WITZENMANN
managing flexibility

INSTRUCTIONS FOR THE INSTALLATION OF WITZENMANN EXPANSION JOINTS

1. Operating instructions

HYDRA expansion joints are maintenance-free. They are designed exclusively for the agreed conditions specified in the order. Long-term reliable operation is only guaranteed when they are properly incorporated and installed in systems and when they can operate without being damaged or hindered. See also „Installation of expansion joints“ in our manual.
Note: even restrained expansion joints can slightly expand or shorten elastically as a result of pressure thrust. This does not limit their function, as in a multi-hinge system the change in length can be absorbed by pipe bending or other expansion joints. Witzenmann can provide further information if necessary.

2. Installation guide

2.1 General installation instructions

- Check the expansion joint for any damage before installation.
- Handle the expansion joint with care – no harsh knocks or impacts – do not throw
- Do not attach chains or ropes to the bellows
- Protect the bellows against weld spatter and abrasion – cover with non-conductive material
- Prevent an electrical short-circuit by welding electrodes, earthing cables, etc. – the bellows may suffer irreparable damage
- Keep the bellows corrugations inside and outside free from foreign matter (dirt, cement, insulation material) – check before and after installation
- Before insulating with mineral wool, cover with sheet metal all around
- Do not use any insulation material containing corrosive substances
- Avoid excessive movements and torsion (twisting) at all, during installation and operation (Figure 1)

Fig. 1

- Remove the marked pretensioning bracket and transport fixtures after installation – not before
- Before start-up, remove any protection and packaging materials, such as cardboard packaging, tape or plastic foil, which are not explicitly shown as being part of the expansion joint
- Make sure that the fixed points at the ends of pipeline sections containing an expansion joint are of adequate size. These must be able to withstand not only the axial pressure thrust (in unrestrained expansion joints), but also the adjustment force of the expansion joint and the friction forces of the pipe guides and supports - in particular the axial pressure thrust can be very large (Fig. 2).

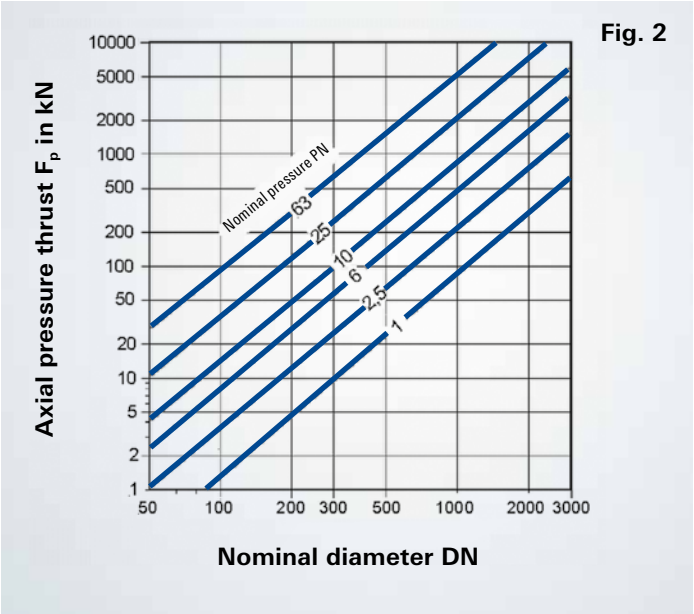

Fig. 2

Axial pressure thrust in pipeline with axial expansion joint

- Preload axial expansion joints and hinge systems after installation (when necessary and when agreed with Witzenmann) – usually 50 % of total movement – taking into account the direction of movement and the temperature during installation
- Before pressurising the pipeline, check that flange connections, guides, fixed and loose bearings have been installed correctly and are functioning properly
- A pressure test outside the system or a pressure test on expansion joints sealed with blind flanges is only permitted after consultation with Witzenmann
- The permissible test pressure and permissible deflection must not be exceeded under any circumstances

- Consider flow direction in expansion joints with internal sleeves
- After the pressure test remove liquid residues in the corrugations if necessary - these can lead to corrosion or steam explosions when increasing temperature rapidly

2.2 Installation instructions for axial and universal expansion joints

- Install only one axial expansion joint between two fixed points
- If several axial expansion joints are installed in a straight pipe section, subdivide the section by using (light) intermediate anchors
- Pipes with axial expansion joints must be guided. Guides are required on both sides of the axial expansion joint; a fixed point fulfils the guiding function. (See Fig. 3 and Fig. 4 and related codes for maximum distances)

Fig. 3

Guide spacings of pipelines with axial expansion joints

- The incoming ends of the pipeline must be aligned at the position where the expansion joint is to be installed. Compensation of assembly tolerances by expansion joint deflection is only permitted after consultation with Witzenmann.
- When connected to vibrating equipment, secure the pipeline directly after the expansion joint

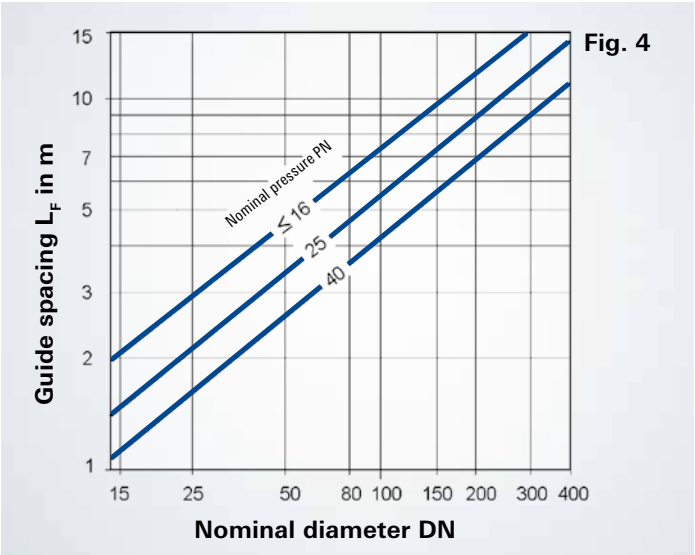

Fig. 4

Recommended spacings for pipe guidance with axially compensated pipelines

2.3 Installation instructions for restrained expansion joints

- Provide suitable pipe guides or supports close to the expansion joint system – take lateral movements in the pipes into account
- Make sure the rotation axes are correctly oriented during installation: parallel to each other and perpendicular to the direction of movement
- Make sure the orientation of the tie rods is appropriate for the function when installing lateral expansion joints (see „Installation of expansion joints“ in our manual!)
- The factory settings of tie rods with nuts must not be changed
- The weight of the pipeline must not be absorbed by expansion joints - no sagging pipes, no additional loads on the restraint hardware

2.4 Assembly instructions for flange connections

2.4.1 General installation instructions

- Upon installing expansion joints with flanged connections it is essential to use the proper bolt torque when tightening the flange connection. Applying the proper torque will prevent the flanges from being subjected to critical stresses and at the same time guarantee the tightness of the flanged connection. Several national and international standards provide calculation schemes in order to obtain the proper bolt torque, which is a function of flange geometry, gasket properties and bolt tightening method.

2.4.2 Bolt tightening

- Calculate proper bolt torque acc. to appropriate standard
- Tighten the bolts in a „criss-cross“ sequence using the bolt tightening method that was taken into account in the calculation of the bolt torque

2.4.3 Installation of loose flanges

- For expansion joints with loose flanges, the bellows tangent is bended around the flange to form a rim. For technical reasons, there may be a small gap between the bended tangent and the flange, which however will neither compromise function nor tightness of the flanged connection. The elastic tangent will exert a uniform contact pressure on the gasket, pushing it against the counter flange. During bolt tightening, any remaining gap between the tangent and flange will vanish.
- For technical reasons, the sealing ridge diameter of expansion joints with loose flanges is limited and might therefor deviate from sealing ridge diameters as given in national or international standards for flanged connections. Accordingly, a standard gasket might overlap the sealing ridge diameter of the expansion joint. This is non-critical, even if the sharp-edged bellows tangent damages the rim of the gasket (only the inner part of the gasket is essential for the sealing effect). Cutting or grinding of the bellows tangent must be omitted in order to guarantee the function of the sealing surface.

2.4.4 Gasket

- Gaskets need to be replaced after each disassembly