

General Instructions

for installation, assembling and storage of soft-material compensators

This is a summary of the general instructions for installing, assembling and storage. Please refer to any special supplemental assembling instructions accompanying the individual compensator.

1. General remarks

Soft-material compensators are very sensitive to stress from impact and compressive stress, contact with sharp objects and overstress by heat. For this reason, the following safety measures are to be taken on site during and after assembling of the compensator:

- 1.1 During intermediate storage prior to assembling, make sure that the compensator does not come into contact with sharp or pointed objects, and that none are stored above or below the compensator.
- 1.2 Prevent damage during assembling work in the vicinity of the compensator by taking safety measures. A suitable cover must be used to protect the upper portion of the compensator from falling objects such as electrodes, screws, and tools. This is particularly important in the case of horizontal pipes. If any one side of the compensator is particularly at risk of being damaged, for instance in the presence of working being done with a crane, this side should be protected as well.
- 1.3 In the event of welding and grinding work being conducted near the compensator, the compensator must be protected by means of insulation from excessive temperature influence. Red-hot abrasive dust and electrode residues must be not be allowed to come into contact with the compensator.
- 1.4 As the aforementioned safety measures may obstruct the necessary heat transfer of the compensator, it is imperative that they be removed prior to initial operation.
- 1.5 Coating the fabric compensator with paint is not allowed, as doing so may obstruct heat transfer and the effects that the solvents contained in paint may have on the compensator are not known.
- 1.6 Unless arrangements have been made with Kempchen to the contrary, fabric compensators may not be insulated from the outside or equipped with a protective plate or grating. Obstruction of heat transfer is not allowable and will destroy the compensator. When in doubt, please contact us.

2. Steel construction

The steel parts to be used for attaching the compensator must be inspected before assembling is commenced.

- 2.1 All sharp edges in the region of the flanges and the pass tube must be rounded off.
- 2.1 Any holes drilled must be free of burs.
- 2.3 Inspect the flanges for possible damage. Scratches are to be touched up, tears in the direction of the duct centre are to be filled or ground (please observe the tolerance indication).
- 2.4 Welding beads on the flanges, traces from zinc-plating, etc., are to be removed so that a sealing connection can take place between the flange and the inside of the compensator.
- 2.5 The screw connections of soft-material compensators must provide for a certain surface pressure between the flange and the compensator. The torque indicated here is always based on easily movable screws.
- 2.6 On one side of the clamping flanges is a chamfer or rounding. Clamping flanges must also be assembled with the rounding on the side of clamping flange turned to the compensator.

3. Assembling preparation

Prior to assembling, please check to make sure that the installation dimensions corresponding to your drawing have been maintained. Allowable tolerances can be found in the tolerance indication on page 206. When in doubt, please consult with the construction manager or contact us.

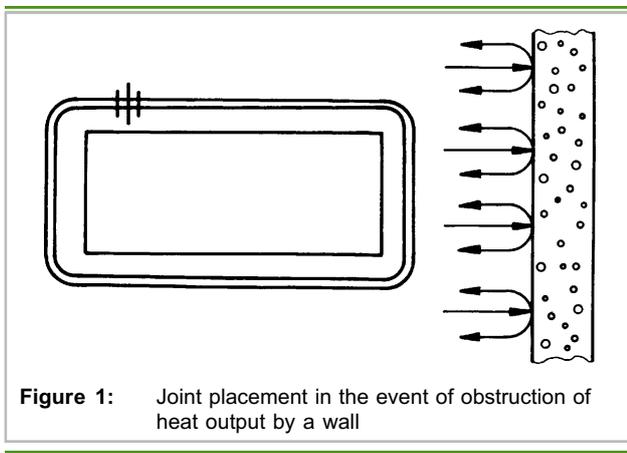
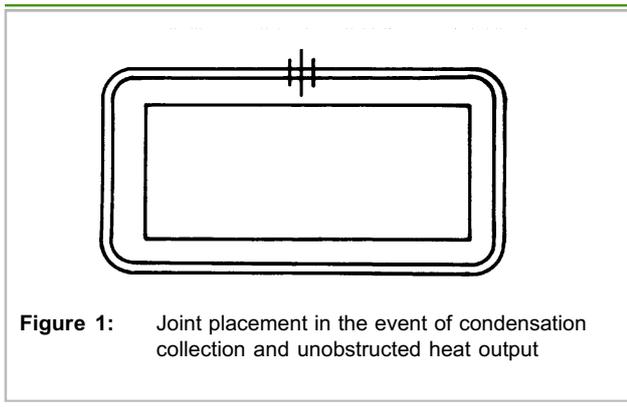
At ambient temperatures below 5 C°, assembling soft-material compensators is only possible under limited circumstances at. Please consult with us before attempting to do so.

- 3.1 Take out the compensator, making sure that the surface underneath is free from sharp or pointed objects. Do not step, stand, or store any objects on the compensator.
- 3.2 Locate the outer side of the compensator (marked with the word "außen" and the order number)

General Instructions

for installation, assembling and storage of soft-material compensators

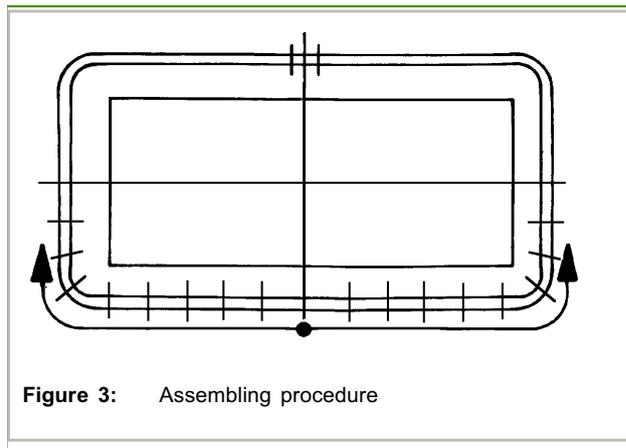
3.3 The joint is the weakest part of the compensator. It should be located on the spot exposed to the least thermal and mechanical stress. In the event of condensation collection in horizontal pipes and when heat transfer is not unobstructed, the joint is to be inserted into the upper part of the duct as shown in Fig. 1. Fig. 2. shows the placement of the joint when heat transfer is obstructed.



- 3.4 Determine whether a pass tube is to be installed. If so, please refer next to "Special instructions for installing pass tubes".
- 3.5 Determine whether pre-insulation is to be installed. If so, please refer next to "Special instructions for installing pre-insulation."
- 3.6 If the compensator is made from an elastomer or features an edge reinforcement made from an elastomer (FKM or EPDM), apply the enclosed anti-seize paste to the flanges to facilitate deassembling at a later date.

4. Assembling

4.1 Pull the compensator onto the flange. For angular compensators, have in mind the position of the corners and flanging radii. On the side turned away from the joint as shown in Fig. 3, start by fastening the compensator without a clamping iron with one screw per flange. Do not tighten these screws.



- 4.2 Starting with this screw, fix the compensator onto the flange both clockwise and counter-clockwise with additional screws. The number of the screws depends on the circumference. As a guideline, at least one screw per flange should be used per meter of circumference. Do not tighten these screws. The screws must always be equally fitted in both directions to avoid displaced assembling.
- 4.3 After the compensator is roughly set up on the flanges, begin assembling the clamping flanges. Next, remove the corresponding number of provisorily attached screws.
- Important: Note the manner in which the screws must be arranged and whether
- a washer
 - a disk spring set
 - or both
- will need to be installed, and arrange the screw set as required for assembling in order to simplify the process.
- The screws should only be tightened by hand. If the compensator is delivered with open ends, please see "Special instructions for closing a compensator."

General Instructions

for installation, assembling and storage of soft-material compensators

4.4 Any base plates are to be placed between the segments of the clamping flanges, as shown in Fig. 4.

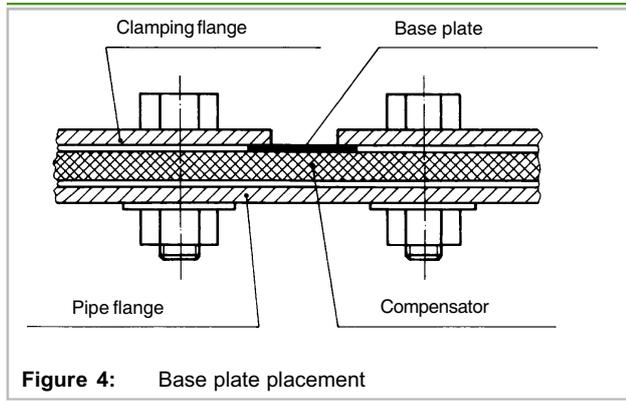


Figure 4: Base plate placement

4.5 Begin by tightening the screws. The screws must first be tightened at approximately half torque. Next, perform a second round of tightening at the indicated torque. For angular compensators, see Fig. 5; for round compensators, Fig. 6.

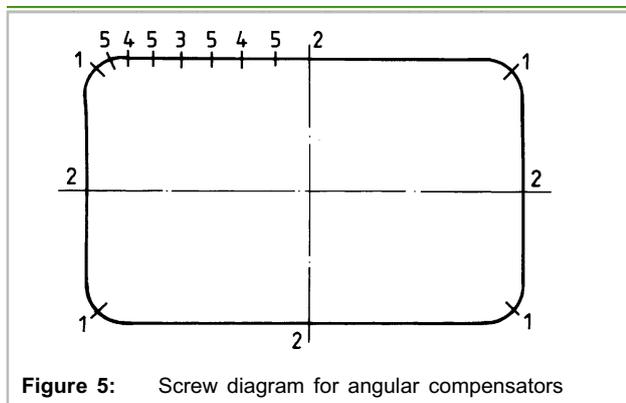


Figure 5: Screw diagram for angular compensators

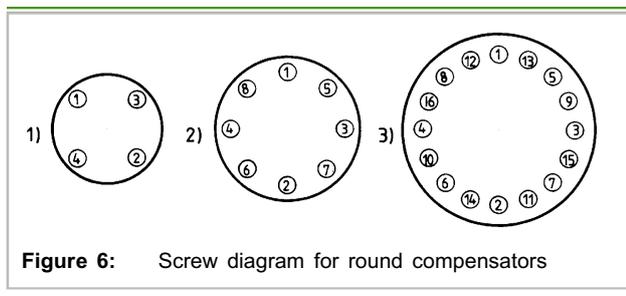


Figure 6: Screw diagram for round compensators

4.6 Initial assembling of the fabric compensator is complete; however, all screws are to be retightened at the indicated torque approximately 24 hours after the operating temperature has been reached for the first time.

5. Storage

Long-term storage of compensators as replacement parts must take place in the proper manner. Sharp kinks must be avoided, as these may result in breakage of the sealing foils. As shown in Fig. 7, the areas at risk for kinks should be supported by a cardboard roll.

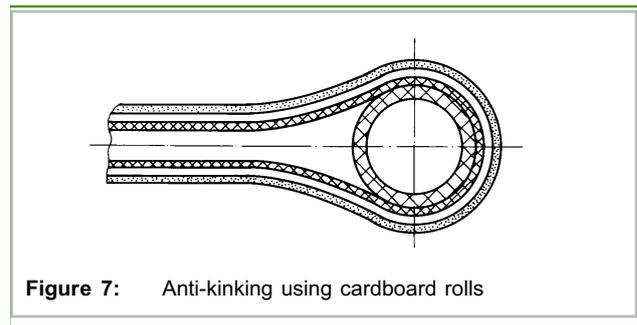


Figure 7: Anti-kinking using cardboard rolls

Compensators stored at low temperatures (<5 C) are to be warmed to room temperature before and during assembling.

6. Maintenance instructions

Fabric and elastomer compensators are typically maintenance-free. Compensators with horizontal piping and media with a high proportion of dust and/or condensate should be inspected regularly and cleaned from the inside when necessary.

Sedimentation restricts movement absorption and may cause damage! If the underside of the compensator feels hard to the touch and does not be squeezable, there may be internal sedimentation. The compensator should be inspected as soon as possible.

Sharp tools and pressure washers may not be used when cleaning the compensator.

The instructions for assembling apply to work on and near the compensator!

General Instructions

for installation, assembling and storage of soft-material compensators

7. Tolerances

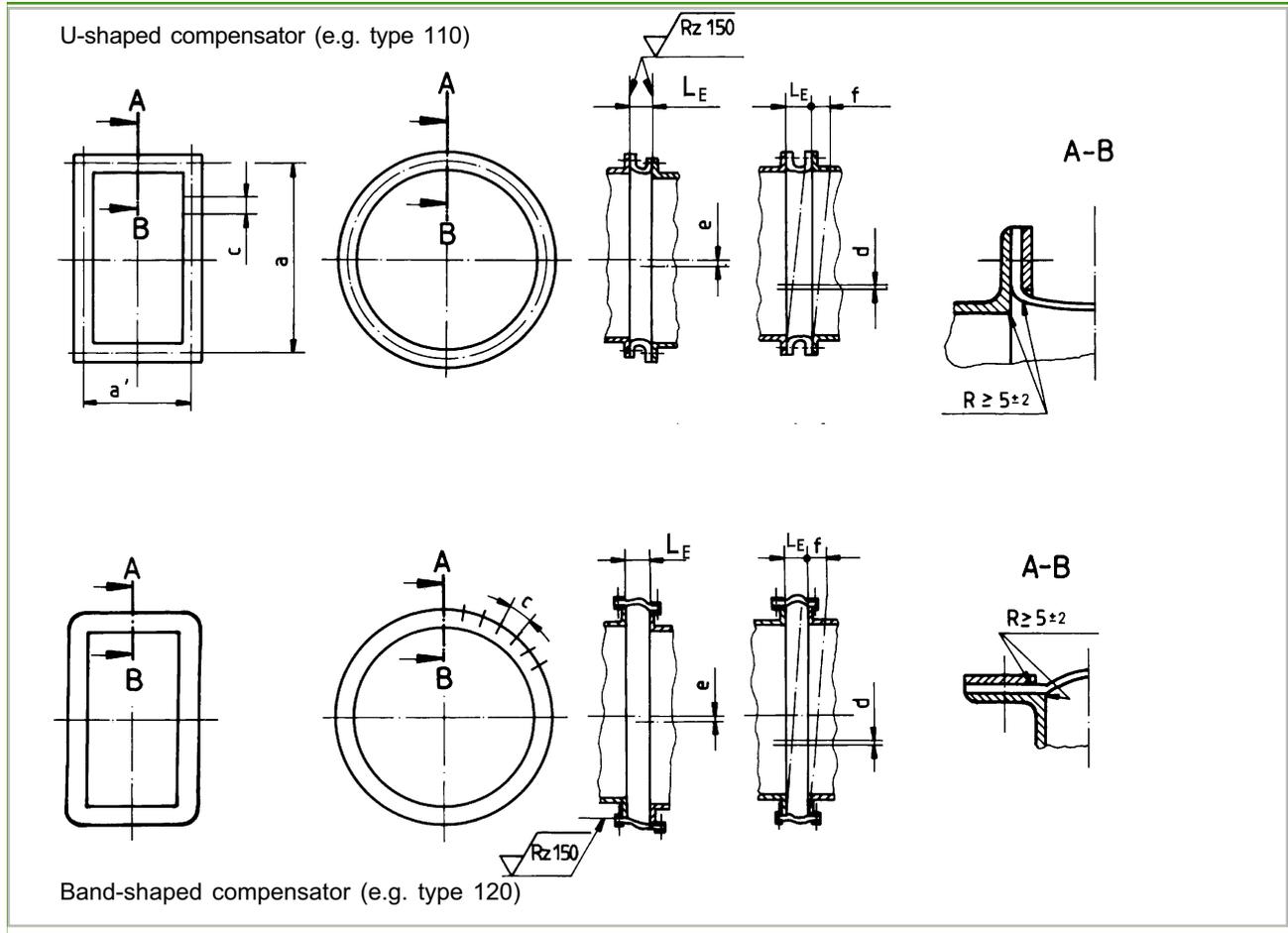


Table 1:

| | | |
|--|------|--------|
| Diameter of bolt circle / distance between hole rows | a/a' | ±3 |
| Overall length | Le | ±10 |
| Hole distance | c | ±1 |
| Hole mismatch with counterflange | d | ±3 |
| Misalignment | e | ±3 |
| Inclination (parallel flanges) | f | ±0.2 % |
| Surface roughness | max. | 150 µm |
| Protrusion per 1000 mm measuring length | max. | ±1 mm |

- Joints may not have any misalignment
- The measuring deviations of the hole distances must not add up