

FLEXWELL® Safety Pipe

Pipe systems for installations

Technical details



Notes

A large rectangular area filled with a fine grid of small squares, intended for handwritten notes or technical drawings.

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System description

Construction and function

The FLEXWELL® Safety Pipe is a:

- double-walled, monitorable, flexible and factory produced pipe system with all necessary quality tests
- approved for the transport of water-hazardous, flammable or otherwise dangerous fluids
- recognized and approved leak detection system
- Dimensions: DN 12 – DN 100
- Pressure range: 25 bar, PN 25
- Temperature range: –10 °C and +50 °C
- DIBt Approval Number: Z – 38.4 - 253

Leak monitoring

The surveillance space between the inner and outer pipe enables permanent leak monitoring using approved leak detection devices operating either on the positive pressure or vacuum principle. The use of these systems is compliant with the highest European safety standards. The system is constructed with safety in mind and will detect any leak above or below the fluid level within a double-walled protective system.

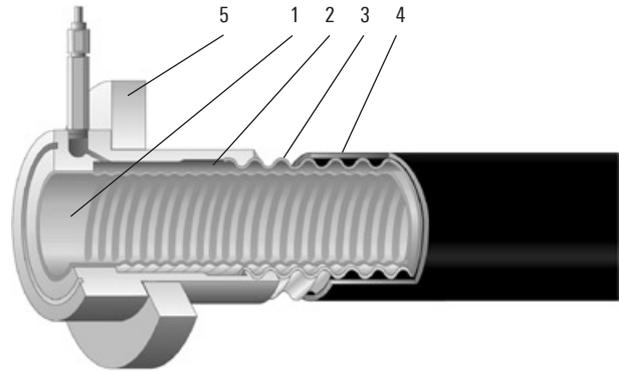
Legal basis

Many laws, standards and regulations determine the requirements for leak detection systems and their use. Here are just a few of the principal ones:

- European Standardisation of Leak Detection Systems (DIN EN 13160, DGRL 97/23/EG)
- Environmental legislation and requirements for water safety (DIN EN 13480, WHG § 62)
- Fulfillment the requirements for fire and explosion prevention for hydrological engineering and construction of buildings (TRbF 50, MLAR)



Quality, process, pressure and material tests are carried out as part of the approval procedure by external technical inspection agencies as well as our internal quality assurance department



Construction of the FLEXWELL® Safety Pipe:

- 1 corrugated inner pipe (1.4404/1.4571)
- 2 surveillance space
- 3 corrugated outer pipe (1.4301)
- 4 Corrosion proofing (PE casing)
- 5 Connecting fitting

Laying and installation

- fast, simple laying in continuous lengths directly from drum/coil into trench or in building
- underground and above ground
- changes of direction are compensated by the flexible pipe system
- acceptance test after completion of laying and installation by means of a function test of the leak monitoring system.
- All connecting fittings and double-walled flanged moulded fittings are mounted either on the surface or in manholes and canal ducts
- All non-detachable double-walled moulded fittings (integrated elements) in a pipe can also be laid underground
- laying and installation is done only by trained and accredited specialist firms (acc. to WHG or VAUwS)
- optional technical support by BRUGG installation and service staff

The Advantages of the system

- double-walled, monitorable, flexible pipe system
- delivery in lengths up to 1000 m
- short construction periods, fast laying
- flameless (non-weld) connecting fitting
- no moulded fittings/welded connections along the pipe route
- optionally, BRUGG can provide the entire range of installation and support services
- approved system Z – 38.4 - 253
- for highly aggressive substances other materials can be applied on a project basis (e.g. 1.4539)

System description

Leak monitoring

The FLEXWELL® Safety Pipe is permanently monitored using pneumatic leak detection devices/leak detectors. These regulate the monitoring pressure in the surveillance space and register any changes of pressure which may occur.

The surveillance space prevents the uncontrolled escape of the transport medium into the environment in the event of a leakage. The surveillance space must be constructed in such a way that the proper functioning and operating safety of the leak detection system is ensured under all operating conditions.

In the case of a leakage the alarm is given by acoustic and optical signals.

Definition of a leak detection system

A "leak detection system" according to currently valid regulations is a device which is capable of warning automatically of leaks in the walls of double-walled piping transporting water-hazardous (flammable and non-flammable) fluids under all operating conditions. All equipment necessary for the detection of leaks is included under the term leak detection system/leak detector.

The main components are:

- the leak detector(LAZ)/leak detection device
- the surveillance space (ÜR)
- the connection to the leak detector ÜR – LAZ
- the double-walled piping
- a leak detection medium

The use of these systems is compliant with the highest European safety standards (Class I). Systems of this Class will detect any leak above or below the fluid level within a double-walled protective system. They are constructed with safety in mind and ensure that no fluid can escape into the environment.

Leak detector (LAZ)/leak detection device

A distinction is made between two types of differential pressure leak detection device for leak monitoring to detect and report leaks in surveillance spaces of double-walled piping either the **vacuum principle** or the **positive pressure principle** with an inert gas.

Approval/suitability

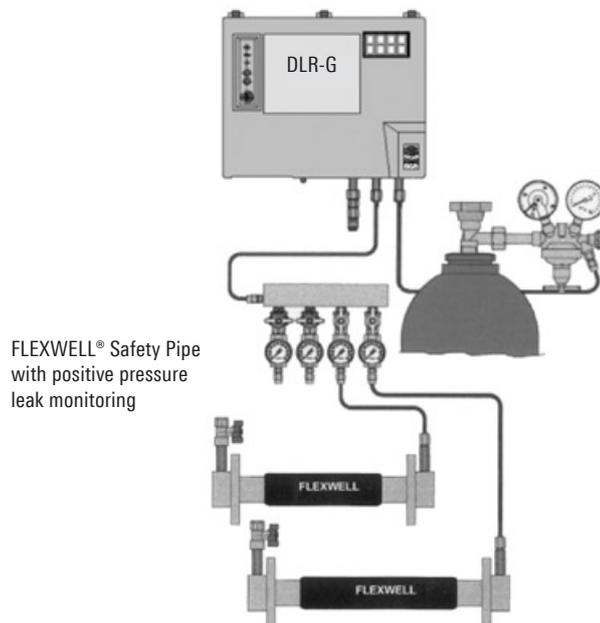
All leak monitoring systems must comply with the established construction and testing principles. This means that all the conditions must be considered which might influence the function and operating safety of the system. Consequently the conditions for operation are tested by the competent authorities and clearly defined and stipulated in the approvals issued by them.

FLEXWELL® Safety Pipe with leak monitoring is an approved leak detection system.

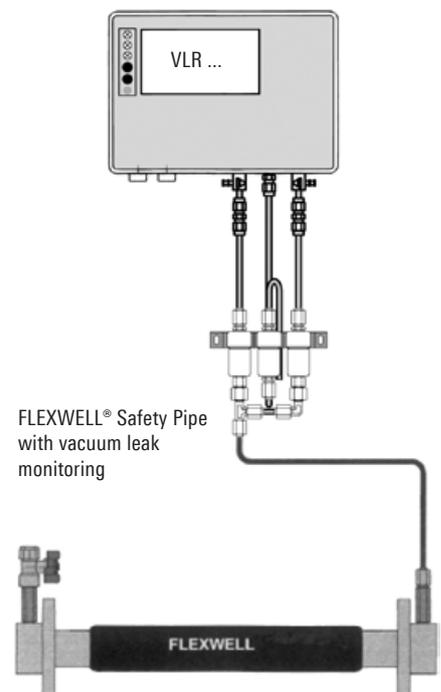
Advantages of the system

The use of double-walled FLEXWELL® Safety Pipe with leak monitoring has, besides offering excellent operational safety, significant economic advantages:

- the entire system can be simply checked at any time without any downtime in operations
- requirements such as e.g. pressure or volume measurements, pressure tests or inspection of the route can be eliminated



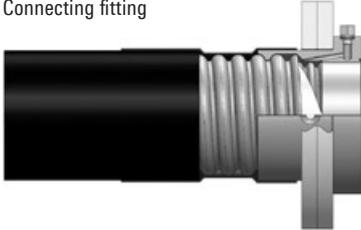
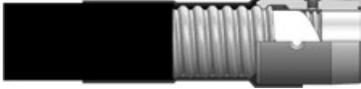
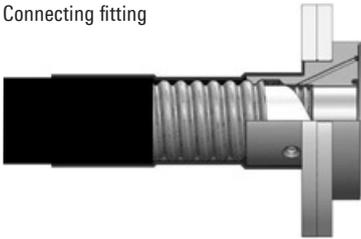
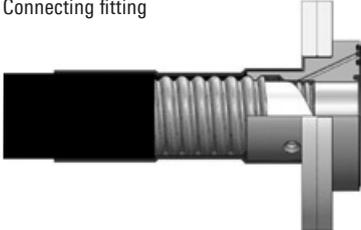
FLEXWELL® Safety Pipe with positive pressure leak monitoring



FLEXWELL® Safety Pipe with vacuum leak monitoring

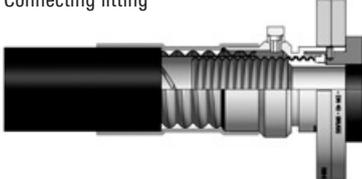
Product overview

Piping/Connecting fittings TIG welding

| Version | Type FSR | Nominal bore/ Connector DN/DN | Pressure PN | Connector Type of joint inner/outer | Material No. | Worksheet | | | |
|---|---|---|---|---|---|--|--|------------------|-----------|
| Pipe  | FSR 13/ 25 | 12 | 25 | smooth-bore inner pipe corrugated outer pipe | 1.4404 1.4301 | FSR 4.130 | | | |
| | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 FSR 75/107 FSR 98/134 FSR 127/175 | 25 32 40 50 65 80 100 | 25 | corrugated inner pipe corrugated outer pipe | 1.4404 1.4301 | FSR 4.131 | | | |
| Connecting fitting  | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 FSR 75/107 FSR 98/134 FSR 127/175 | 25/ 25 32/ 32 40/ 40 50/ 50 65/ 65 80/ 80 100/125 | 25 | collar with split loose flange TIG welding/hard soldering | collar 1.4404 | FSR 4.211 | | | |
| | Connecting fitting  | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 | 25/ 40 / 1 1/2" 32/ 50 / 2" 40/ 65 / 2 1/2" 50/ 65 / 2 1/2" | 25 | external R thread TIG welding/hard soldering | socket with thread 1.4404 | FSR 4.221 | | |
| | | Connecting fitting  | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 FSR 75/107 FSR 98/134 FSR 127/175 | 25/ 40 32/ 50 40/ 65 50/ 65 65/100 80/100 100/150 | 25 | collar with split loose flange and monitorable sealing surface with O-rings (Part 1) TIG welding/hard soldering | collar 1.4404 | FSR 4.216 | |
| | | | Connecting fitting  | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 FSR 75/107 FSR 98/134 FSR 127/175 | 25/ 40 32/ 50 40/ 65 50/ 65 65/100 80/100 100/150 | 25 | collar with split loose flange and monitorable sealing surface with O-rings (Part 2) TIG welding/hard soldering | collar 1.4404 | FSR 4.217 |

Product overview

Connecting fittings GRAPA graphite compression joint

| Version | Type FSR | Nominal bore/ Connector DN/DN | Pressure PN | Connector Type of joint inner/outer | Material No. | Worksheet |
|---|--|--|----------------|--|--|-----------|
| Connecting fitting  | FSR 13/25 | 12/ 12 | 25 | pipe end 15 x 1 | 1.4404 | FSR 4.202 |
| Connecting fitting  | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 FSR 75/107 FSR 98/134 | 25/25 32/32 40/40 50/50 65/65 80/80 | 10 | welded end graphite seal/hard soldering | in contact with medium 1.4404 outer 1.4301 | FSR 4.222 |
| Connecting fitting  | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 FSR 75/107 FSR 98/134 | 25/25 / 1" 32/32 / 1 ¼" 40/40 / 1 ½" 50/50 / 2" 65/65 / 2 ½" 80/80 / 3" | 10 | external thread graphite seal/hard soldering | in contact with medium 1.4404 outer 1.4301 | FSR 4.223 |
| Connecting fitting  | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 FSR 75/107 FSR 98/134 | 25/25 32/32 40/40 50/50 65/65 80/80 | 10 | collar with split loose flange graphite seal/hard soldering | in contact with medium 1.4404 outer 1.4301 | FSR 4.224 |
| Connecting fitting  | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 | 25/25 32/32 40/40 50/50 | 25 | welded end graphite seal/ shaped ring screw joint | in contact with medium 1.4404 outer 1.4301 | FSR 4.230 |
| Connecting fitting  | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 | 25/25 / 1" 32/32 / 1 ¼" 40/40 / 1 ½" 50/50 / 2" | 25 | external thread graphite seal/ shaped ring screw joint | in contact with medium 1.4404 outer 1.4301 | FSR 4.231 |
| Connecting fitting  | FSR 30/ 48 FSR 39/ 60 FSR 48/ 71 FSR 60/ 83 | 25/25 32/32 40/40 50/50 | 25 | ollar with split loose flange graphite seal/ shaped ring screw joint | in contact with medium 1.4404 outer 1.4301 | FSR 4.232 |

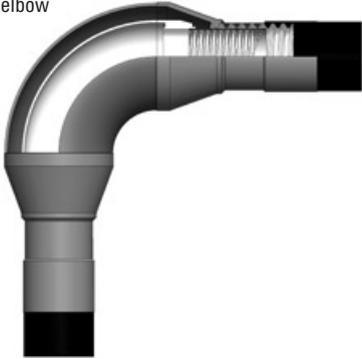
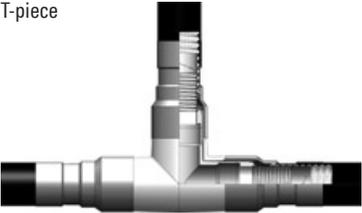
Product overview

Through-connections

| Version | Type FSR | Nominal bore/ DN | Pressure PN | Connector Type of joint inner/outer | Material No. | Worksheet |
|---|-------------|---------------------|----------------|---|--|-----------|
| Through-connection  | FSR 30/ 48 | 25/ 40 | 25 | TIG welding/hard soldering | collar 1.4404 | FSR 4.401 |
| | FSR 39/ 60 | 32/ 50 | | | | |
| | FSR 48/ 71 | 40/ 65 | | | | |
| | FSR 60/ 83 | 50/ 65 | | | | |
| | FSR 75/107 | 65/100 | | | | |
| | FSR 98/134 | 80/100 | | | | |
| FSR 127/175 | 100/175 | | | | | |
| Through-connection  | FSR 13/ 25 | 12 | 25 | TIG welding/hard soldering | in contact with medium 1.4404 outer 1.4301 | FSR 4.403 |
| Through-connection  | FSR 30/ 48 | 25 | 25 | TIG welding/hard soldering | in contact with medium 1.4404 outer 1.4301 | FSR 4.404 |
| | FSR 39/ 60 | 32 | | | | |
| | FSR 48/ 71 | 40 | | | | |
| | FSR 60/ 83 | 50 | | | | |
| | FSR 75/107 | 75 | | | | |
| | FSR 98/134 | 80 | | | | |
| FSR 127/175 | 100 | | | | | |
| Through-connection  | FSR 30/ 48 | 25 | 25 | graphite seal/ shaped ring-screw joint | in contact with medium 1.4404 outer 1.4301 | FSR 4.405 |
| | FSR 39/ 60 | 32 | | | | |
| | FSR 48/ 71 | 40 | | | | |
| | FSR 60/ 83 | 50 | | | | |

Product overview

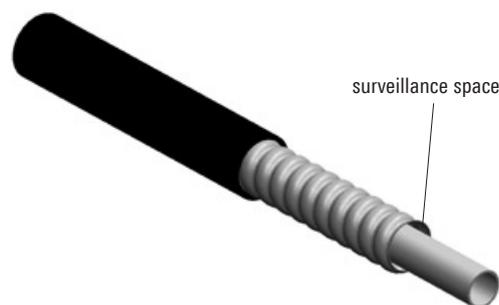
Elbows, T-pieces

| Version | Type FSR | Nominal bore/ Connector DN/DN | Pressure PN | Connector Type of joint inner/outer | Material No. | Worksheet |
|---|-------------|-------------------------------------|----------------|--|--|-----------|
|  | FSR 30/ 48 | 25/ 40 | 25 | complete assembly | inner/ sealing surface 1.4404 outer 1.4301 | FSR 4.410 |
| | FSR 39/ 60 | 32/ 50 | | | | |
| | FSR 48/ 71 | 40/ 65 | | | | |
| | FSR 60/ 83 | 50/ 65 | | | | |
| | FSR 75/107 | 65/100 | | | | |
| | FSR 98/134 | 80/100 | | | | |
| | FSR 127/175 | 100/150 | | | | |
|  | FSR 30/ 48 | 25 | 25 | TIG welding/hard soldering | in contact with medium 1.4404 outer 1.4301 | FSR 4.413 |
| | FSR 39/ 60 | 32 | | | | |
| | FSR 48/ 71 | 40 | | | | |
| | FSR 60/ 83 | 50 | | | | |
| | FSR 75/107 | 65 | | | | |
| | FSR 98/134 | 80 | | | | |
| | FSR 127/175 | 100 | | | | |
|  | FSR 30/ 48 | 25/ 40 | 25 | complete assembly | inner/ sealing surface 1.4404 outer 1.4301 | FSR 4.420 |
| | FSR 39/ 60 | 32/ 50 | | | | |
| | FSR 48/ 71 | 40/ 65 | | | | |
| | FSR 60/ 83 | 50/ 65 | | | | |
| | FSR 75/107 | 65/100 | | | | |
| | FSR 98/134 | 80/100 | | | | |
| | FSR 127/175 | 100/150 | | | | |
|  | FSR 30/ 48 | 25 | 25 | TIG welding/hard soldering | in contact with medium 1.4404 outer 1.4301 | FSR 4.433 |
| | FSR 39/ 60 | 32 | | | | |
| | FSR 48/ 71 | 40 | | | | |
| | FSR 60/ 83 | 50 | | | | |
| | FSR 75/107 | 65 | | | | |
| | FSR 98/134 | 80 | | | | |
| | FSR 127/175 | 100 | | | | |

FLEXWELL® Safety Pipe

with stainless steel smooth-bore inner pipe, stainless steel outer pipe and PE casing

FLEXWELL® Safety Pipe Type FSR 13/25



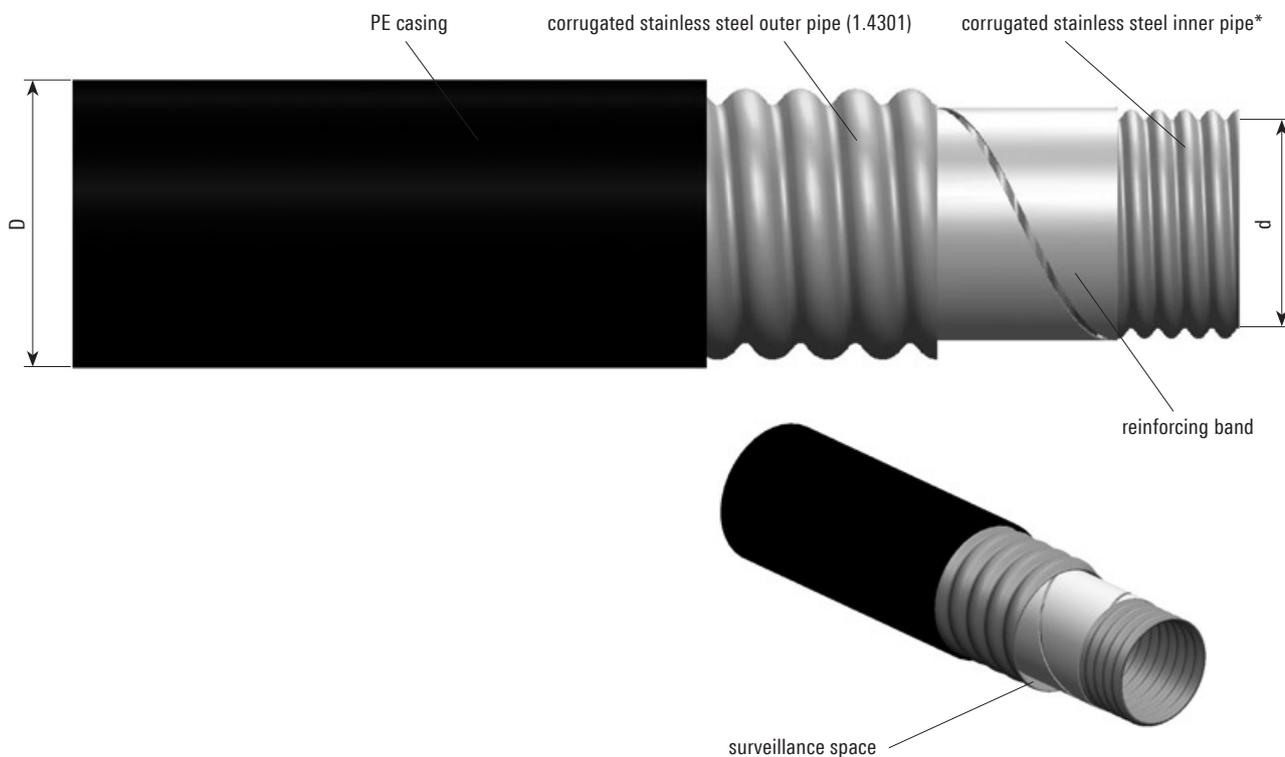
* inner pipe: Material No. 1.4404/1.4571

| Type ID/OD | DN | PN | d | D | PE WT | Volume inner pipe | surveillance space | Weight | Bending radius | Article No. |
|------------|----|----|----|----|-------|-------------------|--------------------|--------|----------------|-------------|
| | | | mm | mm | mm | l/m | l/m | kg/m | cm | |
| FSR 13/25 | 12 | 25 | 13 | 25 | 1.8 | 0.13 | 0.12 | 0.52 | 30 | 821 113 91 |

FLEXWELL® Safety Pipe

with stainless steel inner pipe, stainless steel outer pipe and PE casing

FLEXWELL® Safety Pipe Type FSR 30/48 – FSR 127/175



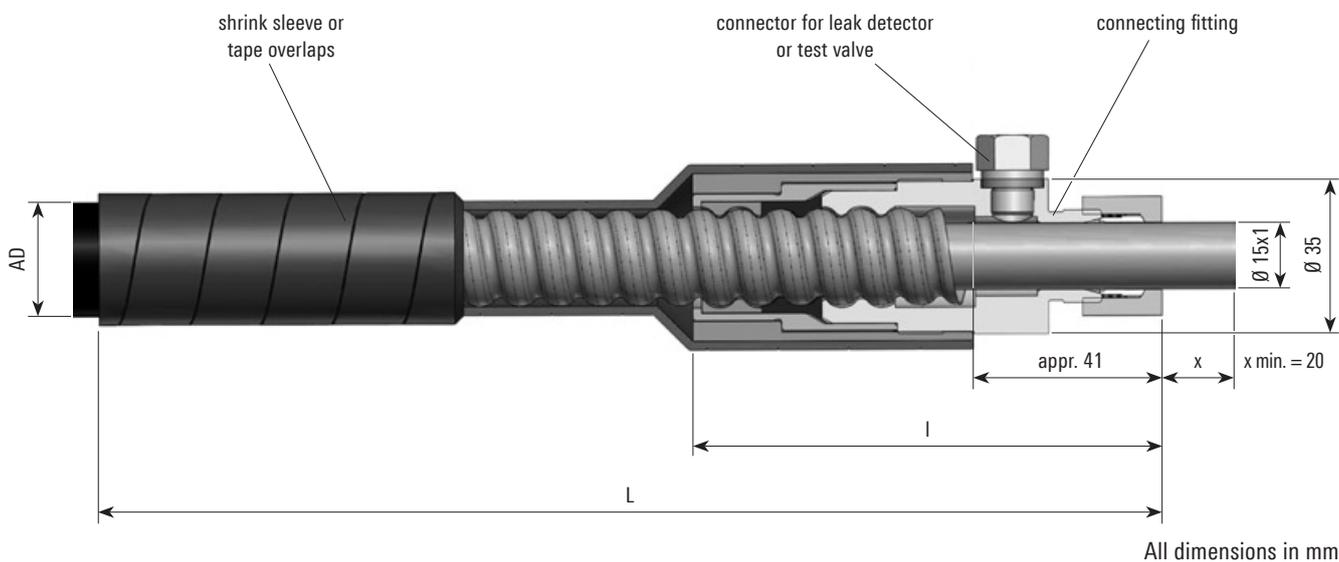
* inner pipe: Material No. 1.4404/1.4571

| Type ID/OD | DN | PN | d | D | PE WT | Volume inner pipe | surveillance space | Weight | Bending radius | Article No. |
|-------------|-----|----|-----|-----|-------|-------------------|--------------------|--------|----------------|-------------|
| | | | mm | mm | mm | l/m | l/m | kg/m | cm | |
| FSR 30/ 48 | 25 | 25 | 30 | 48 | 1.8 | 0.8 | 0.38 | 1.4 | 50 | 821 115 92 |
| FSR 39/ 60 | 32 | 25 | 39 | 60 | 1.8 | 1.3 | 0.41 | 2.0 | 60 | 821 116 92 |
| FSR 48/ 71 | 40 | 25 | 48 | 71 | 2.0 | 2.0 | 0.65 | 2.9 | 60 | 821 114 92 |
| FSR 60/ 83 | 50 | 25 | 60 | 83 | 2.2 | 3.0 | 0.73 | 3.8 | 70 | 821 117 92 |
| FSR 75/107 | 65 | 25 | 75 | 107 | 3.0 | 5.1 | 1.30 | 6.2 | 90 | 821 118 92 |
| FSR 98/134 | 80 | 25 | 98 | 134 | 3.5 | 8.4 | 1.45 | 9.0 | 120 | 821 111 92 |
| FSR 127/175 | 100 | 25 | 127 | 175 | 4.0 | 14.0 | 4.00 | 18.1 | 150 | 821 110 92 |

Connecting fitting FSR 13/25 GRAPA

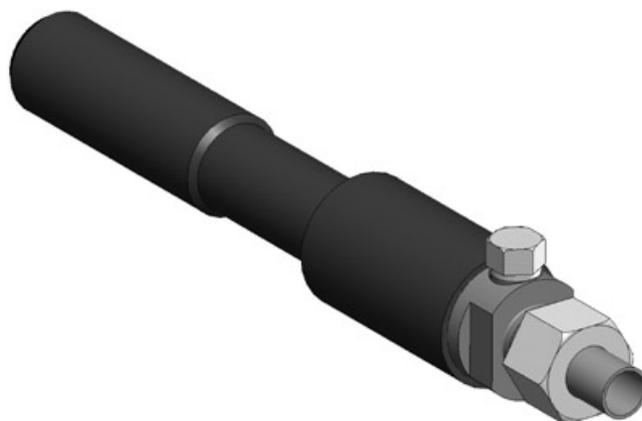
Inner pipe: compression-type screwed joint; outer pipe: graphite compression joint

Connector: pipe 15 x 1
Pressure stage PN 25



Materials: stainless steel

Connecting fitting: Material No. 1.4571/1.4404
Sliding collar: brass, not in contact with medium
Sealing ring: graphite

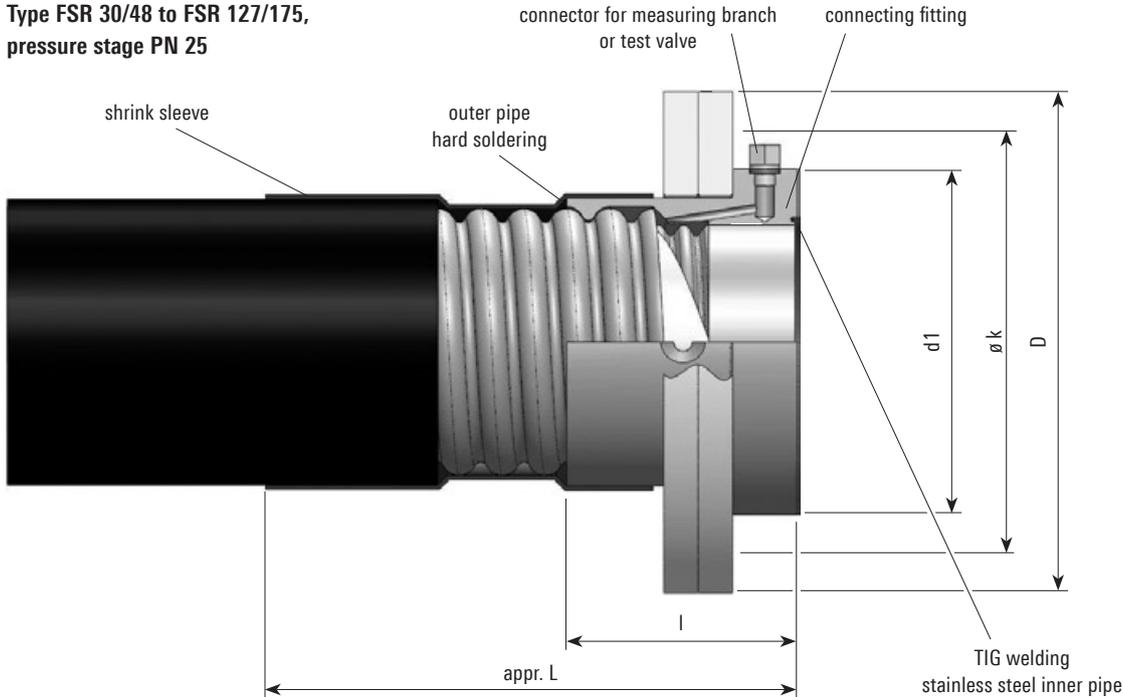


| Type | ID/OD | DN | I | L appr. | x | Article No. |
|--------------|-------|----|-----|---------|-----|-------------|
| | | | mm | mm | mm | |
| AV-FSR 13/25 | | 12 | 105 | 246 | 100 | 829 350 51 |

Connecting fitting with collar and split loose flange

Joining method: TIG welding/hard soldering

FLEXWELL® Safety Pipe
Type FSR 30/48 to FSR 127/175,
pressure stage PN 25

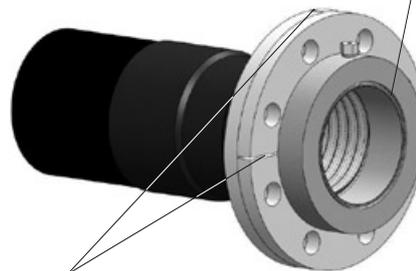


Version:

Collar and split loose flange according to DIN EN 1092-1

Material:

Threaded socket made of material no. 1.4404/1.4571
flange made of material P265GH/P250GH, hot-galvanised



Installation instruction for split loose flange:

The splitting of the loose flange needs to be installed staggered 90° in reverse order.

| Type | ID/OD | DN | d1 mm | Flange acc. to DIN EN 1092-1 | | | | I mm | L appr. mm | Article No. split loose flange galvanised steel | Article No. split loose flange stainless steel 1.4404 | |
|----------------|-------|-----|----------|------------------------------|---------|-----------|-----------|---------|------------------|---|---|------------|
| | | | | DN | D mm | ø k mm | screws* | | | | | |
| AV-FSR 30/ 48 | | 25 | 68 | 25 | 115 | 85 | M12 x 100 | 4 | 85 | 223 | 829 355 51 | 829 355 52 |
| AV-FSR 39/ 60 | | 32 | 78 | 32 | 140 | 100 | M16 x 100 | 4 | 85 | 222 | 829 356 51 | 829 356 52 |
| AV-FSR 48/ 71 | | 40 | 88 | 40 | 150 | 110 | M16 x 110 | 4 | 82 | 216 | 829 354 51 | 829 354 52 |
| AV-FSR 60/ 83 | | 50 | 102 | 50 | 165 | 125 | M16 x 110 | 4 | 90 | 242 | 829 357 51 | 829 357 52 |
| AV-FSR 75/107 | | 65 | 122 | 65 | 185 | 145 | M16 x 120 | 8 | 140 | 300 | 829 358 53 | 829 358 54 |
| AV-FSR 98/134 | | 80 | 138 | 80 | 200 | 160 | M16 x 120 | 8 | 153 | 307 | 829 360 05 | 829 360 06 |
| AV-FSR 127/175 | | 100 | 190 | 125 | 270 | 220 | M24 x 130 | 8 | 125 | 284 | 829 360 51 | 829 360 52 |

* Screw length is given for the connector to a welding-neck flange acc. to DIN EN 1092-1.
Screws and nuts are not included in the delivery volume.

** Construction AV-FSR 75/107 and FSR-AV 98/134:

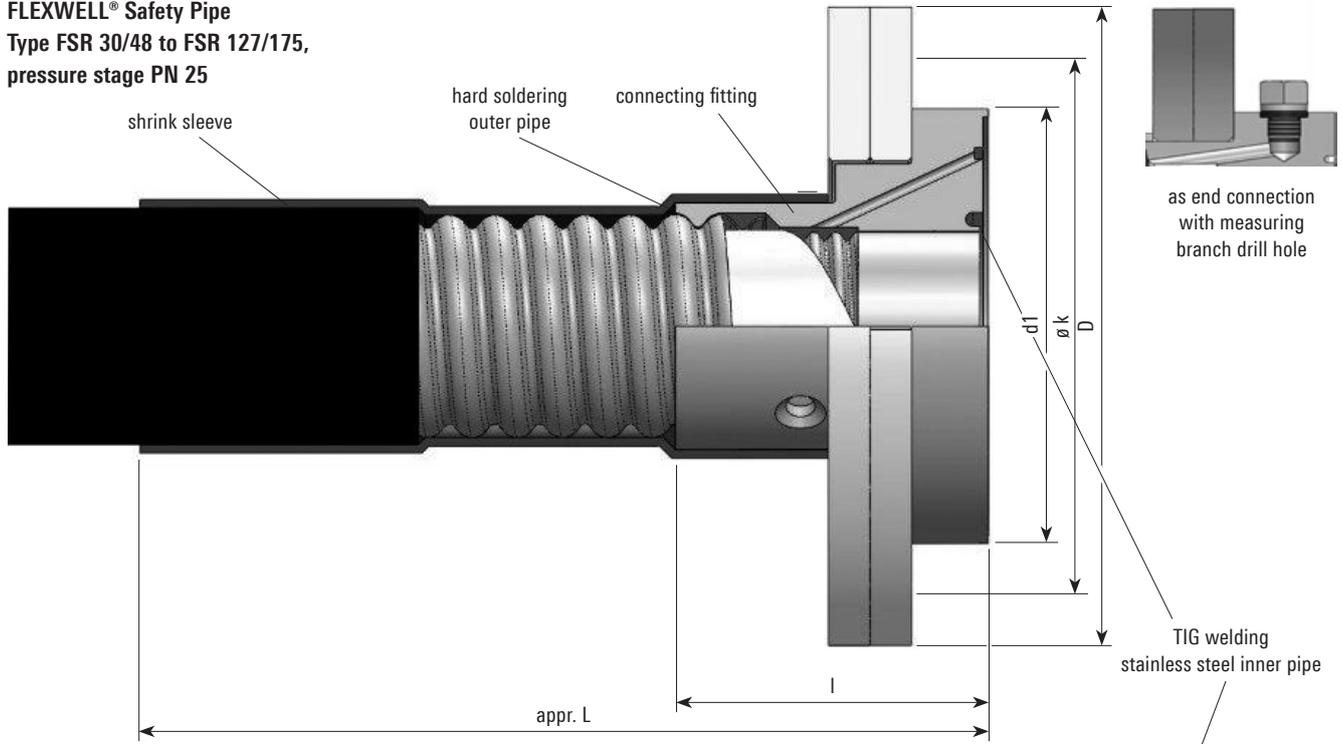


Only BRUGG solder Type BRL 8.50.34 may be used!

Connecting fitting monitorable with collar and split loose flange

with monitorable sealing surface (Part 1), joining method: TIG welding/hard soldering

FLEXWELL® Safety Pipe
Type FSR 30/48 to FSR 127/175,
pressure stage PN 25



Version:

Collar and split loose flange acc. to DIN EN1092-1

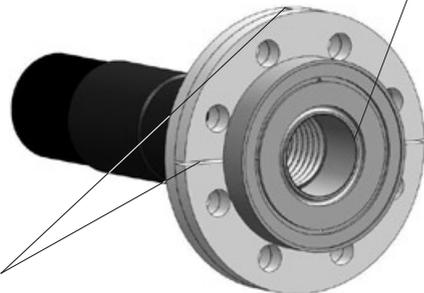
Material:

Threaded socket made of material no. 1.4404/1.4571

Flange made of material no. 1.4404/1.4571

Installation instruction for split loose flange:

The splitting of the loose flange needs to be installed staggered 90° in reverse order.



| Type | ID/OD | DN | d1 | Flange acc. to DIN EN 1092-1 | | | | l | L | Article No. without measuring branch split loose flange stainless steel 1.4404 | |
|--------|---------|-----|-----|------------------------------|-----|-----|-----------|----|-----|--|------------|
| | | | | DN | D | ø k | screws* | | | | pcs. |
| | | | mm | mm | mm | | mm | mm | | | |
| AV-FSR | 30/ 48 | 25 | 91 | 40 | 150 | 110 | M16 x 80 | 4 | 85 | 222.5 | 829 481 86 |
| AV-FSR | 39/ 60 | 32 | 105 | 50 | 165 | 125 | M16 x 90 | 4 | 85 | 222.5 | 829 482 86 |
| AV-FSR | 48/ 71 | 40 | 126 | 65 | 185 | 145 | M16 x 90 | 8 | 90 | 242.5 | 829 483 86 |
| AV-FSR | 60/ 83 | 50 | 126 | 65 | 185 | 145 | M16 x 90 | 8 | 90 | 242.5 | 829 484 86 |
| AV-FSR | 75/107 | 65 | 166 | 100 | 235 | 190 | M20 x 110 | 8 | 132 | 277.5 | 829 485 08 |
| AV-FSR | 98/134 | 80 | 166 | 100 | 235 | 190 | M20 x 110 | 8 | 136 | 295.5 | 829 486 08 |
| AV-FSR | 127/175 | 100 | 223 | 150 | 300 | 250 | M24 x 120 | 8 | 140 | 299.0 | 829 486 86 |

Threaded socket can be delivered with or without measuring branch (Article No. for measuring branch 829 335 00)

* Screw length is given for the connector to a welding-neck flange acc. to DIN EN 1092-1.

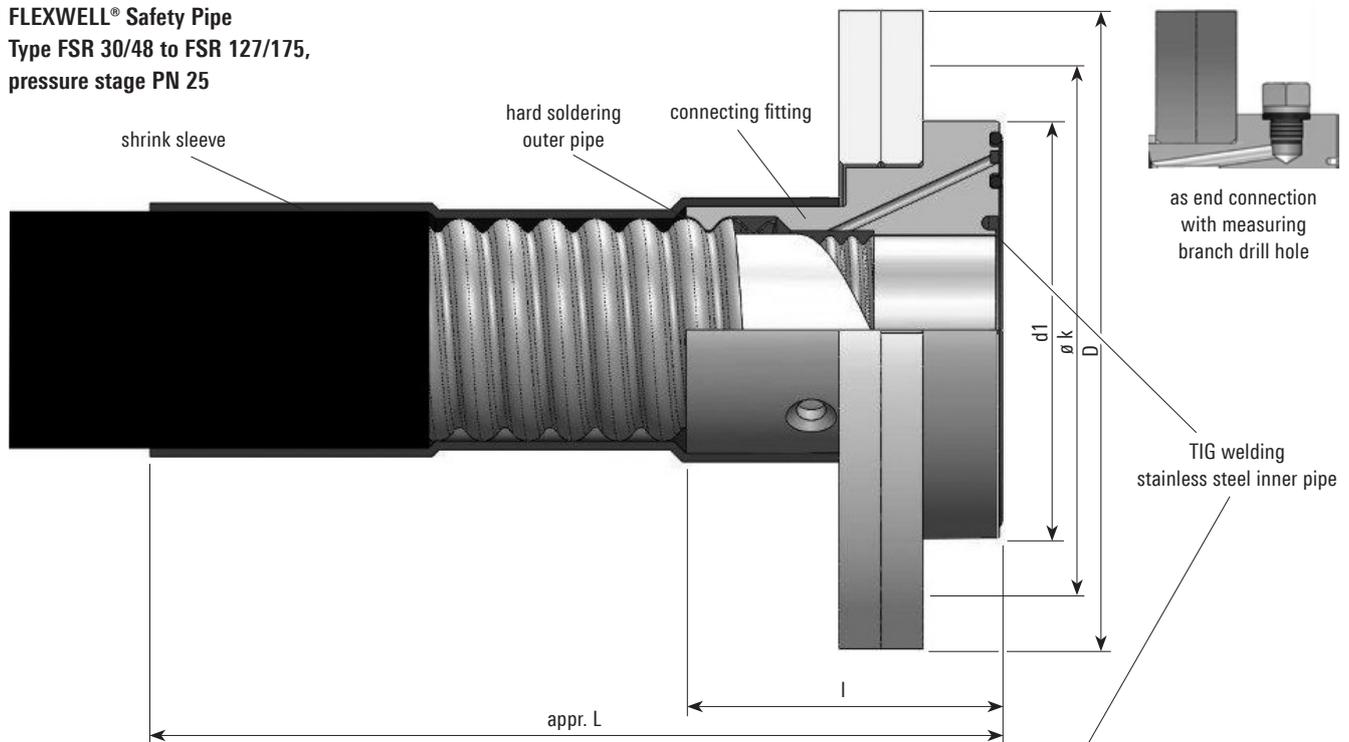
Screws and nuts are not included in the delivery volume.

Only BRUGG solder Type BRL 8.50.34 may be used!

Connecting fitting monitorable with collar and split loose flange

with monitorable sealing surface (Part 2), joining method: TIG welding/hard soldering

FLEXWELL® Safety Pipe
Type FSR 30/48 to FSR 127/175,
pressure stage PN 25



Version:

Collar and split loose flange acc. to DIN EN 1092-1

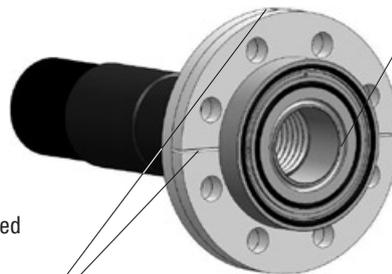
Material:

Threaded socket made of Material No. 1.4404/1.4571

Flange made of Material No. 1.4404/1.4571

O-rings: Viton

O-rings in other materials according to the substances being transported can also be used.



Installation instruction for split loose flange:

The splitting of the loose flange needs to be installed staggered 90° in reverse order.

| Type | ID/OD | DN | d1 | Flange acc. to DIN EN 1092-1 | | | | I | L | Article No. without measuring branch | Article No. | | |
|--------|---------|-----|-----|------------------------------|-----|-----|-----------|----|-----|--------------------------------------|-------------|--------------------|------------|
| | | | | DN | D | ø k | screws* | | | | pcs. | split loose flange | O-rings |
| | | | mm | mm | mm | mm | | mm | mm | stainless steel 1.4404 | Viton | PTFE | |
| AV-FSR | 30/ 48 | 25 | 87 | 40 | 150 | 110 | M16 x 80 | 4 | 85 | 223 | 829 481 87 | 829 487 90 | 829 488 90 |
| AV-FSR | 39/ 60 | 32 | 101 | 50 | 165 | 125 | M16 x 90 | 4 | 85 | 222 | 829 482 87 | 829 487 91 | 829 488 91 |
| AV-FSR | 48/ 71 | 40 | 121 | 65 | 185 | 145 | M16 x 90 | 8 | 90 | 244 | 829 483 87 | 829 487 92 | 829 488 93 |
| AV-FSR | 60/ 83 | 50 | 121 | 65 | 185 | 145 | M16 x 90 | 8 | 90 | 242 | 829 484 87 | 829 487 92 | 829 488 93 |
| AV-FSR | 75/107 | 65 | 162 | 100 | 235 | 190 | M20 x 110 | 8 | 132 | 279 | 829 485 09 | 829 487 95 | 829 488 96 |
| AV-FSR | 98/134 | 80 | 162 | 100 | 235 | 190 | M20 x 110 | 8 | 136 | 276 | 829 486 09 | 829 487 95 | 829 488 96 |
| AV-FSR | 127/175 | 100 | 217 | 150 | 300 | 250 | M24 x 120 | 8 | 140 | 350 | 829 486 87 | 829 487 94 | 829 488 95 |

Threaded socket can be delivered with or without measuring branch (Article No. for measuring branch 829 335 00)

* Screw length is given for the connector to a welding-neck flange acc. to DIN EN 1092-1.

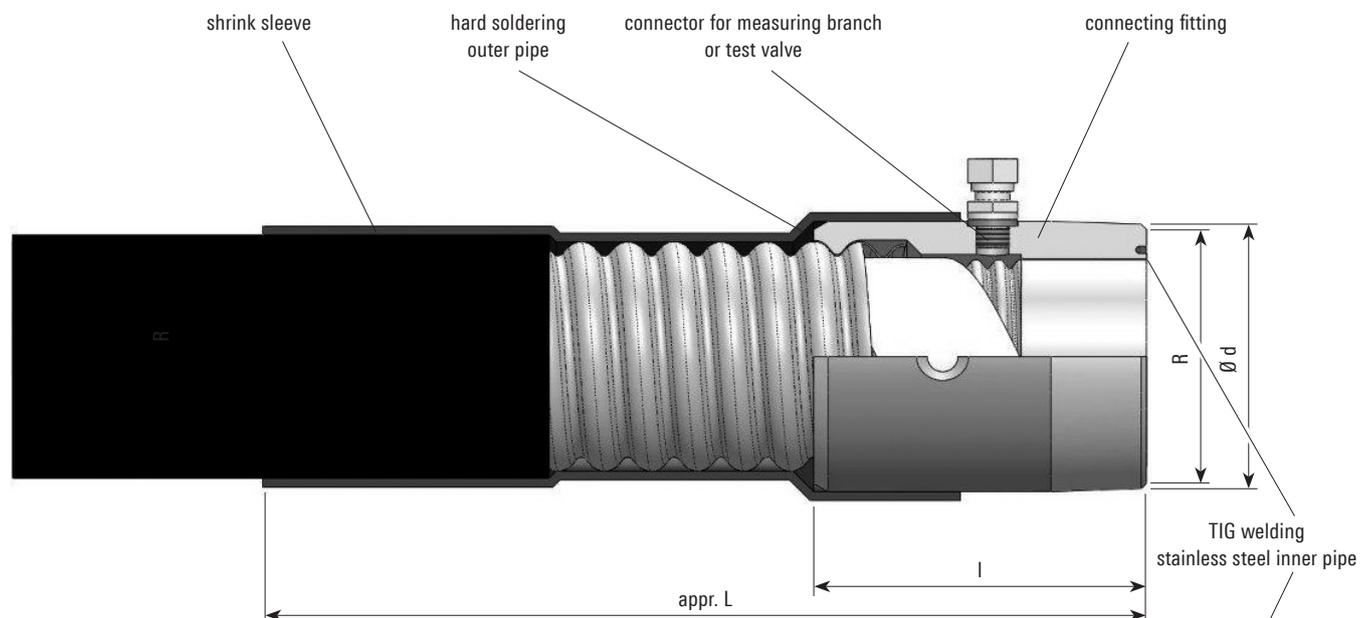
Screws and nuts are not included in the delivery volume.

Only BRUGG solder Type BRL 8.50.34 may be used!

Connecting fitting with screw connection

Joining method: TIG welding/hard soldering

FLEXWELL® Safety Pipe Type FSR 30/48 to FSR 60/83,
pressure stage PN 25



Material:

Threaded socket made of material no. 1.4404/1.4571



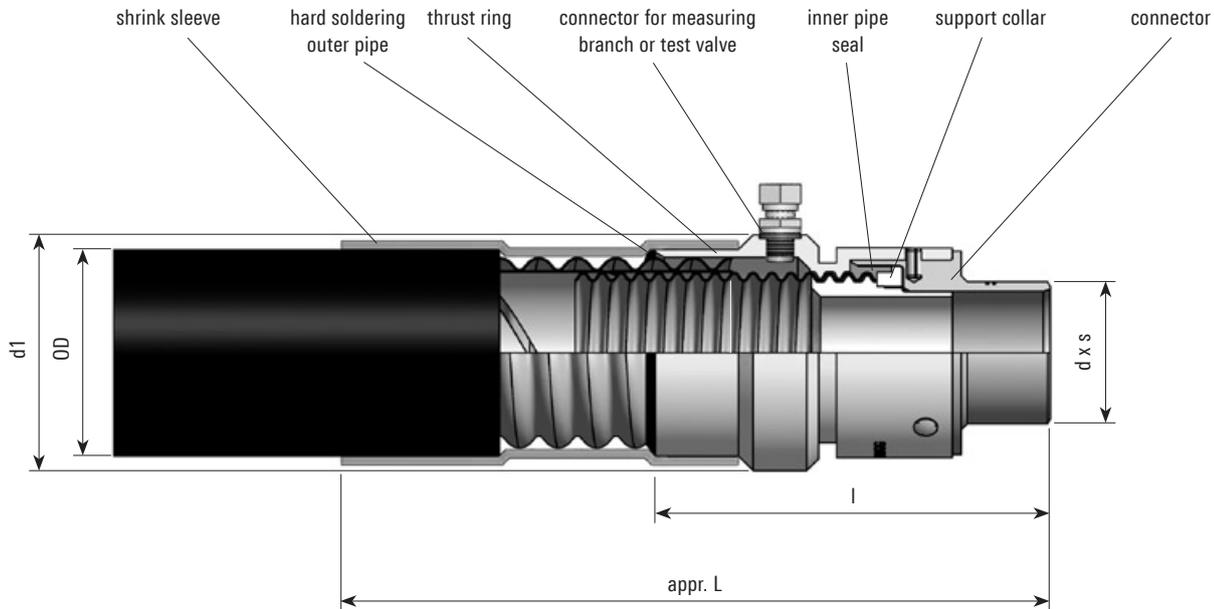
| Type | ID/OD | DN | Connector Whitworth pipe thread | Connector DN | d | l | L appr. | Article No. |
|--------------|-------|----|---------------------------------------|-----------------|------|-----|------------|-------------|
| | | | | | mm | mm | mm | 1.4404 |
| AV-FSR 30/48 | | 25 | R 1 ½ | 40 | 52.0 | 93 | 231 | 829 355 97 |
| AV-FSR 39/60 | | 32 | R 2 | 50 | 63.5 | 100 | 232 | 829 356 97 |
| AV-FSR 48/71 | | 40 | R 2 ½ | 65 | 76.1 | 93 | 247 | 829 357 97 |
| AV-FSR 60/83 | | 50 | R 2 ½ | 65 | 85.0 | 110 | 262 | 829 358 97 |

Only BRUGG solder Type BRL 8.50.34 may be used!

Connecting fitting GRAPA with welded end

Compression joint, joining method: outer pipe hard soldering

FLEXWELL® Safety Pipe Type FSR 30/48 to FSR 60/83
with compression-type graphite seal inner pipe
and hard soldering outer pipe,
pressure stage PN 10



Materials:

- Connector, support collar: Material No. 1.4404
- Thrust ring: Material No. 1.4301
- Inner pipe seal: graphite
- Outer pipe hard soldering: silver solder



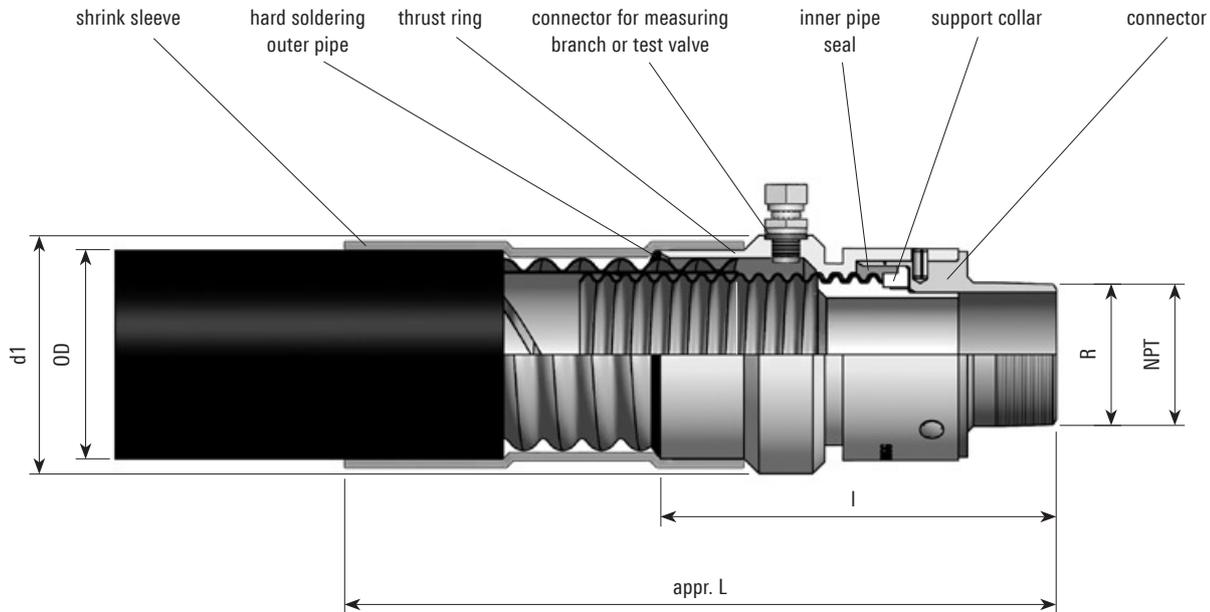
| Type | ID/ | DN | OD mm | d x s mm | d1 mm | l mm | appr. L mm | Article No. |
|------------|-----|----|----------|-------------|----------|---------|---------------|-------------|
| AV-FSR 30/ | 48 | 25 | 46 | 33.7 x 2.6 | 60 | 117 | 290 | 829 355 72 |
| AV-FSR 39/ | 60 | 32 | 57 | 42.4 x 2.6 | 70 | 115 | 285 | 829 356 72 |
| AV-FSR 48/ | 71 | 40 | 69 | 48.3 x 2.6 | 80 | 128 | 305 | 829 357 72 |
| AV-FSR 60/ | 83 | 50 | 81 | 60.3 x 2.9 | 90 | 147 | 310 | 829 358 72 |
| AV-FSR 75/ | 107 | 65 | 107 | 76.1 x 2.9 | 120 | 178 | 345 | 829 358 55 |
| AV-FSR 98/ | 134 | 80 | 132 | 88.9 x 3.2 | 140 | 240 | 400 | 829 360 07 |

Only BRUGG solder Type BRL 8.50.34 may be used!

Connecting fitting GRAPA with external thread

Compression joint, joining method: outer pipe hard soldering

FLEXWELL® Safety Pipe Type FSR 30/48 to FSR 60/83
with compression-type graphite seal inner pipe
and hard soldering outer pipe,
pressure stage PN 10



Materials:

- Connector, support collar: Material No. 1.4404
- Thrust ring: Material No. 1.4301
- Inner pipe seal: graphite
- Outer pipe hard soldering: silver solder



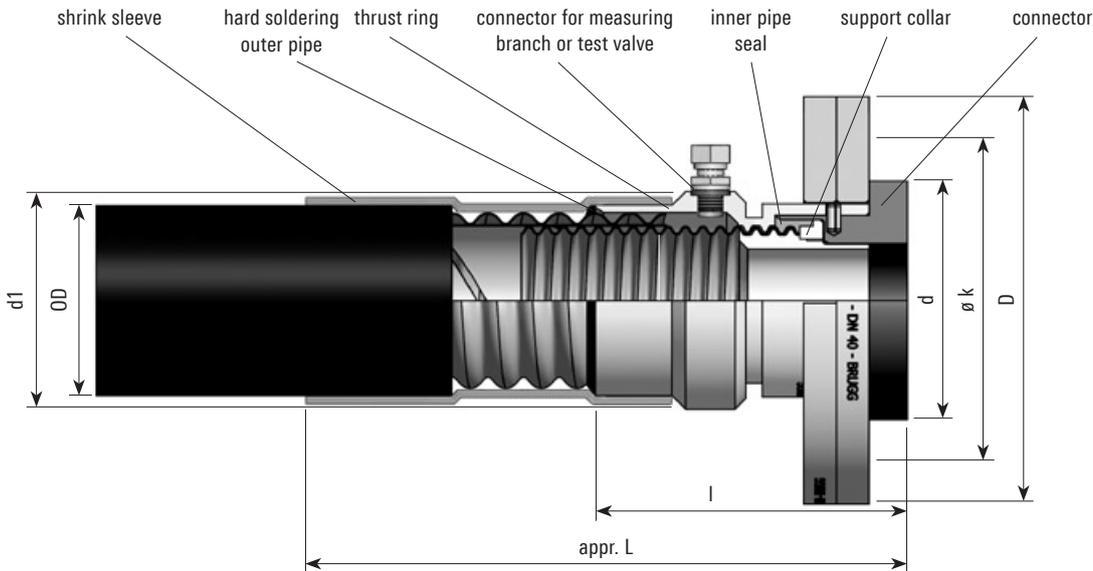
| Type | ID/ | DN | OD | Connector R-thread | Connector NPT-thread | d1 | I | L | Article No. R-thread | Article No. NPT-thread |
|---------------|-----|----|-----|-----------------------|-------------------------|-----|-----|-------------|-------------------------|---------------------------|
| | | | mm | | | mm | mm | appr. mm | | |
| AV FSR 30/ 48 | | 25 | 46 | R 1 | 1" - 11.5 | 60 | 117 | 280 | 829 355 73 | 829 355 74 |
| AV FSR 39/ 60 | | 32 | 57 | R 1 ¼ | 1 ¼" - 11.5 | 70 | 115 | 275 | 829 356 73 | 829 356 74 |
| AV FSR 48/ 71 | | 40 | 69 | R 1 ½ | 1 ½" - 11.5 | 80 | 128 | 290 | 829 357 73 | 829 357 74 |
| AV FSR 60/ 83 | | 50 | 81 | R 2 | 2" - 11.5 | 90 | 147 | 295 | 829 358 73 | 829 358 74 |
| AV FSR 75/107 | | 65 | 107 | R 2 ½ | 2 ½" - 8 | 120 | 178 | 327 | 829 358 56 | 829 358 57 |
| AV FSR 98/134 | | 80 | 132 | R 3 | 3" - 8 | 140 | 201 | 342 | 829 360 08 | 829 360 09 |

Only BRUGG solder Type BRL 8.50.34 may be used!

Connecting fitting GRAPA with collar and split loose flange

Compression joint, joining method: outer pipe hard soldering

FLEXWELL® Safety Pipe
 with compression-type graphite seal inner pipe
 and hard soldering outer pipe,
 pressure stage PN 10



Version:

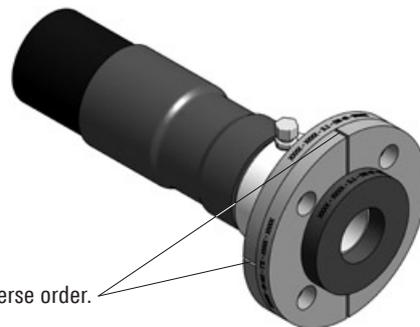
Collar and split loose flange acc. to DIN EN 1092-1

Materials:

- Connector, support collar: Material No. 1.4404
- Thrust ring: Material No. 1.4301
- Inner pipe seal: graphite
- Outer pipe hard soldering: silver solder

Installation instruction for split loose flange:

The splitting of the loose flange needs to be installed staggered 90° in reverse order.



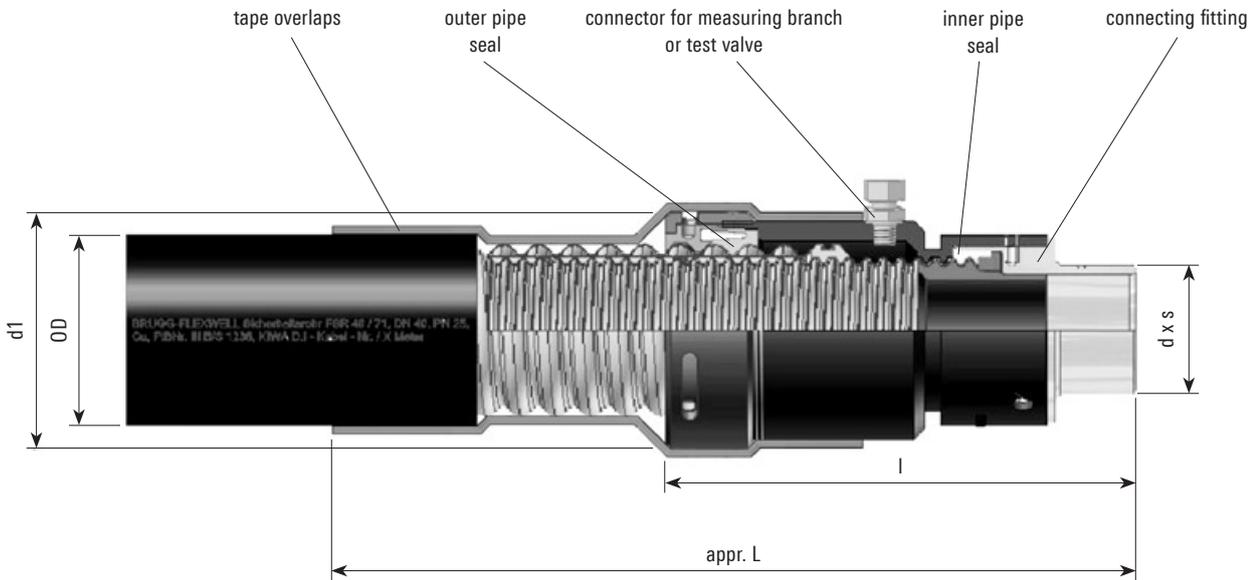
| Type | ID/ | DN | OD | collar and split loose flange acc. to DIN EN 1092-1 | | | d1 | l appr. | L | Article No. split loose flange galvanised steel | Article No. split loose flange stainless steel 1.4404 |
|------------|-----|----|-----|--|-----|-----|-----|------------|-----|---|--|
| | | | | d | D | ø k | | | | | |
| | | | mm | mm | mm | mm | mm | mm | | | |
| AV-FSR 30/ | 48 | 25 | 46 | 68 | 115 | 85 | 60 | 104 | 275 | 829 355 75 | 829 355 76 |
| AV-FSR 39/ | 60 | 32 | 57 | 78 | 140 | 100 | 70 | 99 | 265 | 829 356 75 | 829 356 76 |
| AV-FSR 48/ | 71 | 40 | 69 | 88 | 150 | 110 | 80 | 114 | 280 | 829 357 75 | 829 357 76 |
| AV-FSR 60/ | 83 | 50 | 81 | 102 | 165 | 125 | 90 | 128 | 290 | 829 358 75 | 829 358 76 |
| AV-FSR 75/ | 107 | 65 | 107 | 122 | 185 | 145 | 120 | 180 | 347 | 829 358 58 | 829 358 59 |
| AV-FSR 98/ | 134 | 80 | 132 | 138 | 200 | 160 | 140 | 204 | 365 | 829 360 10 | 829 360 11 |

Only BRUGG solder Type BRL 8.50.34 may be used!

Connecting fitting GRAPA with welded end

Compression joint/screwed joint

FLEXWELL® Safety Pipe Type FSR 30/48 to FSR 60/83
with compression-type graphite seal inner pipe
and screwed outer pipe seal,
pressure stage PN 25



Materials:

Medium contact elements: Material No. 1.4404
other elements: Material No. 1.4301
inner pipe seal: graphite
outer pipe seal: moulded elastomer ring

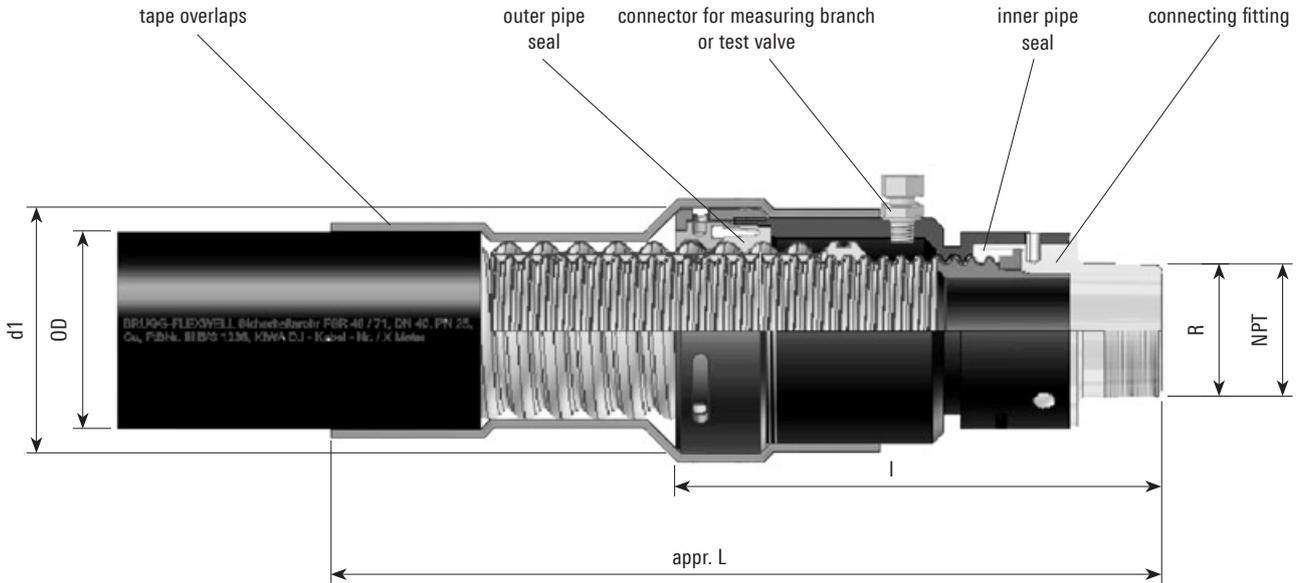


| Type | ID/ | DN | OD mm | d x s mm | d1 mm | l mm | appr. L mm | Article No. |
|--------------|-----|----|----------|-------------|----------|---------|---------------|-------------|
| AV-FSR 30/48 | | 25 | 46 | 33.7 x 2.6 | 68 | 157 | 315 | 829 355 92 |
| AV-FSR 39/60 | | 32 | 57 | 42.4 x 2.6 | 78 | 158 | 310 | 829 356 92 |
| AV-FSR 48/71 | | 40 | 69 | 48.3 x 2.6 | 88 | 174 | 335 | 829 357 92 |
| AV-FSR 60/83 | | 50 | 81 | 60.3 x 2.9 | 105 | 191 | 335 | 829 358 92 |

Connecting fitting GRAPA with external thread

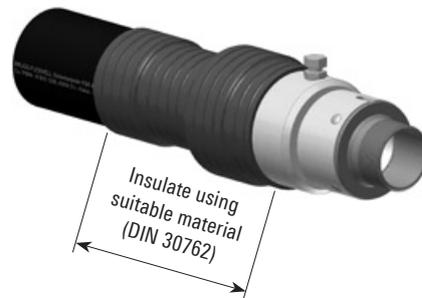
Compression joint/screwed joint

FLEXWELL® Safety Pipe Type FSR 30/48 to FSR 60/83
with compression-type graphite seal inner pipe
and screwed outer pipe seal,
pressure stage PN 25



Materials:

Medium contact elements: Material No. 1.4404
other elements: Material No. 1.4301
inner pipe seal: graphite
outer pipe seal: moulded elastomer ring

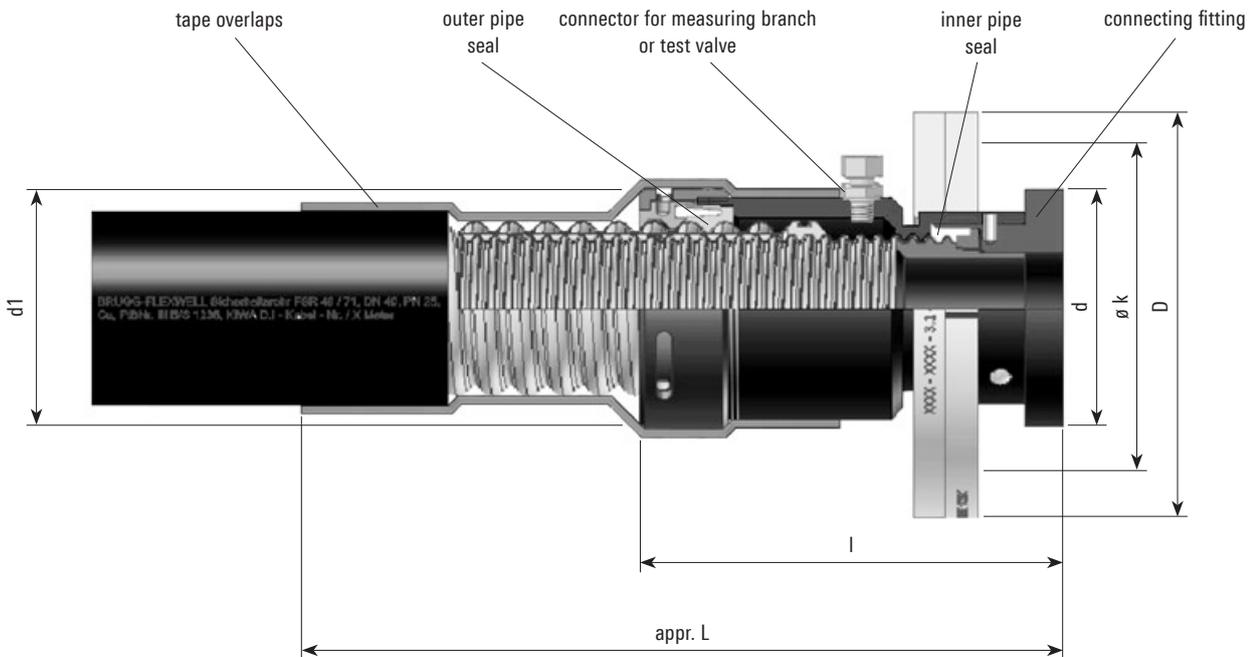


| Type | ID/ | DN | OD | Connector R-thread | Connector NPT-thread | d1 | l | L appr. | Article No. R-thread | Article No. NPT-thread |
|--------|-------|----|----|-----------------------|-------------------------|-----|-----|------------|-------------------------|---------------------------|
| | | | mm | | | mm | mm | mm | | |
| AV-FSR | 30/48 | 25 | 46 | R 1" | 1" - 11.5 NPT | 68 | 157 | 305 | 829 355 98 | 829 365 98 |
| AV-FSR | 39/60 | 32 | 57 | R 1 1/4" | 1 1/4" - 11.5 NPT | 78 | 158 | 300 | 829 356 98 | 829 366 98 |
| AV-FSR | 48/71 | 40 | 69 | R 1 1/2" | 1 1/2" - 11.5 NPT | 88 | 174 | 320 | 829 357 98 | 829 367 98 |
| AV-FSR | 60/83 | 50 | 81 | R 2" | 2" - 11.5 NPT | 105 | 191 | 320 | 829 358 98 | 829 368 98 |

Connecting fitting GRAPA with collar and split loose flange

Compression joint/screwed joint

FLEXWELL® Safety Pipe Type FSR 30/48 to FSR 60/83 with compression-type graphite seal inner pipe and screwed outer pipe seal, pressure stage PN 25

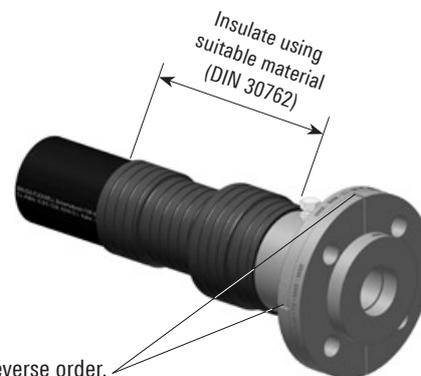


Materials:

- Medium contact elements: Material No. 1.4404
- other elements: Material No. 1.4301
- inner pipe seal: graphite
- outer pipe seal: moulded elastomer ring

Installation instruction for split loose flange:

The splitting of the loose flange needs to be installed staggered 90° in reverse order.

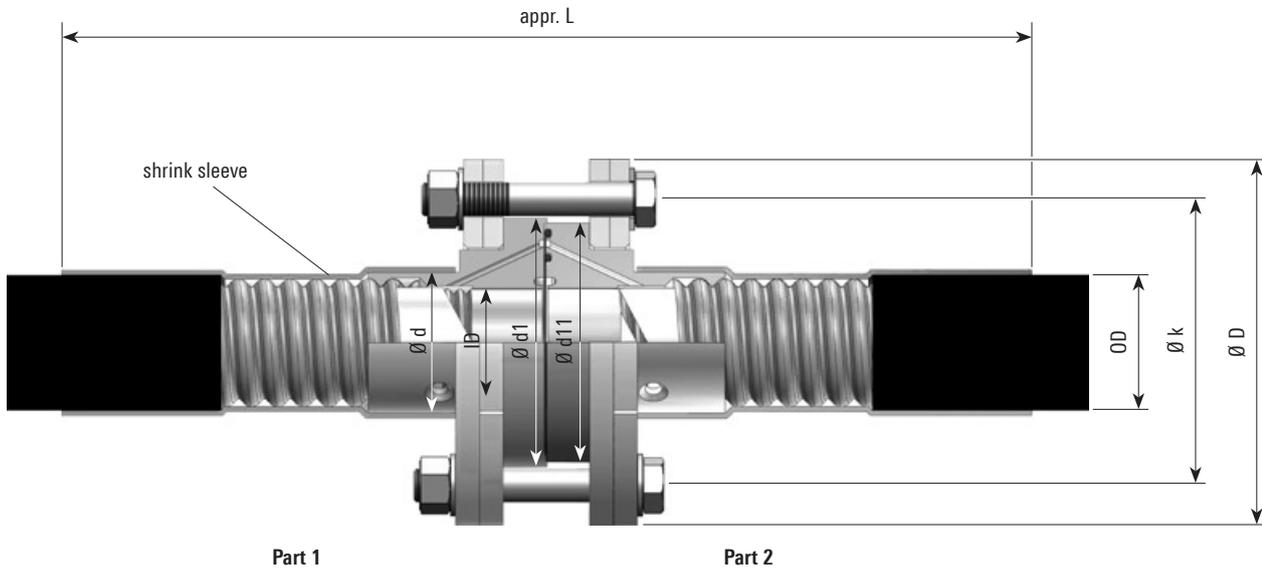


| Type | ID/OD | DN | OD | collar and split loose flange acc. to DIN EN 1092-1 | | | d1 | l | L appr. | Article No. split loose flange galvanised steel | Article No. split loose flange stainless steel |
|--------------|-------|----|----|---|-----|-----|-----|-----|---------|---|--|
| | | | | d | D | ø k | | | | | |
| | | | mm | mm | mm | mm | mm | mm | | 1.4404 | |
| AV-FSR 30/48 | | 25 | 46 | 68 | 115 | 85 | 68 | 141 | 300 | 829 355 95 | 829 355 85 |
| AV-FSR 39/60 | | 32 | 57 | 78 | 140 | 100 | 78 | 139 | 290 | 829 356 95 | 829 356 85 |
| AV-FSR 48/71 | | 40 | 59 | 88 | 150 | 110 | 88 | 174 | 310 | 829 357 95 | 829 357 85 |
| AV-FSR 60/83 | | 50 | 81 | 102 | 165 | 125 | 105 | 169 | 315 | 829 358 95 | 829 358 85 |

Monitorable through-connection with flanged connection

Joining method: TIG welding/hard soldering

pressure stage PN 25



monitorable via O-ring seal

Version:

Collar and split flange acc. to DIN EN 1092-1

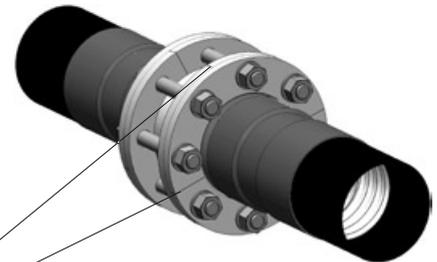
Material:

Threaded socket made of material no. 1.4404/1.4571

Flange made of material no. 1.4404/1.4571

O-rings: Viton (see Worksheet FSR 4.217)

O-rings in other materials according to the substances being transported can also be used



Installation instruction for split looseflange:

The splitting of the loose flange needs to be installed staggered 90° in reverse order.

Part 1 + 2

| Type | ID/OD | DN | d | d1 | d11 | flange | Ø D | Ø k | screws | number of drill holes | L appr. mm | Article No. split loose flange stainless steel 1.4404 |
|--------|---------|-----|-----|-----|-----|--------|-----|-----|-----------|-----------------------|------------------|---|
| | | | mm | mm | mm | DN | mm | mm | | | | |
| DV-FSR | 30/ 48 | 25 | 60 | 91 | 87 | 40 | 150 | 110 | M16 x 110 | 4 | 440 | 829 491 89 |
| DV-FSR | 39/ 60 | 32 | 75 | 105 | 101 | 50 | 165 | 125 | M16 x 120 | 4 | 440 | 829 492 89 |
| DV-FSR | 48/ 71 | 40 | 94 | 126 | 121 | 65 | 185 | 145 | M16 x 130 | 8 | 480 | 829 493 89 |
| DV-FSR | 60/ 83 | 50 | 94 | 126 | 121 | 65 | 185 | 145 | M16 x 130 | 8 | 480 | 829 494 89 |
| DV-FSR | 75/107 | 65 | 135 | 166 | 162 | 100 | 235 | 190 | M20 x 160 | 8 | 550 | 829 495 89 |
| DV-FSR | 98/134 | 80 | 135 | 166 | 162 | 100 | 235 | 190 | M20 x 160 | 8 | 586 | 829 496 89 |
| DV-FSR | 127/175 | 100 | 186 | 223 | 217 | 150 | 300 | 250 | M24 x 160 | 8 | 600 | 829 497 89 |

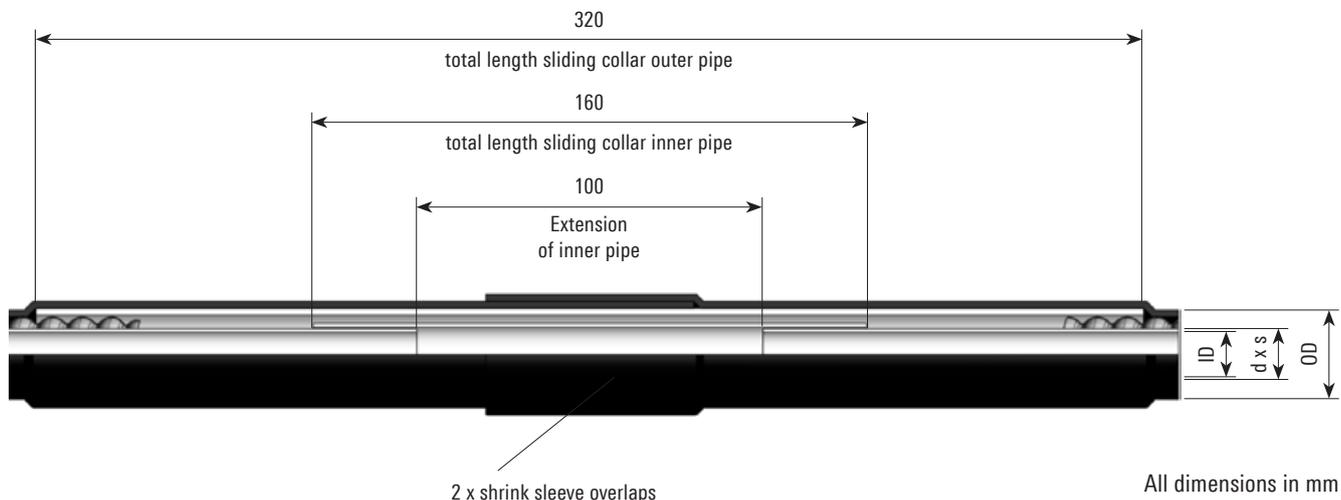
Screws and nuts are not included in the delivery volume.

Only BRUGG solder Type BRL 8.50.34 may be used!

Integrated through-connection

with smooth-bore inner and outer pipe, joining method: TIG welding/hard soldering

FLEXWELL® Safety Pipe Type FSR 13/25
pressure stage PN 25



Material:

All parts made of stainless austenitic steel

Material No. 1.4404/1.4571 inner

Material No. 1.4301 outer

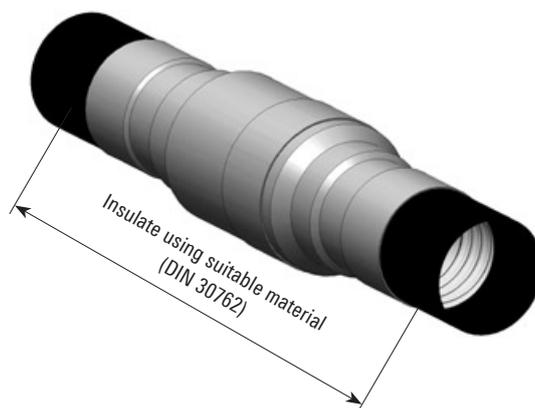
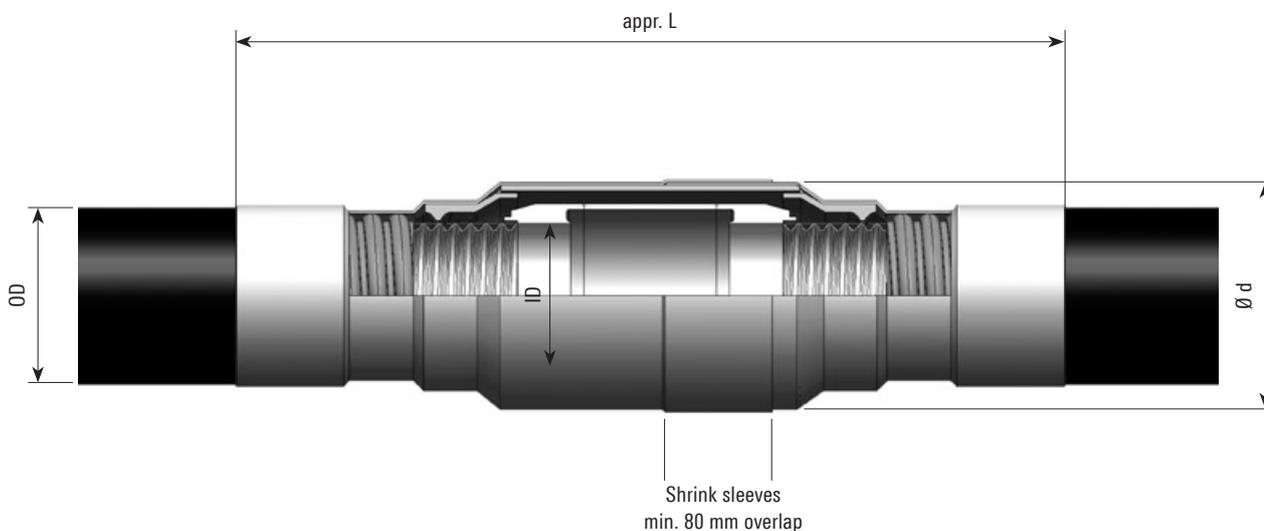
| Type | ID/OD | DN | d x s mm | Article No. 1.4404/1.4571 |
|--------------|-------|----|-------------|------------------------------|
| DV-FSR 13/25 | | 12 | 15 x 1 | 829 350 49 |

Only BRUGG solder Type BRL 8.50.34 may be used!

Integrated through-connection

Joining method: TIG welding/hard soldering

Pressure stage PN 25



Material:

All parts made of stainless austenitic steel
 Material No. 1.4404/1.4571 inner
 Material No. 1.4301 outer

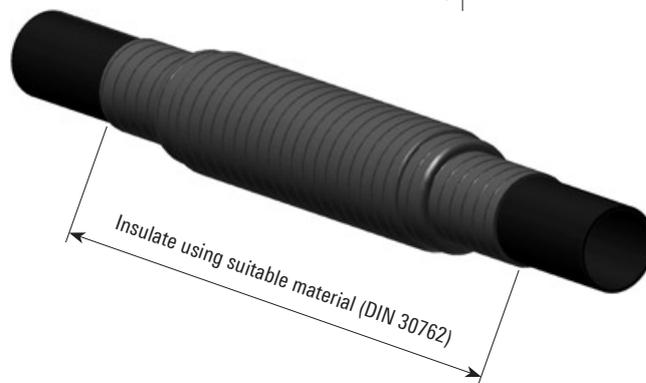
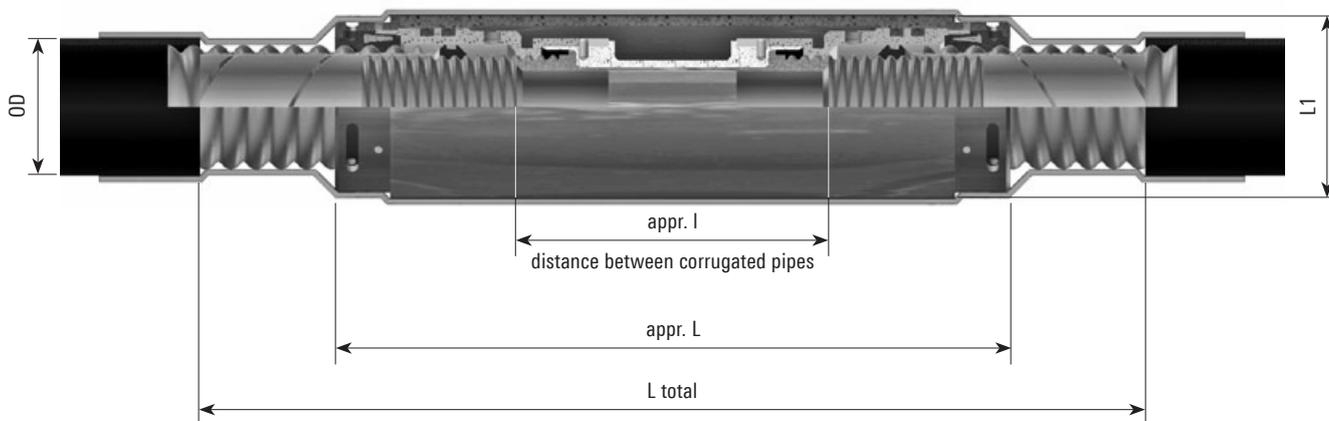
| Type | ID/OD | DN | Ø d | L | Article No. |
|--------|---------|-----|-------|-------------|---------------|
| | | | mm | appr. mm | 1.4404/1.4571 |
| DV-FSR | 30/ 48 | 25 | 60.3 | 550 | 829 403 90 |
| DV-FSR | 39/ 60 | 32 | 76.1 | 550 | 829 404 90 |
| DV-FSR | 48/ 71 | 40 | 88.9 | 610 | 829 405 50 |
| DV-FSR | 60/ 83 | 50 | 101.6 | 610 | 829 405 90 |
| DV-FSR | 75/107 | 65 | 139.7 | 640 | 829 406 50 |
| DV-FSR | 98/134 | 80 | 168.3 | 660 | 829 407 50 |
| DV-FSR | 127/175 | 100 | 193.7 | 690 | 829 407 90 |

Longer through-connections available on request.
 Only BRUGG solder Type BRL 8.50.34 may be used!

Integrated through-connection GRAPA

Compression joint/screwed joint

Pressure stage PN 25



Materials:

elements in contact with medium: Material No. 1.4404/1.4571
 other elements: Material No. 1.4301
 inner pipe seals: graphite
 outer pipe seals: moulded elastomer ring

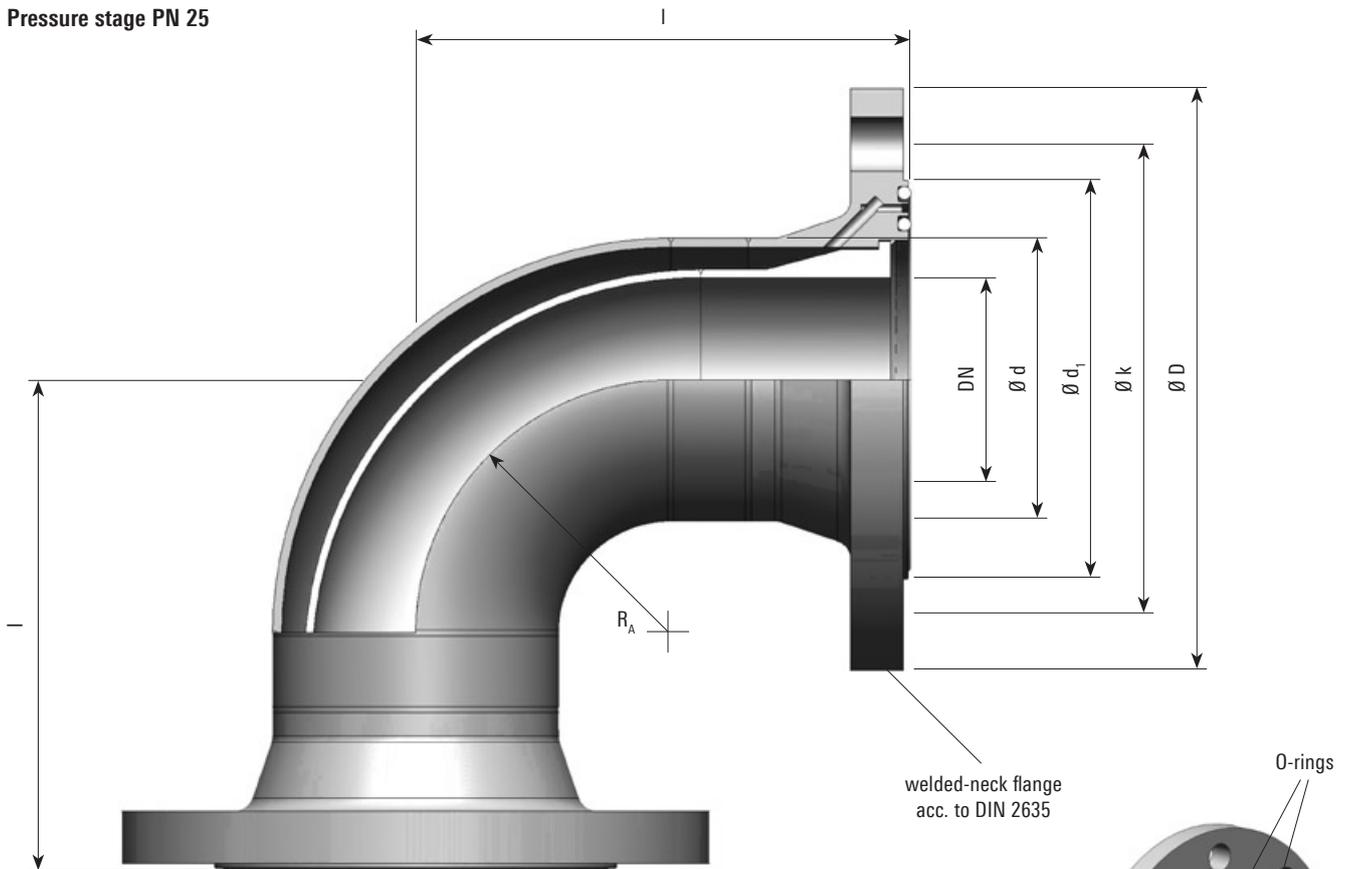
The fitting cannot be detached after installation.

| Type | DN | OD mm | D1 mm | appr. l mm | appr. L mm | L total mm | Article No. |
|--------------|----|----------|----------|---------------|---------------|---------------|-------------|
| DV-FSR 30/48 | 25 | 46 | 76.1 | 107 | 307 | 400 | 829 355 77 |
| DV-FSR 39/60 | 32 | 57 | 85.0 | 107 | 315 | 420 | 829 356 77 |
| DV-FSR 48/71 | 40 | 69 | 95.0 | 117 | 348 | 460 | 829 357 77 |
| DV-FSR 60/83 | 50 | 81 | 114.3 | 130 | 373 | 480 | 829 358 77 |

Monitorable elbow with flanged connection

with monitorable sealing surface, complete assembly

Pressure stage PN 25



Elbow in stainless steel

Material No. 1.4404/1.4571 in contact with medium, Material No. 1.4301 outer parts
 The monitorable elbow with flanged connection is flanged together with monitorable connecting fittings with loose flange Part 1 (Worksheet FSR 4.216) or welded-neck flange (Worksheet FSR 4.421).

Version:

Complete component assembly, welded and tested

O-ring seals: Viton (see Worksheet FSR 4.217)

O-rings in other materials according to the substances being transported can also be used.



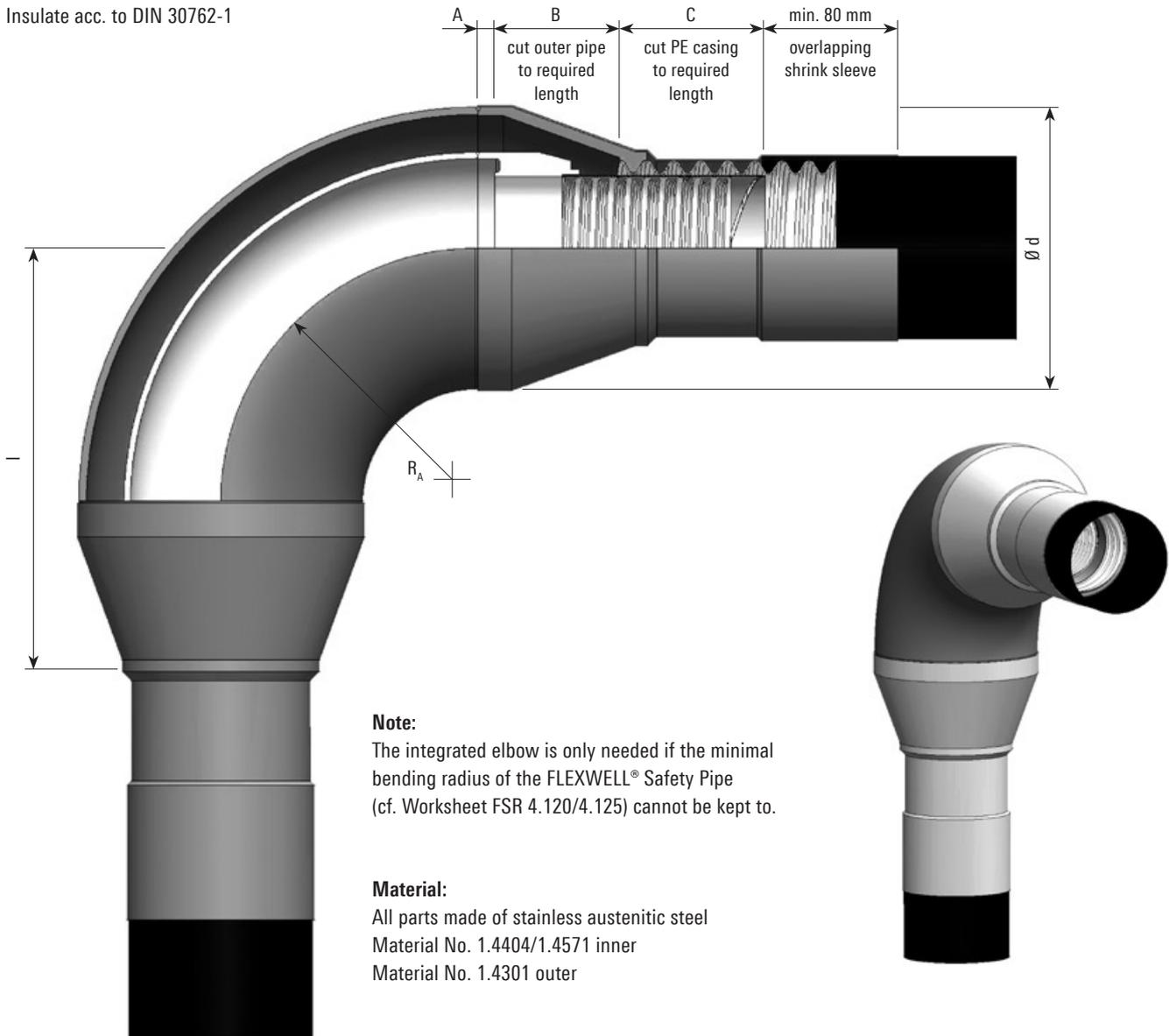
| Type | DN | l | R _A | Ø d | Ø d ₁ | flange DN | Ø D | Ø k | screws for steel | Number of screws | Article No. |
|-------------------|-----|-----|----------------|-------|------------------|-----------|-----|-----|------------------|------------------|-------------|
| | mm | mm | mm | mm | mm | | mm | mm | | | |
| Elbow FSR 30/ 48 | 25 | 131 | 43 | 48.3 | 87 | 40 | 150 | 110 | M16 x 80 | 4 | 829 461 91 |
| Elbow FSR 39/ 60 | 32 | 140 | 55 | 60.3 | 101 | 50 | 165 | 125 | M16 x 90 | 4 | 829 462 91 |
| Elbow FSR 48/ 71 | 40 | 139 | 70 | 76.1 | 121 | 65 | 185 | 145 | M16 x 90 | 8 | 829 463 91 |
| Elbow FSR 60/ 83 | 50 | | | | | | | | | | |
| Elbow FSR 75/107 | 65 | 197 | 105 | 114.3 | 161 | 100 | 235 | 190 | M20 x 100 | 8 | 829 465 91 |
| Elbow FSR 98/134 | 80 | | | | | | | | | | |
| Elbow FSR 127/175 | 100 | 265 | 155 | 168.3 | 217 | 150 | 300 | 250 | M24 x 110 | 8 | 829 466 91 |

Screws and nuts are not included in the delivery volume.

Integrated elbow

Joining method: TIG welding/hard soldering

Insulate acc. to DIN 30762-1



Note:

The integrated elbow is only needed if the minimal bending radius of the FLEXWELL® Safety Pipe (cf. Worksheet FSR 4.120/4.125) cannot be kept to.

Material:

All parts made of stainless austenitic steel
 Material No. 1.4404/1.4571 inner
 Material No. 1.4301 outer

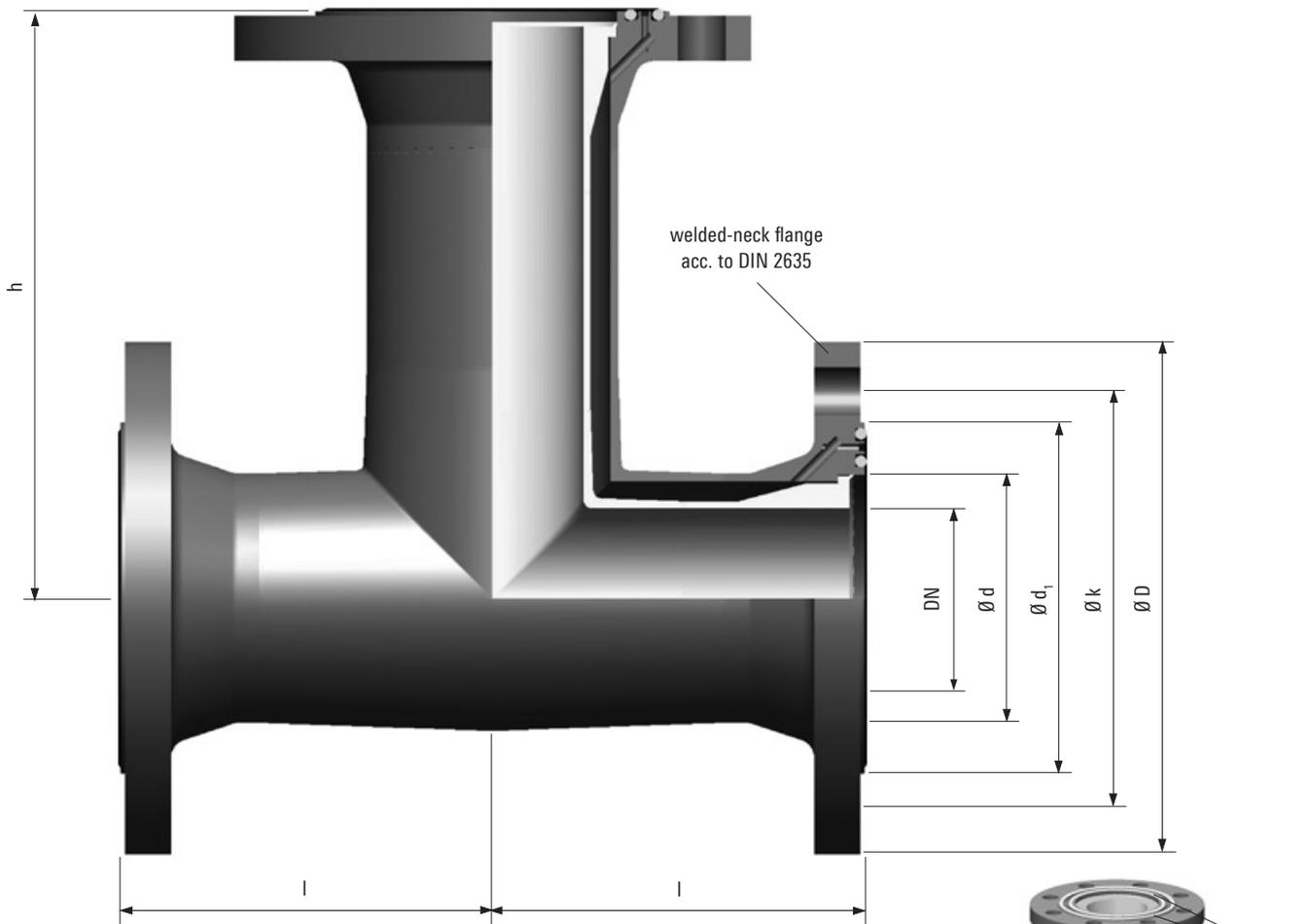
| Type | DN | Ø d mm | l mm | R _A | A mm | B mm | C mm | Article No. |
|-------------------|-----|-----------|-----------|----------------|---------|---------|---------|-------------|
| Elbow FSR 30/ 48 | 25 | 60.3 | appr. 145 | 55 | 5 | 60 | 80 | 829 461 96 |
| Elbow FSR 39/ 60 | 32 | 76.1 | appr. 165 | 70 | 5 | 60 | 80 | 829 462 96 |
| Elbow FSR 48/ 71 | 40 | 114.3 | appr. 182 | 102 | 10 | 51 | 100 | 829 463 96 |
| Elbow FSR 60/ 83 | 50 | 114.3 | appr. 210 | 105 | 10 | 58 | 100 | 829 464 96 |
| Elbow FSR 75/107 | 65 | 168.3 | appr. 252 | 152 | 10 | 58 | 100 | 829 465 56 |
| Elbow FSR 98/134 | 80 | 168.3 | appr. 237 | 152 | 10 | 60 | 120 | 829 466 56 |
| Elbow FSR 127/175 | 100 | 219.1 | appr. 410 | 203 | 15 | 90 | 160 | 829 466 96 |

Only BRUGG solder Type BRL 8.50.34 may be used!

Monitorable T-piece with flanged connection

with monitorable sealing surface, complete assembly

Pressure stage PN 25



T-piece in stainless steel

Material No. 1.4404/1.4571 in contact with medium, Material No. 1.4301 outer parts
 The monitorable T-piece with flanged connection is flanged together with monitorable connecting fittings with loose flange Part 1 (Worksheet FSR 4.216) or welded-neck flange (Worksheet FSR 4.421)

Version:

Complete component assembly, welded and tested

O-ring seals: Viton (see Worksheet FSR 4.217)

O-rings in other materials according to the substances being transported can also be used

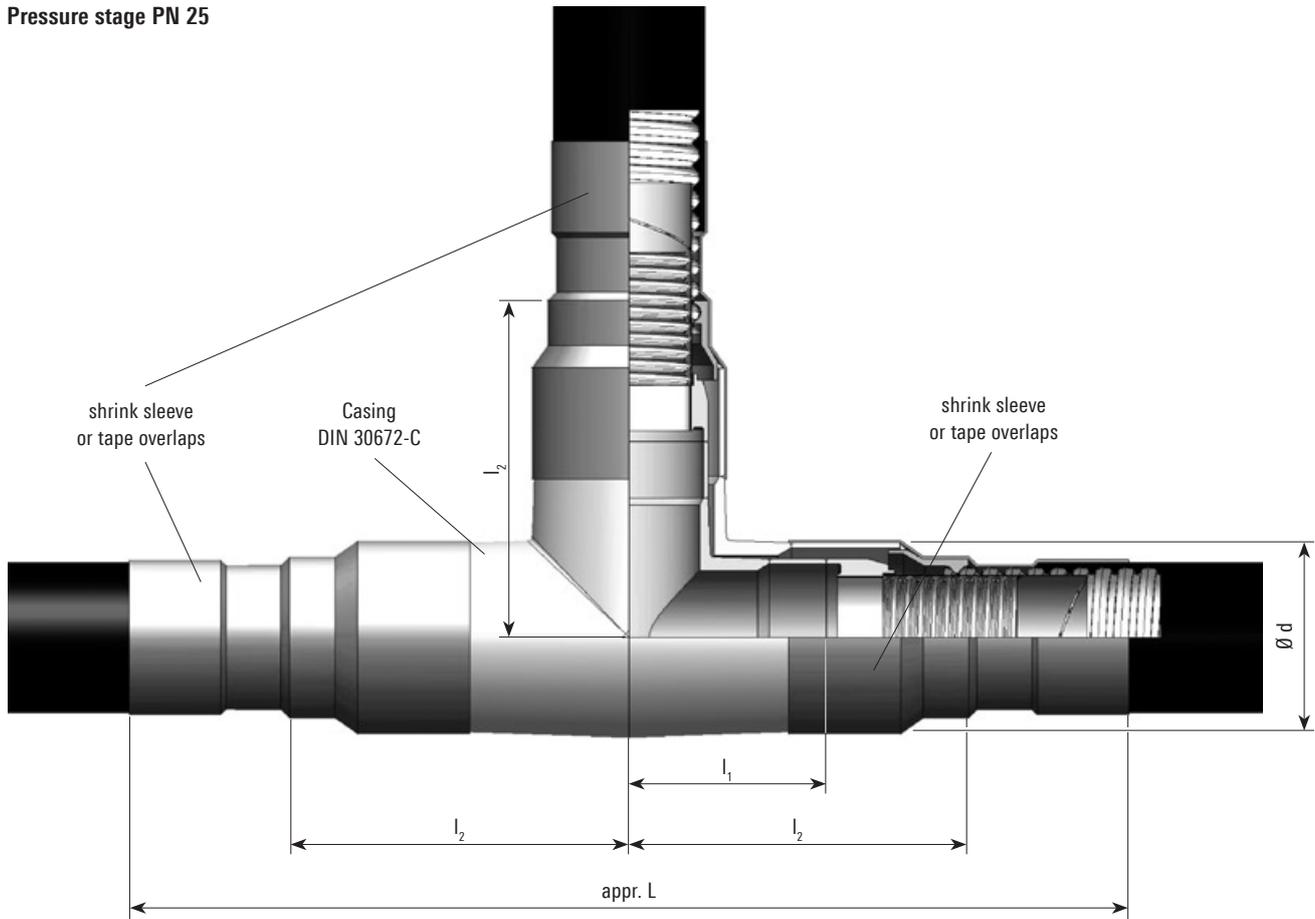
| Type | DN | l | h | Ø d | Ø d1 | flange DN | Ø D | Ø k | screws for steel | Number of screws | Article No. |
|---------------------|-----|-----|-----|-------|------|-----------|-----|-----|------------------|------------------|-------------|
| | | mm | mm | mm | mm | | mm | mm | | | |
| T-piece FSR 30/ 48 | 25 | 101 | 151 | 48.3 | 87 | 40 | 150 | 110 | M16 x 80 | 4 | 829 471 91 |
| T-piece FSR 39/ 60 | 32 | 111 | 161 | 60.3 | 101 | 50 | 165 | 125 | M16 x 90 | 4 | 829 472 91 |
| T-piece FSR 48/ 71 | 40 | 127 | 177 | 76.1 | 121 | 65 | 185 | 145 | M16 x 90 | 8 | 829 473 91 |
| T-piece FSR 60/ 83 | 50 | | | | | | | | | | |
| T-piece FSR 75/107 | 65 | 169 | 269 | 114.3 | 161 | 100 | 235 | 190 | M20 x 100 | 8 | 829 475 91 |
| T-piece FSR 98/134 | 80 | | | | | | | | | | |
| T-piece FSR 127/175 | 100 | 217 | 317 | 168.3 | 217 | 150 | 300 | 250 | M24 x 110 | 8 | 829 476 91 |

Screws and nuts are not included in the delivery volume.

Integrated T-piece

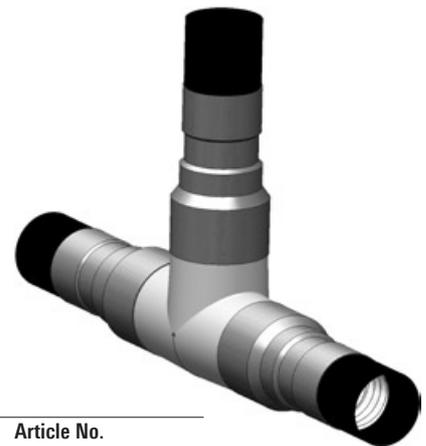
Joining method: TIG welding/hard soldering

Pressure stage PN 25



Material:

All parts made of stainless austenitic steel
 Material No. 1.4404/1.4571 inner
 Material No. 1.4301 outer



| Type | DN | Ø d | l ₁ | l ₂ | L appr. | Article No. 1.4404 |
|---------------------|-----|-------|----------------|----------------|------------|-----------------------|
| | | mm | mm | mm | mm | |
| T-piece FSR 30/ 48 | 25 | 60.3 | appr. 87 | appr. 174 | 624 | 829 471 96 |
| T-piece FSR 39/ 60 | 32 | 76.1 | appr. 94 | appr. 188 | 638 | 829 472 96 |
| T-piece FSR 48/ 71 | 40 | 88.9 | appr. 104 | appr. 201 | 668 | 829 473 96 |
| T-piece FSR 60/ 83 | 50 | 114.3 | appr. 131 | appr. 233 | 772 | 829 474 96 |
| T-piece FSR 75/107 | 65 | 139.7 | appr. 145 | appr. 263 | 820 | 829 475 66 |
| T-piece FSR 98/134 | 80 | 168.3 | appr. 174 | appr. 300 | 922 | 829 476 56 |
| T-piece FSR 127/175 | 100 | 219.1 | appr. 248 | appr. 383 | 1086 | 829 476 96 |

Only BRUGG solder Type BRL 8.50.34 may be used!

Notes

A large rectangular area filled with a fine grid pattern, intended for handwritten notes. The grid consists of approximately 30 columns and 40 rows of small squares.

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