

# BRUGG-STAMANT® Safety Pipe

Systems description

General type approval  
Z-38.4-207



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# Systems description

## Monitorable BRUGG-STAMANT® Safety Piping

BRUGG-STAMANT® Safety Piping is a prefabricated double-walled piping system delivered in construction elements, in the dimensions **DN 15/32 to DN 800/900**, which is particularly suitable for the transport of flammable and non-flammable water hazardous substances.

The installation and laying of the construction elements is done by specialist firms certified acc. to §19 I WHG, TRbF 50 who can prove their qualifications in process and welding techniques.

The annular gap between the inner and secondary containment pipes is used as a surveillance space for a leak detector, which carries out permanent and complete leak monitoring. In the event of a spillage an optical and acoustic alarm is given and, where required, further transport of the medium is interrupted.

The leak detector regulates the monitoring pressure in the surveillance space of the safety piping and registers any changes in pressure, even in the case of minimal spillages, both in the inner and secondary containment pipes.

Additional functions when an alarm is given, such as passing on the alarm signal, switching off pumps or closing down magnetic valves, bring additional operational safety.

There are two monitoring systems:

- |                        |                                |
|------------------------|--------------------------------|
| Leak monitoring on the | 1. Vacuum principle            |
|                        | 2. Positive pressure principle |

Besides increasing operating safety, the use of a leak detector brings considerable economic advantages:

1. The entire system can be checked simply at any time without interrupting operations.
2. Requirements such as pressure-/volume measurements, pressure tests or inspections of the piping route become unnecessary.

The construction elements, which are assembled at our works, include all necessary fittings for the project (such as elbow, T-piece, wall through-connection etc.), including the complete outer corrosion proofing for underground piping according to the requirements of DIN 30672.

The type of material used for the outer pipe and for the inner medium pipe depends on the expected mechanical, thermal, and chemical stress levels as well as on the currently valid building regulations. Conventional project planning for double-walled piping systems, especially with large pipe dimensions for the transport of flammable, environmentally hazardous media makes stringent demands on the technical standards of a design, as well as on the manufacturer's know-how in fire and explosion prevention and the protection of bodies of water.

Years of experience in planning and implementing projects using steel-cased piping in the field of district heating systems and FLEXWELL safety piping in industrial plants, the petrochemical sector and fuel depot construction mean that we are perfectly capable of meeting these requirements



**Structure of the BRUGG-STAMANT® safety pipe**

- 1 Inner pipe
- 2 Surveillance space
- 3 Secondary containment pipe
- 4 Corrosion proofing

# General type approval Z-38.4-207

The construction design of BRUGG-STAMANT® Safety Piping with leak monitoring is manufactured and used in projects according to the description in the general type approval and according to the pressure device regulations 97/23/EG, as well as according to the construction regulations of the TRbF 50. The system is subject to the requirements of 11.GSGV, § 19 g WHG , §7 BetrSichV (Operating Safety Ordinance) and the requirements of the various German federal states under the VAwS.

## Principles of testing and evaluation used in the leak detector

(Definition of the surveillance space, the leak detector with connecting cables and the leak detection medium acc. to TRbF 503)

- BetrSichV
- Technical rules for flammable liquids - TRbF
  - TRbF 50 Part 1 Piping on the factory premises
  - TRbF 502, EN 13160 Guideline/Construction and testing principles for leak detectors for double-walled piping
- Water conservation law - WHG
- Regulations concerning installations handling water hazardous substances - VAwS and their appropriate regulations - VVAwS

## Tests

According to the general type approval, the pressure device regulations 97/23/EG, as well as according to the construction and testing regulations of the TRbF 50.

## Material, construction and pressure tests

We carry out the necessary material, construction, and pressure tests together with the competent official experts during manufacturing in our factory. The final tests of the piping connections on site are also done by the official expert supported by the internal expert from the specialist firm.

## Acceptance test

The function test and operational start-up of the leak monitoring system is carried out according to the description in the approval documents of the specific leak detector used.

## Proof of qualifications

Besides our experience, the following proof of qualifications guarantees that your orders will be carried out professionally and to high quality standards:

- Specialist firm acc. to § 19 WHG
- Specialist firm acc. to TRbF 180 Nr. 1.7
- Specialist firm acc. to TRbF 503
- Procedures test acc. to AD - Data sheet HP 2/1
- Welder test acc. to AD - Data sheet HP 3
- Specialist firm for the manufacture and installation of piping
- Acceptance is monitored according to the pressure device regulations 97/23/EG

# Technical project description leak detector

## Leak detector

(Safety piping and leak monitoring)

approved for the transport of water-hazardous (flammable and non-flammable) media

acc. to VbF i.Vm. of the 11. GSGV, WHG, VAwS

## Safety piping

as a double-walled steel piping construction with surveillance space as part of a leak detection system.

Type: BRUGG-STAMANT® safety piping

## Leak monitoring (acc. to TRbF 502)

Positive pressure leak detector

Vacuum leak detector

## Manufacturer

BRUGG Rohrsysteme GmbH

## Installation / laying

by authorized specialist firms certified acc. to § 19 I WHG and TRbF 50

## Applications

Underground or above-ground piping

## Transport medium

Water-hazardous [flammable and non-flammable] media

## Dimensions

Outer pipe DN 32 to DN 900

Inner pipe DN 15 to DN 800

## Operating conditions:

Operating pressure in inner pipe:

– up to max. 16 bar positive pressure leak monitoring

– up to max. 20 bar vacuum leak monitoring

Calculated pressure, monitoring pressure: according to the description in the approval documents

Testing pressure TRbF 50

Inner pipe: 1.3 times the monitoring pressure in the inner pipe

Surveillance space: 1.3 times the monitoring pressure or acc. to pressure device regulations (DGRL)

A testable static strength calculation acc. to BAZ is made for every BRUGG-STAMANT® pipe system.

# Technical project description materials specification

## Inner pipe

Dimensions seamless and welded pipes acc. to EN 10220

Technical conditions of delivery acc. to TRbF 50 or EN 10216-2, 10217-1, 10217-2, 10208-2

Acceptance test certificate acc. to DIN EN 10204 – “3.1.”

## Outer pipe

Dimensions seamless and welded pipes acc. to EN 10220

Technical conditions of delivery acc. to TRbF 50 or EN 10216-2, 10217-1, 10217-2, 10208-2

With external PE corrosion-proofing jacket acc. to DIN 30670 or DIN 30671.

Acceptance test certificate acc. to DIN EN 10204 – “3.1.”

## IP elbow

Pipe elbow DIN 2605

Works certificate acc. to DIN EN 10204 – “3.1.”

as per description in the approval documents (see also Worksheet SMR 5.03.01/02)

## OP elbow

Pipe elbow, radius according to the inner pipe curvature with appropriate material specification outer pipe DIN 2605 or in segments

PE corrosion-proofing jacket acc. to DIN 30672.

as per description in the approval documents (see also Worksheet SMR 5.03.01)

## T-branch

Consisting of: outer pipe and inner pipe branch, T-branch acc. to DIN 2615, 2618 or Weldolet

as per description in the approval documents (see also Worksheets SMR 5.04.01 - 5.04.05)

## End seal

Provides a pressure and vacuum-tight seal of the annular gap between outer and inner pipe, frictionally welded with simultaneous lead-through of the inner pipe, incl. the connection for the leak detector as per description in the approval documents (see also Worksheet SMR 5.14.01).

## Bearings

Spacers

The inner pipe is carried on axial bearings which guarantees the openness of the surveillance space. As per description in the approval documents (see also Worksheet SMR 5.10.01/5.11.01/5.12.01)

## Leak monitoring

The annular gap, annular volume max. 10 m<sup>3</sup>, between the inner and outer pipe serves as a surveillance space.

Monitoring of the pipe is done either on the positive pressure or vacuum principle, adapted to the actual operating pressure of the inner pipe, by means of an approved leak detector.

Flammable liquids Classes AI, AII, AIII and B, as well as WGK 1 to 3

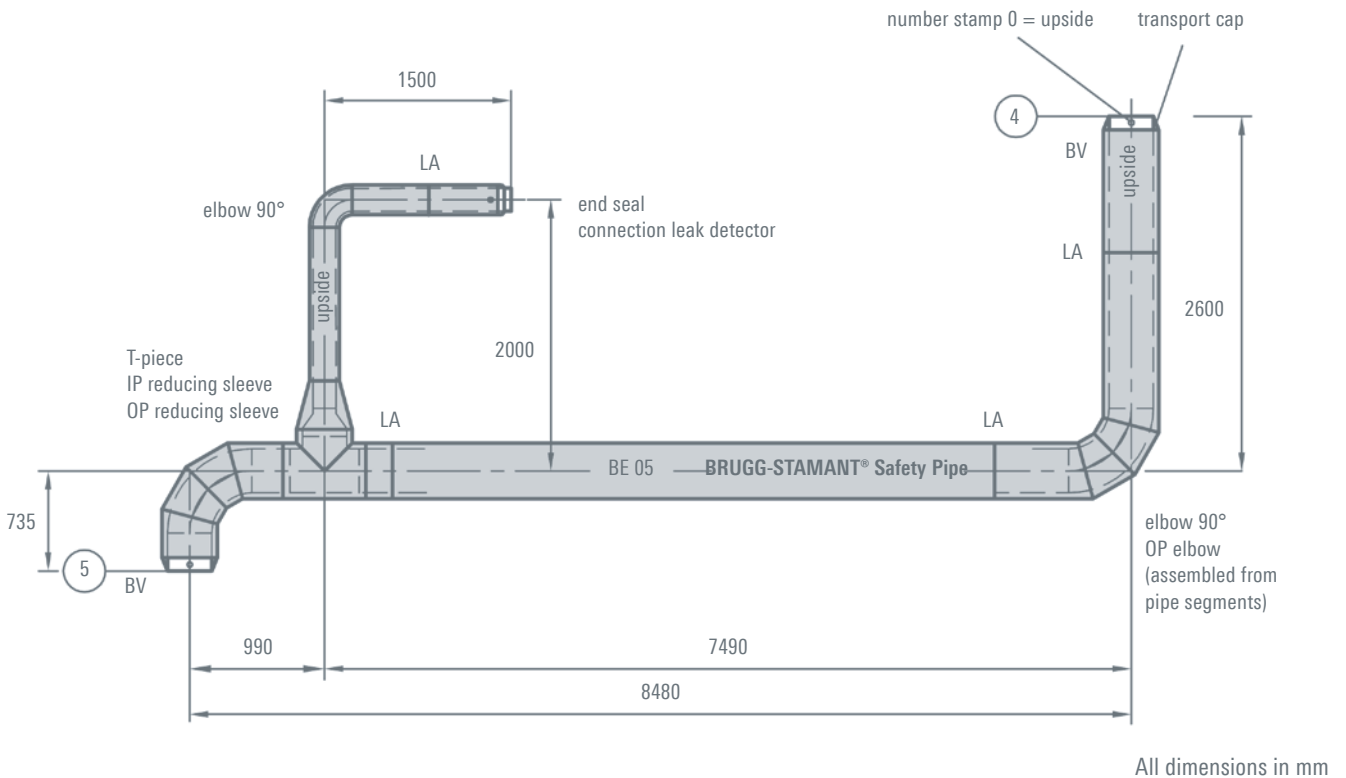
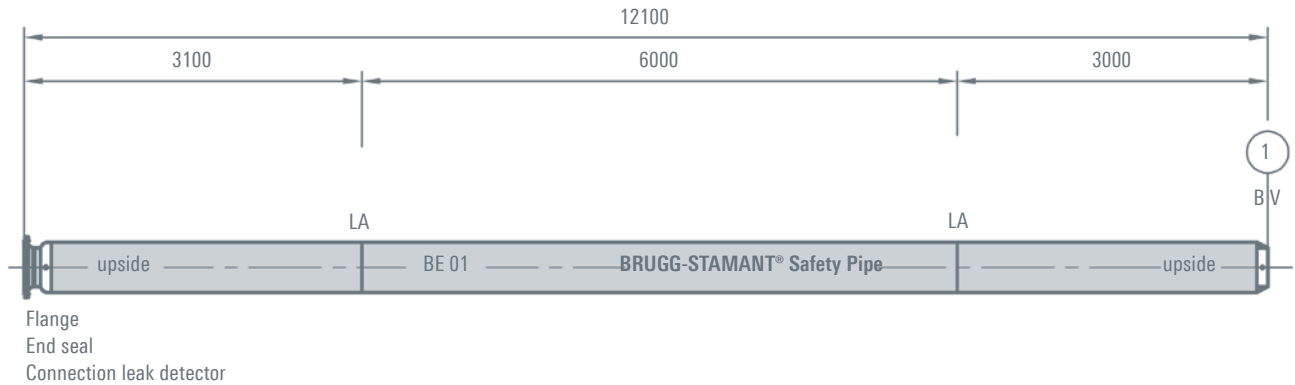
Flammable liquids (AIII) and non-flammable liquids

As per description in the approval documents

# BRUGG-STAMANT® construction elements

BRUGG-STAMANT® safety piping construction elements already include all necessary fittings such as elbows, T-branches, reducing sleeves and end seals. The standard length of the construction elements is 12.0 metres. Longer elements can be delivered after consultation. The maximum length of the elements is only limited by the availability of suitable transport.

## Construction elements in a completed installation



# Leak monitoring

BRUGG-STAMANT® safety piping is permanently monitored using pneumatic leak detection equipment/ leak detectors. These regulate the monitoring pressure in the surveillance space and register any changes of pressure which may occur.

The surveillance space is filled with the leak detection medium (an inert gas) and prevents uncontrolled spillages of the transport medium when leaks occur. The surveillance space must be so constructed that the functioning and operative security of the leak detection system (the leak detector) is assured at all times when the leak monitoring system is connected.

If the pipe is damaged the alarm is given by acoustic and optical signals.

## Definition of leak detection equipment/leak detector

«Leak detection equipment/leak detector» according to the currently valid regulations refers to a device which automatically and under all operating conditions gives warning of leaks in the walls of double-walled piping in which water-hazardous (flammable and non-flammable) fluids are transported. The term «leak detection equipment/leak detector» includes all the equipment necessary for the detection of leaks.

The main components are:

the leak detector/leak detection equipment (LAZ)  
 the connection between the surveillance space (ÜR) and leak detector (LAZ)  
 double-walled piping  
 the surveillance space (ÜR)  
 a leak detection medium

The use of this system complies with the most stringent European safety standards (Class 1). Systems of this class give warning of a leak above or below the fluid level in a double-walled protective system. They are constructed on the principles of absolute safety and ensure that spillages of products into the environment cannot occur.

## Leak detection equipment/leak detector (LAZ)

We distinguish two types of differential pressure leak detection equipment:  
 Leak surveillance to detect leaks in double-walled piping on the vacuum principle  
 and on the positive pressure principle (using an inert gas).

BRUGG-STAMANT® safety piping with a vacuum leak detector  
 BRUGG-STAMANT® safety piping with a positive-pressure leak detector

## Approval/suitability

All leak detection equipment/leak detectors in use must comply with the basic criteria laid down for construction and testing standards. All such preconditions which could have a bearing on the functional and operative safety of the system must therefore be observed. It therefore goes without saying that the conditions for operative use have been tested by the competent authorities and clearly defined and set down in the documents of approval issued by them.

BRUGG-STAMANT® safety piping with leak monitoring is an approved leak detection equipment/leak detector system.

## The advantages of the system

Using double-walled BRUGG-STAMANT® safety piping with leak monitoring offers, besides a high degree of operative safety, substantial economic advantages:

- the entire system can be easily and simply monitored at any time without interrupting operations
- requirements such as e.g. pressure/volume measurements, pressure tests or route surveys can be dispensed with.

# Leak detection on the vacuum principle

The leak detector on the vacuum principle is suitable and approved for monitoring BRUGG-STAMANT® Safety Piping for the transport of:

- flammable water-hazardous substances with an ignition point > 55 °C only in the Ex version
- non-flammable water-hazardous substances.

## Principles of functioning

The vacuum pump installed in the leak detector creates a partial vacuum inside the surveillance space. By monitoring this partial vacuum, leaks in the walls of the piping are automatically detected.

In the event of a drop in the partial vacuum (a rise in pressure) due to a leak below the lower value of the monitoring level of partial vacuum, an optical and acoustic alarm is triggered.

Minimal, unavoidable permeability (not leaks) are regulated automatically by the leak detector without triggering the alarm if they lie between the upper and lower values of the monitoring partial vacuum. Evacuation to compensate is carried out by the vacuum pump in the leak detector.

In every case in which the alarm is triggered, the vacuum pump is automatically switched off. It can only be switched on again by throwing the toggle switch installed for this purpose on the outside of the leak detector.

## Technical basis

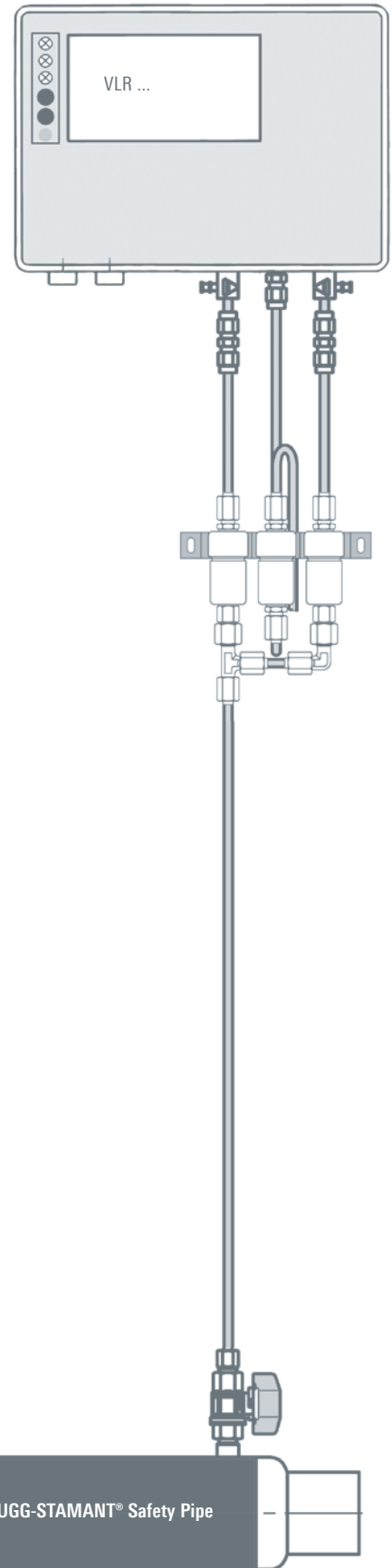
The scope of application of the leak detection device must be limited to fixed maximum pipe lengths due to the laws of physics. These depend on the high and low points of the BRUGG-STAMANT safety pipe used and the type of laying.

## Approval / suitability

All leak detection systems/ leak detectors used must comply with the stipulated construction and test principles. Subject to these, all conditions must therefore be taken into account which could influence the functioning or the operating safety of the system.

For this reason the conditions under which the devices can be used are tested by the official testing offices and clearly defined and laid down in the approval documents issued by them.

BRUGG-STAMANT® Safety Piping with leak detection is an approved leak detection system / leak detector



# Leak detection on the positive pressure principle

The leak detector on the positive pressure principle is suitable and approved for monitoring BRUGG-STAMANT® Safety Piping for the transport of:

- flammable water-hazardous substances
- non-flammable water-hazardous substances.

## Principles of functioning

The operating pressure necessary in the surveillance space of the BRUGG-STAMANT® Safety Piping is regulated by the actual pressure in the operating pipe (inner transport pipe) and is

- generated by topping up, regulated by pressure changes, from a stationary nitrogen pressure reservoir which is connected to the surveillance space
- operating mode Stationary**
- or from a mobile pressure reservoir which is only connected when the line is put into operation or during a function test
- operating mode Mobile**

The leak detectors can be set to operating mode S or M by means of a switch for the two operating modes installed on the outside of the leak detector.

The surveillance space is connected to the leak detector by means of the connecting cables. The positive pressure which is generated is measured by the pressure sensor. When there is a drop in pressure to the predetermined ALARM ON setting due to a leak, an optical and acoustic alarm is triggered.

In operating mode S, the monitoring pressure, after switching on, is regulated by pressure changes which are compensated by topping up from a stationary nitrogen pressure reservoir which is permanently connected to the surveillance space and fitted with a reducing regulator.

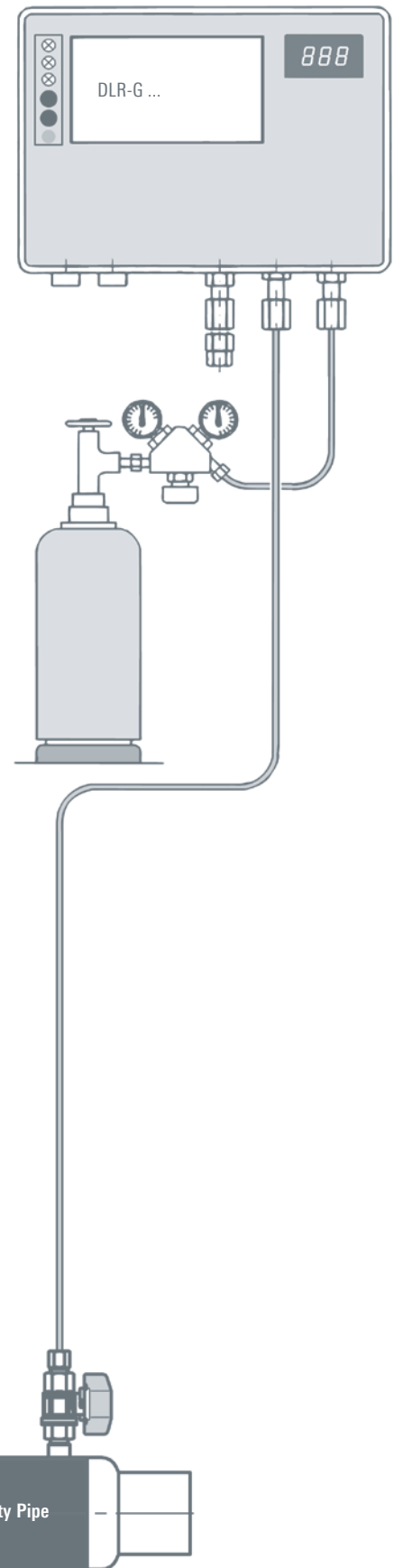
In operating mode M, the monitoring pressure (SET PRESSURE) is generated when the system is switched on just once at the outset by a pressure reservoir connected for the purpose. There is no further pressure-regulated topping up during subsequent operations. A drop in pressure to the predetermined ALARM ON setting due to a leak which triggers the alarm must therefore be compensated by connecting the pressure reservoir until the pressure again reached the SET PRESSURE.

## Approval / suitability

All leak detection systems/ leak detectors used must comply with the stipulated construction and test principles. Subject to these, all conditions must therefore be taken into account which could influence the functioning or the operating safety of the system.

For this reason the conditions under which the devices can be used are tested by the official testing offices and clearly defined and laid down in the approval documents issued by them.

BRUGG-STAMANT® Safety Piping with leak detection is an approved leak detection system / leak detector.

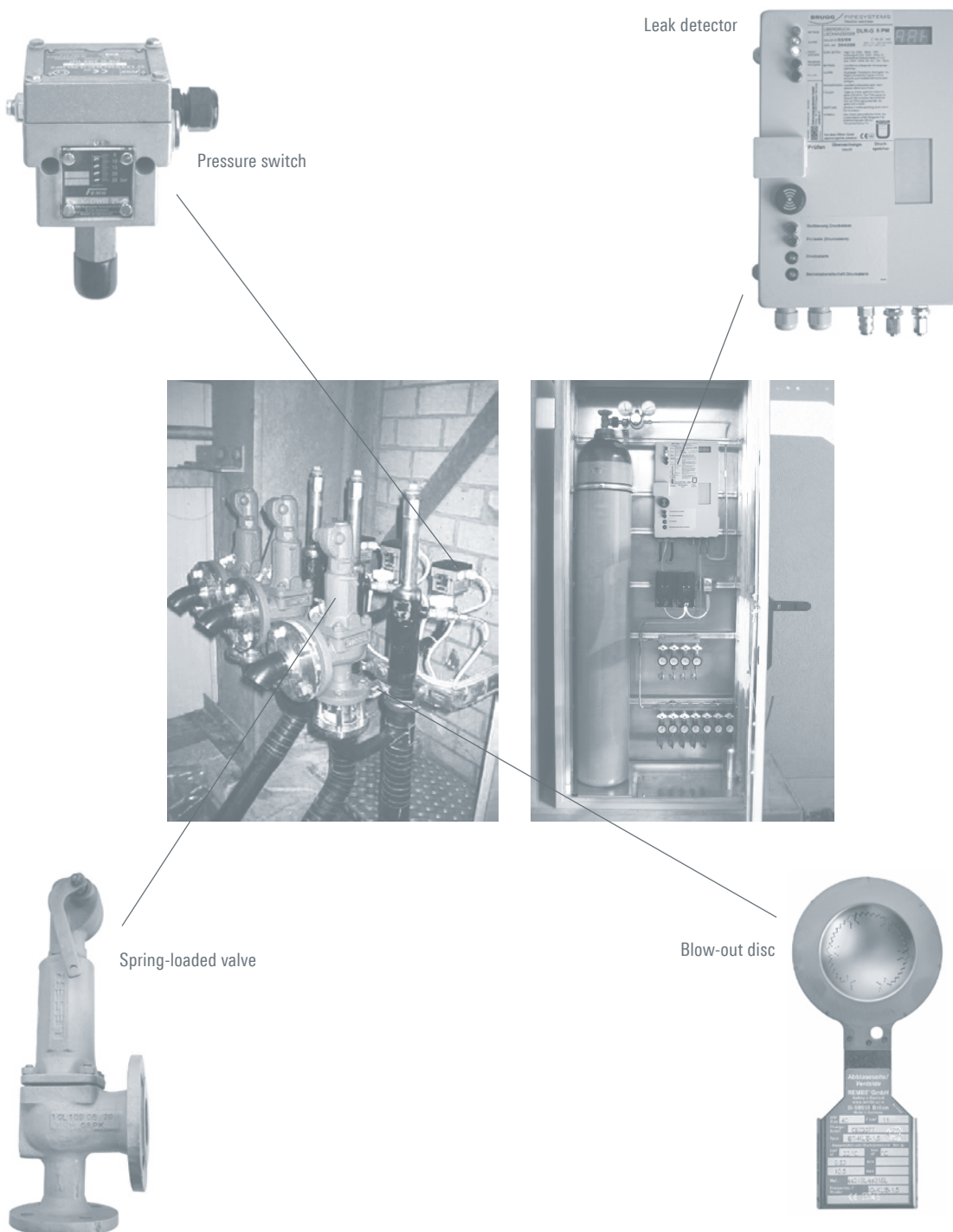


# Leak detection – special design high pressure

BRUGG-STAMANT® Safety Pipe is a product custom-made for every single project. Consequently also the associated leak detection systems are planned individually and in an economic way for any application.

By use of the vacuum leak detection system a working pressure up to 25 bars with and without explosion protection can be realized.

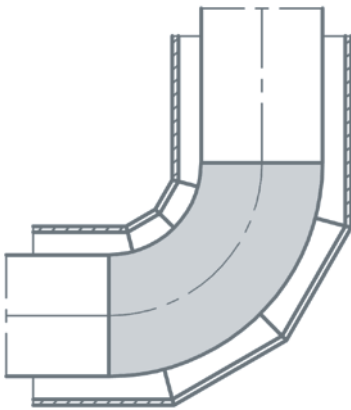
A positive pressure leak detection system enables pipe systems with feed pressure up to 300 bars to be monitored. These systems are equipped with high-pressure fittings and safety components (spring-loaded valves, blow-out discs, digital pressure switches etc.).



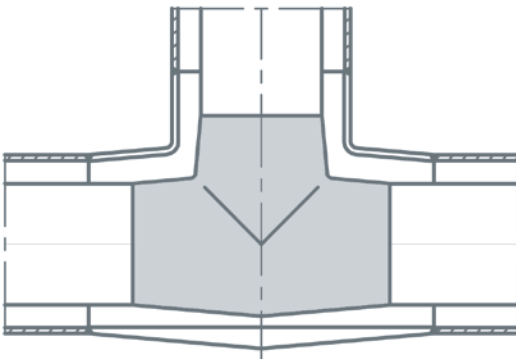
# Excerpt from components list for standard product range



Acc. to Worksheet SMR 4.610



Acc. to Worksheet SMR 4.603



Acc. to Worksheet SMR 4.604



Acc. to Worksheet SMR 4.602

## Spacers

Axial bearings	Acc. to Worksheet SMR 5.10.01
Guide rails	Acc. to Worksheet SMR 5.11.01
Base plate	Acc. to Worksheet SMR 5.12.01

## Double-walled elbow

Concentric curve	Acc. to Worksheet SMR 5.03.01
Outer pipe curve assembled from pipe segments	Acc. to Worksheet SMR 5.03.01

## Double-walled T-piece

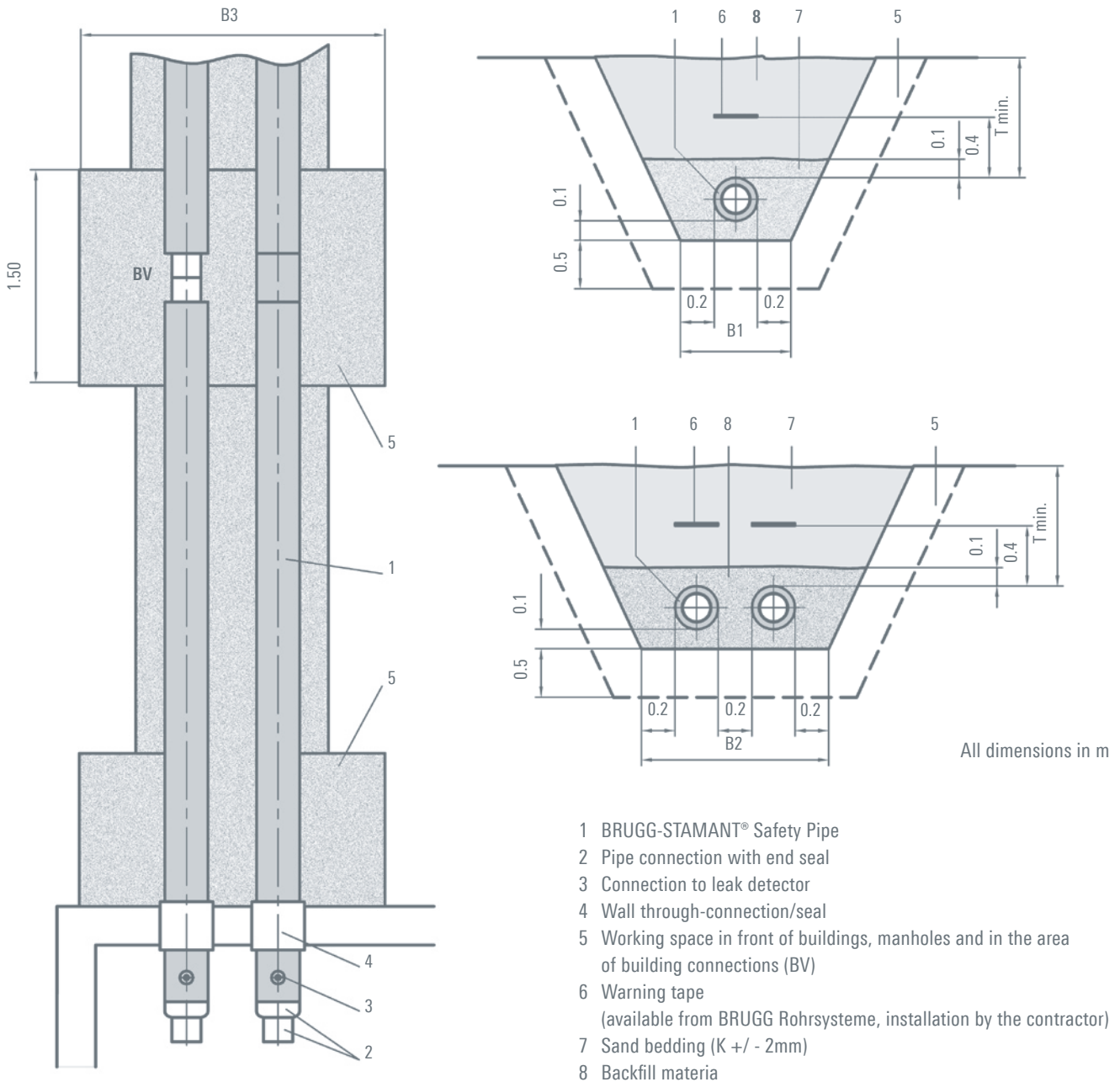
T-piece acc. to DIN 2615	Acc. to Worksheet SMR 5.04.01
T-piece with saddle connection	Acc. to Worksheet SMR 5.04.01
T-piece with Weldolet	Acc. to Worksheet SMR 5.04.01

## End seal

End seal	Acc. to Worksheet SMR 5.14.01
Axial compensator seal	Acc. to Worksheet SMR 5.14.01
Lentiform compensator seal	Acc. to Worksheet SMR 5.14.01

# Details for underground works

Trench cross-section



The trench width «B» is a recommended value.

Please observe all valid technical regulations, guidelines and accident prevention rules.

BRUGG-STAMANT® Safety Pipe	(outer pipe)	DN 65	DN 80	DN 100	DN 150	DN 200	DN 300	DN 400	DN 500	DN 600
min. outer diameter	d (mm)	77.9	90.7	116.3	170.3	221.1	326.1	408.6	510.5	612.1
min. cover t at SLW 60	(m)	min. 0.90								
min. cover t at SLW 30	(m)	min. 0.75								
trench width	B1 (m)	0.48	0.49	0.52	0.57	0.62	0.73	0.81	0.91	1.02
trench width	B2 (m)	0.76	0.78	0.84	0.94	1.04	1.25	1.42	1.62	1.83
front trench width	B3 (m)	1.56	1.58	1.64	1.74	1.84	2.05	2.22	2.42	2.63

# Pipe systems for the future

District heating – Industry – Petrol stations – System packages



## Your partner for pipe systems

We are the people you should talk to when you need to find efficient solutions for transporting liquid materials. With our project engineers, development department, in-house production unit, and our professional team of fitters, we have the know-how and the resources to look after your projects competently and reliably in the sectors of heating systems, petrol station construction, industrial plant construction, and system packages.

## International network

Our global partnership network can be reached on site at any time. More than 34 partners in 20 different countries will look after you wherever you are.

## Customer-specific solutions

Brugg is the full service provider in the field of single-wall, double-wall and insulated pipe systems. This know-how allows us to manufacture project-specific customised items.

## Give us a call!

Our engineers would be pleased to advise you and find a made-to-measure solution.

### Brugg Rohrsystem AG

Industriestrasse 39  
CH-5314 Kleindöttingen  
phone +41 (0)56 268 78 78  
fax +41 (0)56 268 78 79  
pipesystems@brugg.com  
www.pipesystems.com

### BRUGG Rohrsysteme GmbH

Adolf-Oesterheld-Straße 31  
D-31515 Wunstorf  
phone +49 (0)50 31 170-0  
fax +49 (0)50 31 170-170  
info@brugg.de  
www.brugg.de

A company of the BRUGG Group