



BIOGAS TECHNOLOGY

Biogas technology

The effective heating system
for biogas-fermenter

BIOFLEX by BRUGG:
fermenter heating with the corrugated
pipe of the NIROFLEX® family.

BRUGG
Pipes



Fermenter equipment with BIOFLEX corrugated piping

The helically corrugated **BIOFLEX** piping is the ideal solution through its simple and non-weld installation.

Other advantages:

- excellent corrosion resistance
- highly flexible and self-compensating
- far higher heat transfer than with conventional piping



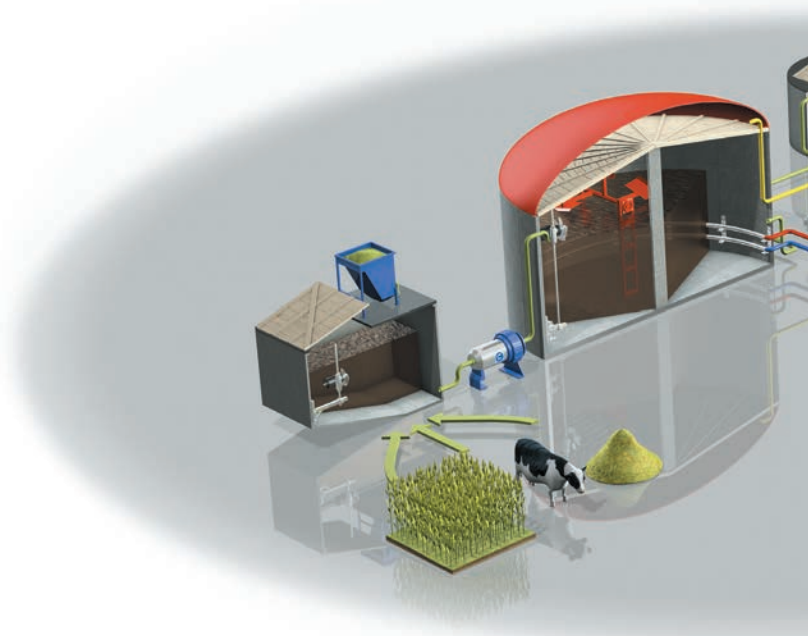
Non-weld installation in record time

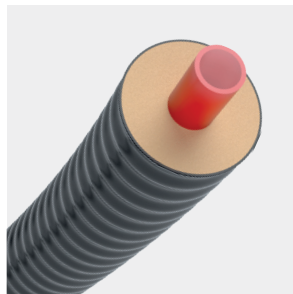
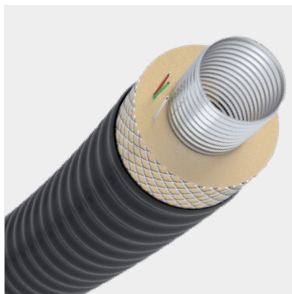
- fast and convenient laying
- simple pipe securing
- non-weld connectors including through-connection through the tank wall

For installation instructions and technical data: see worksheets Biogas technology BGT.

System components for the generation and use of regenerative energy

- 1 BIOFLEX stainless steel corrugated pipe
- 2 CALPEX heat-insulated pipe
- 3 PREMANT plastic-sheathed piping and CASAFLEX house connection pipe





Extensive district heating networks

PREMANT plastic-sheathed piping is specially designed as a mains pipe for large-scale district heating networks. The properties: high insulation coefficient and leak detection systems.

Dimensions: DN 20 - DN 1000

CASAFLEX was specially designed for high-temperature applications. Its flexible metallic stainless steel medium pipe allows it to transport media with a temperature of up to 160 °C.

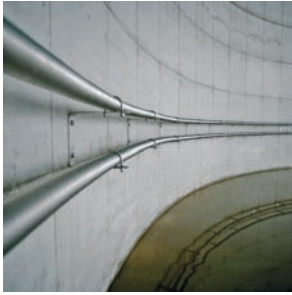
Dimensions: DN 20 - DN 50

CALPEX heat-insulated pipe

CALPEX can be laid direct into the trench with a minimum of work. Connections in the ground can largely be dispensed with. Due to its pre-insulation, the pipe has a high insulation coefficient. The advantage: energy loss is kept to a minimum. The desired length is delivered on site in one piece in a coil. Grouted or screwed connectors.

Dimensions: DN 20 – DN 150





Pipe laying - connector technology

System package

BRUGG fermenter heating

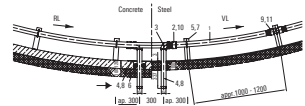
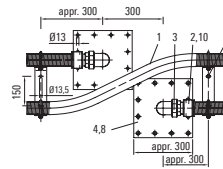
In order to ensure optimal heat transfer to the substratum, the BIOFLEX CNW 60/66 (DN 50) corrugated pipe is fixed to the wall of the fermentation tank in one or more heating coils.

In addition to the corrugated pipe CNW 60/66, the system package also includes the GRAPA connector system, the necessary wall through-connections including seals and the special brackets for securing the piping to the fermenter wall.

There are two different options for connecting the corrugated pipes to the hot water mains:

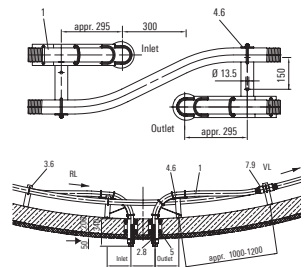
Internal connection technology

With internal connection technology, the corrugated pipe is connected to a rigid pipe using the flameless GRAPA graphite connector. This is then routed through a wall bushing through the fermenter wall to the outside.



Connection outside the fermenter

In this variant, in order to set up the connection with the corrugated pipe using the flameless GRAPA graphite connector system outside the fermenter, the corrugated pipe is bent through a small bending radius and led through a pipe sleeve which passes through the fermenter wall. This does away with the need for a joint in the fermenter.





The system package for heating fermentation tanks

System advantages

- surface up to 50 % higher maximum heat transfer through optimized wall thickness
- pipe profile with optimized thermal and hydrodynamic characteristics
- great flexibility; easily deformable, small bending radii
- can be laid in long lengths
- highly economical with corrosion-resistant materials
- prevention of calcification through turbulent water flow
- quality assurance through helium testing
- "endless manufacture"
- high mechanical load capacity

BIOFLEX corrugated piping

BIOFLEX is a single-walled corrugated piping system made of stainless steel. The key constructional element of these pipes manufactured at our works in long lengths is the helically corrugated pipe.

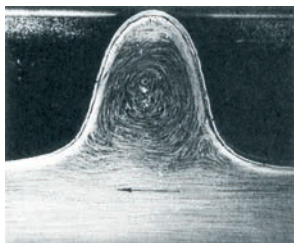
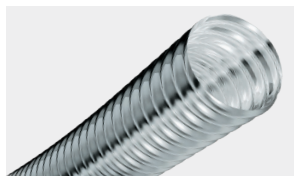
Connector technology

Optimized connections and fittings enable the pipes to be coupled to all standard connections. A flameless graphite packing technology (GRAPA) is used here. This easy-to-fit connector system enables time-savings on installation work without welding.

Maximum heat exchange without calcification

Vortices are formed in the helically corrugated pipe. These keep the water in a constant state of turbulence and exchange.

The core current is heterodyned by a swirl component formed by the pipe geometry, which creates additional vortices. On the one hand this generates maximum heat exchange while on the other it prevents calcification.

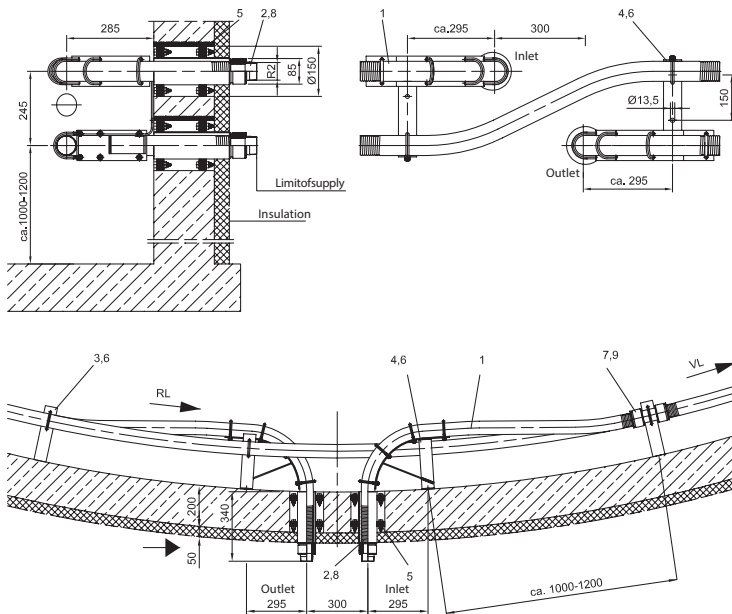


BIOFLEX Pipe system

Biogas Technology

Type CNW

End connector GRAPA-S incl. wall duct dia. 89 mm



- Please note: the support type B (outlet) has to be installed 70 mm higher.
- Gasket insert needs to be seated on the wall duct in full length.
- For installation of the end connector see installation instruction.

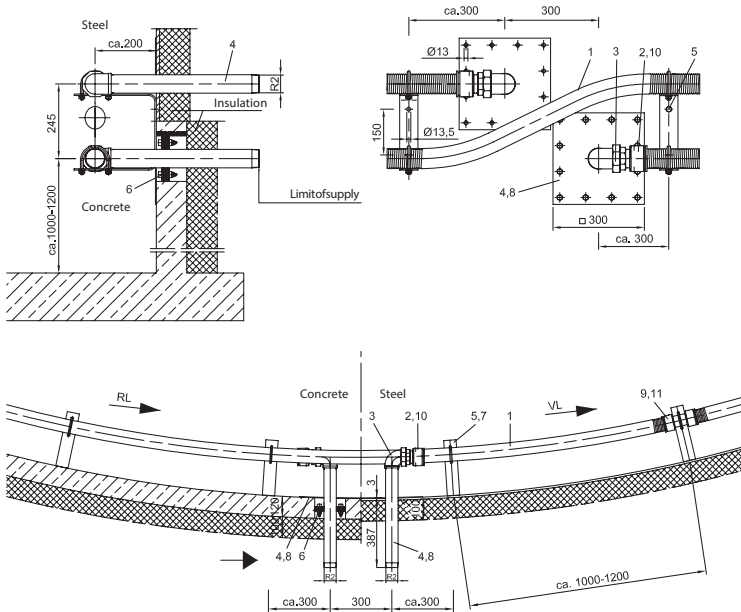
No.	Type	Material grade	Article No.
1	Pipe BFX CNW 60/66 – DN 50	1.4404	1014439
2	End connector GRAPA-S DN 50 incl. wall duct dia. 89 mm	1.4301	1014608
3	Support RBF 60 type A 200/250 (package unit = 10 pieces)	1.4301	1014631
4	Support RBF 60 type B 200/250	1.4301	1014626
5	Gasket insert type A WD 85-94, core drilling dia. 150 mm	1.4301	1014623
6	Fixing set incl. dowel BS 10 (borehole dia. 12 mm)	1.4301/Nylon	1014629
7	Through-/repair-connector/elongation GRAPA-S DN 50 (if necessary)	1.4301	1014630
8	Installation tool for GRAPA-S end connector DN 50	Steel, gas-nitrided	1014677
9	Installation tool for GRAPA-S through connector DN 50	Steel, gas-nitrided	1014687

BIOFLEX Pipe system

Biogas Technology

Type CNW

End connector GRAPA-S incl. flange plate for steel- or concrete fermenter



- Please seal flange plate pressure-tight to fermenter wall.
- For installation of the end connector see installation instruction.
- Please note: in case of wall < 120 mm please use special screws and dowels.
- Please seal the thread with e.g. CURIL K2 sealing compound ist recommended by BRUGG.

No.	Type	Material grade	Article No.
1	Pipe BFX CNW 60/66 – DN 50	1.4404	1014439
2	End connector GRAPA-S DN 50 – R2	1.4301	1014621
3	Elbow screw fitting DN 50	1.4301	1014617
4	Double nipple R2 with flange plate 300 x 300 x 3 mm	1.4301	1014613
5	Support RBF 60 type A 200/250 (package unit = 10 pieces)	1.4301	1014631
6	Gasket insert type Typ A WD 55-64, core drilling dia. 125	1.4301	1014620
7	Fixing set 1 x incl. dowel BS 10 (borehole dia. 12 mm)	1.4301/Nylon	1014629
9	Through-/repair-connector/elongation GRAPA-S DN 50 (if necessary)	1.4301	1014630
10	Installation tool for GRAPA-S end connector DN 50	Steel, gas-nitrided	1014677
11	Installation tool for GRAPA-S through connector DN 50	Steel, gas-nitrided	1014687

Installation instructions Fermenter

Installing the pipe work CNW 60/66, DN 50 with connector and seal

1 Installation of the BIOFLEX pipe work in a fermenter



2 Measuring and marking the position of the pipe supports

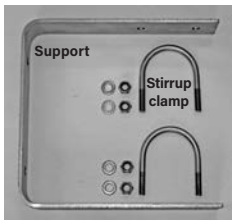
The height of the supports on the fermenter wall is determined by the position of the drill holes. The pipe work must lie axially to the core hole. Measure the height of all supports using a laser measuring device and drill the holes for them at intervals of c. 1.00 metre. Place the first and the last support at a distance of 1.3 m from the centre of the core hole.



3 Installing the supports

Install all the supports for the pipe work. All the stirrup clamps and the screws are made of stainless steel.

Attention! The screws delivered with the pipe work may only be used in tanks with a wall thickness of at least 120 mm!



support for two pipes

4 Rolling off the BIOFLEX pipe

The endless, spirally corrugated BIOFLEX pipe is rolled off the drum metre for metre, aligned and provisionally fixed in place.



5 Fixing the pipe

Fix the BIOFLEX pipe to the supports using the stirrup clamps, but without using any force and causing undue tension.



6 The completely installed pipes



Installation instructions Fermenter

Installing the pipe work CNW 60/66, DN 50 with connector and seal

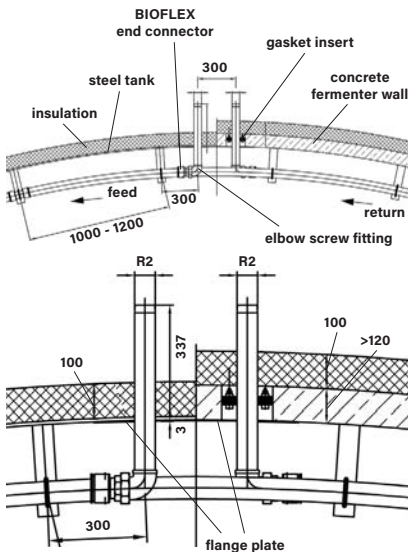
7 The corrugated pipe is led out of the tank with the bending support (as described on Datasheet BGT 1.800)

The BIOFLEX connector lies outside the tank. The welded-on wall duct lies inside the tank wall. For installation instructions for the leading out of the BIOFLEX pipe with its connector and gasket insert, see Figs. 10 to 47.



8 BIOFLEX connector inside of the tank with a rigid pipe wall duct with flange plate for screwing it onto the tank wall (as described on Datasheet BGT 1.810)

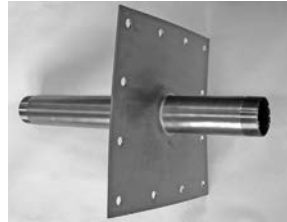
Version for steel tanks or concrete tanks (also prefabricated).



All dimensions in mm

9 Fitting the double nipple (pipe fitting) with flange plate

Version for steel tanks or concrete tanks (also prefabricated)



the shorter end points inwards into the tank

Push the double nipple into the opening of the steel tank or the core hole of the tank. In the case of a concrete tank also push in the gasket insert from outside and fit it in the correct position (pointing to the external wall of the tank).

Screw on the flange plate.

Attention! The screws delivered with the pipe work may only be used in tanks with a wall thickness of at least 120 mm! Permanently elastic insulation material (e.g. Sikaflex) must be fitted between the tank wall and the flange plate.

After this, screw the elbow screw fitting with the rigid component to the double nipple. Position the last support. The pipe should lie horizontally to the elbow screw fitting.

Mount the end connector, aligning it correspondingly. For installation instructions for the BIOFLEX pipe end connector see ISI 8.86.01 to ISI 8.86.04.

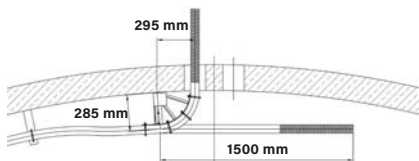
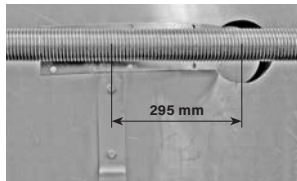
Finally, connect the pipe work with the elbow screw fitting. For the final installation of the gasket insert, see Figs. 46 and 47.

Installation instructions Fermenter

Leading out the pipe work CNW 60/66, DN 50 with connector and seal

10 Position of the bending support relative to the core hole

Important! The exact measurements must be observed to ensure that the wall duct is centrally aligned.

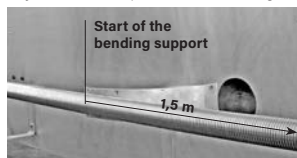


11 The bending support



12 Preparatory work

The corrugated pipe must not be fixed to the bending support and two further supports (i.e., for a length of c. 3.0 m to 3.6 m). The pipe end must project c. 1.5 m beyond the fixed point of the bending support.



13 Bending the pipe out of the tank

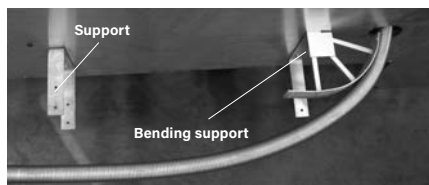
At least 4.5 m of loose pipe end is needed to introduce the pipe into the core hole.

Attention! Make sure there is no kinking of the pipe!



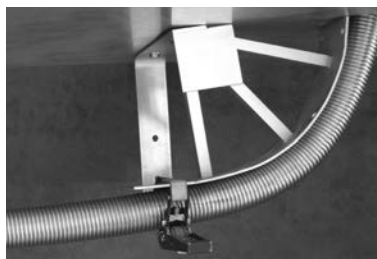
14 Pushing in the pipe

Push the pipe through the core hole as far as it will go.



15 Securing the pipe to the bending support

Pull the pipe towards the bending support in the position shown, using a lashing strap.

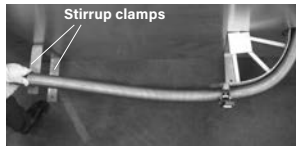


Installation instructions Fermenter

Leading out the pipe work CNW 60/66, DN 50 with connector and seal

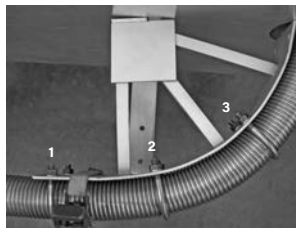
16 Fixing the pipe to the supports

The corrugated pipe must now be fixed to the further supports by means of stirrup clamps.



17 Fixing it to the bending support

Three of the stirrup clamps must be fixed to the bending support in the order shown here! The corrugated pipe lies along the plate in this section.



18 Preparing for stirrup clamp no. 4

Position the lashing strap again as shown. Shove the scantling into the core hole at the sides and press the corrugated pipe onto the stirrup clamp support. Then tighten the lashing strap.



19 Fitting stirrup clamp no. 4

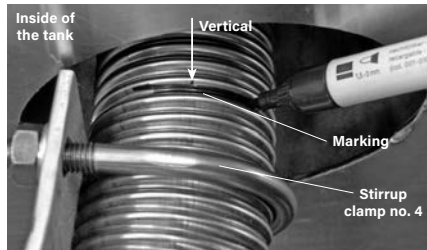
Now fit the last stirrup clamp!

The pipe must be aligned centrally in the core hole.



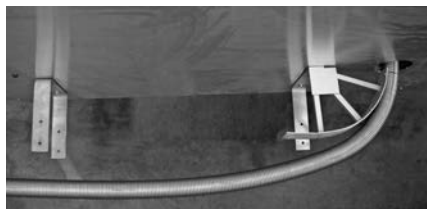
20 Making the marking for the pipe connector

Mark the position on the pipe before drawing it through into the tank.



21 Loosening the stirrup clamps

Release all the stirrup clamps on support and the two further supports.



Defective!
Never bend the pipe without a bending support!

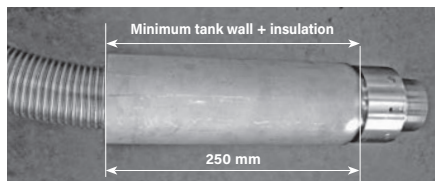


Installation instructions Fermenter

End connector with graphite sealing ring for corrugated pipe DN 50

22 Fitting the connector with wall duct and gasket insert

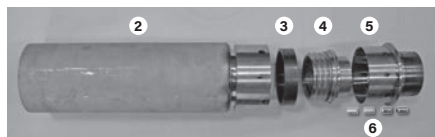
Attention! The wall duct is 250 mm long. If the wall of the tank is thinner than 250 mm, shorten the wall duct to at least the thickness of the tank wall.



23 Packaged unit with connector



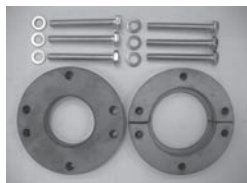
GRAPA connector with external thread



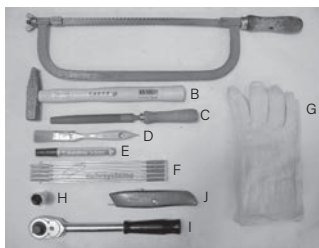
- 1 Corrugated pipe (not shown)
- 2 Pressure ring with wall duct
- 3 Graphite sealing ring
- 4 Support collar
- 5 Connector with external thread
- 6 Groove pins
- 7 Gasket insert:
Two sealing elements for sealing the core hole



24 Installation flanges for the connection

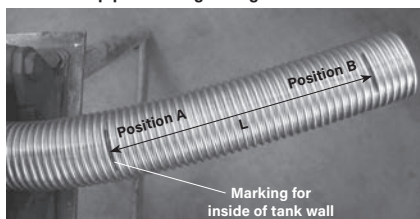


25 Tools for installation



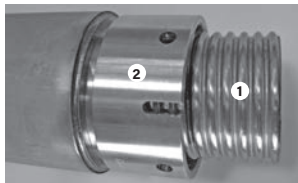
- A saw
- B hammer
- C half-round file
- D brush
- E marker
- F ruler
- G gloves
- H nut SW 17 hexagonal
- I ratchet
- J Stanley knife
- K lashing strap 35 x 500 mm
- L scantling c. 30-40 mm, c. 1 m long

26 Saw off the pipe to a length longer than L



$L = \text{tank wall thickness} + \text{insulation} + 30 \text{ mm}$

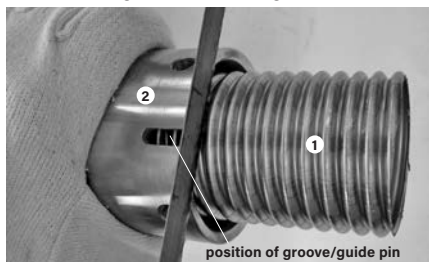
Pressure ring screwed on with wall duct up to position B



Installation instructions Fermenter

End connector with graphite sealing ring for corrugated pipe DN 50

27 Position of the groove when sawing



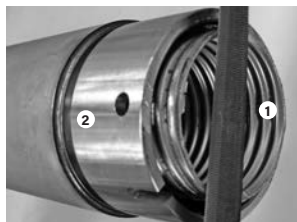
Sawing off the corrugated pipe (1)

Use the pressure ring (2) as a saw jig.
Around the groove, always saw in the trough of the pipe corrugations. Start sawing there.
Hold the pressure ring (2) in place with your hand.

Attention! The trough of the pipe corrugations **must be sawn off at right angles to the pipe axis** along the pressure ring. If necessary, file as needed till the fit is right.

28 Removing burs from the corrugated pipe (1)

Screw the pressure ring (2) further up the pipe. Remove burs from the pipe end until it is perfectly smooth.



29 Remove all filings



30 Put the sealing ring (3) in place



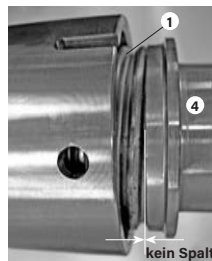
31 Screwing in the supporting ring (4)

Screw the supporting ring (4) into the corrugated pipe (1) until it will go no further.



32 Screwed in supporting ring (4)

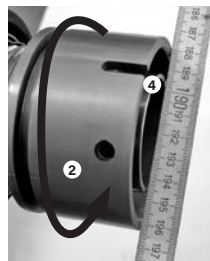
The supporting ring (4) must lie against the corrugated pipe all the way round.



33 Positioning the pressure ring (2)

Turn back the pressure ring (2) far enough so that it lies parallel to the front edge of the supporting ring (4).

Work with the utmost precision - use auxiliary equipment!

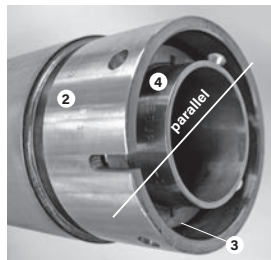


Installation instructions Fermenter

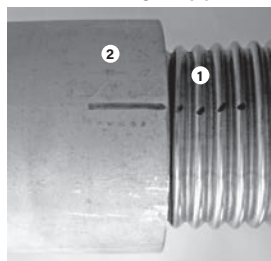
End connector with graphite sealing ring for corrugated pipe DN 50

34 Front view

The sealing chamber, comprising the pressure ring (2), the supporting ring (4) and the sealing ring (3) is now precisely aligned



35 Mark the position of the pressure ring with wall duct (2) with the corrugated pipe (1)



At all stages of the further installation, make sure that the pressure ring (2) does not tilt relative to the pipe.

36 Push in the connector with external thread (5)

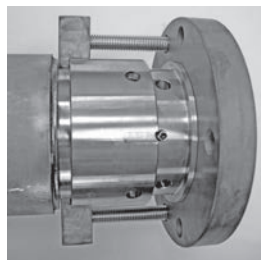
Position the guide pin of the connector (5) correctly to the groove.



37 Fitting the installation flanges

Attention: Insert the split rear flange in the groove (see illustration)

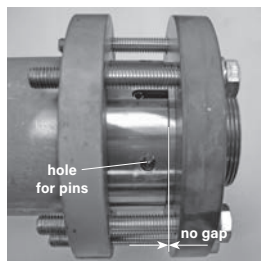
Important! Grease the screws!



38 Draw together the fitting with the flanges

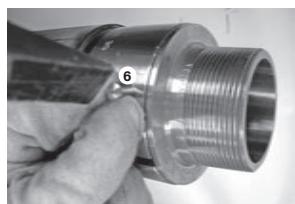
Tighten the screws one after another clockwise until the parts lie together as a block. Make sure not to give the components too much tension. (No tilting)

Remove the flanges.

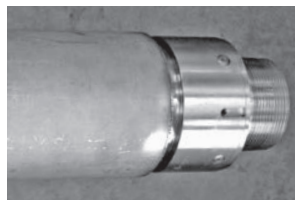


39 Securing the connector

Hammer all the groove pins (6) into place around the entire circumference.



40 Completely installed connector



Installation instructions Fermenter

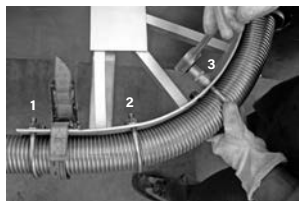
End connector with graphite sealing ring for corrugated pipe DN 50

41 Fit the lashing strap again at the position shown!



42 Fit the stirrup clamp

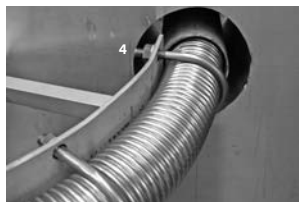
First secure the pipe to the supports by means of the stirrup clamps. Then fit stirrup clamps 1 to 3 on the bending support.



43 Fit the lashing strap



44 Then fit the last stirrup clamp (no. 4)

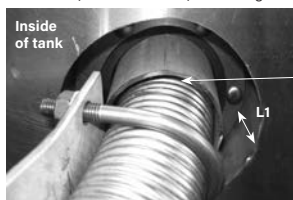


45 The pipe end with the fitting now protrudes from the tank



46 Rear seal of the core hole

Push the first sealing element from outside the tank into the core hole and slide over the connector fitting onto the wall duct (inside the tank) for a length of c. 40 mm (L1).



Attention:
3 mm gap
circumferen-
tial between
pipe and
pipe sleeve!



Tighten the washers clock-
wise using the ratchet and
a torque wrench. Tighten
the washers several times.
Repeat this after two hours.
Max. torque M8 = 10 Nm

47 Front seal for the core hole

Place the second sealing element at the front of the core hole and repeat the procedure detailed above.



Biogas technology – system components

Fermenter heater BIOFLEX CNW BG 60/66

completely in stainless steel

Worksheet BGT 1.800:

End connector GRAPA-S with wall duct for concrete fermenter

Worksheet BGT 1.810:

End connector GRAPA-S with flange plate for steel- or concrete fermenter

Article	Material	Dimensions	Article-No.	
Pipe BFX CNW 60/66*	1.4404	DN 50	1014439	
End connector GRAPA-S male thread R 2"	1.4301	DN 50 / R 2"	1014621	
End connector GRAPA-S incl. wall duct Ø 89 mm	1.4301	DN 50 / R 2"	1014608	
Elbow screw fitting	1.4301	DN 50	1014617	
Double nipple R 2 with flange plate	1.4301	DN 50	1014613	
Package unit pipe support (contains 10 pieces pipe support RBF type A)	1.4301	200/250	1014631	
Pipe support RBF 60 type B	1.4301	200/250	1014626	
Gasket insert 2 x type A WD 55-64 Core drilling Ø 125 mm	1.4301	55-64/125	1014620	
Gasket insert 2 x type A WD 85-94 Core drilling Ø 150 mm	1.4301	85-94/150	1014623	
Fixing set incl. dowel BS 10	1.4301/Nylon	Borehole Ø 12 mm	1014629	
Through-/repair-connector/elongation type GRAPA-S	1.4301	DN 50	1014630	
Installation tool for end connector	Steel gasnitrided	DN 50	1014677	
Installation tool for repair-connector	Steel gasnitrided	DN 50	1014687	



PIONEERS IN INFRASTRUCTURE

PIPE SYSTEMS FOR THE FUTURE

System packages for the use of regenerative energies

BRUGG Pipes offers suitable system components for the generation and use of regenerative energies as well as the safe over- and underground transport of fluids in local and district heating networks, gas stations and industry applications.

Give us a call!

We would be pleased to assist you and to find customized solutions together.

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