Installation and sevicing instructions for fabric expansion joints

1. Storage

ROTH fabric expansion joints are delivered well secured and sufficiently packed. Until the time of installation they must be stored dry and clean and be not subjected to solar radiation. All packing materials should only be removed immediately before installation. Transportation frames, if any, must be taken off after installation, before bringing to service.

☞ **During storage and unpacking, make sure that no sharp-edged objects can damage the joints.**

2. Assembly preparations

The following steps should be taken before assembling the joint:

- Verify that flange dimensions and bolt circles match.
- Check all edges and surfaces of the system components for burrs and pollution.
- Verify that all dimensions and measures are designed according to the corresponding construction plans.
- Torsion-free installation with no lateral deflexion as well as the correct installation length must be granted.
- Components not supplied by ROTH (i.e. conducts, floating flanges) must not be sharp-edged. Edges which may contact the joint require a round-off radius of at least 3mm.

3. Implementation

ROTH fabric expansion joints should be installed at the end, as a conclusion of the pipe work to prevent damages resulting from other work such as welding, grinding, scaffolding. They also must be protected against sharp-edged objects or tools.

☞ Fabric expansion joints are no supporting components of the piping system; therefor the correct positioning of guides and fixed points -as shown in our catalogue- is of utmost importance.

☞ Inside and outside of ROTH fabric expansion joints are unmistakably marked. These marks must be observed in order to grant correct installation!

☞ PTFE-foils embrittle at low temperatures. Please handle fabric expansion joints with PTFE-foil at temperatures below 10° C with special care. Assemblies at low temperatures should be avoided.

☞ Any glues used for assembly must be suitable for the compensator materials, as well As for the working temperatures, otherwise there is a danger of fire !

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3.1 Pre-assembled joint kits

Preassembled fabric expansion joint units generally consist of the joint, its steel parts and an insulation pillow. These components are assembled by ROTH before delivery in order to reduce expenses and time needed for installation of a unit.
Still, following rules should be obeyed:

- All dimensions and measures according to the given drawings and/or data sheets must be strictly adhered to.
- Transportation frames should be removed as late as possible, after all other work on the piping system has been finished.
- Large and heavy kits should be supported by crane or similar equipment during installation.

☞ **ATTENTION: Never use transportation frames as a suspension, but lift the joint units with several spread loops or butt straps !**

- Protect fabric expansion joints against flying sparks and sharp-edged objects.

3.2 Closed expansion joints

Compared to preassembled joint kits, closed fabric expansion joints with steel parts delivered separately are assembled by the customer on site. ROTH fabric expansion joints are manufactured drilled or undrilled, according to order instructions and technical specifications.The rules for preassembled joint kits as shown in section 3.1 should also be obeyed for closed joints.
For drilled/undrilled expansion joints we recommend following step-by-step installation:
Fit in the conduct and insulation pillow, if any, as described in section 3.4. Position the expansion joint exactly aligned onto the mating flanges. Then, place the floating flanges or attachment-strips and fit them -together with the expansion joint- against the mating flanges by using screw-clamps.
After fitting the expansion joint and the steel parts in their correct place, the clamp-area can now be drilled (this is for undrilled joints only). Use backing flanges or attachment-strips and mating flanges as drilling gauges. The screw-clamps must provide enough surface pressure to avoid fraying of the fabric layers at the drill-holes. If locally possible, holes may be punched before fitting in the expansion joint.
Fastening of the drilled expansion joint is executed as follows:
Tighten all backing flanges / attachment-strips manually with screws and nuts. When all screw fixings are fit, tighten them with a torque spanner (please note our recommendations on torque stated in the table 1 section 3.3).
Please make sure that the screw heads are located on the side of the bellow, and not the screw threads.
ROTH does not take any liability for leaks that may occur in the flange area caused by changing existing bores or drilling additional holes.

☞ As technical fabric layers tend to creep, it is necessary to check the screw fixings 1-2 days after installation as well as after putting into service, and to re-tighten the screws with a torque spanner.

3.3 Recommended dimensions for flange-connections:

table 1

flange-width [mm]	flange-thickness [mm]	distance of wholes [mm]	bolt dimension	fastening torque [Nm]	axial bolt force [Nm]
30	8	80	M 10	20	11800
40	10	90	M 12	35	17300
60	12	130	M 16	85	31000

3.4 Open-ended construction

Basically we recommend to purchase closed expansion joints. However, due to local situations or the size of joints, this is not always possible. In this case we deliver tube and flange expansion joints open-ended and supply skilled personnel for installation and supervision, if you wish.
Please take account of our information on open-ended expansion joints on our insert “closing instructions for ROTH fabric expansion joints“.

3.5 Insulation pillow

The use of an insulation pillow becomes necessary at temperatures exceeding 400°C. In most cases the pillow is equipped with flanges, so it is possible to install it with the expansion joint in one piece. According to your demands, the pillow may be fastened with attachment-strips, using screws or clips. Generally, the insulation pillow should be installed together with the conduct before fitting-in the expansion joint. Make sure that the insulation completely fills up the space between conduct and expansion joint, without restricting their flexibility.
For insulation without flanges it is important that the pillow does not become stuck between the conduct and the pipe end, while in operation.

4. Outside insulation

Usually, to ensure the calculated and necessary heat exchange, fabric expansion joints must not be covered with insulation materials. If you, however, plan to insulate expansion joints from the outside, please note this in your inquiries, so we can provide a suitable construction of layers. In this case, we shall be glad to give you professional advice.
Works on outside insulation must be executed with the utmost caution to avoid damaging of the expansion joint by sharp-edged metal sheets, or similar.

Generally, the minimum distances for pipe insulation stated in the ROTH insulation instructions, acc. fig. 1, must be followed.

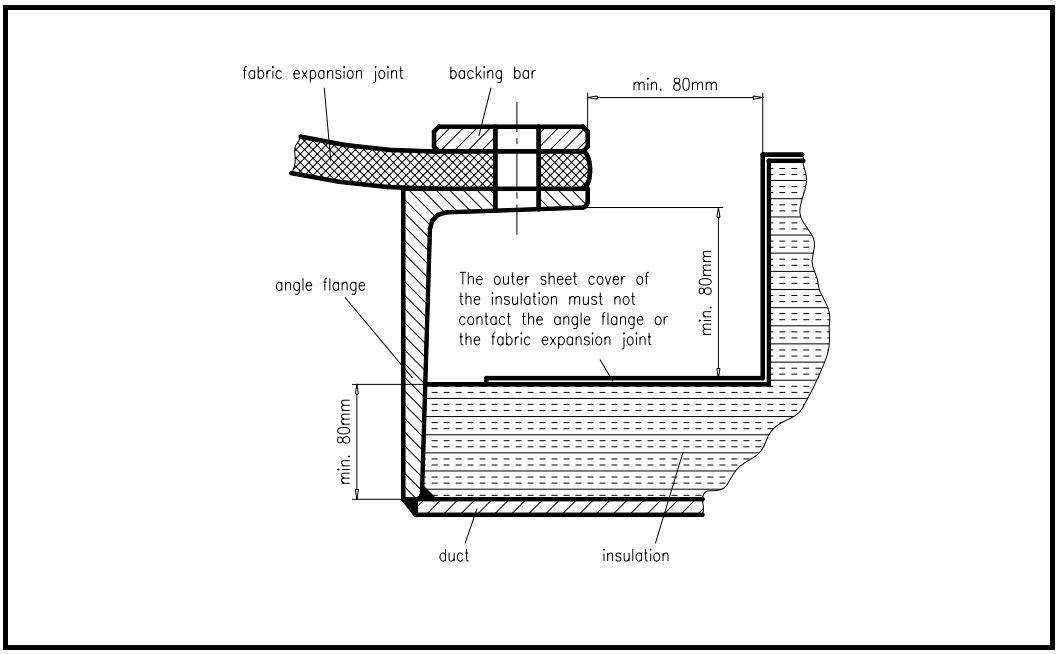

fig. 1

5. Methods of attachment

Fabric expansion joints are designed and made according to the operating and leakproof requirements imposed on them. The resistance to leaks is, however, only as good as permitted by the chosen method of attachment and the surface quality of the sealing surfaces. The correct method of attachment must therefore be selected in order to ensure the operational reliability of the expansion joint.

Some methods of attachment and their selection criteria have been listed below:

5.1. Clamps

Clamps are a simple and low-cost form of attachment that does not require the drilling of the expansion joint. They are subject to the following operational limitations:

- only suitable for circular cross-sections
- surface pressure of 5 N/mm^2, as usually required at the sealing surfaces of fabric expansion joints, cannot be achieved owing to the limited tensile strength with clamps
- for conventional clamp types, the attainable surface pressures are approx. 3 N/mm^2 up to DN 500 and approx. 1 N/mm^2 up to DN 1000
- the pressure of the medium in the pipe must not exceed 100 mbar
- the temperature of the medium must not exceed 200° C, because the significant differences in the thermal expansion of the pipe and clamps, which are insulated by the expansion joint, can lead to overstretching and leaks when exposed to

- composite clamps must be installed with max. part lengths of 1000 - 2000 mm in order to achieve uniform radial forces at the circumference

5.2. Retaining bars

With equivalent technical properties to those offered by flange connections, retaining bars are used to secure the simple tube expansion joints.

They are applied in cases where it is not possible to achieve with clamps the radial forces required for sealing purposes. This is in particular the case for rectangular and oval cross-sections.

For information on the layout of the screw connections and appropriate strip dimensions see table 1, section 3.3.

5.3. Flange connection

Flange connections are regularly used for large round and rectangular cross-sections. It is the most favourable design for installation purposes. As with retaining strips, the required surface pressure at the static sealing area can be achieved by the appropriate choice of flange width and thickness, hole spacing and bolt size.
For reference purposes see table 1 (section 3.3)

Compression of the expansion joint flange owing to the force exerted by the bolts can lead to permanent depressions in the area of the flange and slacking the bolts.
Either take up the slack at the flange bolts with a torque wrench after commissioning or use appropriately dimensioned cup spring assembly at each bolt to allow self-adjustment.

Expansion joints with PTFE-welded sealing surfaces are not self-sealing and must be sealed with additional gaskets in the flange area. We recommend the use of customary, onesided self-adhesive PTFE flat seal.

5. Service and maintenance

Compared to stiff piping systems, expansion joints are limited-life-time components. Their use does not require expensive maintenance. Their durability greatly depends on the observation of all given construction parameters. According to strains and servicing conditions, but at least every 3 months, routine inspections, i.e. on screw fixings, should be done. That way, damages caused by fatigue, thermal or chemical stresses can be recognized and spare parts can be ordered timely. Fabric expansion joints must not be covered with paint, because solvents may damage the surface coatings of the joints. Therefor, do not use caustic cleansing agents or those containing solvents.
In particular cases it is possible to repair fabric expansion joints, according to the seriousness of damages; however, after exceeding a certain time of operation, we generally recommend to replace the joints. Please do not hesitate to contact us for further information.

☞ **ATTENTION: If defects may cause the risk of injuries, appropriate safety devices must be supplied !**

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