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Installation Instructions Expansion Joints – Lateral Expansion Joints

General safety recommendations

Prior to installation and start-up, installation and start-up instructions must be read and observed. Installation, start-up and maintenance work shall only be performed by **qualified and authorised staff.**

Maintenance

Expansion joints are maintenance free. Prior to disassembly and maintenance, the system must be depressurised, cooled down, emptied. Otherwise there is a risk of an accident!

Transport, packaging and storage

- The consignment must be checked for completeness upon receipt.
- Any transport damage must be reported to the carrier and the manufacturer.
- At an intermediate storage we recommend to use the original packaging.

Admissible ambient conditions for storage and transport are ambient temperature - 4°C to +70 °C
Expansion joints must be protected against wetness, humidity, dirt, shocks and damage.

Warranty

A warranty claim requires professional installation and start-up in accordance with installation and start-up instructions. The necessary installation, start-up and maintenance work must be performed by qualified and authorised staff.

Operating pressure

- The permissible operating pressure results in the nominal pressure considering the reduction factors.
- At higher temperatures, the expansion capacity has to be reduced according to the reduction factors.

Start-up and check

Before starting-up check if

- The pipeline is installed with sufficient inclination to avoid water pockets
- There is sufficient drainage
- Pipe anchors and pipe supports/ guides are firmly installed prior to filling and pressure testing the system
- The expansion joint is not stressed by torsion, especially not expansion joints with socket attachment
- The flow direction has been observed for expansion joints with inner sleeves
- The steel bellows is free of dirt, welding, plaster or mortar splatters or any other soiling; clean if necessary
- The general due diligence requirements to avoid corrosion damage are observed, such as water treatment, or prevention of galvanic corrosion in copper and galvanized pipes.

Insulation

- Expansion joints may be insulated exactly as the pipeline.
- If no coating is provided, protect the bellows to avoid insulation material dropping into the convolutions.
- If the expansion joint is to be placed under plaster, a protective cover is essential. This ensures the bellows function, protects against soiling and avoids contact with structure materials.

Improper operation

- The limits given in the technical data of the standard range must not be exceeded.
- Swinging suspensions adjacent to expansion joints are not permitted.
- Do not clean the newly installed pipeline by blowing it with steam to avoid water hammers and unacceptable vibration stimulating of the bellows.

System start-up

- During pressure testing and operation, the allowable test or operating pressure for the expansion joint mustn't be exceeded.
- Excessive pressure peaks as a consequence of valves closing too abruptly, water hammers etc. are not permitted.
- Avoid contact with aggressive media.
- The start-up of steam lines must be performed such that the condensate has time to drain off.

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Installation Instructions Lateral Expansion Joints

Description and application fields of Lateral Expansion Joints

Lateral expansion joints work in the same way angular expansion joints do, utilizing the angular rotation of the steel bellows. They are also suitable for limited installation space. The expansion capacity depends on the construction length of the bellows and their centre to centre distance. The longer the distance between the bellows, the larger is the lateral expansion capacity.
A longer centre-to-centre distance also results in lower displacement forces of the expansion joint.
A lateral expansion joint is an independent expansion system representing a complete two-pin hinge system.

Special characteristics:

- Very low anchor loads as the tie bars restrain the pressure thrust resulting from internal pressure
- Less demanding regarding pipe supports/ guides. Even swing hangers may be acceptable.

Depending on the expansion capacity, there are two types of lateral expansion joints:

- Expansion joints with lateral expansion capacity in one plane (Type Double Hinged)
- Expansion joints with lateral expansion capacity in a circular plane (Type Double Tied)

Installation advice

Assembly

- Anchor points and pipe guides must be firmly installed before filling and pressure testing the system.
- Expansion joints must be installed without being subject to torsion.
- The steel bellows must be protected against damage and dirt (e.g. welding, plaster or mortar splatter).
- Steam pipelines should be installed in such a way that water hammers are avoided. This can be achieved by adequate drainage, insulation, by preventing water pockets and by sufficient inclination of the line.
- Observe the flow direction while installing expansion joints with inner sleeves.
- Avoid the installation of expansion joints in the immediate vicinity of pressure reducers, hot steam coolers and shut-down valves, if high frequency oscillations are expected due to turbulence. Otherwise special measures must be installed (e.g. thick-walled sleeves, perforated disks, calming sections etc.).
- If high frequency vibrations or turbulence or high flow speed are expected, we recommend the installation of expansion joints with inner sleeve.
- Inner sleeves are also recommended for expansion joints with DN ≥ 150, if the flow speed of air, gas or steam media exceeds 8 m/s, or 3 m/s in case of liquid media.

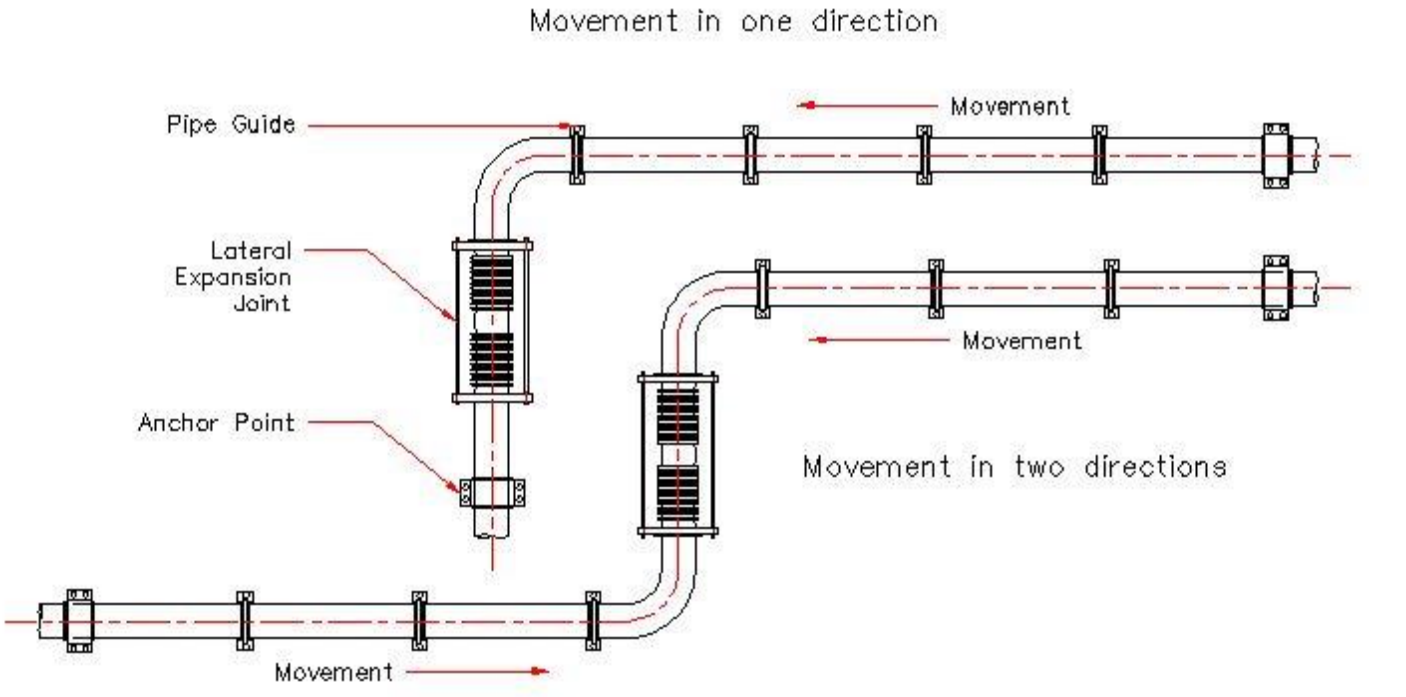
Pipe guides, pipe supports

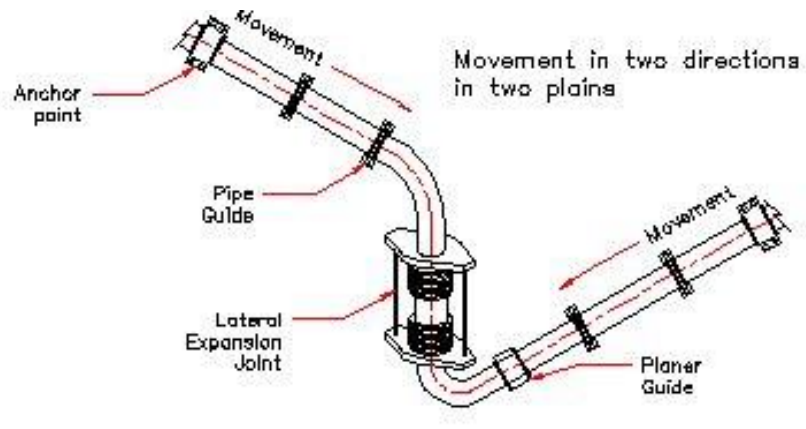
- When installing lateral expansion joints, which can take up lateral expansion only in one plane, pay attention to consistency between the direction of the pipe expansion and the movement capability of the expansion joints (perpendicular to the bolt axis). The nominal lateral expansion capacity can be taken from the technical data sheets. Lateral expansion joints have no special demands on guide supports.
- For short-leg boiler and turbine room pipelines guide bearing is not necessary.
- The weight of the pipeline (including medium and insulation) and all wind and additional loads must be absorbed by suitable pipe hangers or supports. Movements of the expansion joint must not be hindered.
- Long pipe sections before and after the lateral expansion joint need a guide support.

Anchor points

- Only one lateral expansion joint is allowed between two anchor points. The anchor points must absorb the inherent resistance of the expansion joint, resulting from the bending resistance of the bellows and the pin friction of the hinge supports as well as the frictional forces of the guides/supports.

NOTE
Pipe guides with excessive frictional resistance resulting from a too high surface pressure, dirt or corrosion deposits may block and cause considerable pressure peaks in the pipeline, its anchors and connections.





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Vibration compensation with lateral expansion joints

Lateral expansion joints in spherical hinge design are suitable for compensating mechanical oscillations in pressure lines laterally in circular plane, such as for pumps, compressors and other power machinery. If the machine is securely mounted on a concrete base, in most cases the installation of a lateral expansion joint is sufficient. However, if the machine is mounted on a flexible foundation, two lateral expansion joints making a 90° L-arc system are to be provided in order to compensate for the all-around vibrations. Immediately behind the expansion joint, an anchor point independent from the flexible foundation is required!

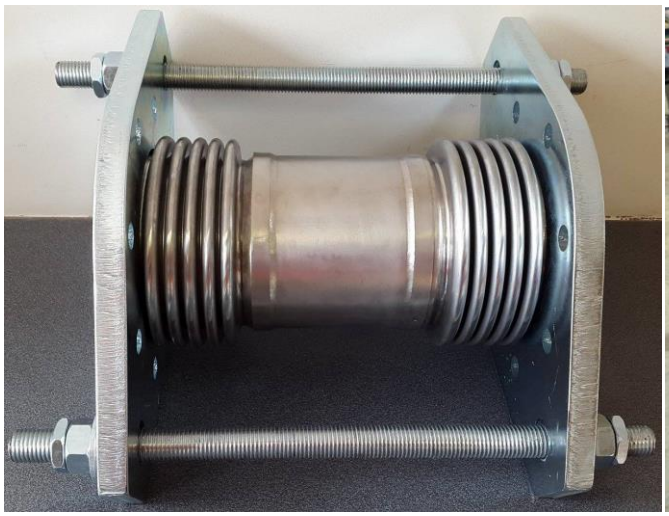
CAUTION

In general, vibrations of very high frequency due to strong turbulent flows, such as those occurring after safety, reducing and shut-down valves, as well as vibrations caused by vibrating gas or liquid columns can't be compensated.

Pre-restraint

Lateral expansion joints are usually installed with 50% pre-restraint of their expansion capacity. It is advisable to carry out pre-restraining on the completely installed system.

- While pre-restraining, consider the installation temperature of the pipeline, particularly for above ground level pipelines.
- If the installation temperature differs from the lowest design temperature, reduce the pre-restraint in accordance with the pre-restraint



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