

# SECON<sup>®</sup>-X

Pipe systems for petrol stations

Technical details



UK Distributor

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**BRUGG** PIPESYSTEMS  
Flexible solutions

# Contents

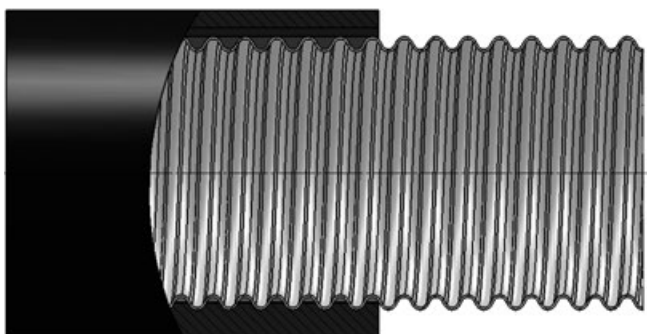
<b>SEC 1.0</b>	<b>Contents</b>
<b>SEC 1.10</b>	<b>System description</b>
SEC 1.100	System description SECON®-X
<b>SEC 1.11</b>	<b>Product overview</b>
SEC 1.11.01	Piping, Connections, Fittings
<b>SEC 1.20</b>	<b>Pipe</b>
SEC 1.20.01	Product construction – dimensions, bending radii, weights, volumes
<b>SEC 5.0</b>	<b>Connections</b>
SEC 5.01.15	Connection fitting with profile and O ring seal, screwed
SEC 5.01.16	Connection fitting with loose flange or split loose flange and monitoring sleeve
SEC 5.01.19	Connection fitting modular system with R thread and monitoring sleeve
SEC 5.01.20	Monitoring sleeve with connection to a leak detector
	<b>Fittings</b>
SEC 5.02.04	Through-connection double-walled GRAPA compression/screwed
SEC 5.04.01	T-piece double-walled, double-walled reduced
SEC 5.04.11	T-piece completely assembled
SEC 5.05.01	Manhole and pipe sleeve entry
<b>SEC 5.52</b>	<b>Fluid mechanics</b>
SEC 5.52.01	Pressure loss diagram for petrol normal and high-octane (Normal and Super)
SEC 5.52.02	Pressure loss diagram for heating oil (EL) and diesel fuel
<b>SEC 5.55</b>	<b>Tips for laying</b>
SEC 5.55.01	for positive pressure-/suction pipes SECON®-X

# System description

SECON®-X is a flexible, double-walled and bendable composite piping system with an inner pipe made of stainless steel and an encasing mantle pipe made of PE separated by struts. This pipe system was specially developed as a fuel carrier pipe for petrol stations.

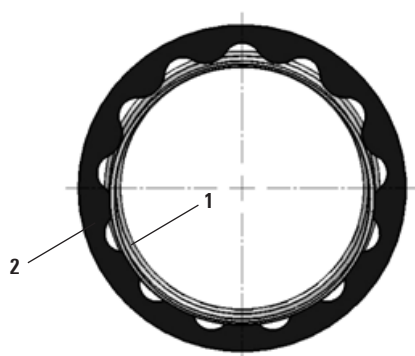
SECON®-X is:

- flexible, double-walled
- diffusion resistant and corrosion-proof
- fast and easy to lay



## Construction of the pipe

The flexible composite piping has a corrugated inner pipe made of stainless steel, Material No. 1.4404 (equivalent to US Standard AISI TP 316 L). It is encased by a PE mantle separated by struts which are offset with the corrugations of the inner pipe. The geometry of the helically corrugated inner pipe creates an annular, unobstructed canal in the gap between the pipes which prevents the prohibited spillage of the medium in the event of a leak and thus of contamination. In addition, this monitoring space can be used for a pressure test or for leak monitoring. SECON®-X is also suitable for fuels of the next generation with a high admixture of methanol and other additives. Since SECON®-X is made of corrosion-proof material, no additional cathodic corrosion-proofing is necessary.



- 1 Corrugated inner pipe made of stainless steel
- 2 PE mantle separated by struts

## Applications

- supply lines as positive pressure pipe
- supply lines as suction pipe
- fill pipes
- ventilation, vapour recovery and vapour displacement pipes

## Sizes and pressure ratings

SECON®-X is available in the nominal bores DN 25, DN 40, DN 50 and DN 100. The maximum permissible operating pressure is 10 bar. As a suction pipe, any vacuum desired can be used.

## Connection methods

Installation of the connection fittings at the ends of the SECON®-X piping is carried out on site. It is non-welded, so there is no open flame. Using simple tools, the appropriate connecting piece is pressed onto the end of the corrugated pipe. You can choose between a collar connection with a loose flange, a threaded screw connection or a welded connection. An elastomer sleeve with a test branch for monitoring the annular gap between the pipes with a simple leak detector can be delivered on request.

## Accessory equipment

The following accessory equipment is available:

- manhole ducts
- T-pieces
- through-connections
- leak detectors

## Laying the pipe

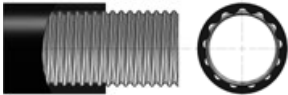


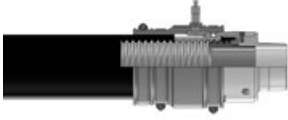


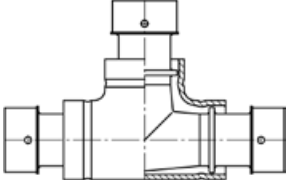
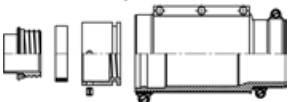
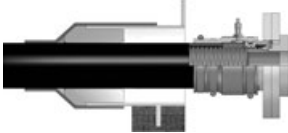
SECON®-X pipes are manufactured in series production in lengths of 500 m up to over 1000 m in one piece. The lengths required for individual projects are delivered coiled on drums or in rings. They can be directly pulled into the pipe trench and laid. They can be directly cut to length on site and where needed, laid through narrow bending radii. This enables very simple and fast laying.

## Type tests, Approvals

Approval acc. to IP Specification and European Standard EN 14125 "Piping for Petrol Stations laid in the ground" as well as ERA Technology and KIWA has been obtained.

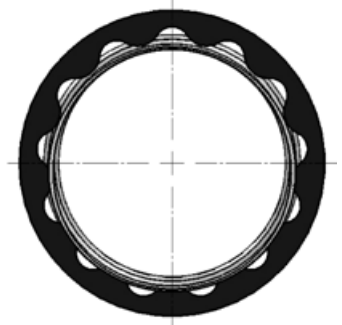
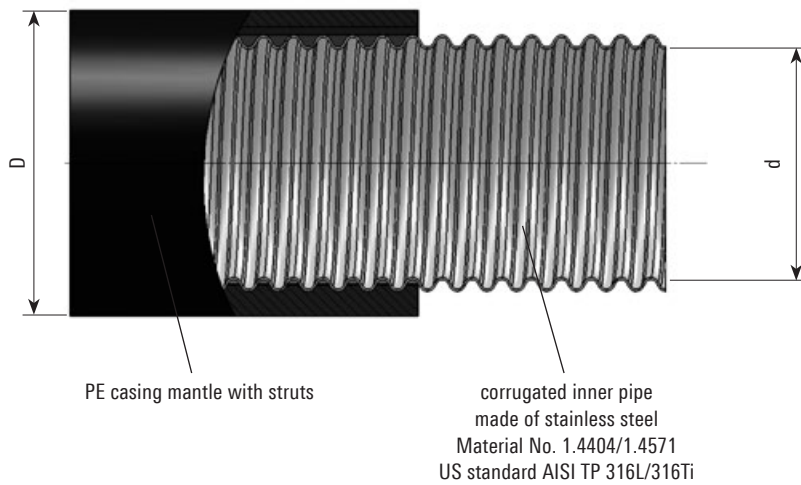
# Product overview

## Piping/Connections/Fittings

Version	Type SEC	Nominal bore/ Joint	Pressure PN	Joint Types of connection inner/outer	Material No.	Worksheet
Pipe 	30/ 44	25		corrugated inner pipe PE-LD outer casing with Internal struts	1.4404	SEC 1.20.01
	48/ 63	40				
	60/ 75	50				
	98/120	100				
Connection fitting with O ring seal 	30/ 44	25	10	internal/external thread	steel galvanized 1.4404/ 1.4301	SEC 5.01.15
	48/ 63	40				
	60/ 75	50				
	98/120	100				
Connection fitting with split loose flange 	48/ 63	40	10	internal/external thread with split loose flange acc. to DIN EN 1092-1	steel galvanized 1.4404/ 1.4301	SEC 5.01.16
	60/ 75	50				
	98/120	100				
Connection fitting GRAPA 	48/ 63*	R 1 1/2"	10	with R thread	steel or *1.4404/ 1.4301	SEC 5.01.19
	60/ 75	R 1 1/2"				
	60/ 75*	R 2"				
	98/120*	R 3"				
	98/120	R 4"				
Monitoring sleeve 	48/ 63	40		with valve for connection to leak detector or test valve	ECO 51P 6030	SEC 5.01.18
	60/ 75	50				
	98/120	100				
Through-connection 	30/ 44	25			1.4404/ 1.4571/ 1.4301/ ECO 51P 6030	SEC 5.02.04
	48/ 63	40				
	60/ 75	50				
	98/120	100				
T-piece double-walled 	48/ 63	40-40- 40		with connectors GRAPA-S	1.4404/ PA 12	SEC 5.04.01
	60/ 75	50-50- 50				
		50-40- 50				
		50-40- 40				
		100-50- 50				
		100-50-100				
Connection pieces GRAPA with monitoring sleeve 	48/ 63	40		connector to T-piece with monitoring	steel galvanized/ St 52.3/  1.4571/ ECO 51P 6030	SEC 5.04.01
	60/ 75	50				
		100				
Connector for T-piece on request Manhole entry 	30/ 44	88.9 x 3.2 mm		pipe sleeve (contractor)		SEC 5.05.01
48/ 63	114.3 x 3.6 mm					
60/ 75	114.3 x 3.6 mm					
98/120	168.3 x 4.5 mm					

# Product construction

Dimensions, bending radii, weights, volumes



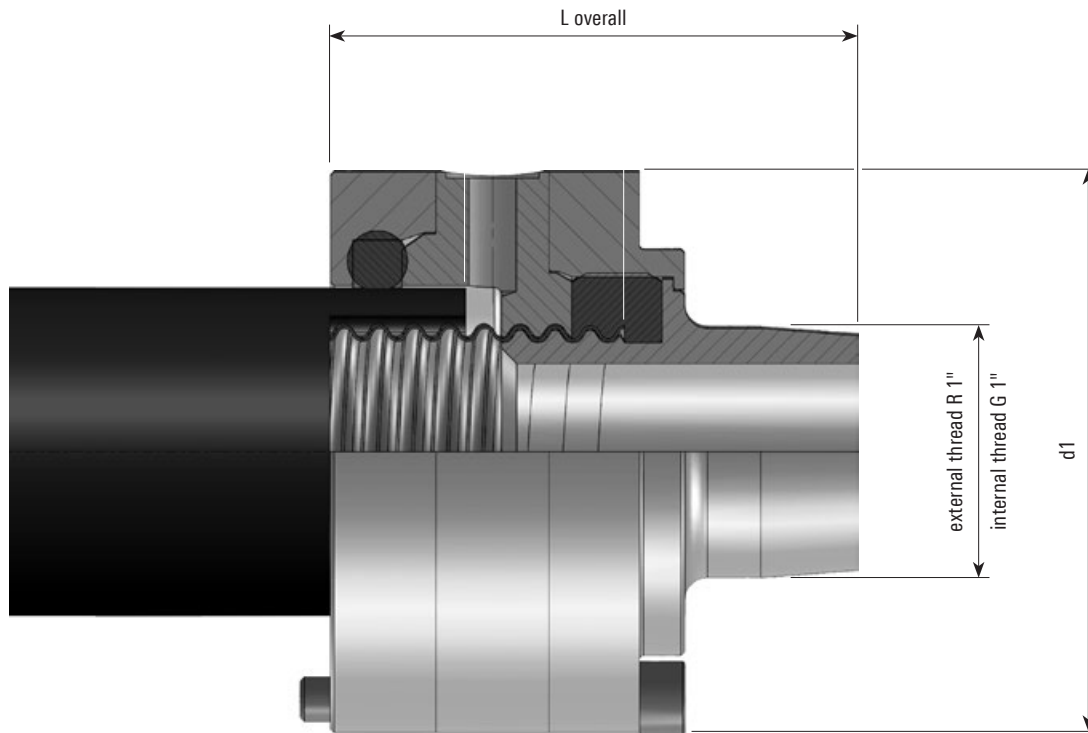
This table contains all geometrical data.

Type	DN	Dimensions		Bending- radius*	Weight kg/m	Volume dm <sup>3</sup> /m or l/m	Article No.
		d mm	D mm				
SEC 25	25	30	44	30	0.87	0.8	1014275
SEC 40	40	48	65	36	1.70	2.0	1014276
SEC 50	50	60	77	40	2.10	3.0	1014277
SEC 100	100	98	124	80	4.50	8.4	1014278

\* Only bend the pipe using a bending jig or bending machine.

# Connection fitting

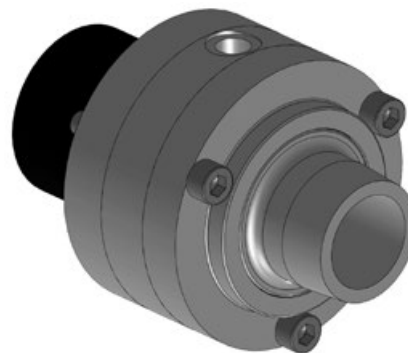
with profile and O ring seal, screwed



**Material:**

- Connector with external thread R 1" Material No. 1.4404
- Connector with internal thread G 1" Material No. 1.4404
- Inner pipe seal corrugated pipe seal made of ECO
- Outer pipe seal O ring made of ECO\*
- All other components Material No. 1.4301

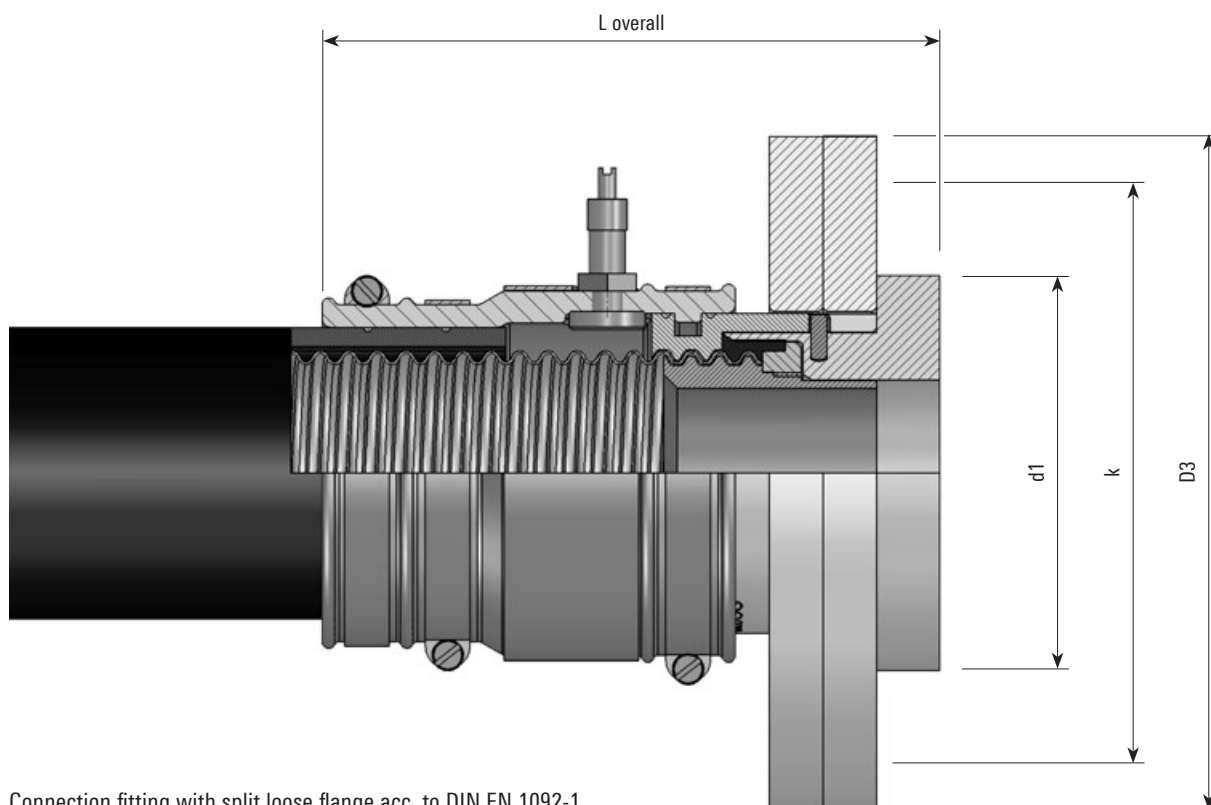
\* on request NBR



Type	DN	Version	Joint	d1 mm	L ges. mm	Article No.
SEC 25	25	external thread	R 1"	74.5	82.8	1014285
SEC 25	25	internal thread	G 1"	74.5	73.4	1014284
SEC 40	40	external thread	R 1 1/2"	105.0	83.1	1014294
SEC 50	50	external thread	R 2"	115.0	88.9	1014309
SEC 100	100	external thread	R 3"	158.0	146.4	1014317

# Connection fitting

with loose flange or split loose flange and monitoring sleeve\*



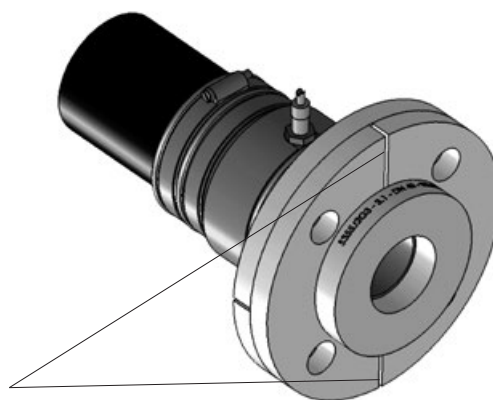
Connection fitting with split loose flange acc. to DIN EN 1092-1 and monitoring sleeve (see Worksheet SEC 5.01.18)

**Material:**

- Connector with collar      Material No. St 52-3 or 1.4404
- Pressure ring                Material No. St 52-3 or 1.4301
- Support collar                Material No. 1.4404
- Split loose flange            P265GH/P250GH, galvanized
- Inner pipe seal                graphite ring

**Tip for installing the split loose flange:**

Stagger the separation of the loose flanges 90° against each other.

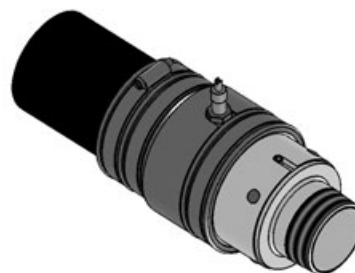
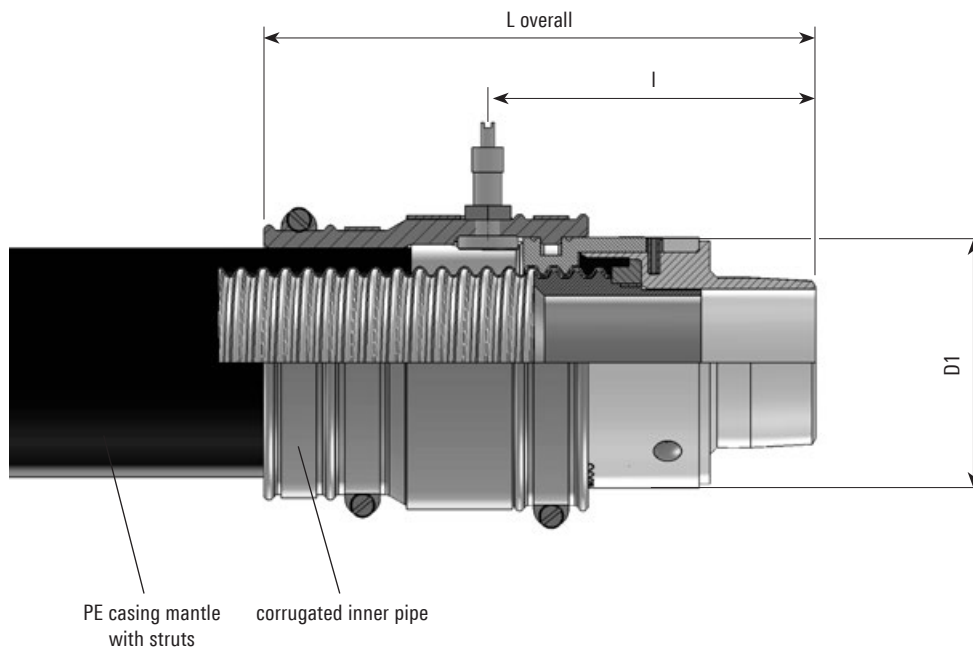


Type	DN	D3	d1	k	L ges.	Number of bores	Article No. split loose flange St 52-3	Article No. Connection fitting 1.4404/1.4301
		mm	mm	mm	mm			
SEC 40	40	150	88	110	137.5	4	1014291	1014320
SEC 50	50	165	102	125	141.5	4	1014302	1014324
SEC 100	100	220	158	180	189.3	8	1014313	1014329

\* Monitoring sleeve see Worksheet SEC 5.01.20.

# Connection fitting

Modular system with R thread and monitoring sleeve\*



**Material:**

Connector with external thread  
 Pressure ring  
 Support collar  
 Inner pipe seal

Material No. St 52-3 or 1.4404  
 Material No. St 52-3 or 1.4301  
 Material No. 1.4404  
 graphite ring

**Material: steel laminated (St 52.3/1.4404)**

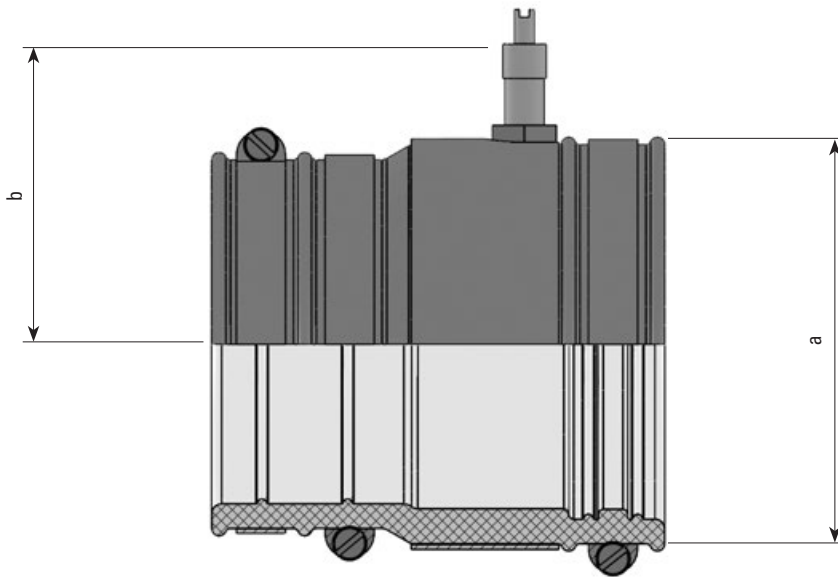
Type	DN	Thread R	L overall mm	l mm	D1 mm	Article No. St 52-3	Article No. 1.4404/1.4301
SEC 40	40	1 ½"	103	83	71.2	1014290	1014319
SEC 50	50	2"	106	89	84.7	1014301	1014323
SEC 50	40	1 ½"	103	83	84.7	1014305	1014327
SEC 100	100	3"	172	122	136.0	1014303	on request
SEC 100	100	4"	172	122	136.0	1014331	on request

\* Monitoring sleeve see Worksheet SEC 5.01.20.



# Monitoring sleeve

with connection to a leak detector



**Material:**

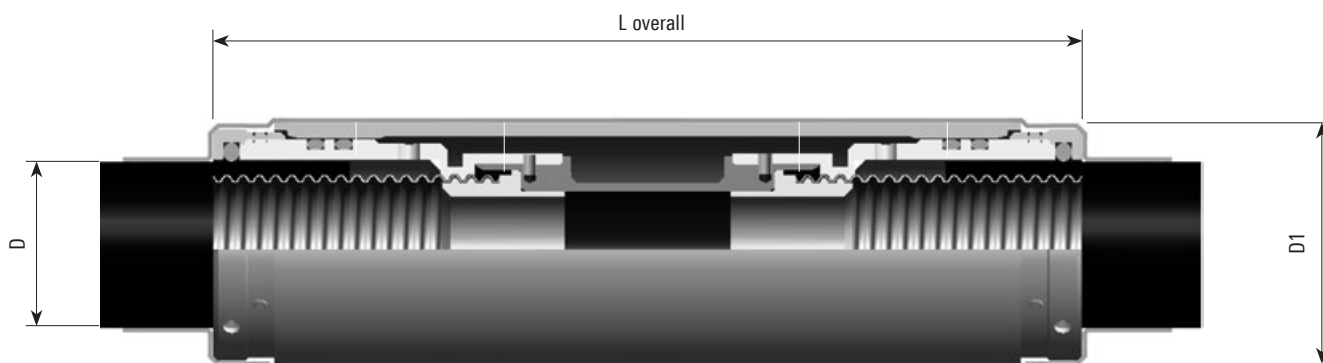
Monitoring sleeve

ECO 51P 6030

Type	DN	a mm	b mm	Article No. packaged unit
SEC 40	40	90	55	1017607
SEC 50	50	97	75	1017608
SEC 100	100	150	90	1017602

# Through-connection double-walled GRAPA

Compression/screwed



**Material:**

Fuel-carrying components

Material No. 1.4404/1.4571

Other components

Material No. 1.4301

Inner pipe seals

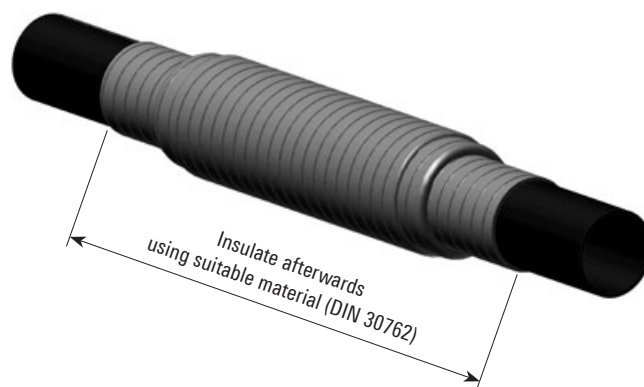
graphite

Outer pipe seals

O-ring made of ECO\*

\* on request NBR

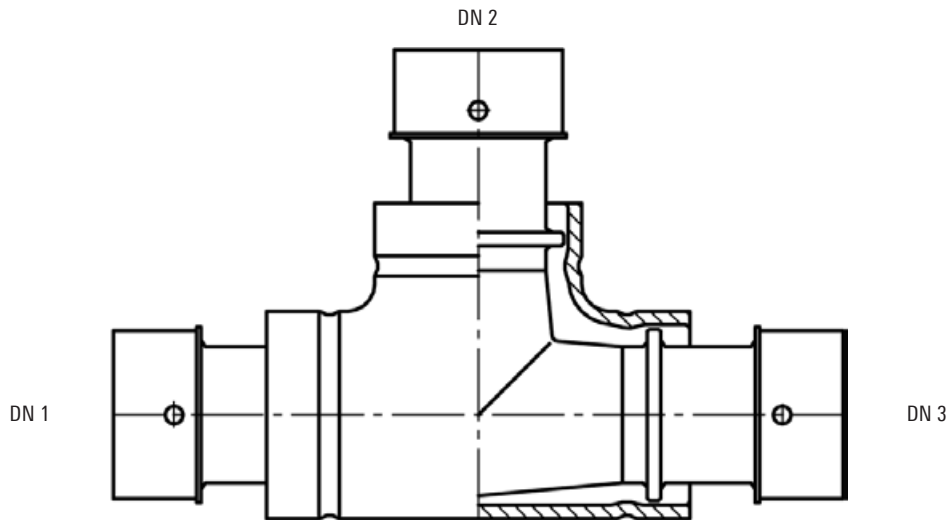
This fitting is non-detachable after installation.



Type	DN	D mm	D1 mm	L overall mm	Article No.
SEC 25	25	44	76.1	298.6	1014337
SEC 40	40	65	95.0	339	1014338
SEC 50	50	77	114.3	357	1014339
SEC 100	100	124	157.0	404	1014340

# T-piece

double-walled, double-walled reduced

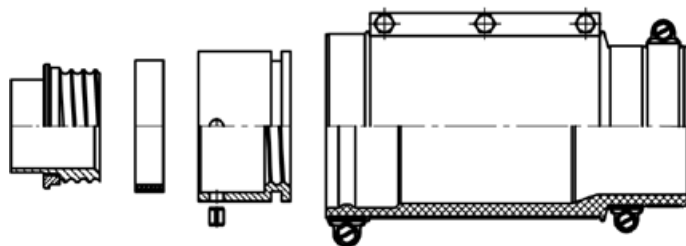


**Material:**

Fuel-carrying components      Material No. 1.4404/1.4571  
 Other components                PA / ECO 51P 6030 / St 52.3 / 1.4404

Type	Article No.
<b>DN 1 - DN 2 - DN 3</b>	
SEC 40 - 40 - 40	on request
SEC 50 - 50 - 50	1017666
SEC 50 - 40 - 50	1017668
SEC 50 - 40 - 40	on request
SEC 100 - 50 - 50	on request
SEC 100 - 50 - 100	1017676

**Connection fittings GRAPA incl. sleeve**

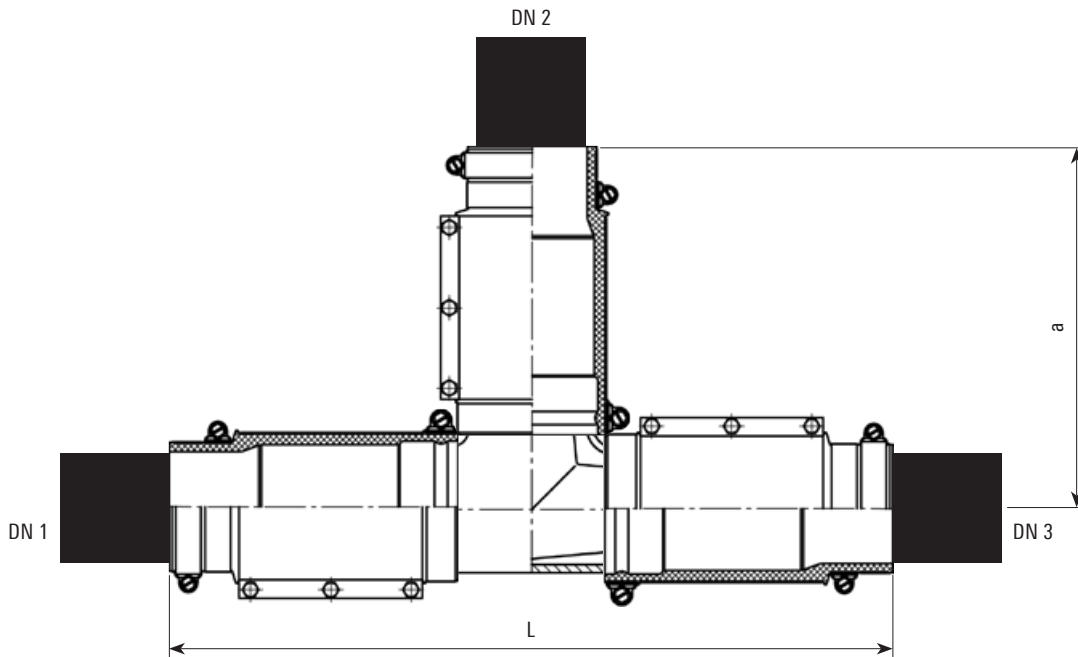


**Material:**

Fuel-carrying components      Material No. 1.4404  
 Further components            Material No. 1.4301  
 Inner pipe seals                graphite sealing rings  
 Outer pipe seals                ECO 51P 6030 / St 52.3 / 1.4404

Type	Article No.
SEC 40	1014345
SEC 50	1014346
SEC 100	1014347

# T-piece completely assembled



Type	L	a
DN 1 - DN 2 - DN 3	mm	mm
SEC 40 - 40 - 40	620	310
SEC 50 - 50 - 50	540	270
SEC 50 - 40 - 50	540	310
SEC 50 - 40 - 40	500	310

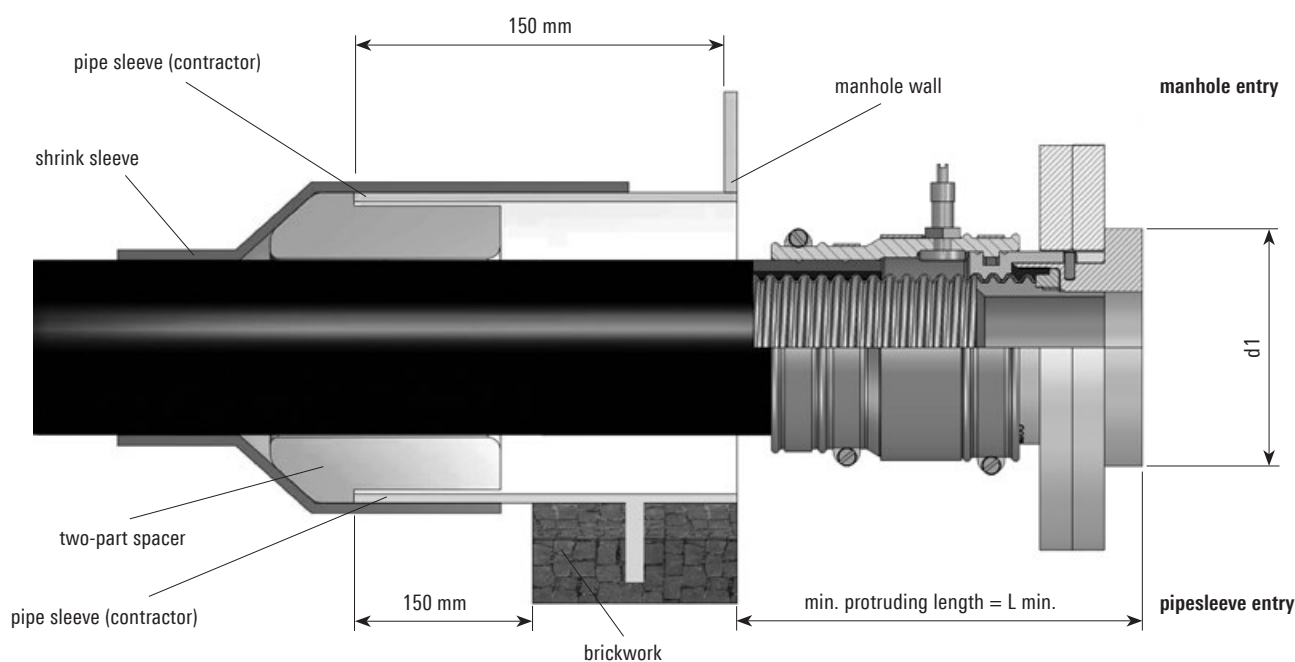
**Note:**

For a complete T-piece a T-piece basic unit together with three connection fittings are needed as per the description in Worksheet SEC 5.04.01.

# Manhole and pipe sleeve entry

## General information

Die SECON®-X Manhole entry Type SSE is designed for use with standard-sized pipe sleeves. The pipe sleeves must be provided by the building contractor.



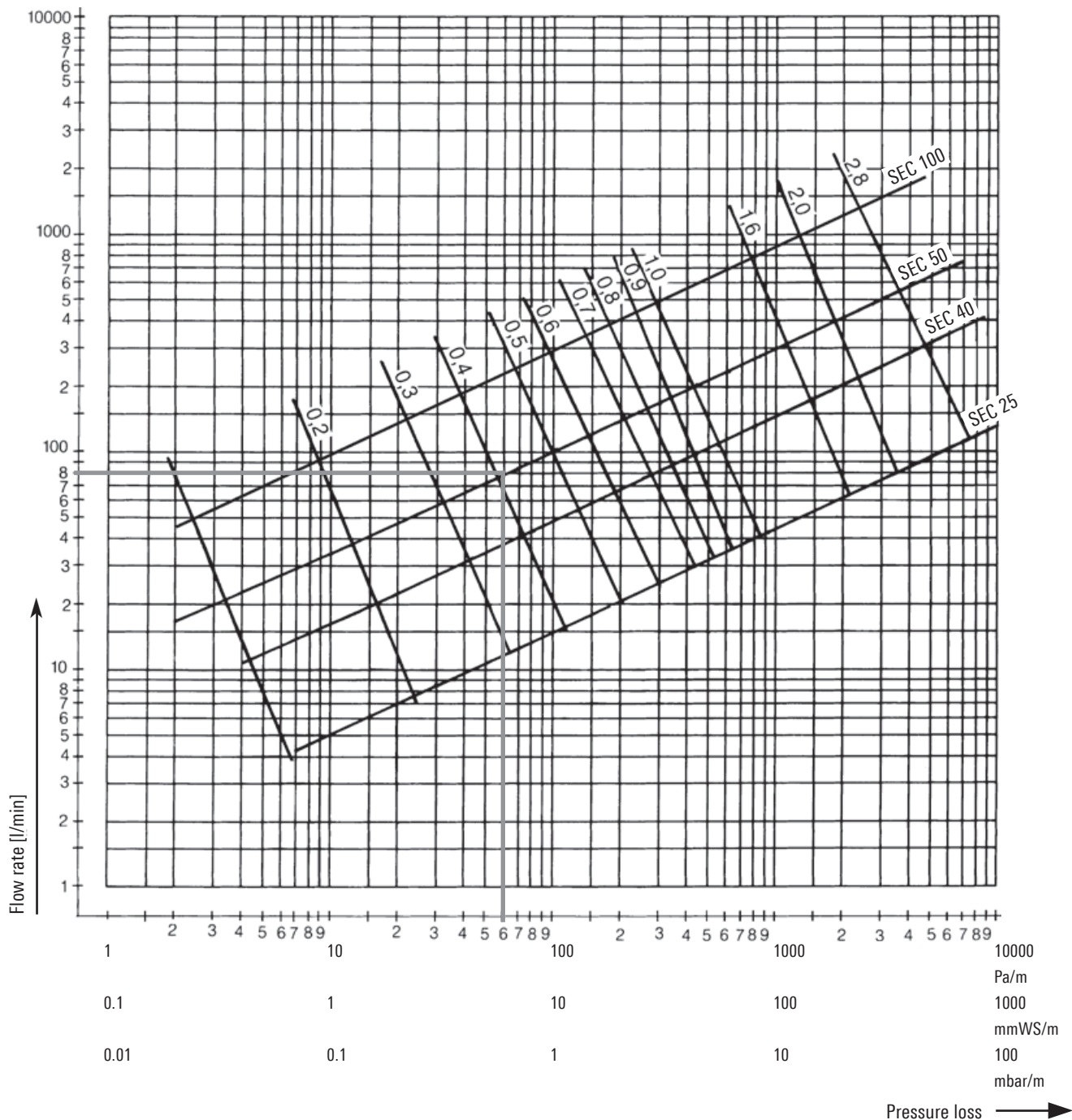
Type SSE	pipe sleeve(contractor) mm	d1 mm	L min. mm	Article No.
SEC 40	114.3 x 3.6	88	200	1014345
SEC 50	114.3 x 3.6	102	200	1014346
SEC 100	168.3 x 4.5	158	250	1014347

Material delivered by BRUGG: two-part spacer and shrink sleeve

# Fluid mechanics

Pressure loss diagram for normal and high-octane petrol

Temperature: 15 °C  
 Specific density: 735 kg/m<sup>3</sup>  
 Kinematic viscosity: 5.5 · 10<sup>-7</sup> m<sup>2</sup>/s



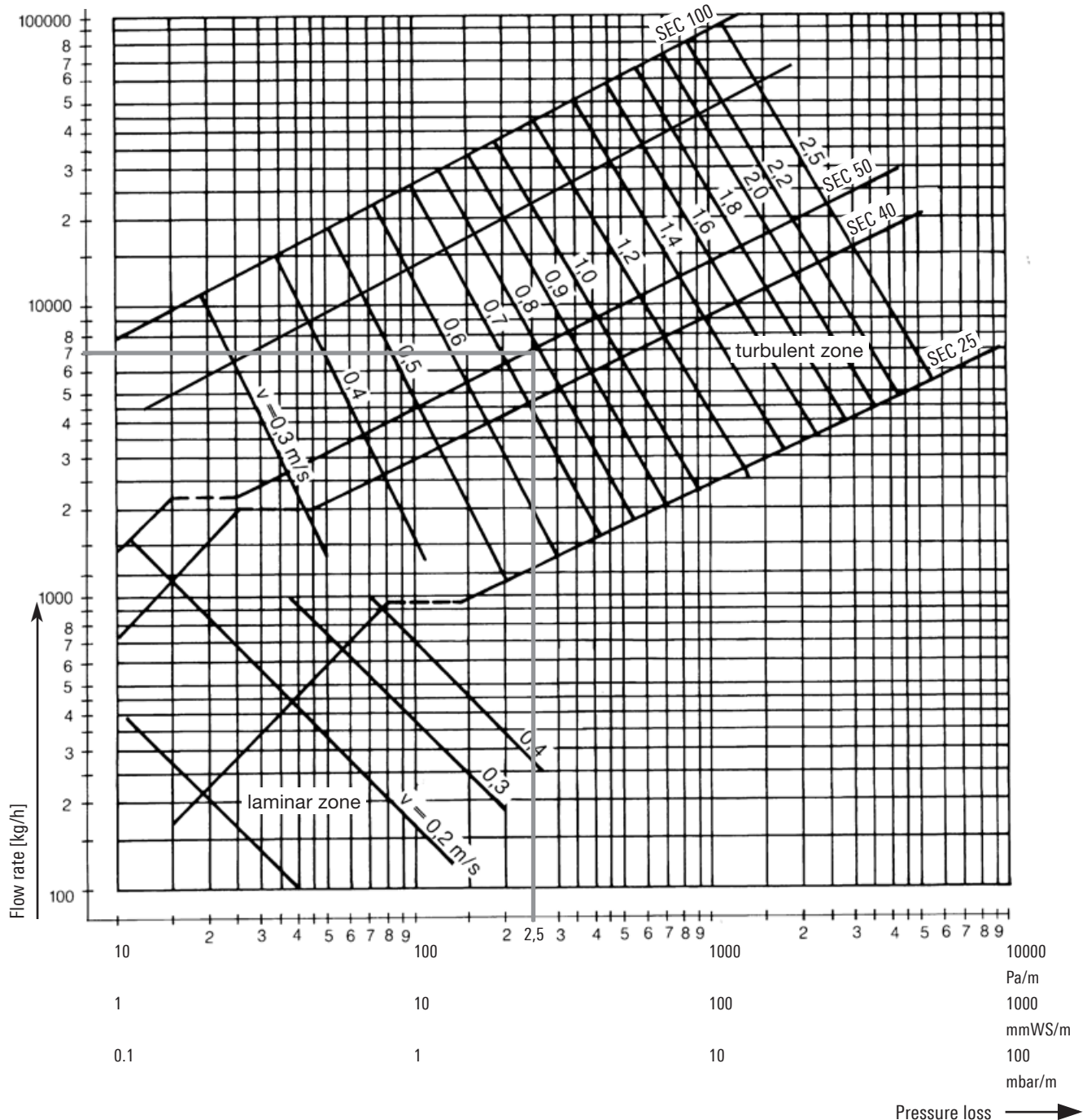
**Example:**

Pipe DN 50  
 Pressure loss with a flow rate of 80 l/min  
 at a speed of c. 0.4 m/s is 0.6 mbar/m

# Fluid mechanics

Pressure loss diagram for heating oil (EL) and diesel fuel

Temperature: 15 °C  
 Specific density: 860 kg/m<sup>3</sup>  
 Kinematic viscosity: 7 · 10<sup>-6</sup> m<sup>2</sup>/s



**Example:**

Pipe DN 50  
 Pressure loss at a mass throughput 7000 kg/h  
 at a speed of c. 0.8 m/s is 2.5 mbar/m

# Tips for laying

for positive pressure/suction pipes SECON®-X

## Thorough preparations

The following preparations should be completed before laying commences:

- Install fuel dispenser lift hole with installation mounting to fix and restrain the piping
- Install the switching duct with mounting for the piping to be led into it
- Install the remote feed tank with fill nozzle and counter flange for installing the remote fill pipe
- Prepare the dome cover with counter flange for the piping (aligned according to the pipework drawings)
- Prepare the steel manhole with the correct pipe sleeve dimensions for leading in the piping

## Preparing and levelling the soil

The SECON®-X Pipe systems for petrol stations must be laid on a layer of sand bedding at least 10 cm thick. The depth of the trench bottom can be calculated by adding the height of the sand bedding to the laying depth of the suction piping. Use sand with a grain size of < 2 mm and level the sand bedding afterwards. Finally tamp down the sand to compact it.

The careful preparation of the trench bottom is essential for the fast and efficient laying of the piping.

## Laying the suction pipes

The SECON®-X pipe system for petrol stations is a bendable pipe system, in contrast to conventional piping. It is manufactured in one piece and wound on cable drums. The piping is laid direct from the drum into the trench on site and cut to the length needed.

Important points which must under all circumstances be observed when laying the sand bed:

- In order to guarantee the safe functioning of the pipe on the inherently safe suction principle, the piping must have a continuous downward gradient to the tank.
- When choosing the downward gradient, take care to consider any crossing pipes on your routing. The minimum gradient must be maintained under all circumstances along the entire line.
- You must make up the sand bedding in such a way that the suction piping lies directly on it all the way along when it laid later. This will prevent the pipe from sagging and forming bulges. Under no circumstances is it permissible to let the piping lie on the bedding only at certain points.
- The laying of the sand bedding must be completed before pulling in of the piping commences.

## Laying the feed pipes

Unlike conventional piping, the leak-monitorable feed pipes are a bendable pipe system. They are manufactured in one continuous piece and wound on cable drums. The pipes are laid direct into the trench off the drum on site and cut to whatever length is needed. Due to its flexibility the pipe can be laid in one piece over great lengths.

Manual installation of pipe connections on site is only necessary at the ends of the pipe lines.

## Expansion takeup

Longitudinal expansion due to temperature rise is taken up in positive pressure piping by the geometrical variation of the corrugated pipe, rather like a compensator. No action therefore needs to be taken to compensate expansion. Expansion bends as in conventional piping are not needed.

## Anchor points

Anchor points are not needed when piping is laid in the ground. That means that routing can be freely chosen in this respect so that no extra work is needed.

Volume increase in fluid transport media due to temperature rise and resulting higher pressures can only be elastically compensated to a limited extent when piping is laid above ground.

## Safety equipment

Positive pressure pipes must comply with TRbF 40/50. Additional approvals are in preparation here.



# Double-walled pipe system in a water protection area

SECON®-X Petrol station piping for the newbuilding of a motorway service area in Bremerhaven-Wulsdorf



Henry Reepschläger,  
TIN GmbH, Weyhe

„The endless, flexible SECON®-X pipe system from BRUGG can be laid easily and incredibly fast. We laid the piping for this motorway service area in a water reserve with more than five hundred metres of SECON®-X in almost no time at all – and complied with all the quality requirements.“



Laying the filling pipes directly off the drum

Following the decision of the investor, work began on erecting a new motorway service area next to the Autobahn A 27 at the exit Bremerhaven-Wulsdorf. The planning for this project was done in close cooperation with Shell Deutschland Oil GmbH. They set the quality standards for the realization of the plant.

The new building is in a designated water protection reserve, so that it was compulsory to use double-walled and leak-monitored piping for carrying the fuel. The Office of Environmental Protection in the port of Bremerhaven was particularly concerned that double-walled petrol station piping should be used on the premises of the service area. BRUGG cooperated with the professional planners and the architects' office to draw up a project design for a double-walled piping network. All the requirements according to water Law and Environmental Protection Law needed to be complied with in this.

Thanks to SECON®-X's "General technical approval", all legal requirements for underground piping for the transport of environmentally hazardous substances were complied with one hundred percent. The system is double-walled and can be permanently monitored. Double-walled safety piping is compulsory not only for automotive fuels such as diesel and high-octane petrol, but also for the underground transport of carbamide in solution (AdBlue). Modern fuels such as E10 or biodiesel can be optimally transported in the chemically resistant stainless steel inner pipe too.



Bending the pipe

SECON®-X Petrol station piping for the newbuilding of a motorway service area in Bremerhaven-Wulsdorf

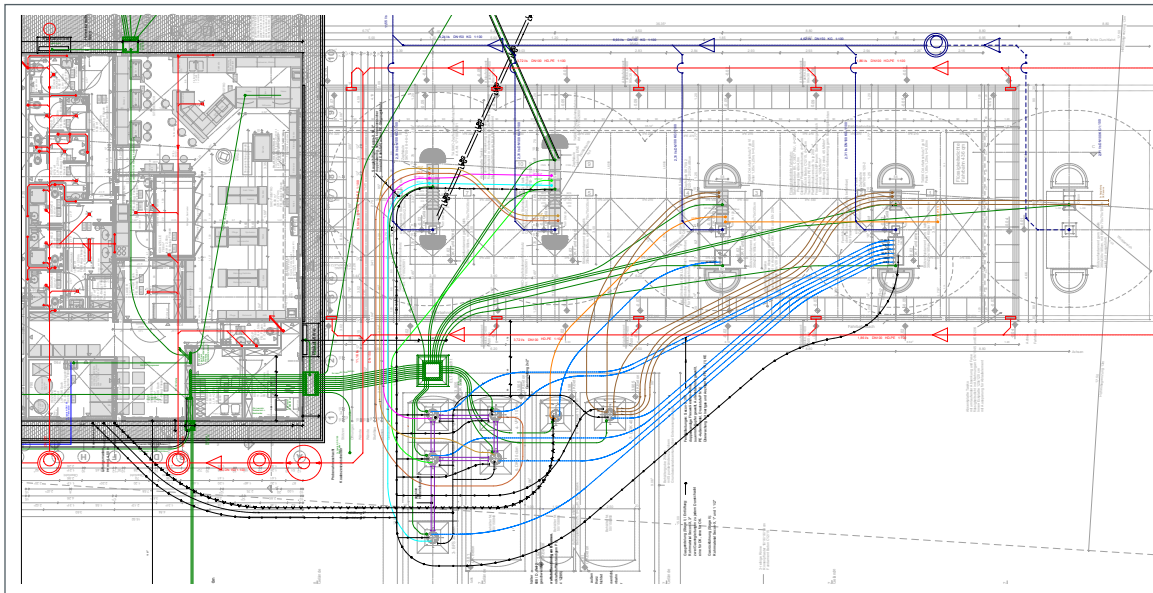
We score by the rapidly laying of SECON®-X. This convinced Inspectors of government on site.

It is possible In case of allowance of using the SECON®-X as single walled pipe system.

Optional – if necessary later – it’s the possibility to integrate the pipe system in leak detection. This will be a very interesting detail for Fill pipes, Suction pipes and as well for vapor recovering lines stage I and stage II.



Double walled SECON®-X Tee piece



Plan view  
Fuelling station  
SHELL  
motorway  
service area

To contact us and for further information, please fill in the following details and send them by fax to +49 (0)5031 15298.

- Please send me detailed information material
- I have a project I am currently working on and would like to speak to you personally

Sender

Company: \_\_\_\_\_

Contact person: \_\_\_\_\_

Telephone: \_\_\_\_\_

eMail: \_\_\_\_\_

Street/No.: \_\_\_\_\_

Postcode/Town: \_\_\_\_\_

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 www.brugg.de

Company stamp

# Notes

A large rectangular grid area for taking notes, consisting of 20 columns and 40 rows of small squares.

# 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 Rohrsysteme GmbH

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