528	12 pcs.
PSI STOPAQ® CZ tape 100	100	10 m	4-034-21529	6 pc.
PSI STOPAQ® FN 4100 filler	2 kg / bag		4-034-21526	9 bags

More content can be found at
www.psi-products.com

PSI FIBERTEC

HIGH-TECH GRP MATERIAL FOR OPTIMAL MECHANICAL PROTECTION IN CORROSION PROTECTION AND PIPELINE SYSTEMS

WWW.PSI-PRODUCTS.COM

GENERAL INFORMATION / TECHNICAL DATA

PSI Fibertec is a resistant, glass fibre reinforced composite plastic. It offers ideal mechanical protection for pipe coatings and is completely watertight. It adheres to almost any type of surface, such as metal, PE, PVC, PP, stoneware, GRP materials and concrete. In addition, the high-tech material is highly resistant to chemicals. A resistance table can be supplied upon request. Fibertec is supplied in rolls (0.95 x 10 m, material thickness 1.8 to 2 mm), is exceptionally flexible to work with and can be adapted to surfaces without any problems. It cures in sunlight or under a UV lamp. After curing (curing time depending on sunshine between 30 minutes and 8 hours, with UV lamp depending on strength between 20 and 60 minutes), the surface can be mechanically processed and coated. There are many applications: as horizontal drill kit, to protect pipe coatings, for ground-to-air transitions, for shaft linings, etc. Designed as an open system, subsequent installation is possible.

Full coating

Technical Information
PSI Fibertec is extremely resistant to chemicals.
A resistance table can be supplied upon request.

Properties	Unit	Value	Standards
Specific volume	g/cm³	1.75	53479 ISO 1183
Tensile force	M Pa	55.7	53455 EN ISO 527-4
Elastic mode from tension	M Pa	13500	53457 EN ISO 527-4
Elongation at break	%	1.1	53455 EN ISO 527-4
Bending strength	M Pa	146	53452 EN ISO 14125
Elastic mode from bending	M Pa	100000	53457 EN ISO 14125
Pressure resistance	M Pa	150	53454 EN ISO 14126
Elastic mode from pressure	M Pa	15600	53457 EN ISO 14126
Impact resistance	kJ/m²	57.5	53453 EN ISO 179
Fibre content	% by weight	20	53479 EN ISO 1172
Volume shrinkage	%	0.15	53464 EN ISO 2577
Vapor permeability	mg/100 hrs	0.34	53495 EN ISO 62
Emission of styrene	ppm	<20	

The specified values may have slight tolerances.

APPLICATIONS

Other possible applications

PSI Fibertec is not only perfectly suitable for protecting plastic-coated pipes and plastic pipes against mechanical loads. Further applications include e.g. ground-to-air transitions, pipe clamp underlays, linings, etc. In short, wherever there is a need for high resistance to indentation and impacts, PSI Fibertec offers optimal protection.

Ground-to-air transitions

Horizontal drill kit

2-layer PE pipe

Pipe clamp underlay

Description	Art. No.
Roll of PSI Fibertec 0.95x10 metres, thickness 1.8-2 mm (pre-cut sections available)	4-033-23015
Heavy duty UV lamp, 400 watts	4-033-23012
Protective gloves Ansell Sol-Vex Plus	4-033-22951
Transparent adhesive tape, 50 mm x 66 m	4-033-23011
Hand stretch film 500 mm wide, 17µ thick	4-033-23200

More content can be found at
www.psi-products.com

PRODUCT DESCRIPTION / APPLICATION

PSI Pipecast is the latest development in the field of composite plastics to protect pipes against specific mechanical loads (e.g. during horizontal drilling, etc.). Pipecast is a resin-saturated fibreglass fabric (GRP), which activates with water.

PSI Pipecast is packed in airtight aluminium foil bags in ready-to-use condition. No mixing of components on site is required. Simply put it in luke warm water for around 15 seconds. The reaction time of the resin is approx. 3 minutes. PSI Pipecast hardens in less than 30 minutes and completely cures within 12 hours (at 21 °C). The innovative fibreglass/resin material is highly resistant against chemicals, can withstand both high and low temperatures and can even be applied under water.

Advantages

- Short curing time, quick installation
- Simple and easy to apply, no mixing of components required
- Resistant to extreme temperatures
- Can be applied under water and on moist surfaces
- Outstanding adhesion and resistance to chemicals, particularly oil products
- Can be shaped to provide mechanical protection for complicated parts

Technical data

Color	black
Material thickness	0.8 - 0.9 mm
Dimensions (l x w)	4.57 m x 97 mm
Dielectric strength	10 KV/mm
Water absorption	< 2%

Typical uses:

Mechanical protection of pipes, particularly suitable as corrosion protection system for HDD in combination with the exceptionally shear resistant Canusa WLAS shrink sleeve (DIN/EN approved to category C/50). Safe and secure retrospective coating of cutbacks at welded seams of pre-insulated pipes with PSI Pipecast.

Material consumption for steel pipes (application example):

With rolls 4.57 m x 97 mm with 1 x 75% overlap with approx. 450 mm coating width

DN 80 (88.9 mm)	approx. 2 rolls
DN 100 (114.3 mm)	approx. 2 rolls
DN 150 (168.3 mm)	approx. 3 rolls
DN 200 (219.1 mm)	approx. 3 rolls
DN 250 (273.0 mm)	approx. 4 rolls
DN 300 (323.9 mm)	approx. 5 rolls
DN 400 (406.4 mm)	approx. 6 rolls

Consumption quantities may change depending on the application and need to be defined individually.

Note:

The suitability of Pipecast for the intended purpose and the expected loads must be tested by the user on his own responsibility. The applicable DVGW directive on the coating of pipes and post-factory coating systems must be followed.

More content can be found at
www.psi-products.com

PSI ROCK SHIELD FLEECE

WWW.PSI-PRODUCTS.COM

GENERAL INFORMATION

Pipe protection fleece is an outstanding economical alternative to traditional bedding in sand.

The relevant regulations for pipe bedding, backfilling and compaction are to be observed at all times. In particular, DIN 1612, DIN 18300 and the DVGW worksheets G462, G463 and G472 apply here.

The PSI rock shield fleece is made 100% of mechanically compressed PP/PES. It is offered with a high impact strength of 5800 N, suitable for a wide range of applications. With an overlap of approx. 10 cm and a gentle propane gas flame, the PSI rock shield fleece can be welded safely.

PSI Rockshield fleece is also suitable to separate subsequent pipe coating systems from the ground at thermal loadings of > 50 °C

Technical data

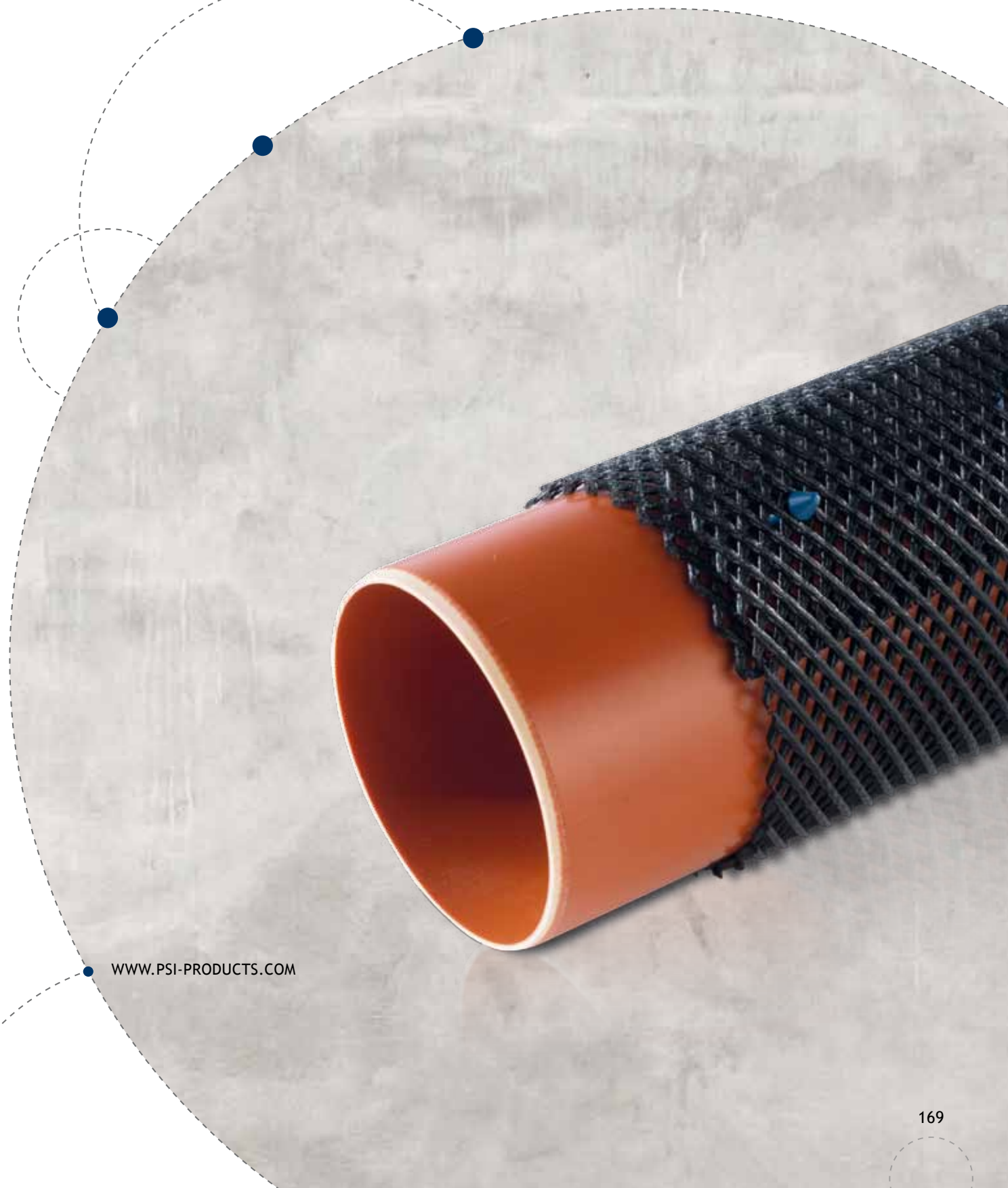
PP 1000

Material:	100% PP/PES
Mass per unit area:	1000 g/m²
Type of bonding:	Needling
Thickness with 2 kPa load:	7 mm
Maximum tensile strength longitudinally:	27 kN/m
Maximum tensile strength diagonally:	55 kN/m
Impact strength:	5800 N
Width:	0.4 to 5.0 m
Roll-length:	25 m
Biological resistance:	good

The technical data provided shows average values and can differ up to 10%.

More content can be found at
www.psi-products.com

PSI ROCK SHIELD NET



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GENERAL INFORMATION

The ideal alternative to sand bedding

PSI Rock Shield Net is indispensable if it is not possible to create an adequate sand bed when laying the pipe or when working in rocky ground. PSI Rock Shield Net has proven worthy with siphon pipes which do not allow sand bedding. For shaft and house connections, which are frequently dug up, we also recommend using PSI Rock Shield Net as additional protection.

Benefits that pay off:

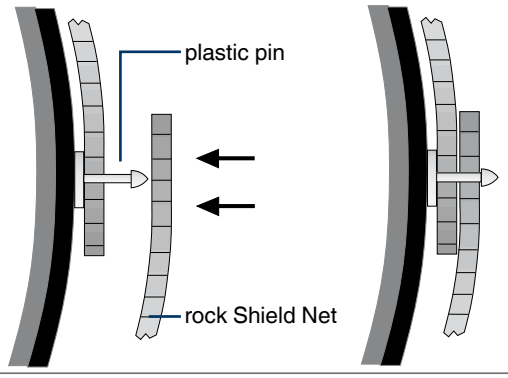
- Cost savings by saving on filler material, transport and waste disposal costs
- stretchy polyethylene material
- highly deformable, close meshed
- high impact resistance
- resistant to microbes and soil bacteria, moisture, etc.
- UV-stabilized

Installation:

Rock Shield Net is laid around the pipe with 80-100 mm overlap. Closed with plastic pins, adhesive tape, or welded together with a gentle propane gas flame.

Description	Type 6	Type 9
Material	HDPE	HDPE
Color	black	black
Thickness	approx. 6 mm	approx. 9 mm
Mesh size	4 x 4 mm	4 x 4 mm
Weight	1.1 kg/m²	1.4 kg/m²
Packaging unit	20 m roll Width approx. 1.0 m	20 m roll Width approx. 1.0 m
Special widths and cuts available upon request		
Art. No.	4-033-23001	4-033-23002
Accessories: Connecting clips (approx. 3 pcs./m)	100 pcs. in a bag	100 pcs. in a bag

Installation with plastic pins



More content can be found at
www.psi-products.com

PSI RUBBER STEEL FLANGE GASKETS

DIN DVGW product

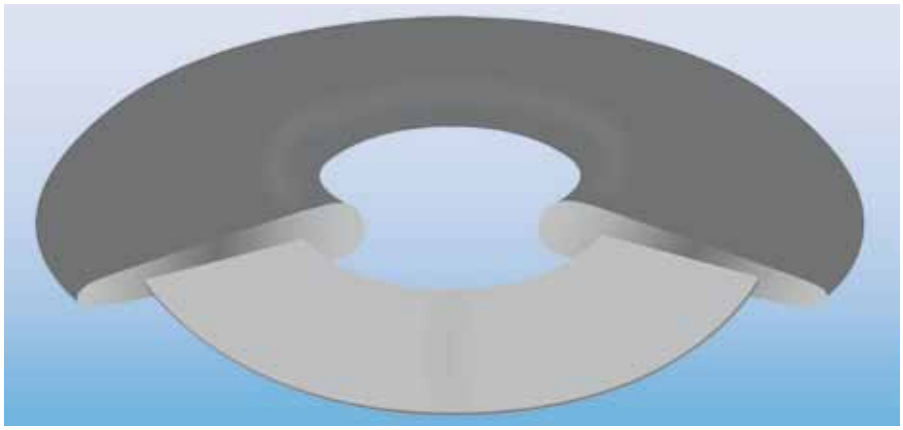
POTABLE WATER
KTW/W270

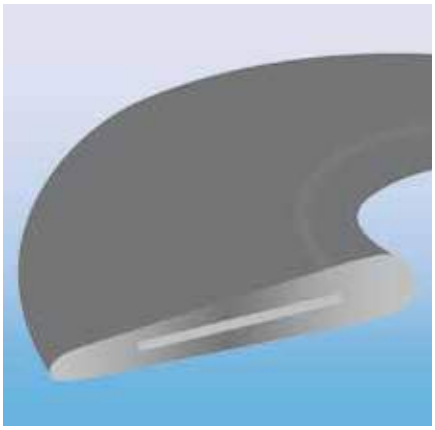
EPDM

NBR

WWW.PSI-PRODUCTS.COM

GENERAL INFORMATION





Rubber steel gasket type G-S-S with vulcanized steel ring for greater dimensional stability, safe centring and perfect sealing according to DIN EN 1514-1 (PN6-40).

Gaskets according to DIN 2690
For dimensions from DN 15 up to DN 1200 (up to DN 2000 upon request)
Suitable for pressure ratings PN 6 up to PN 40

Advantages

- Low tightening torque
- No retightening of flange bolts required
- Even distribution of longitudinal pressing along offset or misaligned flanges
- High resilience compensates for pressure changes and temperature fluctuations
- Cost-effective due to high operational safety and low maintenance requirements
- Resistant due to a wide range of elastomers to choose from
- Leakage protection for flanges with rough surfaces, damaged flange gasket surfaces, as well as enamelled and rubberized flange faces

Applications

- General pipeline construction, plant construction: water, gas, sewage, oil and chemicals
- Industry: enamelled and rubberized pipelines
- Plastic pipelines and equipment manufacturing
- Mining

CE

13

PSI Products GmbH
Ulrichstr. 25
72116 Mössingen

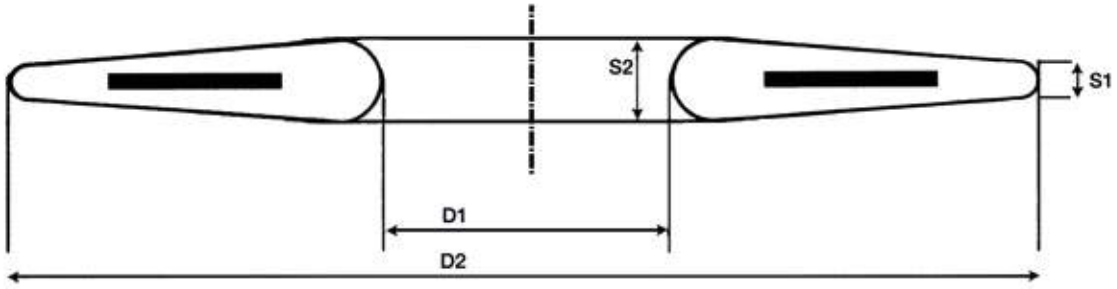
NBR . 70
EN 682
GBL

More content can be found at
www.psi-products.com

TECHNICAL DATA

Rubber steel gasket type G-S-S with vulcanized steel ring according to DIN EN 1514-1: IBC for pressure rates from PN 6 to PN 40

Dimensions in mm



Example for gasket dimensions type G-S-Standard

Elastomer materials according to ISO R 1629

Materials	Shore hardness A	Temperature range
NBR / DVGW [1]	70 +/- 5	-25 °C to +90 °C
EPDM / KTW, W270 [2]	70 +/- 5	-25 °C to +120 °C

[1] NBR is used as a sealing material for gas supply pipelines and their components, certified with quality mark DIN-DVGW Reg. NG-5113BR0477 according to EN 682 type GB (temperature range -5 °C to +50 °C)

[2] in compliance with KTW D1 / D2, 1.3.13 BFA for potable water and W270 physical properties of elastomer material according to DIN EN 681-1.

Other dimensions and materials available upon request

Two in one

Due to its wedge shape, the the PSI Rubber Steel Gasket Type G-S-S can be used as an alternative to the so-called 'O-ring' seal and as a standard rubber/steel gasket.

Thanks to the gasket's thicker inner diameter facing the medium, a sealing effect is achieved very quickly.

INSTALLATION INSTRUCTIONS

- Flanges must be clean, dry and aligned in parallel before installation
- The gasket must not be damaged
- Greasy separating agents or lubricants should not come into contact with the rubber gasket
- Tighten the bolts evenly several times in a crosswise sequence
- Appropriate pipe support must be in place in order to prevent the pipe from settling, otherwise the gasket will be squeezed on one side
- Rubber/steel gaskets should not be used more than once

Standard tightening torques (in Nm) for PSI rubber steel flange gaskets

DN	PN 6	PN 10	PN 16	PN 25	PN 40
15	6	11	11	11	11
20	10	16	16	16	16
25	13	21	21	21	21
32	22	36	36	36	36
40	28	45	45	45	45
50	31	58	58	58	58
65	42	77	77	38	38
80	70	45	45	45	45
100	74	49	49	70	70
125	50	64	64	105	105
150	54	89	89	124	124
200	76	123	82	123	155
250	65	102	127	177	234
300	105	105	160	177	245
350	136	133	177	264	345
400	111	160	223	340	515
500	120	188	316	370	437
600	173	250	480	500	-

For flanges DN 15 - DN 600:

The values are based on a coefficient of friction of $\mu = 0.12$ and a maximum surface pressure of 15 N/mm². The number and sizes of screws comply with DIN standards 2632 to 2635.

The guide values for tightening torques for flanges larger than DN 600 can be calculated according to the following rule of thumb:

PN 10: DN / 3 = torque in Nm
PN 16: DN / 1.5 = torque in Nm
PN 25: DN = torque in Nm
PN 40: DN * 2 = torque in Nm

If the flange material consists of plastic, e.g. PE, please note that the tightening torques must be adjusted or reduced according to the respective flange material.

PSI ADJUSTABLE FLANGE GASKET

TYPE WD

- SEALS MISALIGNED FLANGES
- REPLACES WEDGE DISKS AND THE NEED FOR ADDITIONAL GASKETS
- ADJUSTABLE UP TO 8°

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GENERAL INFORMATION

The adjustable flange gasket type WD consists of two segments connected by a tongue and groove joint. This allows the two wedge-shaped parts to be turned against each other up to an angle of approx. 8°. After installation, the two parts form a “medium-tight“ bond.

Simple and extremely economical

No need for using wedge disks or additional gaskets

The PSI Adjustable Flange Gasket Type WD simply and very economically replaces steel or cast iron wedge disks. These heavy wedge disks are difficult to install and also require two additional seals.

The result: Inexact assembly and higher costs. Complicated handling of such metal elements in tight spaces produces uncertainties during installation and increased risk of leakage.

Simple application for misaligned flange faces

Sometimes it is not possible to align flange faces properly. Especially underground pipes with adaptors and flanges, e.g. hydrants and valves, cannot always be aligned perfectly.

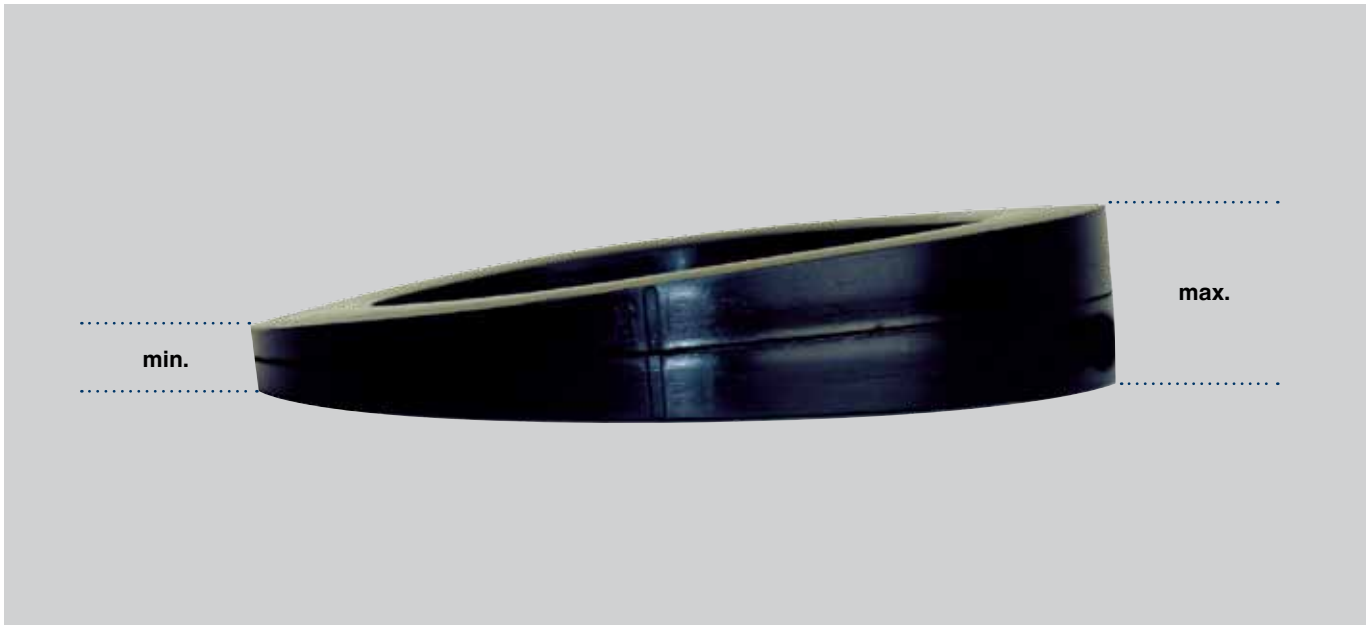
This content can found at
www.psi-products.com

TECHNICAL DATA

The standard material of the PSI adjustable flange gasket type WD is EPDM. However, depending on the application, it can also be made of other elastomers such as FPM (Viton) and silicone. EPDM service temperature ranges from - 25 °C to + 120 °C

Dimensions		Thickness		Bolt length	Size	Art. No. EPDM
DN	PN	min.	max.			
32	10 - 40	9	20	90	M 14	1-008-04001
40	10 - 40	9	22	90	M 14	1-008-04002
50	10 - 40	9	24	100	M 14	1-008-04003
65	10 - 40	9	26	100	M 14	1-008-04004
80	10 - 40	14	30	100	M 14	1-008-04005
100	10 - 16	14	30	100	M 14	1-008-04006
100	25 - 40	14	33	110	M 18	1-008-04007
125	10 - 16	14	36	100	M 14	1-008-04110
150	10 - 16	14	39	110	M 18	1-008-04008
150	25 - 40	14	39	130	M 22	1-008-04009
200	10 - 16	15	50	120	M 18	1-008-04010
200	40	15	50	160	M 24	1-008-04011
250	10	16	59	140	M 18	1-008-04012
250	40	16	59	170	M 27	1-008-04013
300	10	22	68	150	M 18	1-008-04014
350	10	22	68	150	M 18	1-008-04015
400	10	22	74	160	M 22	1-008-04016
500	10	23	79	180	M 22	1-008-04017

PSI Adjustable Flange Gasket Type WD
Dimensions according to DIN EN 1514-1 in mm
Other dimensions and material qualities available upon request



PSI FLANGE ISOLATION KITS

GLV-UNISEAL® T, GLV-UNISEAL® GGR

POTABLE WATER KTW/W270

TA-Luft-Conformity

GLV-UNISEAL® T

GLV-UNISEAL® GGR

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GENERAL INFORMATION

GLV-UniSeal® T
KTW recommendation, C-161711-08-Sf/st
W270 approval, W163374-08-SI

GLV-UniSeal® GGr
Reg.No. Graphite
NG-5124BL0367
DG-5126BL0565

Complies with German Clean Air Act according to
VDI 2440/2200, No. 9016364011

Flange isolation with excellent characteristics

The GLV-UniSeal® T and the GLVUniSeal ® GGr are high quality isolating gaskets. With the surfaces of the seal retainer closed on all sides, water absorption is reduced to an absolute minimum.

General use:

- Flange isolation gaskets combined with isolating sleeves and washers satisfy the requirements of cathodic protection.
- Flange isolation kits can be used in chemically aggressive environments for sealing flammable gases and liquids.
- The GLV flange isolation kits can also be used for general sealing purposes.

The GLV-UniSeal® T and GLV-UniSeal® GGr make use of indirect bolt force load, which means that the gasket can be used wherever an absolutely tight sealing must be achieved with low surface pressure. The silicone or graphite ring stays permanently elastic throughout the entire lifetime of the seal and is does not age or become brittle due to the temperature or media it is subjected to. The O-ring properties of the silicone or graphite ring guarantee optimal sealing under indirect bolt force load.

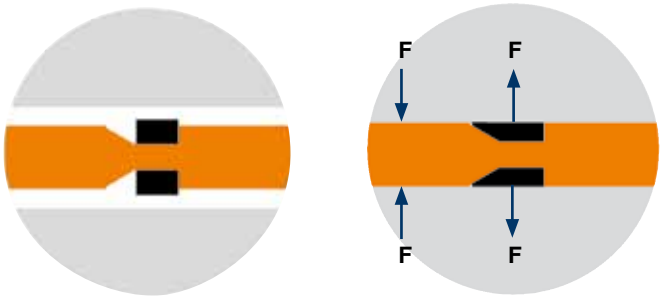
Generally the gasket can be used with all DIN or ANSI flanges. It can be installed in new systems or replaced during maintenance work.

Advantages of GLV-UniSeal® T and GGr Seals at a glance

- Easy to install
- Maintenance-free, no retightening of the bolts required
- Blow-out safety due to chambered sealing rings inside grooves
- Permanently elastic due to being a pure graphite seal (does not become brittle due to temperature)
- Suitable for heavy duty service due to indirect bolt force load
- Functionally reliable due to lowest water absorption

More content can be found at
www.psi-products.com

Indirect bolt force load

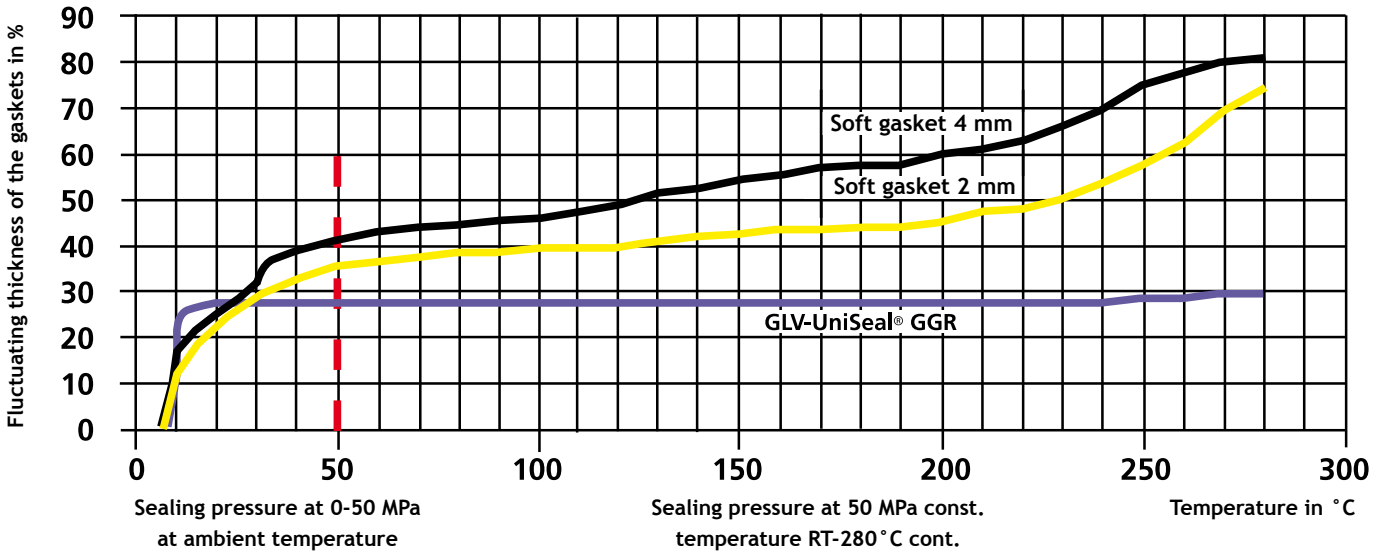


PSI flange isolation gaskets can be individually adapted to all flange shapes.

GENERAL INFORMATION

This diagram shows the compressive behaviour of isolating sealing joints and the relation between functional safety under service conditions in hot water respectively steam.

Compressive behaviour of GLV-UniSeal® GGr under indirect bolt force load compared to a conventional soft seals under direct bolt force load (in dependency of sealing pressure and temperature).



(Diagram data for soft gasketing according to DIN EN 28091)

The GLV-UniSeal® GGr and GLV- UniSeal® T installed together with isolation sleeves and isolating washers are tested with 5000 voltage according to DIN 50049/2.3 EN 10204. Potable water version GLV-UniSeal®T, GLV T gaskets are made according to KTW/W270 recommendations. General application of GLV-UniSeal®T are the pharmaceutical Industry, water stations, etc.

Application areas of GLV-UniSeal® GGr, German Clean Air Code ("TA Luft"), DVGW

These materials have a high universal resistance to most substances and offer long and safe sealing. This gasket material has universal applications and can be used in many different industries including petrochemical, gas, offshore, water, oil etc.

Chemical Resistance

GLV-UniSeal® T gasket is manufactured from high quality PVC with good resistance against hydrous solutions and non-concentrated acids and alkalines. The silicone rubber RTV 1-02 sealing element has a good resistance against diluted alkalis, weak acids, water, hydrous and inorganic salts. It stays permanently elastic and has good aging and degrading resistance. The O-Ring-characteristic of the silicone bead ensures absolute tightness of a full elastomer gasket even at low sealing pressure.

GLV-UniSeal® GGr –The gasket is manufactured from epoxy resin bound glass roving fabric with good resistance against most chemicals, fuels, oils, water, hot water and steam.

Exception

Exceptions are strong alkalines, acids and oxidizing agents. Expanded graphite has excellent sealing characteristics and almost unlimited chemical resistance, very good aging characteristics and is temperature resistant up to 500° C.

Note:

A combination of maximum nominal diameter and maximum pressure rating is not possible.
Example: Nominal diameter 1000 mm and pressure rating PN100.

The flange isolation's inside diameter is slightly smaller than the inner diameter of the DIN flange. This helps preventing contact corrosion and improves electrical separation behavior.

TECHNICAL DATA

	GLV-UniSeal® GGr	GLV-UniSeal® T
DN	15 - 900 (DN 1000/1200)	
ANSI	1/2“ - 40” (depending on pressure class, 44“ only GLV-UniSeal® T)	
Pressure class PN	6, 10, 16, 25, 40, 63	6, 10, 16, 25, 40
Class	75, 150, 300, 400	75, 150, 300

Special dimension upon request / * DN 1000/1200 up to max. PN16 only with GLV-UniSeal® T, larger dimensions upon request

Isolation material		GLV-UniSeal® GGr	GLV-UniSeal® T	
Retainer		Epoxy resin glass roving fabric	Polyvinylchlorid (PVC) -	
Color		light green	white	
Mech./electric properties	**Unit**	**GLV-UniSeal® GGr**	**GLV-UniSeal® T**	**Test method**
Thickness	mm	4	4-6*	-
Density	g/cm³	1.9	1.4	DIN 53479
Tensile strength	Mpa	220	55	DIN 53455
Impact strength 20 °C/180 °C	Mpa	500/350	130	ISO 604/DIN 53454
Flexural strength 80 °C/180 °C	Mpa	- / 150	80/-	DIN 53452
Notched bar impact value	kJ/m²	33	6.3	DIN 53453
Operating temperature	°C	150	80	DIN/IEC 216/T1
Max. peak temperature	°C	180	100 / 1 hour	DIN 44904
Spec. volume resistance	Ω x cm	10ex16	10ex15	DIN/VDE 303T30
Dielectric strength	kV/mm	13	27	JEC 243/DIN 53841
Water absorption (10 mm thickness)	mg / %	20	< 0.01	ISO 62/1 / DIN 53495

* Up to DN250 = 4 mm, from DN300 = 6 mm

Sealing material	Unit	Expanded graphite (GLV GGr)	RTV 1 - 02-Silicon (GLV T)	Test method
Thickness	mm	1.5	2.0	-
Density	g/cm³	1.25	1.20	DIN E28090T2/DIN 53505
Hardness	Shore A	-	55	Shore A DIN 53504S3D
Impact strength	Mpa	> 45	-	DIN 52913
Compression	%	> 20	-	ASTM F36A
Resilience	%	> 12	-	ASTM F36A
Chlorite content	ppm	≤ 50	-	-
Ash content	%	≤ 2	-	DIN 51903
Surface pressure	Mpa	15	-	-
max. surface pressure	Mpa	120	-	-
max. sustained temperature	°C	+500	+100	-
Approvals	-	DVGW TA-Luft-Comformity	KTW/W270	-

Available versions

Gasket Type E (FF)
Gasket with bolt holes according to the flange standards (Full Face)

Gasket Type F (IBC)
Gasket without bolt holes according to the flange standard (I.B.C.)

only: scope of delivery only Flange gasket without washers or sleeves
DW: Scope of delivery flange gasket, per bolt one sleeve, two insulating discs, two washers

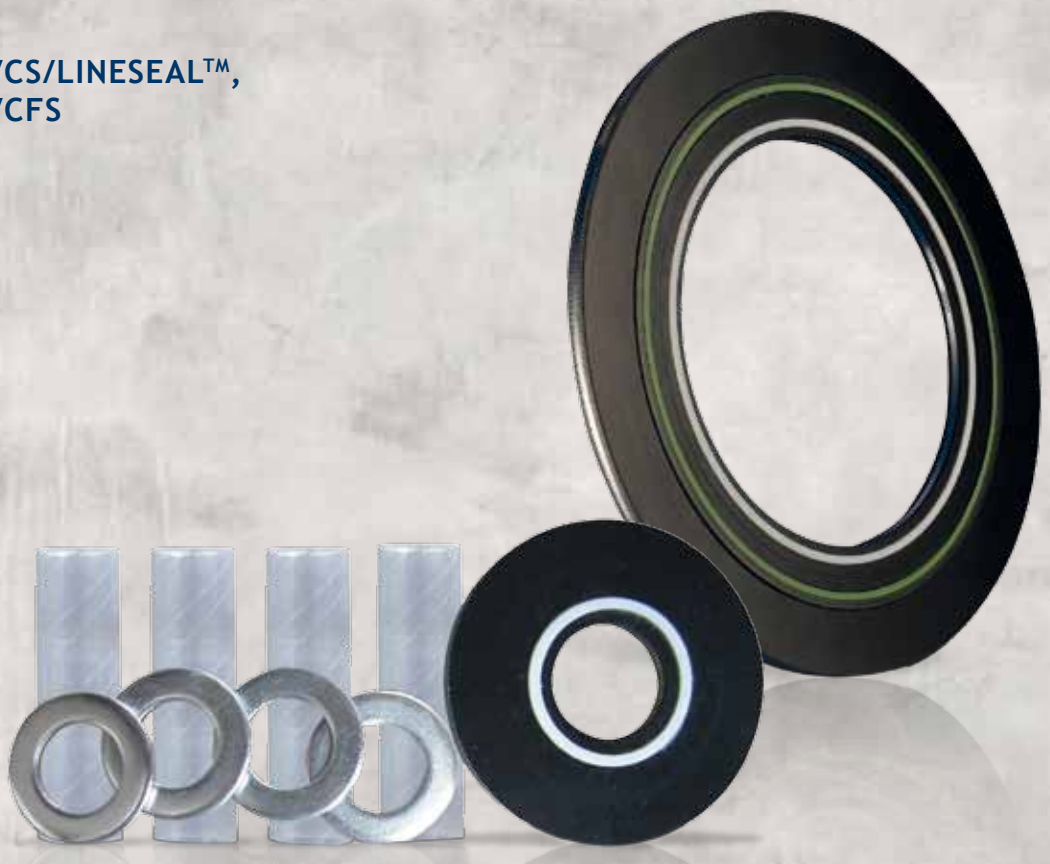
PSI PIKOTEK®
FLANGE ISOLATION KITS

Approval by
Shell Global Solutions

RUBBER FACED PHENOLIC (RFP),
LINEBACKER®

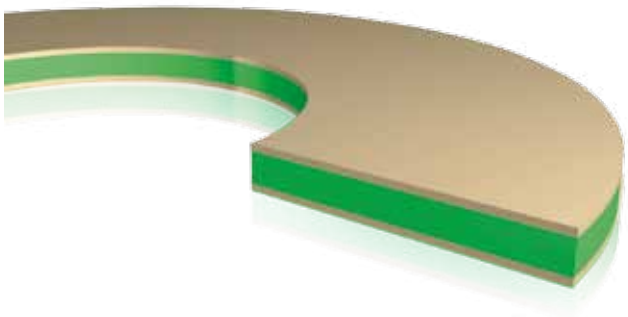
GASKETSEAL®,
EPDM

VCS/LINESEAL™,
VCFS



WWW.PSI-PRODUCTS.COM

GENERAL INFORMATION



Direct bolt force load

Rubber Faced Phenolic is worldwide used as standard isolating gasket in the oil and gas industry. The phenolic sheets are on both sides laminated with neoprene and work under direct bolt force load. For DVGW (gas) and KTW (potable water) approval, the GLV-UniSeal® gaskets are available.

Technical data

	Description
Gasket Material	PSI flange isolation gaskets are available in: Laminated phenolic sheets (HP) both sides laminated with Neoprene (CR) or Nitrile (NBR-Perbunan). Color: black

ASTM	Test method	Rubber Faced Phenolic (only*, DW**)
D149	Dielectric strength (KV/mm)	20
D659	Compressive strength (psi)	25,000
D229	Water absorption (%)	1.6
D257	Isolating resistance (MOhm)	40,000
D790	Flexural strength (psi)	22,500
D638	Tensile strength (psi)	20,000
D732	Shear strength (psi)	10,000
	Temperature range (°C)	-54 up to +80 °C
	Carrier plate thickness (mm)	3.2

* only: only gasket WITHOUT isolating sleeves and washers
** DW: Gasket, one isolating sleeve per bolt and 2 isolating and steel washers per bolt

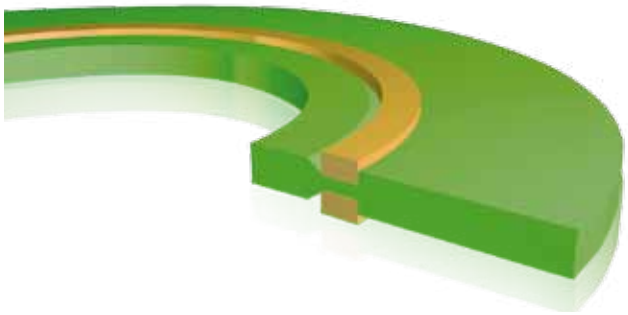
Available versions

Gasket Type E (FF)
Gasket with bolt holes according to the flange standards (Full Face)

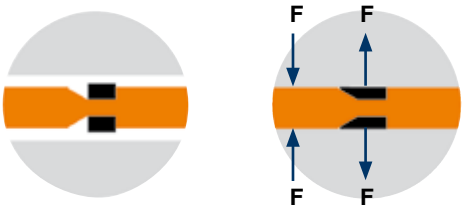
Gasket Type F (IBC)
Gasket without bolt holes according to the flange standard (I.B.C.)

More content can be found at
www.psi-products.com

GENERAL INFORMATION



Indirect bolt force load



LineBacker® seals utilize a patented rectangular sealing element, in combination with an unique groove design to effectively seal and insulate flanges of all types. With the unique "quad" ring design, an elastic memory is given to the elastomer. Materials such as Kel-F, polyamide, PTFE (teflon) and vinyl are also available as sealing elements which considerably increases the available options for adapting sealing materials to applications and environmental conditions. This greater variety of materials also provides excellent temperature and chemical range compatibility. The LineBacker's® "m" and "y" factors are close to zero, thus enabling the creation of a positive sealing without high bolt loads, which are present with flat gaskets.

LineBacker® isolation gaskets can be manufactured in any common diameter.

Various LineBacker® seal retainers and sealing rings can be used for special applications.

PSI's unique sealing elements provide an elastic memory to a wide assortment of materials.

LineBacker® gaskets can be ordered individually.

Approval by
Shell Global Solutions

Properties

- The isolation is a high-quality seal. It functions as an electrical separation point and prevents contact corrosion.
- Prevention of flange leakage
- Guards against blowouts
- Usable with any type of flange
- The sealing material is matched to operation conditions
- Lowest possible bolt force and compressive load
- Increased gasket life

The GLV-UniSeal® seals are available as an alternative for DVGW (gas) and KTW (potable water) approval.
*** PGE upon request !**

TECHNICAL INFORMATION

General physical LineBacker® data & max. temperature limits

ASTM	Test method	Plain Phenolic**	G-3 High temp. Phenolic**	G-7** Silicone/Glass**	G-10 Epoxy/Glass	G-11 Epoxy/Glass
D149	Dielectric Strength Volts/Mil. (Short Time)	500	550	350 – 400	550	550
D659	Compressive Strength (psi)	25.000	50.000	40.000	65.000	60.000
D229	Water Absorption (%)	1.6	0.7	0.07	0.04	0.07
D257	Isolating Resistance Meg Ohms	40.000	46.000	2.500	200.000	200.000
D790	Flexural Strength (psi)	40.000	46.000	2.500	65.000	62.000
D638	Tensile Strength (psi)	20.000	42.000	25.000	51.000	42.500
D732	Shear Strength (psi)	10.000	18.000	20.000	21.000	22.000
	Temperature Range Degrees C	-54 to +104 °C	-54 to +200 °C	Cryogenic up to +232 °C	Cryogenic up to +150 °C	Cryogenic up to +200 °C

* G-7 material should not be used with hydrocarbons
** on request

Seal Element Temperature Limits

Nitrile	EPDM	Viton	Teflon
-40 to +121°C	-54 to +149°C	-29 to +177°C	Cryogenic to +232°C

In order to determine a gasket's overall temperature range, temperature limits of both, retainer and sealing element, have to be considered.

How To Order

To order LineBacker® sealing/isolating gaskets
please indicate the following:

1. Pipe Size
2. Pressure Rating up to class 600/PN 100 (ANSI, DIN, API)
3. Type of flange gasket (LineBacker®)
4. Retainer material
5. Sealing element version
6. Gasket type (type E or F)
7. Flange type (weld-neck, slip-on, RTJ, etc.)
8. Quantity
9. For pipe sizes greater than DN600 please contact PSI.

Performance data and technical information provided herein is intended for guideline purposes only. Suitability of product configuration for specific applications must be determined by end-user.

Gasket Type E (FF)

Gasket Type F (IBC)

TECHNICAL INFORMATION

Suggested Flange Isolation Material Compatibility

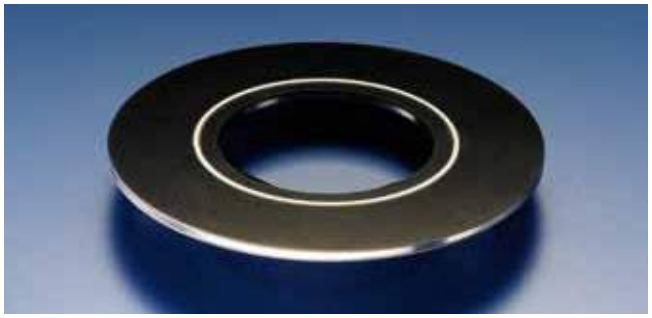
Medium	Seal Retainer	Sealing Ring	Temperature Range °C
Acetone	Phenol****	EPDM	0 to +27
Air	G-10	Nitrile	-40 to +107
Ammonia dry	G-10	Teflon	-54 to +104
Ammonia (wet)***	G-10	Teflon	0 to +38
Bleach	G-10	Teflon	0 to +27
Butylene (Butadiene)	G-10	Teflon	0 to +38
Carbon dioxide	G-10	Nitrile	0 to +66
Caustic soda (NaOH)	Consult PSI Products GmbH		
Cryogenic	G-10	Teflon	-184 to +138
Ethanol	G-10	EPDM	0 to +38
Ethylene (Ethene)	G-10	Teflon	0 to +27
Fuel oil	G-10	Viton	-29 to +138
Natural gas	Phenol****	Nitrile	-40 to +104
Sour gas	G-10	Viton	-29 to +104
Petrol	G-10	Teflon	-54 to +107
Hydrogen	G-10	Nitrile	-40 to +121
Jet fuel	G-10	Viton	-29 to +107
LNG liquid gas	G-11	Teflon	-184 to +38
Mercaptane	G-10	Teflon	-29 to +27
Methanol	G-10	Teflon	0 to +38
Nitrogen	Phenol****	Nitrile	-40 to +104
Oil, crude	G-10	Viton	-29 to +138
Oxygen**	G-10	Teflon	-54 to +121
Pentane	G-10	Teflon	0 to +27
Propane	G-10	Nitrile or Teflon	0 to +27
Propylene	G-10	Viton	0 to +27
Sewage	G-10	Viton	-29 to +138
Spent liquor	G-10	Teflon	0 to +38
Steam	Consult PSI Products GmbH		
Styrene	G-10	Teflon	0 to +27
Sulphur (molten)	G-10	Teflon	0 to +138
Toluene	G-10	Viton or Teflon	0 to +66
Water (hot)	G-10	EPDM	+79 to +138
Water (potable)	G-10	EPDM	0 to +138
Water (sea)	G-10	EPDM	0 to +138
White liquor	G-10	Teflon	+27 to +138

* G-7 material should never be used with hydrocarbons
** Organic materials that will feed a fire if a leak occurs and an ignition source is next to it.
*** Ammonia (wet) - Data up to +100 °F (+38 °C) only (same materials as dry).
**** upon request

General Notes:
The above mentioned performance data is intended as guideline only. Performance suitability for any specific application should be determined by the end-user. Changes with regard to temperature, pressure, concentration or media composition, acting synergistically, may exclude the proposed media suitability above. Material selection is solely at the risk of the end-user. Consult a professional or PSI for specific applications. PSI's liability is limited to the liability listed inside the PSI standard warranties.

Metal Retainer Materials:
Due to flange metal compatibility, LineBacker® gaskets are available in many different metal retainer materials, especially for applications with extremely dangerous media types or with extreme temperatures and pressures.

GENERAL



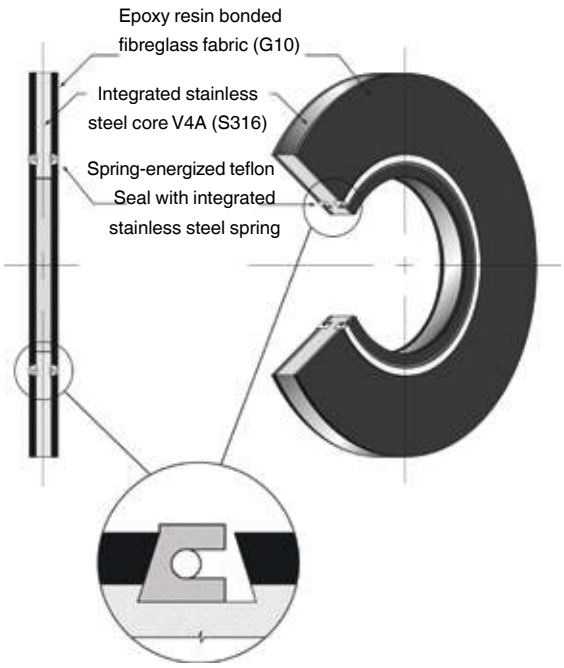
The PSI **Pikotek** VCS/LineSeal™ flange isolation is a system for "Very Critical Service" designed for electrical flange isolation and general sealing applications. This seal is suitable for use with raised-face, flat-face and RTJ flanges in all pressure classes including API 10.000 psi service. In addition to its superior sealing characteristics and excellent dielectric properties, the VCS/LineSeal™ is ideal for isolating flanges made from dissimilar metals, thus reducing galvanic corrosion and local flange face corrosion.

VCS/LineSeal™ Isolation System Advantages and Benefits

- Extremely reliable sealing and isolating solution for all critical services
- Seals and isolates all pressure classes up through ANSI 2500 class and API 10.000 psi
- Withstands severe service conditions including large bending moments, fluctuating vibrations, temperatures and pressures
- Designed to withstand corrosive environments, including high concentrations of CO2, H2S, process water, etc.
- Outstanding isolation properties for cathodic protection
- Pressure-activated seals provide highly reliable sealing and eliminate costly leakage
- The gasket size is adjusted to the respective flange diameter in order to protect the flange faces from media-induced corrosion and flow-induced erosion
- Avoids flow turbulences at flanged connections
- Mitigates galvanic corrosion at dissimilar metal flanges
- Resilient lamination material does not fail due to overpressure (e.g. due to overtightened bolts)
- Available to match any flange specification (ANSI, API, MSSP, BS, DIN, AS, etc.)
- Can mate mismatched RTJ with raised-face flanges
- Easy installation, and removal
- Flanges do not have to be lubricated as with ring gaskets. The VCS/LineSeal™ easily slips into place
- Sealing system results in low required bolt loads. Less make up force is required resulting in less flange and bolt stress
- VCS/LineSeal™ aligns and centers itself, is quickly installed and no special tools are required
- Its maintenance-free and corrosion protective design helps the gasket withstand deformation under high loads

VCS/LineSeal™ Design

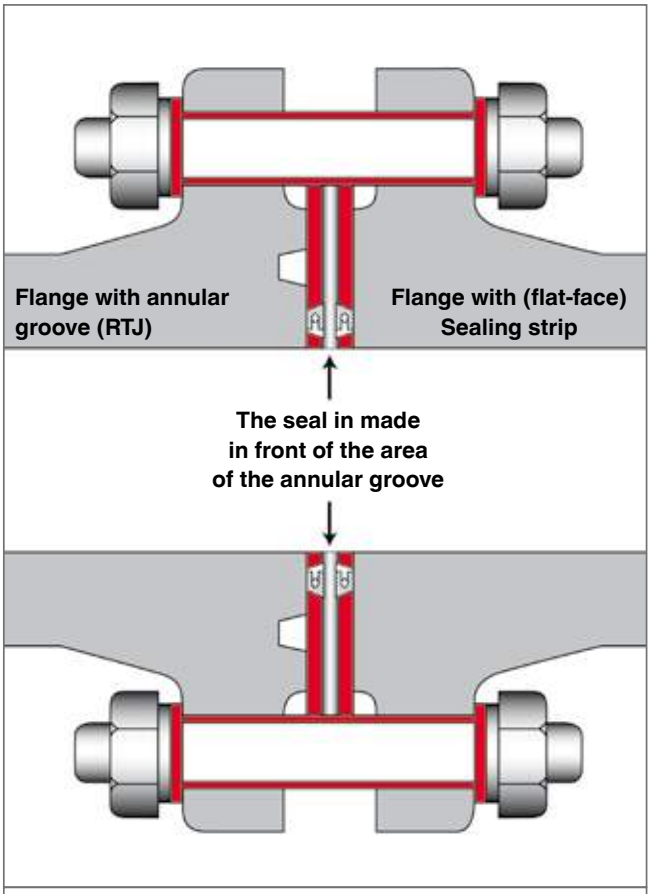
The unique design of the VCS/LineSeal™ system incorporates high-strength, glass-reinforced epoxy laminate bonded to a stainless steel core. This provides the strength of a traditional metallic seal while maintaining complete electrical isolation between the flange faces. The seal grooves are machined through the laminate isolating material into the stainless steel core. This provides a strong base for the seal seat and breaks a potential leak path. Spring-energized teflon sealing elements are installed in the dovetail-shaped seal grooves and provide pressure-activated sealing that sets the VCS/LineSeal™ apart from other less reliable sealing solutions. Other sealing element configurations are also available such as Viton, Nitrile or Silicon.



GENERAL

Electrical Insulation

In addition to its superior sealing characteristics, the PSI **Pikotek** VCS/LineSeal™ flange isolation distinguishes itself not only through it excellent sealing properties but also by providing electrical flange isolation and a hard-wearing sealing mechanism. The VCS/LineSeal™ significantly decreases electrical potential between two flange faces by providing a non-conducting, non-metallic interface. This effectively eliminates corrosion resulting from dissimilar metal contact or ground current induced corrosion of metal piping components. When used with isolation sleeves and washers, the VCS/LineSeal™ flange isolation is particularly effective at interrupting the electrical conductivity in the pipeline systems with cathodic protection. Strength and a long service life are outstanding properties of the VCS/LineSeal™ flange isolation in comparison to other isolating gaskets. Traditional isolating gaskets are fragile and prone to failure because they are often made from brittle, non-metallic materials (e.g. phenolic resin) and are not capable of withstanding inadequate installation practices. The steel core of the VCS/ LineSeal™ flange isolation and its patented construction enable the gasket to withstand far more system pressure, fluctuating pressures, bending moments, and overtorquing.



Flange connection for electrical isolation and against contact corrosion (in red)

Sealing Characteristics

The primary job that any gasket must perform is to seal the pressure differential between the internal and external environment. The VCS/LineSeal™ performs this task through the use of its spring-energized, pressure-activated sealing elements. At low system pressure, the spring acts to deflect the lips of the seal, thus enabling low pressure sealing. As the pressure increases and comes in direct contact with the sealing element, the system pressure deflects the seal lips and more sealing force is applied against the flanges. This high pressure sealing is accomplished while maintaining complete electrical flange isolation. This high-reliability sealing system makes the PSI Pikotek VCS/LineSeal™ the seal to use when failure cannot be tolerated. The fact that the VCS/LineSeal™ uses pressure-activated sealing elements which are located inboard of the ring groove on RTJ flanges has the additional benefit of allowing the VCS/LineSeal™ to seal mismatched RTJ to raised-face or flat-face flanges. This feature is very useful when replacing valves using stock inventory that may have a different flange face than the mating flanges.

More content can be found at
www.psi-products.com

TECHNICAL INFORMATION

Metal Core

The core of each seal is made of hardened stainless steel (V4A/S316). Other metals such as duplex or Inconel are available upon request.

Isolating Material Options

Test Method	G-10*	G-11*	G-10CR** (Cryogenic)
Compressive Strength (psi)	65.000	50.000	65.000
Dielectric Strength (VPM)	750-800	500	800
Max. Continuous Operating Temp.	150 °C	202 °C	130 °C
Min. Continuous Operating Temp.	-129 °C	-46 °C	-273 °C
Water Absorption (%)	0.05	0.085	0.085
Flexural Strength (psi)	65.000	57.700	57.700
Tensile strength (psi)	50.000	41.000	41.000
Bond Strength (lb.)	2.600	2.200	2.200
Shear Strength (lb.)	22.000	21.200	21.200

* NEMA grade glass reinforced epoxy (GRE) laminate
** Produced to NIST G10CR process specification for materials used in cryogenic applications

Sealing material

The sealing elements are intended to provide an impenetrable barrier through which no contained media or other substance can penetrate. Consequently, the composite retainer backing material behind the seal remains uncontaminated, thus permanently holding the seal in place in a static, fully encapsulated manner.

Sealing Element Material Options

1. Teflon (Spring-Energized) Standard

Recommended for all environments. Helical wound spring provides radial load. Encapsulation in the seal groove eliminates creep or cold flow. This sealing system truly distinguishes PSI Pikotek gaskets from all other flange sealing systems.
Temperature range: -250 °F to +392 °F (-157 °C to +200 °C)

2. Viton

General purpose oilfield elastomer. Excellent resistance to aliphatic hydrocarbons, glycols and H_2S. Good resistance to aromatic hydrocarbons. **Not recommended for:** systems with amine inhibitors and in pipeline systems containing significant partial pressures of polar gases (i.e. CO_2) where radical pressure drops (i.e. 2000 PSI to 0 PSI) commonly occur.
Temperature range: -26 °C to +200 °C (note: gasket material is a limiting factor)

3. Buna-Nitrile

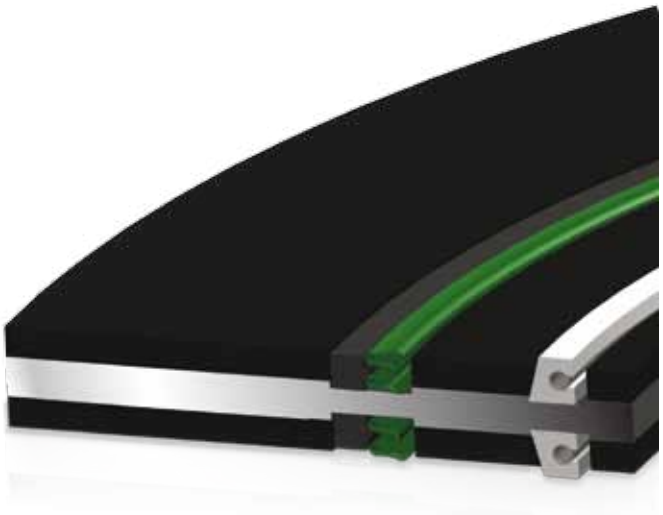
General purpose elastomer only suitable for low chemical resistance.
Temperature range: -200 °F to +240 °F (-129 °C to +116 °C)

4. Silicon

Suitable for use in potable water applications. Approved by WRAS.
Temperature range: -67 °F to +572 °F (-55 °C to +300 °C)

Special sealing element materials are available upon request and subject to technical suitability.

GENERAL INFORMATION



The World's only Firesafe flange isolation system VCFS* (VCS FireSafe*)

- Based upon proven PSI Pikotek VCS/LineSeal™ platform
- Provides complete electrical flange isolation
- Tandem seal technology
- Primary sealing system has more than twenty years successful track record
- Secondary sealing system is fire safe
- Passed API 6FB, part 3 fire test
- Used in conjunction with cathodic protection systems
- Reduces potential flange rotation
- Provides sealing under low bolt load

The VCFS* utilizes PSI Pikotek standard VCS design with its 20 years plus track record of successfully sealing very critical services. The FS* version was created by taking a standard VCS configuration and adding a secondary sealing element that is capable of maintaining a seal while subject to a 1500 °F (815 °C) fire. The VCFS* combines the VCS's proven track record of electrical isolation and sealing integrity in aggressive chemical environments with a solution that has fully passed the API 6FB, 3rd Edition fire test.

The VCFS* is suitable for all services up to, and including, ANSI 2500# and is offered for ring type joint (RTJ) flanges from 6" - 24" and raised face flanges from 2" - 24". The VCFS* is designed for service where the cost of joint failure cannot be tolerated and the operator desires both, electrical isolation and added sealing integrity in the case of a fire.

The VCFS* seal consists of a PTFE spring-energized primary sealing element and an E-ring secondary seal, all seated in a highly resilient metal core, permanently bonded to an isolating lamination. Due to its unique pressure activated sealing mechanism, the gasket requires far less bolt load to seal than other gasket types. In addition, the engineered E-ring will serve as a secondary seal during normal operation and as the primary sealing element during a fire.

The API 6FB Fire Test
The API 6FB test requires that any sealing or connection holds up for 30 minutes in fire and then another 60 minutes cooling down. After the assembly is cooled down to room temperature, the line is de-pressurized and then re-pressurized. During all stages of the test the gasket must not exceed an leakage rate prescribed by API.

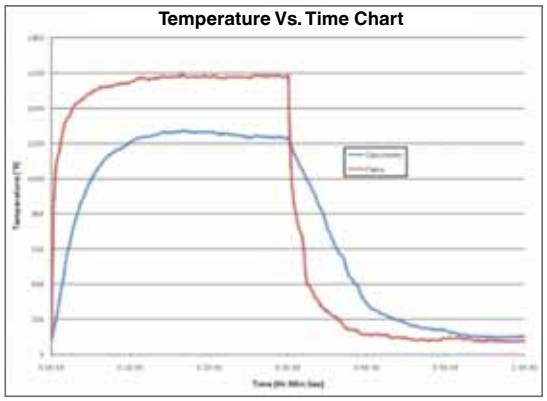


Chart 1
Temperature log of the calorimeter blocks and thermo-couples during the full 60 minutes burn and cool down cycle.

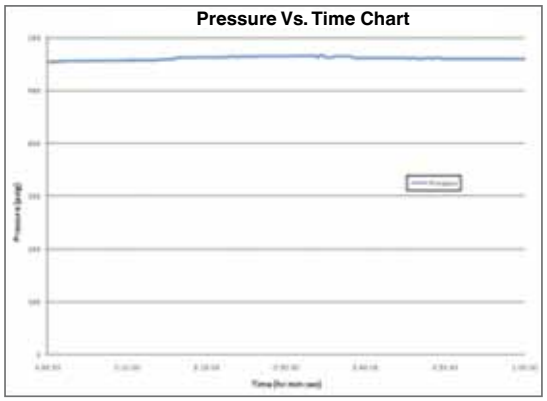


Chart 2
Pressure versus time chart for this test.

More content can be found at
www.psi-products.com

TECHNICAL INFORMATION

Isolating Material Options

Test method	G-10* (Cryogenic)	G-11*
Compressive Strength (psi)	65.000	50.000
Dielectric Strength (VPM)	750-800	500
Max. Continuous Operating Temp.	302˚F (150 ˚C)	392 ˚F (202 ˚C)
Min. Continuous Operating Temp.	-200˚F (-129 ˚C)	-50 ˚F (-46 ˚C)
Water Absorption (%)	0.05	0.085
Flexural Strength (psi)	65.000	57.700
Tensile Strength (psi)	50.000	41.000
Bond Strength (lb.)	2.600	2.200
Shear Strength (lb.)	22.000	21.200

* NEMA grade glass reinforced epoxy (GRE) laminate

HCS Washer System:

As part of the development of the VCFS gasket, we had to compensate the occurring bolt load loss during the burn process of the API 6FB fire test. Therefore we developed the new X37 hardened coated steel washer system which meets these requirements.

Metal

- Grade 1050 steel
- Heat treated per ASTM F-436 specification
- Quenched and tempered for hardening
- Hardness of rockwell C scale 38 to 45 (HRC 38 - HRC 45)

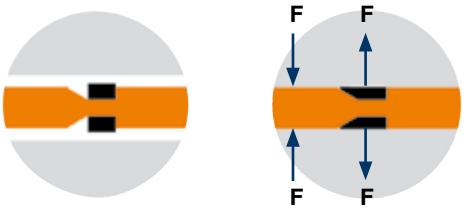
Coating

- The washer coating is a copyright protected development called X37
- The coating consists of a corrosion resistant pre-treatment and several layers of modified PTFE synthetic resin coating with curing agents.
- The coating is overall strong and long-lasting with high dielectric and lubrication properties
- Dielectric of ~ 1000 Volts/mil
- Maximum working temperature of 482 °F / 250 °C
- Minimum working temperature -40 °C
- 2000 hours salt spray test

***Note:**
The “FS” or “Fire Safe” designation denotes only that this gasket has successfully passed the API 6FB fire test. Due to the fact that every fire is unique and many uncontrolled variables are present, no other claims regarding suitability or performance in a fire are made. Each designer, user and/or operator will need to assess their individual situation when deciding to install FS style gaskets. Patent Pending.

GENERAL INFORMATION

Indirect bolt load force



GasketSeal® seals are among the most effective Flange gaskets. The seal consists of two molded semi O-rings mounted in grooves on opposite sides of an insulating retainer. While maintaining all the advantages of a full O-ring seal, the semi O-ring seal eliminates the need for a sealing groove in the flange face. The GasketSeal's® "m" and "y" factors are close to zero, thus enabling the creation of a positive sealing without high bolt loads, which are present with flat gaskets. GasketSeals are available in a wide variety of retainer rings and sealing element combinations for matching seals to service and environmental conditions.

GasketSeal® flange isolation kits can be manufactured in any popular diameter.

Match the gasket's sealing element and retainer material to suit specific applications.

The unique sealing element provides advantages of an O-ring seal without grove positioning problems.

GasketSeal® seals can be ordered individually or as part of an isolation kit.

Approval by
Shell Global Solutions

Properties

- Prevention of flange leaks
- Guards against blowouts
- Usable with any type of flange
- Matching gasket materials to service conditions
- Lowest possible bolt force and compressive load
- Increased gasket life
- The isolation is a hight quality seal. It works as an electrical separation point and prevents contact corrosion.

The GLV-UniSeal® seals are available as an alternative for DVGW (gas) and KTW (potable water) approval.

TECHNICAL INFORMATION

General physical GasketSeal® data & max. temperature limits

ASTM	Test method	Simple Phenol**	G-3 High temp. Phenol**	G-7* Silicon/Glass**	G10 Epoxy/Glass	G11 Epoxy/Glass
D149	Dielectric Strength Volts/Mil. (Short Time)	500	550	350 – 400	550	550
D659	Compressive Strength (psi)	25.000	50.000	40.000	65.000	60.000
D229	Water Absorption (%)	1.6	0.7	0.07	0.04	0.07
D257	Isolating Resistance Meg Ohms	40.000	46.000	2.500	200.000	200.000
D790	Flexural Strength (psi)	40.000	46.000	2.500	65.000	62.000
D638	Tensile Strength (psi)	20.000	42.000	25.000	51.000	42.500
D732	Shear Strength (psi)	10.000	18.000	20.000	21.000	22.000
	Temperature Range Degrees C	-54 °C to 104 °C	-54 °C to 200 °C	Cryogenic up to +232 °C	Cryogenic up to +150 °C	Cryogenic up to +200 °C

* G-7 material should never be used with hydrocarbons
** on request

Temperature limits sealing element

Nitrile	Viton
-40 to +121 °C	-29 to +177 °C

In order to determine a gasket's overall temperature range, temperature limits of both, retainer and sealing element, have to be considered.

To order GasketSeal® sealing/insulating gaskets please indicate the following:

1. Pipe Size
2. Pressure Rating (ANSI, DIN, API)
3. Type of Flange gasket (GasketSeal®)
4. Backing
5. Sealing ring version
6. Type of Flange gasket (type E or F)
7. Flange type (weld-neck, transfer, RTJ, etc.)
8. Quantity
9. For pipe sizes greater than DN600, please contact PSI.

Performance data and technical information provided herein is intended for guideline purposes only. Suitability of product configuration for specific applications must be determined by end-user.

Gasket Type E (FF)

Gasket Type F (IBC)

GENERAL INFORMATION

You can order the EPDM isolation seal in varying strengths, versions, types E or F and with an isolation set.

The PSI range of EPDM gaskets offers durability and strength. For gaskets having a thickness greater than 4 mm we insert a polyester fabric inlay which adds strength to the durable EPDM gasket material. This polyester fabric inlay reduces the risk of damage to the gasket by overtightening of the flanges.

For DVGW (gas) and KTW (potable water) approval, the GLV-UniSeal® are available.

Direct bolt load force

To order EPDM® sealing/insulating gaskets please indicate the following:

1. Pipe Size
2. Pressure rating (DIN, BS)
3. Use of seal
4. Material thickness
5. Type of Flange gasket (type E or F)
6. Flange type (weld-neck, transfer, RTJ, etc.)
7. Quantity

Gasket Type E (FF)

Gasket Type F (IBC)

TECHNICAL INFORMATION

Material specifications

EPDM material (Ethylene-Propylene-(Diene) copolymer	
Polyester Scrim Insertion	4 mm thickness – 1 ply polyester scrim insertion 6 mm thickness – 2 ply polyester scrim insertion
Color	black
Durometer Hardness “A”	70 ± 5 degrees Shore
Tensile Strength (min.)	9 MPa
Elongation (min.)	300%
Temp. (Short Term 10 hours)	+150 °C
Temp. (Continuous 1000 hours)	-30 up to +120 °C
Compression set at 70 °C for 24 hours	31%
Conductivity	Non-Conductive >10x12 Ohms to infinity
Elasticity	Very good
Tear propagation resistance	Good 23 KN/M

General Notes:

The above mentioned performance data is intended as guideline only. Performance suitability for any specific application should be determined by the end-user. Changes with regard to temperature, pressure, concentration or media composition, acting synergistically, may exclude the proposed media suitability above. Material selection is solely at the risk of the end-user. Consult a professional or PSI for specific applications. PSI’s liability is limited to the liability listed inside the PSI standard warranties.

PSI’s liability will be limited to the liability listed in the PSI standard warranties.

PSI FLANGE ISOLATION ACCESSORIES
SLEEVES & WASHERS

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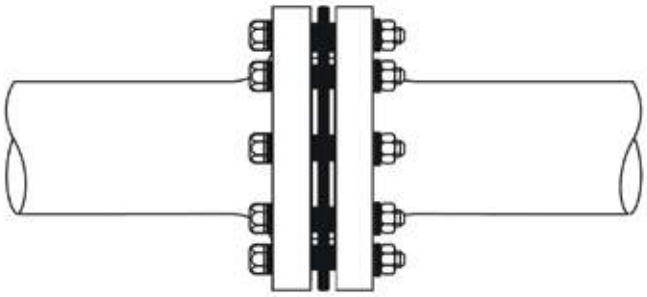
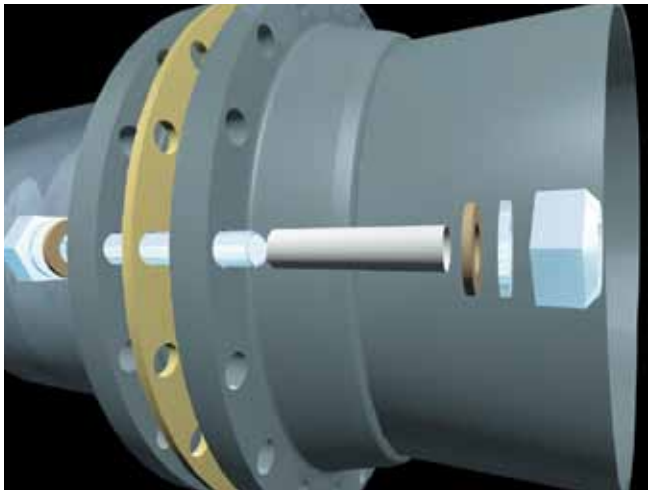
GENERAL INFORMATION

Flange connection as electrical separation point prevents contact corrosion





Apart from new installations, PSI flange isolations offer the option of converting existing flange connections into a point of electric separation. In doing so, it is not necessary to make any mechanical changes to the flange connection.

The PSI flange isolation sets are available for all popular standards, sizes and pressure rates.

PSI flange isolations can be supplied as individual gasket or complete flange isolation kit. An isolation set DW consists of one isolation sleeve, 2 isolation washers as well as 2 steel washers for each bolt hole.

Isolation sets are also available in special sizes.

Double isolation washer set (DW)

The double isolation washer set is used for added protection against short circuit currents at the nuts and bolts.

When using the double isolation washer set, nuts and bolts are electrically insulated on both sides of the flange.

Another important reason is to prevent contact corrosion through flange isolation at flanges out of different metals.

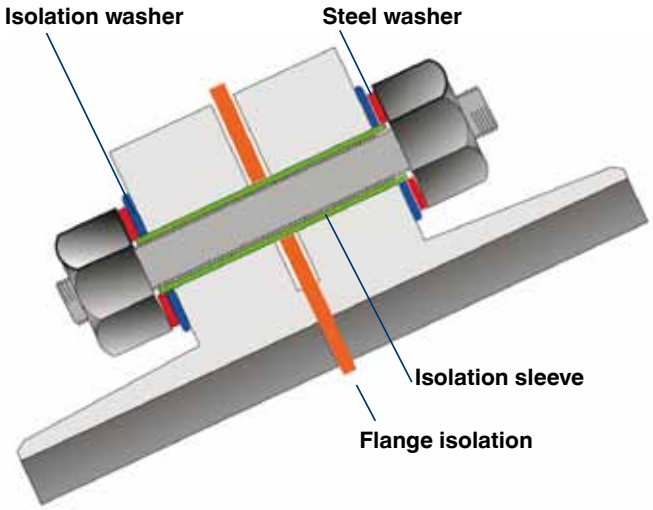
ISOLATION SLEEVES & WASHERS

Isolation Sleeves

Isolation sleeves are available in the following materials:

- Mylar (standard version)
- Nomex 410
- Phenol
- G-7 (glass silicone composite laminate)
- G-10 (fibre glass composite laminate)

The isolation sleeves are designed for all flange types to be easily inserted into the bolt holes. PSI isolation sleeves have a wall thickness of 0.3 - 0.8 mm and are installed together with isolation and steel washers. They are available for standard American bolt sizes from 1/2" (12.7 mm) to 3 1/2" (88.9 mm) as well as metric bolt sizes from M12 to M52. Further sizes upon request



Isolation washers

Isolation washers are available in the following materials:

- Laminated phenolic resin (standard version)
- G-7 (glass silicone composite laminate)
- G-10 (fibre glass composite laminate)
- HCS (proprietary X37 coating)

PSI isolation washers have excellent isolation properties. The fit is designed so that the isolation sleeve can be inserted through the isolation washer. They are available for standard American bolt sizes from 1/2" (12.7 mm) to 3 1/2" (88.9 mm) as well as metric bolt sizes from M12 to M52. Further sizes upon request.

Steel washers

Steel washers are designed in a way that the isolation sleeve can be inserted through them. Steel washers are available in the following materials:

- Hot-rolled steel ST 37,
  galvanized (standard version)
- Hot-rolled stainless steel S316/V4A (special version)

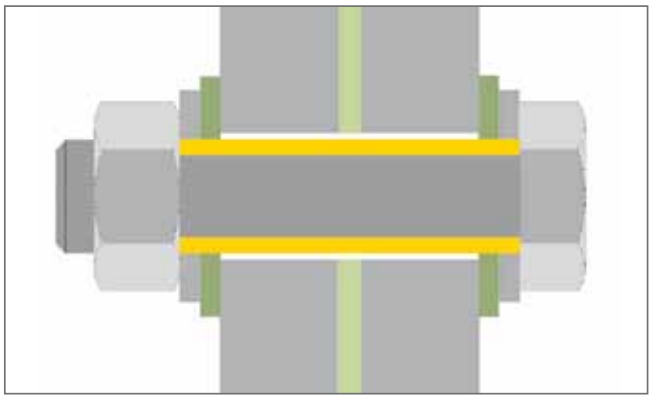
TECHNICAL INFORMATION

Advantages

- Optimal electrical separation
- Extreme strength
- No increase of bolt diameter
- Ideal for on-site application

Use isolation bolts for flange isolations for applications up to 200 °C
(isolation bolts for flange isolations for applications up to 290 °C upon request).

Bolts according to DIN 1025, special bolts upon request.
Bolt dimensions in line with DIN/ANSI flange requirements.
Bolt materials: Quality grade 5.6, 8.8 CK35, 42 CrMo4, UNC – special materials upon request.



Isolation

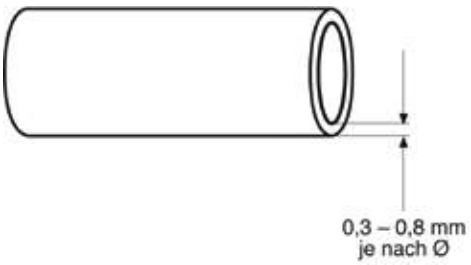
Parameters		Test Method	Unit	Values
Material	Epoxy/Glass			
Color	white/yellow			
Glass threads	per cm			30
Breaking load in B state			N/cm	> 2000
Breaking load after curing	min.		N/cm	> 2500
Elasticity module			Mpa	approx. 50.000
Continuous operating temperature			°C	180
spec. volume resistance			Ω/cm	$1x10^{14}$
Isolation resistance when submersed in water		IEC168	Ohm	$1x10^{12}$
Water absorption		ISO 62/1	mg	< 20

Production:

The bolt is lathed off to the permitted diameter and covered with an epoxy resin glass fibre coating afterwards. Heat treatment hardens the epoxy glass fibre coating and adjusts it to the nominal dimension.

INDIVIDUAL COMPONENTS

Isolation sleeves



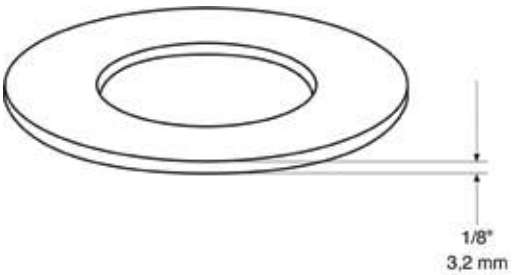
Mylar	Standard version for GLV-UniSeal® T and GGr	
Version:	Spiral wound polyester film	
Dielectric strength:	DIN/VDE 0303 T2/IEC 243	280.000 V/mm
Water absorption:	DIN 53495	< 0.8%
Temperature range:	DIN VDE 0304 part 2	-60 °C to +130 °C

Nomex 410	special version: Armid spiral wound paper	
Dielectric strength:	DIN/VDE 0303 T2/IEC 243	22.500 V/mm
Water absorption:	DIN 53495	< 0.1%
Temperature range:	DIN VDE 0304 part 2	-196 °C to +220 °C

G10 (only inch sizes)		
Version:	Glass silicone composite laminate	
Dielectric strength:	ASTM D149	15.700 V/mm
Water absorption:	ASTM D229	0.10%
Temperature range:	ASTM D229	-150 °C to +150 °C

INDIVIDUAL COMPONENTS

Isolation washers



Isolation washer	standard version for flange isolations	
Version:	Laminated phenolic resin	
Dielectric strength:	DIN/VDE 0303 part2/IEC 243	20.000 V/mm
Water absorption:	DIN 53495	< 1.6%
Operating temp., max.:	DIN VDE 0304 part 2	-20 °C to +100 °C

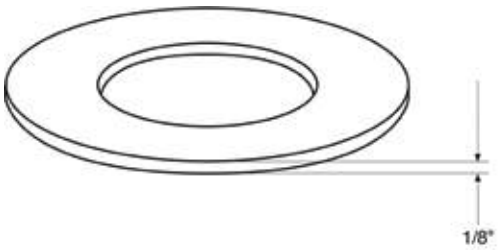
Isolation washer G10		
Version:	Glass silicone composite laminate	
Dielectric strength:	DIN/VDE 0303 part2/IEC 243	20.000 V/mm
Water absorption:	DIN 53495	< 1.0%
Temperature range:	DIN VDE 0304 part 2	-60 °C to +130 °C

HCS isolation washer	standard version for VCFS	
Version:	proprietary X37 coating	
Dielectric strength:		39.400 V/mm
Temperature range:		-40 °C to +250 °C

Isolation washer G7	Special version: Glass silicone composite laminate	
Dielectric strength:	DIN/VDE 0303 T2/IEC 243	10.100 V/mm
Water absorption:	DIN 53495	< 0.13 %
Temperature range:	DIN VDE 0304 part 2	-60 °C to +180 °C

INDIVIDUAL COMPONENTS

Steel washers



Thickness depending on nominal size DN 2-7 mm

Steel washer
Standard version: Carbon steel hot rolled galvanized steel

Steel washer **S316 (V4A)**
Special version: Hot rolled stainless steel

The ID of the steel washers corresponds to the OD of the isolation sleeves. Flange gaskets, sleeves and washers can be combined with each other according to temperature range.

Standard isolation set DW

Isolation sleeve:	Mylar
Isolation washers:	Laminated phenolic resin
Washer:	galvanized steel

Special isolation set DW

Isolation sleeve:	Mylar/Nomex
Isolation washers:	G10/G7
Washer:	galvanized steel S304/V2A

PSI PIPE CLEANING PIGS

FOAM PIGS

FLEXI PIGS

PIG LOCALIZATION

WWW.PSI-PRODUCTS.COM

GENERAL INFORMATION

Filling, emptying, separating

PSI foam pigs are ideal tools for filling and emptying processes during hydrostatic tests and liquid transport, as well as when separating different media types transported through the same pipeline.

Drying

After pressure-testing (hydrostatic tests) the pipe need to be thoroughly dried, especially gas pipes. Low density, open pored PSI foam pigs are highly suitable for this task.

Cleaning

PSI foam pigs remove media residue from pipelines with great cleaning performance and also remove rust, deposits of various kinds and foreign bodies.

PS foam pigs can be supplied in various densities and sizes from 2" to 48".

Larger sizes up to 64" upon request.

All types of pigs are resistant to oil, petrol, methanol and other chemicals in accordance with the PSI chemical resistance table.

Subject to technical changes.

More content can be found at
www.psi-products.com

DESCRIPTION / TECHNICAL DATA

Application range for:	type	material	ø inch	gravity kg/m3	coating shore A
• Drying • Slight contamination • Eliminating of air humidity • Test pig for unknown contamination	PU FP	PU-foam	50 - 1600	25	-
• Drying • For medium contamination without incrustation • Suitable for long distances • Dewatering • Non-pressing sealing during maintenance work	PU-Plain	PU-foam	50 - 1600	110	-
• For medium contamination without incrustation • Suitable for long distances • Dewatering	PU-Plain-S	PU-foam	50 - 600	80	-
• Cleaning of longer distances with reduction and heavy contamination • Hydrostatic test • Sealing	PU-LR	PU-foam outer skin abrasion-proof PU	50 - 1600	110	90
• Suitable for long distance cleaning with lots of fittings	PU-LR-S	PU-foam outer skin abrasion-proof PU	50 - 600	80	90
• Removal of deposits • Dewatering • Cleaning long distances • Hydrostatic test • Cleaning prior to pipe commissioning	PU-CC	PU-foam outer skin abrasion-proof PU at periphery PU-stripes (rotation effect)	50 - 1600	110	90
• Removing deposits • Cleaning prior to pipe commissioning	PU-CC-S	PU-foam core Outer skin wear-resistant PU PU strip around circumference (rotation effect)	50 - 600	80	90
• Long distances with very heavy contamination • Firmly bonded deposits **Not suitable for plastic pipes**	PU-AC	PU-foam core Spirally wound silicone carbide or corundum stripes. Top and bottom consist of	50 - 1600	110	90
• Highest cleaning performance • Heaviest encrustation • Esspecially heavy rust • Long distances • Exceptionally firmly bonded deposit **Not suitable for plastic pipes**	PU-TWB	PU-foam core bottom and top abrasion-proof PU complete with steel brushes (plastic brushes possible)	50 - 1600	110	90

Temp °C	Running speed m/s	Service life in km*	ø-Reduction rate	min. radius bends	Fitting reduction
+5 - +80	1-4	ca. 45	50%	1,5 D	yes
+5 - +80	1-4	ca. 90	15%	1,5 D	-
+5 - +80	1-4	ca. 90	20%	1,5 D	yes
+5 - +80	1-4	ca. 90	10%	1,5 D	yes
+5 - +80	1-4	ca. 90	10%	1,5 D	yes
+5 - +80	1-4	ca. 90	10%	1,5 D	-
+5 - +80	1-4	ca. 90	15%	1,5 D	yes
+5 - +80	1-4	ca. 60	15%	1,5 D	yes
+5 - +80	2-5	ca. 90	5%	2,5 D	-

* The max. service live data given above are empirical values and may differ.

DESCRIPTION / TECHNICAL DATA

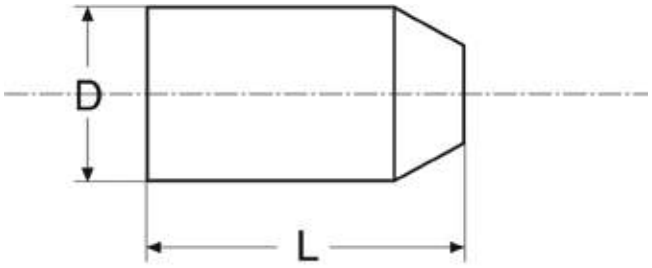
Application range for:	type	material	ø inch	gravity kg/m3	coating shore A
• Strong encrustation • Especially heavy rust • Long pipelines • Exeptionally firmly bonded deposits **use plastic brush for plastic pipes**	PU-WB	PU-foam core helically inserted outer shell made of abrasion-proof PU, helically inserted wire brushes	50 - 1600	110	90
• Filling and draining of pipelines • To separate different liquids • Cleaning of soft deposits	Flex S3	big body PU 3 exchangeable PU-collars	50 - 400	-	75
		EPDM	50 - 400	-	45-65
		NBR	50 - 400	-	45-50
		CR Neoprene	50 - 400	-	45
• To separate out different liquids • Displacement and cleaning pig for pipelines with parafin or similar deposits • Especially for pipelines with inner coating	Flex S4	big body PU 4 exchangeable PU-collars	50 - 400	-	75
		EPDM	50 - 400	-	45-65
		NBR	50 - 400	-	45-50
		CR Neoprene	50 - 400	-	45
• Cleaning of pipelines with narrow bends • For hard deposits	Flex C2	big body PU 2 exchangeable PU-collars + 2 steel wire brushes	50 - 400	-	75
	Flex C3	big body PU 3 exchangeable PU-collars + 3 steel wire brushes	50 - 400	-	75
• Calibration • Location anf removal of objects	Flex G2	big body PU 2 exchangeable PU-collars 1 calibration disc aluminium/steel/mild steel	50 - 400	-	75
	Flex G3	big body PU 1 calibration disc aluminium/steel/mild steel	50 - 400	-	75
		EPDM	50 - 400	-	45-65
		NBR	50 - 400	-	45-50
		CR Neoprene	50 - 400	-	45
		FPM Viton	50 - 400	-	50-80

The above specified idle times are empirical values. These can be different.

Temp °C	Running speed m/s	Service life in km*	ø-Reduction rate	min. radius bends	Fitting reduction
+5 - +80	2-5	ca. 90	10%	2,5 D	-
-20 - +80	2-7	ca. 240	15%	3	-
-50 - +150	2-7	ca. 240	15%	3	-
-30 - +110	2-7	ca. 240	15%	3	-
-45 - +100	2-7	ca. 240	15%	3	-
-20 - +80	2-7	ca. 240	15%	3	-
-50 - +150	2-7	ca. 240	15%	3	-
-30 - +110	2-7	ca. 240	15%	3	-
-45 - +100	2-7	ca. 240	15%	3	-
-20 - +80	2-7	ca. 240	10%	3	-
-20 - +80	2-7	ca. 240	10%	3	-
-20 - +80	2-5	ca. 240	15%	2,5 D	-
-20 - +80	2-5	ca. 240	15%	2,5 D	-
-50 - +150	2-5	ca. 240	15%	2,5 D	-
-30 - +110	2-5	ca. 240	15%	2,5 D	-
-45 - +100	2-5	ca. 240	15%	2,5 D	-
-20 - +200	2-5	ca. 240	15%	2,5 D	-

**Design 3 DIN 2605 (R = 1.5 D) / Design 5 DIN 2606 (R = 2.5 D)

TYPE FP



inch	DN	D	L	Design
2.0	50	75	150	3
2.5	65	90	200	3
3.0	80	100	220	3
4.0	100	130	250	3
5.0	125	150	275	3
6.0	150	190	300	3
7.0	175	200	320	3
8.0	200	230	360	3
10.0	250	290	430	3
12.0	300	350	560	3
14.0	350	400	600	3
16.0	400	450	700	3
18.0	450	520	750	3
20.0	500	570	800	3
22.0	550	620	850	3
24.0	600	670	900	3
26.0	650	730	1100	3
28.0	700	770	1100	3
30.0	750	840	1150	3
32.0	800	880	1250	3
34.0	850	930	1300	3
36.0	900	980	1350	3
40.0	1000	1080	1540	3
42.0	1050	1120	1680	3
44.0	1100	1190	1680	3
48.0	1200	1300	1800	3
56.0	1400	1500	2240	3
64.0	1600	1700	2520	3

The nominal diameters (DN) indicated in the tables correspond to the inner diameter of the pipe.

The sizes are given in mm (± 2%)

The order size is in inches.

Type FP

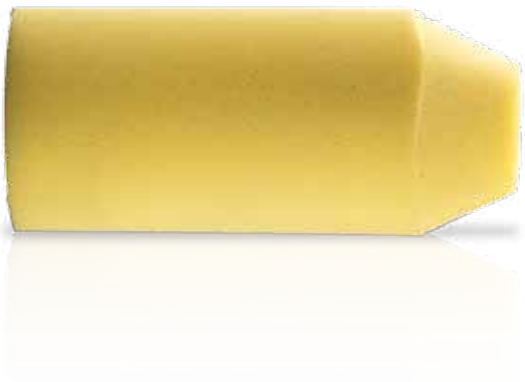
Pig body made of soft, open-pored polyurethane foam, strengthened with a water-tight polyurethane bottom.

Due to its great elasticity, pig type FP easily fits through valves, restrictors, elbows and 1.5 D bends.

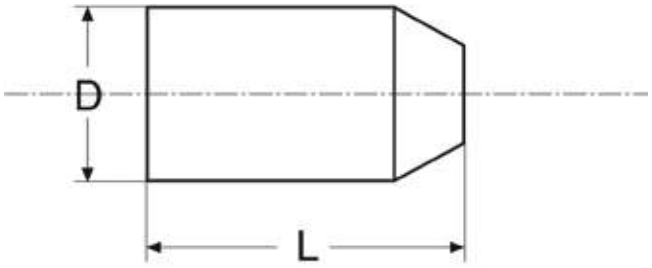
Possible diameter reduction by 50%.

Density: approx. 14-42 kg/m³ for type FP (0.87-2.60 lbs/ft³)

Application: Drying pipelines, soft cleaning



TYPE PU-PLAIN AND PU-PLAIN S



inch	DN	D	L	Design
2.0	50	60	160	3
2.5	65	75	155	3
3.0	80	85	155	3
4.0	100	110	195	3
5.0	125	139	220	3
6.0	150	168	266	3
7.0	175	177	280	3
8.0	200	215	330	3
10.0	250	260	415	3
12.0	300	321	510	3
14.0	350	346	530	3
16.0	400	410	595	3
18.0	450	455	660	3
20.0	500	505	760	3
22.0	550	555	810	3
24.0	600	605	880	3
26.0	650	665	990	3
28.0	700	710	945	3
30.0	750	760	1130	3
32.0	800	810	1170	3
34.0	865	855	1340	3
36.0	900	910	1370	3
40.0	1000	1010	1470	3
42.0	1050	1060	1580	3
48.0	1200	1220	1760	3

The nominal diameters DN indicated in the tables correspond to the inner diameter of the pipe.

The sizes are given in mm (± 2%).

The order size is in inches.

Type PU-Plain

Made of high-density polyurethane foam, reinforced with a water-tight polyurethane bottom.

For soft cleaning or drying of long distances after water passes through.

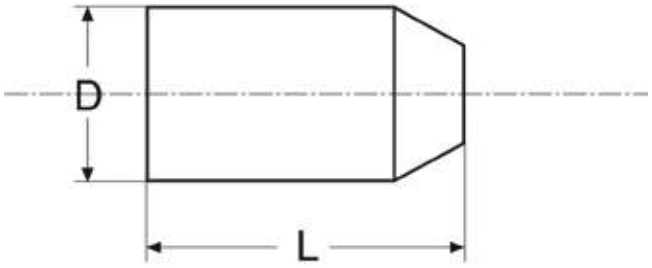
Density approx. 128-160 kg/m³ (8-10 lb/ft³). This type easily passes through 1.5 D bends.

Also available with coated top (standard from 16”).

Type PU-Plain-S

Same as type PU-Plain, but softer. Density approx. 80-85 kg/m³ (6.5 lb/ft³). Only available up to size 24". Also available with coated top (standard from 16”).

TYPE PU-LR AND PU-LR-S



inch	DN	D	L	Design
2.0	50	60	155	3
2.5	65	72	155	3
3.0	80	85	155	3
4.0	100	110	195	3
5.0	125	135	220	3
6.0	150	165	266	3
7.0	175	177	280	3
8.0	200	215	330	3
10.0	250	267	415	3
12.0	300	317	480	3
14.0	350	346	530	3
16.0	400	410	595	3
18.0	450	463	760	3
20.0	500	513	760	3
22.0	550	563	810	3
24.0	600	613	880	3
26.0	650	673	990	3
28.0	700	718	945	3
30.0	750	768	1130	3
32.0	800	818	1170	3
34.0	865	863	1340	3
36.0	900	918	1370	3
40.0	1000	1018	1470	3
42.0	1050	1068	1580	3
48.0	1200	1228	1760	3

The nominal diameters DN indicated in the tables correspond to the inner diameter of the pipe.

The sizes are given in mm (± 2%).

The order size is in inches.

Type PU-LR

Made of high density polyurethane foam with an outer skin made of high quality, wear- resistant polyurethane (hardness approx. 90 Shore A).

Recommended for cleaning long, straight pipe sections, also with narrow spots and heavier contamination.

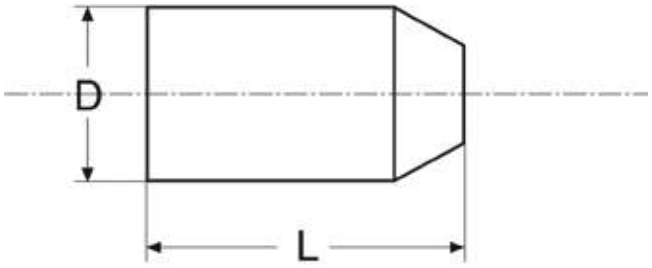
Density approx. 128-160 kg/m³ (9-10 lb/ft³).
This type easily passes through 1.5 D bends.

Type PU-LR-S

The same as type PU-LR, however with a softer core (hardness approx. 55 Shore). Recommended for cleaning pipe sections with lots of fittings and narrowing.

Density approx. 80-85 kg/m³ (6.5 lb/ft³).
Only available up to size 24".

TYPE PU-CC AND PU-CC-S



inch	DN	D	L	Design
2.0	50	60	155	3
2.5	65	72	155	3
3.0	80	85	155	3
4.0	100	110	195	3
5.0	125	135	220	3
6.0	150	165	266	3
7.0	175	177	280	3
8.0	200	215	330	3
10.0	250	267	415	3
12.0	300	319	480	3
14.0	350	346	530	3
16.0	400	410	595	3
18.0	450	463	760	3
20.0	500	513	760	3
22.0	550	563	810	3
24.0	600	613	880	3
26.0	650	673	990	3
28.0	700	718	945	3
30.0	750	768	1130	3
32.0	800	818	1170	3
34.0	865	863	1340	3
36.0	900	918	1370	3
40.0	1000	1018	1470	3
42.0	1050	1068	1580	3
48.0	1200	1228	1760	3

The nominal diameters DN indicated in the tables correspond to the inner diameter of the pipe.

The sizes are given in mm (± 2%).

The order size is in inches.

Type PU-CC

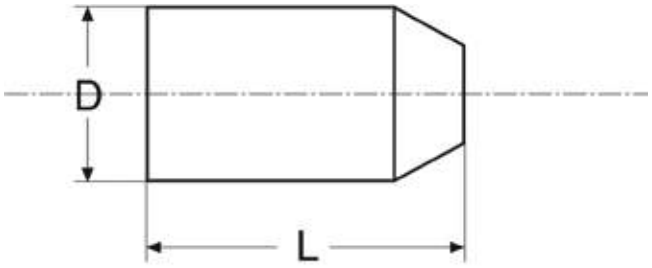
Made of high density polyurethane foam. The outer skin of high quality, wear-resistant polyurethane is made up of spirally coiled stripes around the circumference. These make the pig rotate as it moves thus giving it great flexibility.

Recommended for evenly removing deposits and dewatering, for example after hydrostatic tests. The type PU-CC easily passes through 1.5 D bends. Density approx. 110-115 kg/m^3 (9-10 lb/ft^3).

Type PU-CC-S

Same as type PU-CC, however with a softer core.
Density approx. 80-85 kg/m^3 (6.5 lb/ft^3). Only available up to size 24".

TYPE PU-WB AND PU-TWB



inch	DN	D	L	Design
2.0	50	60	155	3
2.5	65	73	145*/155**	3
3.0	80	85	155*/165**	3
4.0	100	110	195	3
5.0	125	139	220	3
6.0	150	168	266	3
7.0	175	177	280	3
8.0	200	215	330	3
10.0	250	260	415	3
12.0	300	321	510	3
14.0	350	346	530	3
16.0	400	400	595	3
18.0	450	463	760	3
20.0	500	513	760	3
22.0	550	563	810	3
24.0	600	613	880	3
26.0	650	673	990	3
28.0	700	718	945	3
30.0	750	768	1130	3
32.0	800	818	1170	3
34.0	865	863	1340	3
36.0	900	918	1370	3
40.0	1000	1018	1470	3
42.0	1050	1068	1580	3
48.0	1200	1228	1760	3

* PU-WB
** PU-TWB

The nominal diameters DN indicated in the tables correspond to the inner diameter of the pipe.

The sizes are given in mm (± 2%).

The order size is in inches.

Type PU-WB

Made of high density polyurethane foam. The outer skin is made of high-density, wear-resistant polyurethane foam applied in strips causing the pig to rotate as it moves. Steel brushes applied in strips increase the cleaning effect. The brushes are embedded in the pig.

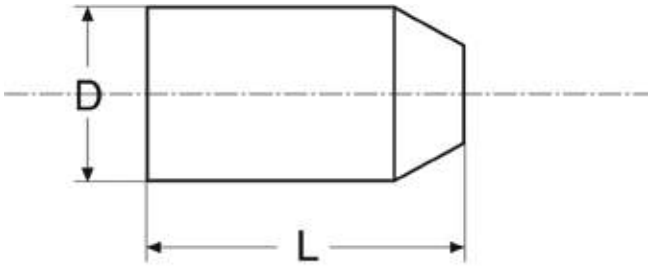
Recommended to remove heavy deposits and particularly heavy rust, also in long pipelines. This type easily passes through 3.0 D bends. Density approx. 110-115 kg/m^3 (9-10 lb/ft^3).

Type PU-TWB

Same as PU-WB, however, without polyurethane stripes on the surface but entirely coated with wire brush

Density approx. 128-160 kg/m^3 (8-10 lb/ft^3).

TYPE PU-AC AND SPECIAL VERSIONS



inch	DN	D	L	Design
2.0	50	64	155	3
2.5	65	73	155	3
3.0	80	89	155	3
4.0	100	114	195	3
5.0	125	143	220	3
6.0	150	172	266	3
7.0	175	181	280	3
8.0	200	219	330	3
10.0	250	274	415	3
12.0	300	325	510	3
14.0	350	350	530	3
16.0	400	412	595	3
18.0	450	459	660	3
20.0	500	509	760	3
22.0	550	559	810	3
24.0	600	609	880	3
26.0	650	669	990	3
28.0	700	714	945	3
30.0	750	764	1130	3
32.0	800	814	1170	3
34.0	865	859	1340	3
36.0	900	918	1370	3
40.0	1000	1014	1470	3
42.0	1050	1068	1580	3
48.0	1200	1224	1760	3

The nominal diameters DN indicated in the tables correspond to the inner diameter of the pipe.

The sizes are given in mm (± 2%).

The order size is in inches.

Type PU-AC (Abrasive Coated)

Same as PU - CC, however with an additional carbon coating all around. Recommended for removing heavy contamination, incrusted deposits and corrosion also in long pipelines.

This type easily passes through 1.5 D bends.
Density approx. 110-115 kg/m^3 (9-10 lb/ft^3).

Special versions

Loops

All foam pigs can be equipped with one or two loops if required. Starting with DN 20" one loop on the top is standard.

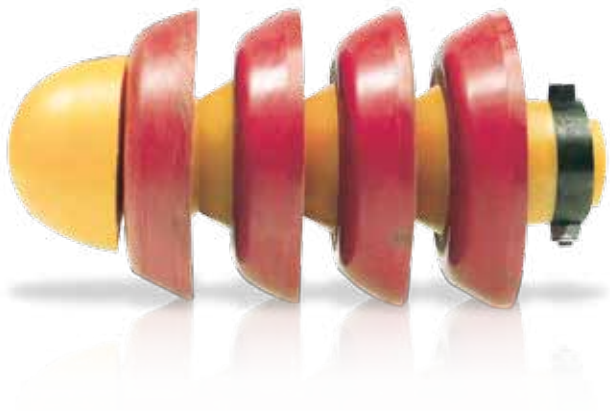
Various shapes

All pigs can be supplied either conically or cylindrically shaped on both sides. Such pigs are suitable for bi-directional operations (forwards and backwards).

Wire brush pigs

Made of a hard wooden core with nylon brush. For easy cleaning of short pipes.

GENERAL INFORMATION



For separating, filling and emptying, cleaning, gauging

PSI cup pigs are ideal tools for cleaning and gauging pipelines. These pigs are equipped with replaceable polyurethane cups and/or circular wire brushes mounted to the flexible polyurethane body available up to 24“.

Steel body available upon request.

(available size 2“-56“)

Subject to technical changes.

TYPE FLEX-S3 AND FLEX-S4

		A		B		Weight	Design
inch	DN	inch	mm	inch	mm	kg	
2.0	50	5.12	130	3.94	100	0.35	3
3.0	80	7.28	185	4.92	125	0.55	3
4.0	100	8.27	210	6.10	155	0.80	3
6.0	150	12.80	325	8.66	220	3.00	3
8.0	200	15.55	395	11.42	290	5.00	3
10.0	250	19.29	490	14.57	370	9.00	3
12.0	300	21.85	555	17.32	440	13.00	3
14.0	350	24.41	620	19.29	490	20.00	3
16.0	400	27.17	690	22.05	560	26.00	3

Type Flex-S3

These pigs are equipped with three replaceable polyurethane cups mounted on an extremely flexible polyurethane body.

This type easily passes through 1.5 D bends. Since the pigs are entirely made of polyurethane, they are particularly suitable for internally coated pipelines.

Separation pigs can also be used as displacement or cleaning pigs for pipelines with paraffin or similar deposits and for cleaning new pipelines.

For special applications the pigs are available in natural color polyurethane without addition of coloring substances.

Guide bars in the opening are recommended for T-pieces when their branch opening is 75% of the pipe ID.

		A		B		Weight	Design
inch	DN	inch	mm	inch	mm	kg	
2.0	50	5.12	130	3.94	100	0.40	3
3.0	80	7.28	185	4.92	125	0.60	3
4.0	100	8.27	210	6.10	155	1.00	3
6.0	150	12.80	325	8.66	220	3.50	3
8.0	200	15.55	395	11.42	290	6.00	3
10.0	250	19.29	490	14.57	370	11.00	3
12.0	300	21.85	555	17.32	440	16.00	3
14.0	350	24.41	620	19.29	490	23.00	3
16.0	400	27.17	690	22.05	560	32.50	3

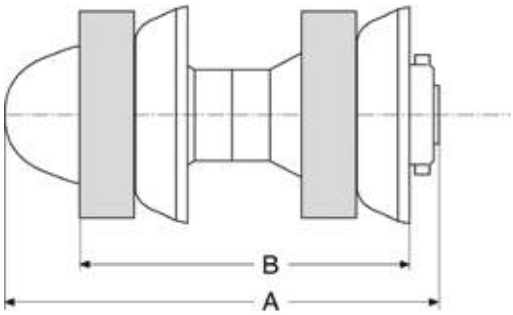
Type Flex-S4

Type Flex-S4 corresponds to type Flex-S3, but it is equipped with four replaceable polyurethane cups.

Available spare parts
- Standard cup
- Pig body
- Diabolo spacers
- Ring spacers
- Socket head screw
- Self-locking nuts
- Steel security ring

Subject to technical changes.

TYPES FLEX-C2 AND FLEX-C3



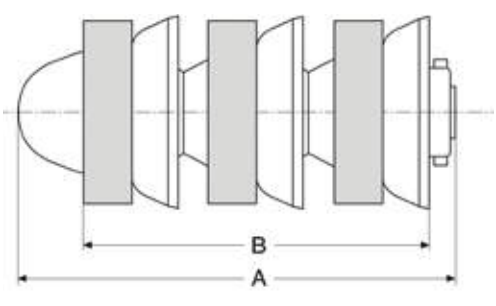
Type Flex-C2

Type Flex-C2 is equipped with 2 polyurethane cups and circular steel wire brushes mounted to the flexible polyurethane body. This type easily passes through 1.5 D bends.

This type is also available with stainless steel brushes or plastic brushes for internally coated pipelines.

Guide bars in the opening are recommended for T-pieces when their branch opening is 75% of the pipe ID.

		A		B		Weight	Design
inch	DN	inch	mm	inch	mm	kg	
2.0	50	5.12	130	3.94	100	0.60	3
3.0	80	7.28	185	4.92	125	0.90	3
4.0	100	8.27	210	6.10	155	1.10	3
6.0	150	12.80	325	8.66	220	4.00	3
8.0	200	15.55	395	11.42	290	7.00	3
10.0	250	19.29	490	14.57	370	11.00	3
12.0	300	21.85	555	17.32	440	15.00	3
14.0	350	24.41	620	19.29	490	24.00	3
16.0	400	27.17	690	22.05	560	29.00	3



Type Flex-C3

Type FLEX-C3 corresponds to type FLEX-C2, but it is equipped with 3 steel wire brushes and 3 polyurethane cups.

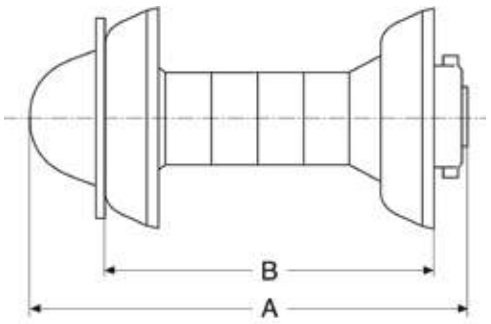
Available spare parts

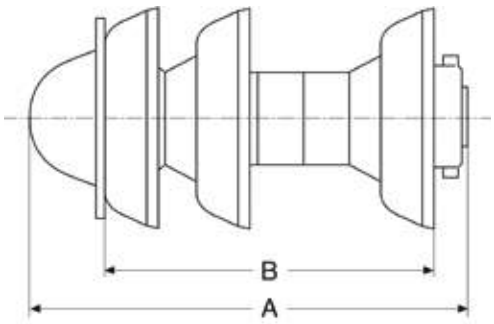
- Standard Cup
- Body-shaft
- Diabolo spacers
- Ring spacer
- Socket head screw
- Self-locking nuts
- Steel security ring
- Steel brush

		A		B		Weight	Design
inch	DN	inch	mm	inch	mm	kg	
2.0	50	5.12	130	4.13	100	0.90	3
3.0	80	7.28	185	5.91	125	1.00	3
4.0	100	8.27	210	6.50	155	1.50	3
6.0	150	12.80	325	10.24	220	5.50	3
8.0	200	15.55	395	12.21	290	10.00	3
10.0	250	19.29	490	14.57	370	15.00	3
12.0	300	21.85	555	16.34	440	21.00	3
14.0	350	24.41	620	17.72	490	32.00	3
16.0	400	27.17	690	20.47	560	39.00	3

Subject to technical changes.

TYPES FLEX-G2 AND FLEX-G3





Type Flex-G2

Gauging pigs are used to check if welded seams do not have any excessive weld penetration. Gauging pigs are also used to localize and remove objects which could prevent pigs from passing through.

Mounted on a very flexible pig body, these pigs are optionally available with two (FLEX-G2) or three (FLEX-G3) replaceable polyurethane cups and a gauging plate. The diameter of the gauging plate is normally 90% or 95% of the pipe ID. When ordering, please specify the precise diameter of the gauging plate.

This type of pig easily passes through 2.5 D bends.

Guide bars in the opening are recommended for T-pieces when their branch opening is 75% of the pipe ID.

Flex-G2 and Flex-G3

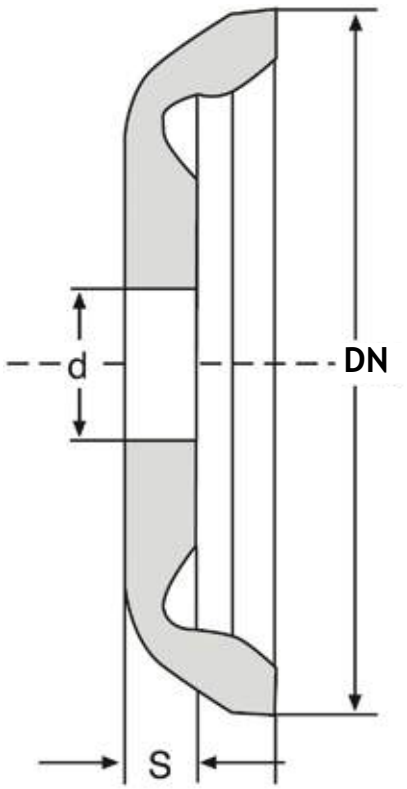
		A		B		Weight	Design
inch	DN	inch	mm	inch	mm	kg (G2)	
2.0	50	5.12	130	3.94	100	0.40	5
3.0	80	7.28	185	4.92	125	0.60	5
4.0	100	8.27	210	6.10	155	1.08	5
6.0	150	12.80	325	8.66	220	3.00	5
8.0	200	15.55	395	11.42	290	5.00	5
10.0	250	19.29	490	14.57	370	9.00	5
12.0	300	21.85	555	17.32	440	12.00	5
14.0	350	24.41	620	19.29	490	18.00	5
16.0	400	27.17	690	22.05	560	25.00	5

Available spare parts

- Standard Cup
- Body-shaft
- Diabolo spacers
- Ring spacer
- Socket head screw
- Self-locking nuts
- Steel security ring
- Gauging plate

Subject to technical changes.

PIG CUPS



The cups are particularly wear-resistant. This exceptional wear resistance, combined with a unique cup design, ensures a maximum cleaning and sealing effect.

The cups are resistant to most products carried in pipelines. They are resistant to natural gas, crude oil, refined hydrocarbon products, most chemicals, vegetable oils and food products.

For special applications the cups are also available in natural colored polyurethane without addition of coloring substances.

		S		d		Weight
inch	DN	inch	mm	inch	mm	kg
2.0	50	0.32	8	0.41	14	0.02
3.0	80	0.39	10	1.06	20	0.04
4.0	100	0.47	12	1.06	27	0.12
6.0	150	0.79	20	1.91	49	0.32
8.0	200	0.87	22	1.91	49	0.70
10.0	250	0.98	25	2.38	61	1.40
12.0	300	1.10	28	2.38	61	2.30
14.0	350	1.22	31	3.01	76.5	3.20
16.0	400	1.38	35	3.01	76.5	5.00

The centre hole on the cup can be modified to suit customer requirements.

Subject to technical changes.

GENERAL INFORMATION

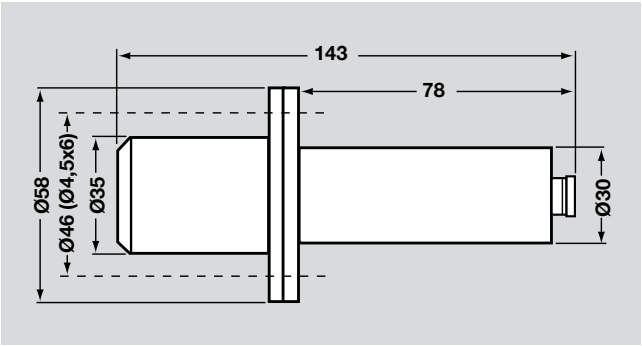
Pig localization includes the most up-to-date technology. This can be used for all common pigs in the pipeline system. The pig localization includes a transmitter fixed to a pig and a receiver with an antenna for locating the pig.

Please contact us for further information.

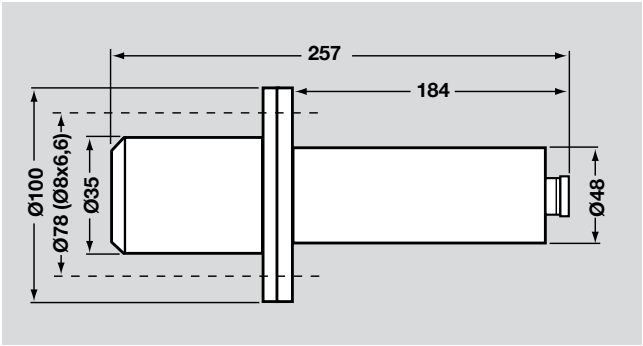
Flange for transmitter on PU pig

Transmitter on Flexi pig

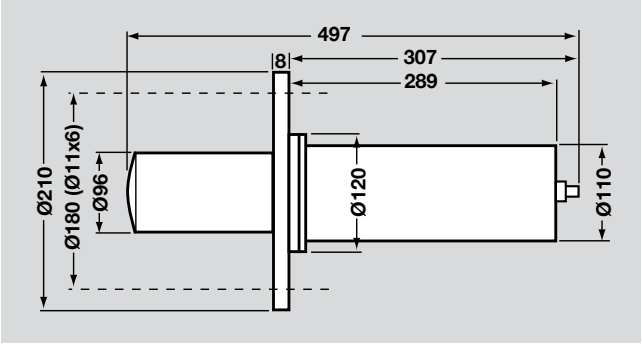
Type 80 hours



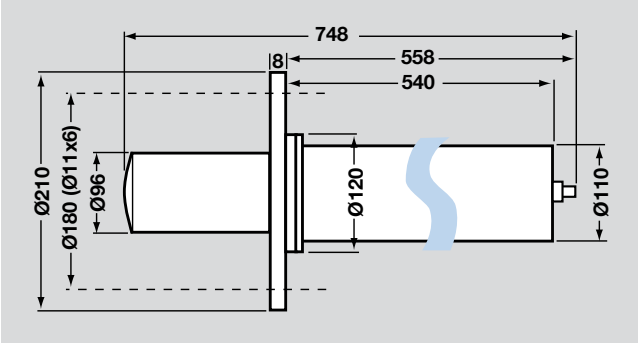
Type 180 hours



Type 260 hours



Type 500 hours



Transmitter

Type	Nominal size DN	Inch	Operating time in hours	Weight in kg
80 hours	100 - 150	4” - 6”	80	0.6
180 hours	200 - 500	8” - 20”	180	2.2
260 hours	500 - 1600	20” - 64”	260	9.6
500 hours	500 - 1600	20” - 64”	500	14

Receiver

Parameters	
Temperature range	-15 ... +70 °C
Signal	5 ... 15 m in air
Weight	6.6 kg
Case dimensions	400x370x175 mm

SELECTION GUIDE

Types of pig	PU-FP	PU-Plain	PU-Plain-S	PU-LR	PU-LR-S	PU-CC	PU-CC-S
For the following application areas:							
test run	X	X	X				
drying	X	X	X				
with slight contamination	X						
with medium contamination		X	X			X	X
with severe contamination				X	X		
elimination of humidity	X						
test pig for unknown contamination	X						
for long pipe sections		X	X	X	X	X	X
dewatering		X	X			X	
with many fittings					X		X
with persistent deposits							
for the removal of corrosion							
filling and emptying pipes							
hydrostatic test				X		X	
for separating various media							
for paraffin or similar deposits							
calibration							
localization (with transmitter + receiver)			X	X	X	X	X
for fitting reduction	X		X		X		X
For the following pipes:							
steel	X	X	X				
cast iron	X	X	X	X	X	X	X
plastic	X	X	X	X	X	X	X
with inner coating							
Suitability for pipe bends – designs:							
3	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X

PU-AC	PU-TWB	PU-WB	Flex S3	Flex S4	Flex C2	Flex C3	Flex G2	Flex G3
			X					
				X				
X	X	X			X	X	X	X
X	X	X	X	X	X	X	X	X
X			X		X		X	
X	X	X			X	X	X	X
X	X	X			X	X		
			X	X				
			X	X				
			X	X				
							X	X
X	X	X	X	X	X	X	X	X
X	X	X			X	X	X	X
			X	X	(X)	(X)	X	X
			X	X	(X)	(X)	X	X
			X	X	(X)	(X)	X	X
X			X	X	X	X	X	X
X	X	X	X	X	X	X	X	X

(x) limited use

SELECTION GUIDE

Important questions on the use of pigs	
1. The currently existing C-factor or %-efficiency loss compared to the ideal value:	
2. Type of medium in the pipeline (water, gas, oil, etc.)	
3. Inside and outer diameter of pipe (changing inner diameter) Transitions (sharp-edges or smooth)	
4. Dimensions of Junctions, cross or T-pieces, valves, etc. (attach piping plan)	
5. Pipe laying depth	
6. Type of deposits e.g. limescale, mud, etc.:	
7. Amount of deposits (approx. pipe ID)	
8. Pipe length	
9. Planned driving medium	
10. What pressure output is available for cleaning?	
11. Which maximum pressure is allowed for the pipe system?	
12. Entry and exit possibilities:	
13. Comment or further details which are considered to be important:	

Company _____

Contact _____

Street _____

Town _____

Tel. _____

Fax. _____

e-mail _____

PSI DETECTION AND WARNING TAPES

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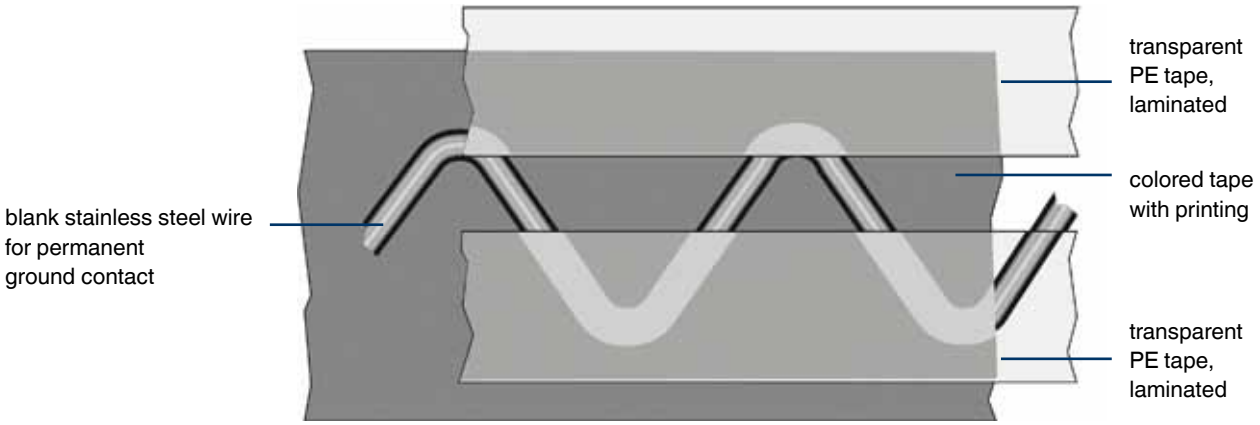
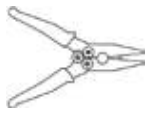
DATA

Scheme for detection tape



Detection tapes

Description	Type	Art. No.	Qty. per packaging unit
 **Detection tape** Width 40 mm PE film 0.15 mm printed with integrated stainless steel wire 250 m roll	„Achtung Gasleitung“ yellow	4-017-00020	5 pcs.
	„Achtung Wasserleitung“ blue	4-017-00005	5 pcs.
	„Achtung Abwasserleitung“ green	4-017-00013	5 pcs.
	„Achtung Abwasserdruckleitung“ green	4-017-00029	5 pcs.
	„Achtung Kabel“ yellow	4-017-00014	5 pcs.
 **Crimper** for crimp connectors		4-017-00030	1 pcs.
 **Crimp connector** for detection tape		4-017-00012	100 pcs. in a bag

Other detection and pipe warning tapes in special widths and with special print can be supplied upon request

DATA

Pipe warning tape

Description	Type	Art. No.	Qty. per packaging unit
 **Pipe warning tape** Width 40 mm PE film 0.10 mm printed 250 m roll	„Achtung Gasleitung“ yellow	4-017-00018	10 pcs.
	„Achtung Wasserleitung“ blue	4-017-00009	10 pcs.
	„Achtung Abwasserleitung“ green	4-017-00016	10 pcs.
	„Achtung Abwasserdruckleitung“ green	4-017-00023	10 pcs.
	„Achtung Kabel“ yellow	4-017-00015	10 pcs.
	„Achtung Fernwärmeleitung“ yellow	4-017-00007	10 pcs.
	„Achtung Trinkwasserleitung“ blue	4-017-00019	10 pcs.
	„Achtung Regenwasserleitung“ green	4-017-00027	10 pcs.
Width 50 mm PE film 0.25 mm 250 m roll	„Achtung Deutsche Telekom T Kabel“ yellow	4-017-00025	10 pcs.
Barrier tape 800 mm x 500 m in dispenser box	Barrier tape, tear-resistant, red/white	4-017-00026	10 pcs.

Other detection and pipe warning tapes in special widths and with special print can be supplied upon request

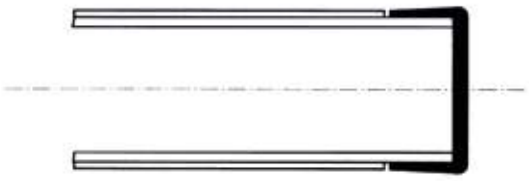
PSI PIPE END CAPS

WWW.PSI-PRODUCTS.COM

GENERAL INFORMATION

To protect the pipe from damage and dirt during transport and on site. Casing end caps are made of polyethylene.

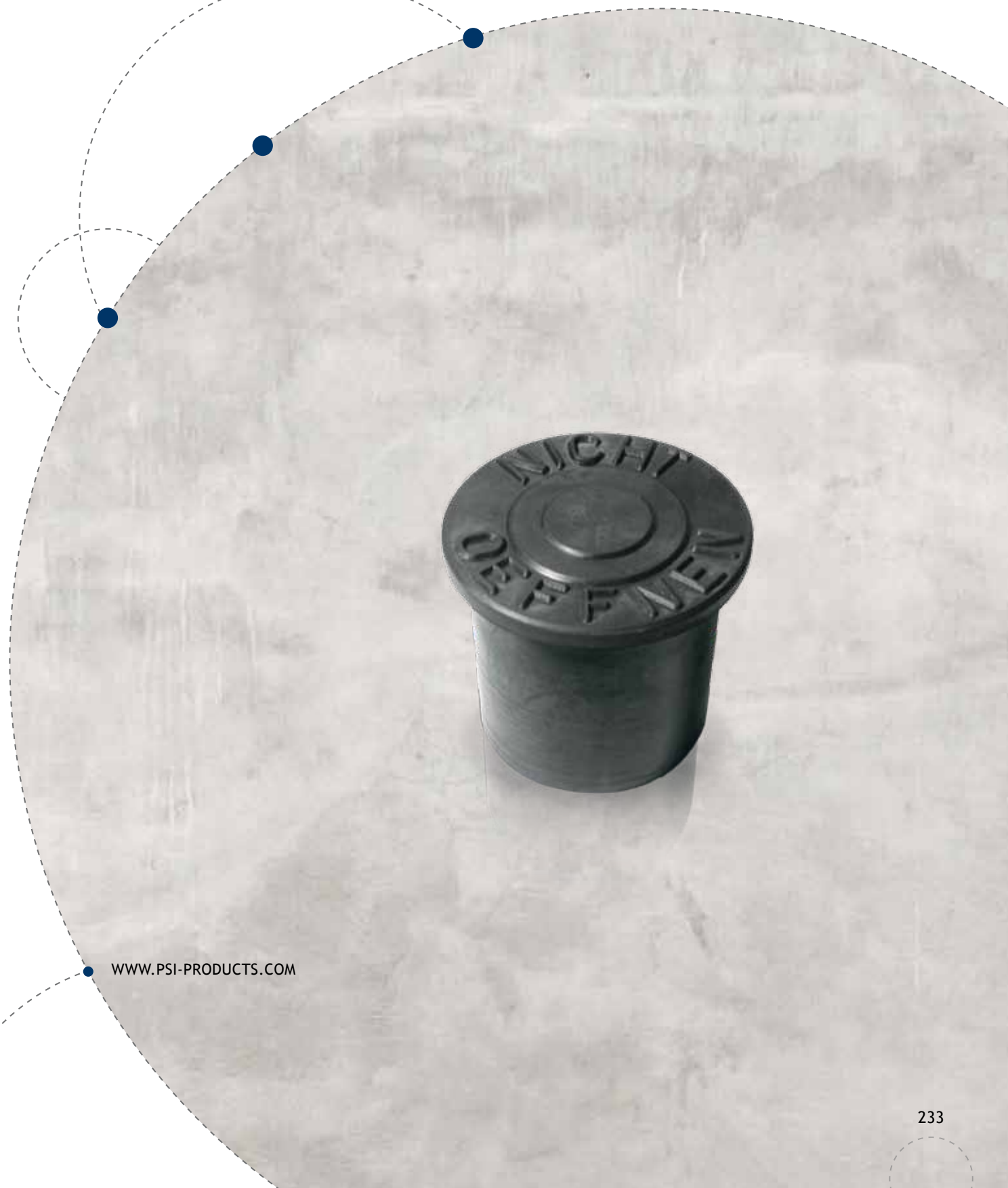
You will find all available sizes in our current price list.



Subject to technical changes.

PSI SIGNCAP

TYPE KOS & VAS



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GENERAL INFORMATION

PSI Signcap to mark, secure and warn from unauthorized access to installations with important functions.
The PSI Signcap standard product is available in black, blue and red with the label „NICHT OEFFNEN“ and without labelling, respectively. PSI Signcap small has added a new dimension to the range of products. This means that VAS square cap house service connections (conical 14x14 mm) can also be marked with Signcap small.

The Signcap small standard product is available in blue with the labelling „NICHT OEFFNEN“. The raised font ensures a permanently visible labelling. A long service life is achieved thanks to flexibility, weather and frost resistance of the material (EPDM). PSI Signcap can be mounted without tools and easily plugged onto the square cap.

The PSI Signcap / Signcap small
is also available in other colors
or with other printing respectively.

Signcap type KOS for square 32x32 mm (conical)

Signcap labelling	Color	Art. No.
NICHT OEFFNEN	black	3-041-00001
(without printing)	black	3-041-00002
NICHT SCHLIESSEN	black	3-041-00006
NICHT OEFFNEN	blue	3-041-00003
NICHT OEFFNEN	red	3-041-00004
NICHT SCHLIESSEN	red	3-041-00005
NICHT OEFFNEN	yellow	3-041-00007

Signcap type VAS for square 14x14 mm (conical)

Signcap small labelling	Color	Art. No.
NICHT OEFFNEN	blue	3-041-00100
NICHT OEFFNEN	red	3-041-00101
NICHT OEFFNEN	yellow	3-041-00102

Type VAS **Type KOS**

Other versions, printings, colors, quantities and delivery times upon request

CERTIFICATES

QUALITY GUARANTEED

CERTIFICATES

APPROVALS

TEST REPORTS

WWW.PSI-PRODUCTS.COM

To provide best quality and best service to our customers, we are organized according to DIN EN ISO 9001: 2008, continuously tested and certified. This certification documents:

- Verified procedures
- tested product quality
- monitored quality management

CERTIFICATE-D-ISO 9001-2008, TÜV SÜD MANAGEMENT SERVICE GMBH; CERTIFICATE-REGISTER-NO. 12 100 31866 TMS

ZERTIFIKAT ■ CERTIFICATE ■ 認證證書 ■ СЕРТИФИКАТ ■ CERTIFICADO ■ CERTIFICAT

TÜV SÜD Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH

certifies that

PSI Products GmbH
Ulrichstraße 25
72116 Mössingen, Germany

Kirschenfeldstraße 18/2
72147 Nehren, Germany

has established and applies
a Quality Management System for

The Sales of Pipeline assemblies
at the site Mössingen;

Acquisition, storage, processing, assembling and dispatch
of pipeline accessories at the site Nehren.

An audit was performed, Report No. **70725034**.

Proof has been furnished that the requirements
according to

ISO 9001:2008

are fulfilled.

The certificate is valid from **2016-07-22** until **2018-09-14**.

Certificate Registration No.: **12 100 31866 TMS**.

Product Compliance Management
Munich, 2016-06-27

TÜV SÜD Management Service GmbH • Zertifizierungsstelle • Ridlerstraße 65 • 80339 München • Germany
www.tuev-sued.de/certificate-validity-check

TÜV®

PRODUCT AND APPLICATION SPECIFIC DOCUMENTS

Furthermore, there are product and application-specific certificates, approvals and test reports, which qualify our products for your applications.

SEALING TECHNOLOGY

LINK-SEAL® MODULAR SEALS

Det Norske Veritas DNV
EC Type Examination Certificate: Certificate No: MED-B-8650
“Penetration through “A” class divisions: pipes, duct, trunk etc. penetration”

Lloyd‘s Register:
“Pressure Test for Wall Penetration Seal, Type Link-Seal® Modular Seal”; Certificate No: APE 0409369/1

TÜV approvals and test reports:

- TÜV Süddeutschland:	Prüfbericht: DDA4/118/94 für Ringraum-Dichtung in Modul-Bauweise
- TÜV SÜD:	Fertigungsstätten Prüfung
- TÜV SÜDWEST	Technischer Bericht DDA4/118/94 Bauteilprüfung einer Ringraumdichtung in Modulbauweise

Potable Water Approvals:

Pressure plates:
Druckplattenprüfung gemäß KTW-Leitlinie UBA; Prüfzeugnis TZW
Werkstoffprüfung DVGW W270; Untersuchungsbericht TZW

Sealing elements: Dichtungselement Elastomerleitlinie UBA;
Werkstoffprüfung DVGW W270; Prüfzeugnis TZW

„Radondichter“ Dichtungswerkstoff, Prüfbericht Dr. Joachim Kemski
PSI Link-Seal® KTW/W270 Dichtungswerkstoff

COMPAKT SEALS

DN200 geschlossen: Prüfung der Dichtigkeit DN200 geteilte, Prüfung der Dichtigkeit
Fest- und Losflansch Prüfung der Dichtigkeit Varia Prüfung der Dichtigkeit
Werkstoff EPDM, KTW; Prüfungzeugnis
Werkstoff EPDM W270; Prüfungzeugnis

PSI SPECIAL COMPAKT SEALS

Werkstoff EPDM, KTW Prüfungzeugnis
Werkstoff EPDM W270 Prüfungzeugnis

PSI WALL COLLARS

MFPA Leipzig; Druckdicht im Einbauzustand:
- from pipe OD 32 to 315
- from pipe OD 355

„Radondichter“ Dichtungswerkstoff, Prüfbericht Dr. Joachim Kemski
- für Rohr DA 32 bis DA 315PSI

WALL COLLARS FOR PRE-INSULATED-PIPES

MFPA Leipzig: Druckdicht im Einbauzustand

PSI SEALING PLUGS

Lloyd's Register:
Pressure testing (3 bar)
IMO Regulations; application in steel divisions
Type Examination Fire Approval Pressure

SEALS WITH FIXED / LOOSE FLANGE

MFPA Leipzig; Druckdicht im Einbauzustand

WALL SLEEVES

Faserzement (FZ) - MFPA Leipzig: Druckdicht im Einbauzustand
Faserzement (FZ) - MFPA Leipzig: Klassifizierungsbericht Brandverhalten A1 - DIN EN 13501-1
PVC - MFPA Leipzig: Druckdicht im Einbauzustand

PSI PLASTIC INSULATORS DSI

Ruhrgas Werkstoffprüfung:
DSI Kunststoffgleitkufen GKO 125 gs, 125 gl, 36 gs, 36 gl; TALW-Bauteilprüfung

CORROSION PROTECTION

NITTO HEAT SHRINKABLE SLEEVE NEO COVER NC 1150

EN 489; TEST REPORT; FFI

CANUSA CERTIFICATE

CPS SuPERSEAL /L; EN 489; Test Certificate FFI (Superseal KLD/WLD)
CPS SuPERSEAL /T; EN 489; Test Certificate FFI(Superseal KLD/WLD)

DVGW BAUMUSTERPRÜFZERTIFIKAT; DIN 30672, DIN EN 12068

KEBU B80-C KEBU B30
KEBU Bitumen-Band GW
KEBU Bitumen-Band Spezial
KEBU Petro-Band A303
KEBU Kebulen SFT
PSI Primer FP P27 MonoTop 40

OEVGW ZERTIFIKAT

KEBU System A-2-C50 G2KEBU System A-2-C50 W1KEBU System A-3-C50 G2
KEBU System A-3-C50 W1

FLANGE GASKETS & FLANGE ISOLATION

PSI RUBBER STEEL FLANGE GASKETS

KFD NBR; EN 682-1, DVGW VP406 A7; DIN-DVGW Baumusterprüfzertifikat:
KFD EPDM; DVGW W270; Prüfbericht TZW
KFD EPDM; EN 681-1,BGA KTW, DVGW W270; DIN-DVGW Baumusterprüfzertifikat:

PSI GLV-UNISEAL® T, GLV UNISEAL® GGR FLANGE ISOLATION GASKETS

GLV-UNISEAL

GLV-UniSeal T; KTW; Prüfzeugnis Hy
GLV-UniSeal T; KTW; Bericht Hy
GLV-UniSeal T; DVGW W270; Prüfzeugnis Hy
GLV-UniSeal GGR; TA Luft (VDI R 2440, VDI R 2200); MPA Zertifikat
GLV-UniSeal GGR – DIN 3535-6; DIN DVGW Baumusterzertifikat

PSI PIKOTEK® FLANGE ISOLATION KITS

LineBacker® PGE; Shell Approval

VCS/LineSeal ™; Shell Approval
VCS/LineSeal ™; TA Luft (VDI R 2200) CST FH Münster

VCFS ZERTIFIKAT

GWI Bestätigung gemäß DVGW VP 401
VCFS; TA Luft (VDI R 2200); CST FH Münster
API 6FB; Fire Test Report; YARMOUTH Research and Technology

GENERAL CROSS-PRODUCT CERTIFICATES AND DOCUMENTS

- **AEO-CERTIFICATE**
  Zugelassener Wirtschaftsbeteiligter “AEOC (zollrechtliche Vereinfachung)”

- **CHEMICAL RESISTANCE LIST**
  Copyright Bürkle GmbH, www.buerkle.de

General Terms and Conditions of Business

§1 Scope and application
(1) Our terms of delivery apply only to companies, legal entities under public law and special funds under public law as defined by § 310 par. 1 BGB (German Civil Code).
(2) Our terms of delivery apply exclusively. Terms and conditions of the buyer that oppose or deviate from our terms and conditions will not be recognized. Rules of the German Tendering and Contract Regulations (VOB) are not part of the contract. Legal ineffectiveness of individual terms does not alter the effectiveness of those remaining.
(3) Our terms of delivery also apply to all future supply agreements with the customer, even if they are not agreed on separately again.

§2 Offer and acceptance
(1) Our offers are non-binding unless expressly designated or agreed otherwise.
(2) Orders received by us are binding offers. The buyer is bound to his offer for 2 weeks. The buyer can accept binding offers from us only within 2 weeks.

§3 Price and payment
(1) Our prices are ex works. Prices are determined according to our generally valid price list effective on the day of delivery. The buyer bears the costs of packaging and shipping. Sales tax is added to the prices. If the value added tax, freight and customs rates are included in the price, increases or reductions are passed on to the buyer. If cost increases for direct materials and supplies or wages occur, we are permitted to pass these on to the buyer unless these cost increases are due to our own actions.
(2) Our invoices are due and payable in euros without deductions within 30 days of invoicing and delivery. We grant 2% prompt payment discount for payment within 14 days after invoicing. For all prices agreed on in euros, the buyer must pay regardless of any appreciation or depreciation of the euro against other currencies. Checks are considered only after their redemption for payment. If the payment date is exceeded, we are authorized to demand interest of 8 percentage points above the respective basic interest rate as defined by § 288 BGB. Other suits for damage in the case of delay remain unaffected.
(3) The buyer cannot assert countervailing claims due to refusal to perform or offset rights. This does not apply if countervailing claims are not challenged or have been declared final by a court.

§4 Delivery
(1) Place of delivery and fulfillment is our business premises. If shipping has been agreed, risk passes to the buyer upon transfer to the freight forwarder; in case of default of acceptance, risk passes when we have made the shipment available. If there is a default of acceptance, the buyer bears the costs of storage and maintenance of the object to be delivered. During the default of acceptance, in deviation from § 6 of these delivery terms, we are liable only for intentional actions and gross negligence.
(2) Times for delivery or performance of services stated by us are only approximate unless we have expressly agreed otherwise. If shipping has been agreed, the lead times and delivery times refer to the time of transfer to the common carrier, forwarder or other third party assigned to transport the goods.
(3) Partial deliveries are permitted if usable by the buyer within the contractual purpose, delivery of the remaining goods is assured and the buyer does not bear any additional costs as a result. The obligation to deliver is deemed properly fulfilled if the delivery is made within the quality and quantity tolerances customary in commerce and the industry. Fulfillment of our obligation to deliver depends on the timely and proper fulfillment of the contractual obligations of the buyer. The obligation to deliver is subject to the reservation of timely delivery by our suppliers. We are not liable if delivery is delayed or made impossible due to force majeure or similar cases, in particular mobilization, war, disruption of operations or labor dispute. This does not apply if we are responsible for the delay or impossibility of delivery as defined by § 6 of these terms of delivery.
(4) The start of the delay in delivery is determined in accordance with legal regulations. In all cases, a reminder by the buyer is required.

§5 Reservation of property rights
(1) We retain ownership of the object of delivery until complete payment of the purchase price, including all ancillary costs. The reservation of ownership applies also to the accepted balance due if we grant trade credit to the buyer (open account provision). The reservation of ownership also applies to all existing and future claims from the business relationship with the buyer.
(2) If the buyer is late in payment, we can withdraw from the contract. The buyer must inform us immediately of seizures or other attachments by third parties. The buyer bears the costs of any third-party-objection proceeding.
(3) The buyer is entitled to resell the object of delivery in a proper business transaction. The buyer assigns to us all claims (incl. sales tax) against third parties arising from the resale, regardless of whether the object of delivery has been resold with or without further processing. The assignment applies also to receivables balances at the end of an invoicing period from customers of the buyer if the buyer grants trade credit to the customers. The buyer is authorized to collect receivables assigned to us in this manner.
(4) Processing or alteration by the buyer of the object of delivery is always performed for us. If the object of delivery is processed together with other objects that do not belong to us, we acquire an ownership share in the new object in the ratio of the value of the object of delivery to the value of the other processed objects at the time of processing. If no such acquisition of ownership occurs, the buyer now transfers to us in advance its future ownership / ownership share in the newly created object as security. For the rest, the same stipulations apply for the object created through processing as do for the goods subject to reservation of ownership.
(5) If the object of delivery is combined inseparably or mixed with other objects, we acquire an ownership share in the new object in the ratio of the value of the object of delivery to the value of the other processed objects at the time of combining or mixing. If the object of the buyer is considered the main object, it is hereby agreed that the buyer transfers the ownership share to us.
(6) If the value of the secured objects exceeds 150% of the value of the open receivables, the buyer is entitled to a claim for release.

§6 Liability
(1) In the case of property damage or financial loss caused by negligence, we and our agents are liable only in case of breach of a material contractual obligation, but the amount is limited to the damages foreseeable and contractually typical at the time the contract is agreed on; material contract obligations are those that characterize the contract and which the buyer may rely on.
(2) For the rest, our liability conforms to the legal regulations. The same applies for mandatory liability under the product liability law.
(3) Paragraphs 1 and 2 apply correspondingly for liability from commission of an offense.
(4) If we provide technical information or advice and this information or advice is not part of the contractually agreed services that we owe, this is done without payment and with exclusion of all liability.

§7 Warranty
(1) The buyer may assert claims due to a defect in goods delivered by us only if the buyer notifies us of the defect in writing without delay. In the case of a hidden defect, the buyer must inform us of the defect in writing without delay once the defect is discovered. For the rest, the obligation to inspect and inform of defects at delivery under § 377 HGB (German Commercial Code) applies. If we provide a drawing of the goods in advance of their delivery, the following applies: The buyer can assert claims for a defect in the goods that is foreseeable in the drawing only if the buyer informs us of this foreseeable defect in writing without delay. In the case of a hidden foreseeable defect, the buyer must inform us of the defect in writing without delay once the defect is discovered. For the rest, the obligation to inspect and inform of defects at delivery under § 377 HGB (German Commercial Code) applies correspondingly.
(2) Delivery is deemed to be free of defects if made within the quality and quantity tolerances customary in commerce and the industry. For the rest, the buyer is responsible to determine fitness of the goods for the buyer's particular purpose.
(3) In the case of a defect, we are first entitled to repair the defect or deliver a replacement. If the repair or replacement delivery fails, the buyer has the right to withdraw from the contract if this is provided for by law. Supplementary performance does not include removal of the defective object nor reinstallation if we were not originally obligated to install it. Claims by the buyer for damages remain unaffected by this stipulation. Also unaffected in all cases are the statutory special regulations for final delivery of the goods to a consumer (supplier recourse §§ 478, 479 BGB).
(4) A guarantee of quality or durability exists only if such guarantee has been expressly agreed on in writing. The description of our goods does not establish such a guarantee; this applies, in particular, for statements on our website.
(5) The limitation period for assertion of claims is twelve months from transfer of risk. This limitation does not apply if § 438 par. 2 no. 2 and § 634 a par. 1 BGB prescribe longer periods. It also does not apply in cases of injury to life, body or health caused at least negligently and in cases of an intentional or gross negligent breach of duties.
(6) The warranty expires if the buyer, without our agreement, changes the object of delivery or has it changed by third parties and as a result repair of the defect is made impossible or unreasonably difficult. In each case, the buyer shall bear the additional costs for repair of the defect arising from the change.
(7) Delivery of used objects as agreed on with the buyer in individual cases is made with exclusion of all warranty for defects.

§8 Insolvency of the buyer
If significant doubts arise about the buyer's creditworthiness, after demanding concurrent performance, we are entitled to withdraw from the contract or to demand security in the amount of our outstanding claims. Serious doubts about creditworthiness arise, in particular, if payment obligations are more than 4 weeks in arrears.

§9 Choice of law and jurisdiction
This agreement shall be governed by German law. The United Nations Convention on Contracts for the International Sale of Goods does not apply. Jurisdiction is with the court at our company domicile; but we retain the right to sue the buyer at its residential or business domicile.

Use of your mailing address for advertising purposes
We use the address received due to obligations from a legal transaction or similar transaction in order to provide the contractual partner information by mail regarding our company and our products. But this use can be objected to at any time with future effect without specification of reasons. The objection shall be sent either to vertrieb@psi-products.de or by mail to PSI Products GmbH, Ulrichstrasse 25, 72116 Mössingen, Germany.

Date of General Terms and Conditions of Business: 07/2013

The current terms and conditions of sale and delivery
of PSI Products GmbH apply; you can find them at:
www.psi-products.com

THE BEST CHOICE BETWEEN CONNECTIONS ARE PRODUCTS OF PSI

PSI Products GmbH
Ulrichstrasse 25
72116 Mössingen / Germany

Phone: 0 049 (0)7473 37 81 0
Fax: 0 049 (0)7473 37 81 87

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www.psi-products.com