Installation and Service Instructions
Axial - Expansion Joint

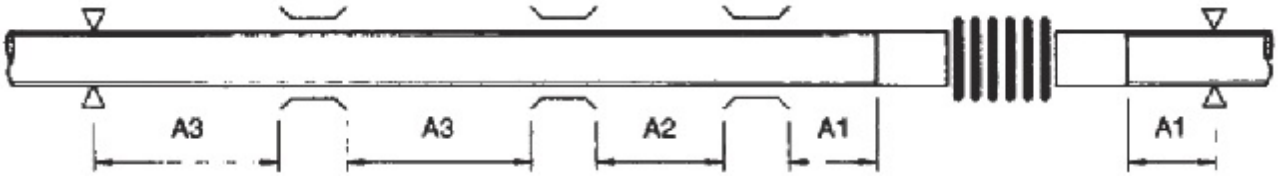
The following points must be observed during installation:

1. Make sure the exp. joint is the correct size for installation (where necessary, allow for pre-tensioning)
2. If the exp. joint has an arrow on it, this must point in the direction of flow.
3. During installation and subsequent operation, the exp. joint must under no circumstances be subjected to torsion (twisting)
4. The bellows of the exp. joint must be protected with ceramic fibre material (e.g. against sweat, plaster or mortar splashes) and against high mechanical stresses (throwing, heavy blows).
5. If present, the yellow marked installation fixing must be removed before putting into service.
6. Do not apply any test pressure until the line has been made immovable at the fixed points and guides.
7. During servicing, check for freedom of movement in the guide bearings. Inspect the bellows for damage, corrosion and cracks and check that the stroke is within limits. Test the fixed points for rigigity.
8. Testing after changes in operation conditions (e.g. pressure, temperature, medium, flow direction, vibrations, frequency of load fluctuations) and when the existing equipment is extended. In such cases, consultation with us should take place, regarding testing the existing expansion joints for their suitability under the altered conditions.
9. The valid working pressure has to be limited with a suitable safety-feature.

pipe transfer:

During installation of piping take care of a straight course. On disposition of the fixed points you have to look out that there only appear movements in accordance with the chosen type of expansion joint.

Between two fixed points there only have to be always one axial expansion joint at a time.



guide bearings have to be put in position as on the sketch above

guide bearing:

As guide bearings, which protect the pipline from bending in all directions, plain or roller bearings are preferable. A free-swinging suspension has to be avoided. For pipelines in the open, protection against wind and snow should be provided.

pre-tensioning:

Axial Expansion Joints are designed as standard for taking up movements in both plus and minus directions. With the appropriate installation, half the movement can be taken up in each direction - e.g. +/- 20 = 40 mm. By pre-tensioning the bellows, the full worfing range of the expansion joint can be exploited.

The following parameters are relevant for calculation of the pre-tensioning:

1. Installation dimensions at installation temperature
2. neutal length of the expansion joint without pre-tensioning
3. total movement of the expansion joint
4. highest actual operating temperature
5. lowest actual operating temperature
6. installation temperature

caution: If there are temperatures above 100° C make use of the decreasing factors concerning "pressure" and "movement"
(as you can see in our catalogue issue 2/2001, page 31-25 or on the web http://www.innoflex.at (installation and service instructions)

decreasing factors								
temperature °C	50	100	150	200	250	300	350	400
pressure	0,93	0,86	0,84	0,78	0,75	0,68	0,59	0,54
movement	0,98	0,95	0,93	0,91	0,89	0,87	0,86	0,85

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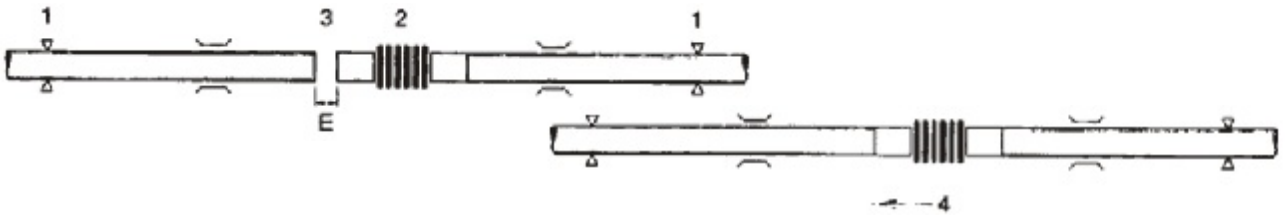
Examples of pre-tensioning:

Installation length = TL + H/2 - H x t_u/t_d

where $t_u = t_e - t_m$ and $t_d = t_{max} - t_{min}$

		example 1	example 2
TL	length of expansion joint as dekivered	218 mm	218 mm
t_{max}	maximum possible temperature of the pipeline	+ 130°C	+50°C
t_{min}	minimum possible temperature of the pipeline	- 10°C	- 10°C
t_e	installation temperature	+20°C	+20°C
H	calculated total expansion of the pipeline	66 mm	66 mm
	installation length according to above formular	237 mm	218 mm

pre-tensioning in the direction:



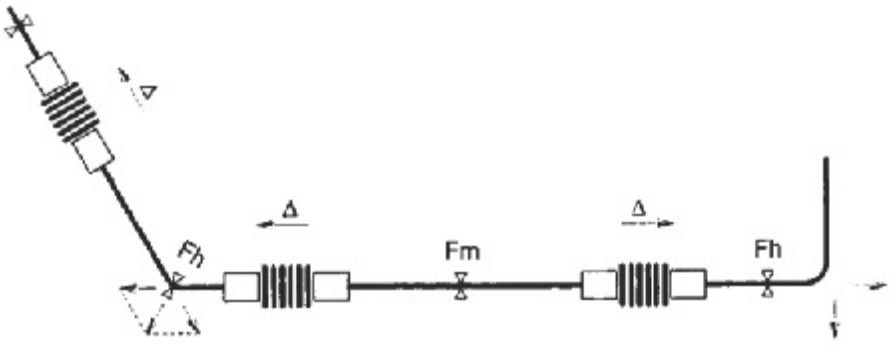
1. Fix the pipeline at both ends.
2. Mount the axial expansion joint in the initial position.
3. Cut out a legth of pipe corresponding to the required pre-tensioning E, or mount the pipeline such that the seperation of the pipes from one another corresponds to the required pre-tensioning E.
4. Move the axial expansion joint into the pre-tensioned position E. Finally weld the pipes or combine them using a flange.

fixed points:

The section of pipe in which the expansion joint is installed must ve bounded by fixed points. These must take up both the displacement forces of the expansion jointed the frictional resistance of the auide bearing. Fixed points and guides must be laid out so that the expansion joint does not bear the weight of the pipe.

there are the following types
of fixed points:

a) end-fixed point F_e
b) knee/elbow fixed points F_k
c) intermediate fixed points F_m



Important: Make sure that the fixed points are really rigid. It must not be possible for the pipeline to move several millimeters before the system actually becomes rigid.

If is possible to combine expansion joint of different construction or functionality within the same pipeline system, as lonf as there is a sufficient number of rigid fixed points to prevent the transmission of forces and moments.

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