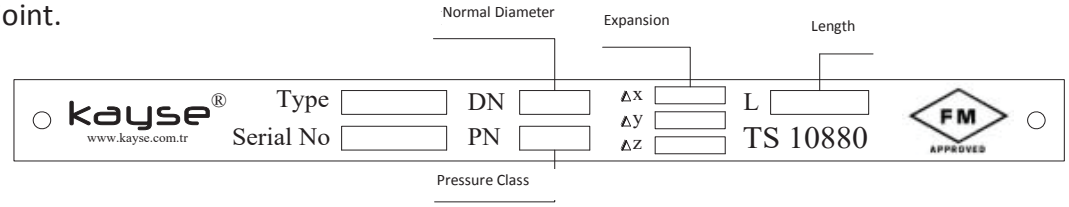
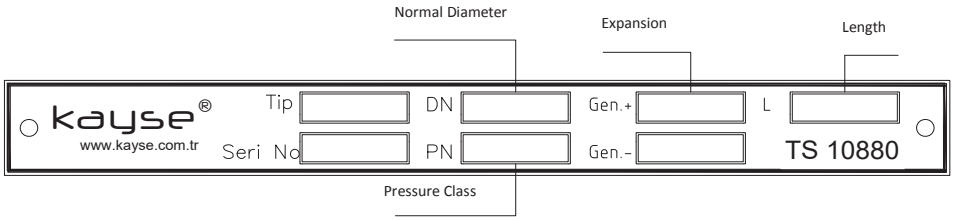
METAL EXPANSION JOINT MOUNTING INSTRUCTIONS -

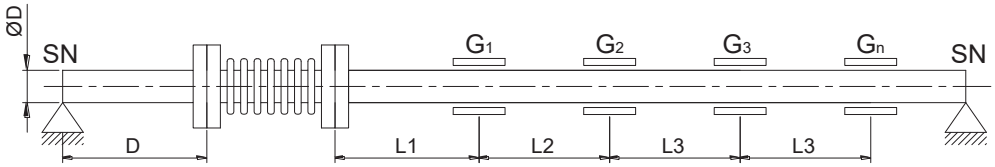
1-Ensure that nominal pressure and expansion values in the pipeline falls within the limits of the selected expansion joint.





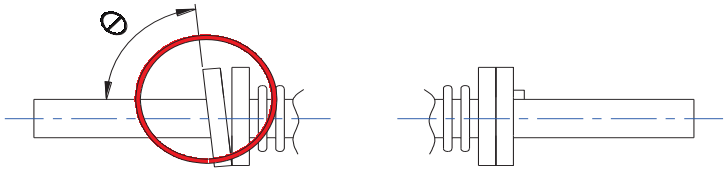
2-Only one Axial joint should be mounted between two fixed points.

3- Sliding supports and fixed points on the pipeline should be arranged as follows:



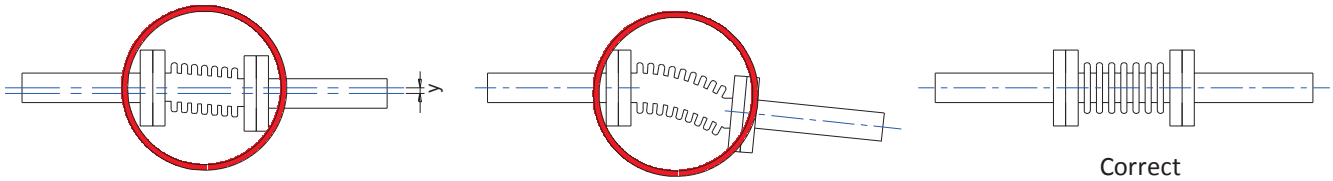
L_1=max 4D L_2=max 14D SN= Fixed point G= Sliding Support

4- Counter flanges must be perpendicular to pipe axis.



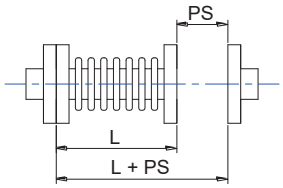
Wrong Correct

5- Expansion joint and pipeline should remain on the same axis.



Wrong Wrong Correct

6- Expansion joint must be prestressed. Prestress calculation is given below. Practically, half of total expansion amount can be taken. Expansion joint gap in the pipeline equals L+PS. One flange of Expansion joint



Should be connected to counter flange. Other flange should be connected to the other counter flange by using long studs, Tightened by using equal force and with prestress.

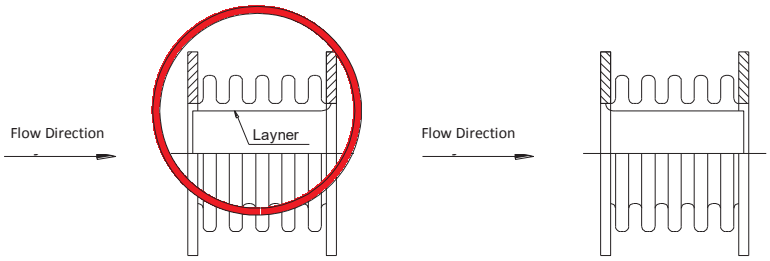
$$PS = \underset{\text{(Öngerme)}}{} \frac{\Delta L}{2} - \Delta L \frac{T_i - T_{min}}{T_{(max)} - T_{min}}$$

ΔL= Expansion Amount
Ti= Ambient Temperature
Tmin= Minimum Temperature
Tmax= Maximum Temperature

7- Ensure that slags and arc sparks produced during welding do not damage the bellows. No arc should pass over the bellow. Cover bellows with a protective sheet during welding process.

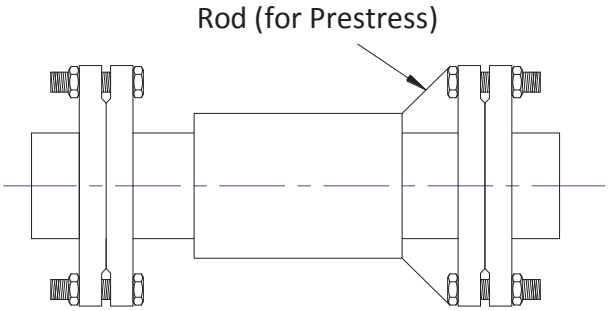
Wrong Correct

8- Beware of fluid direction while mounting liner joints.

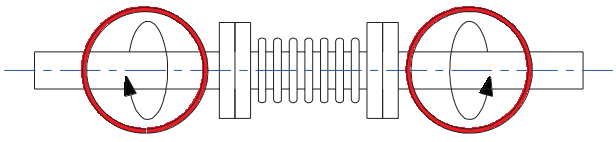


Wrong Correct

9- External pressure expansion joints are prestressed during production and do not require additional prestress. Centered prestress rods should be broken with a hammer after installation.

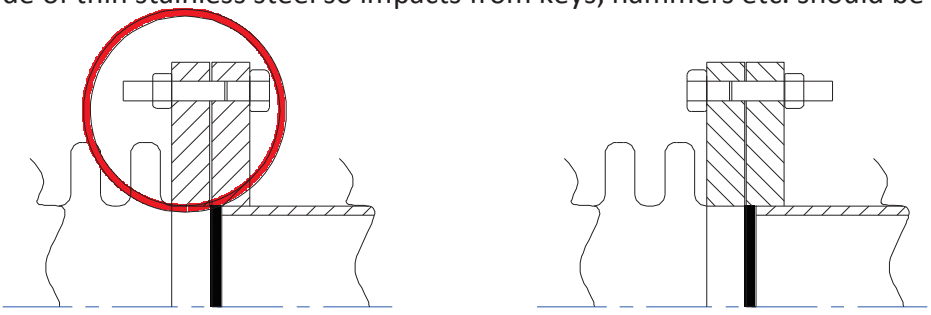


10- Expansion joints are zero load elements, they cannot bear any additional load. Particularly for mounting of fixed flange joints, ensure that counter flange holes correspond to the expansion joint flange's bolt circles. Never twist an expansion joint.



Wrong

11- Bellows are made of thin stainless steel so impacts from keys, hammers etc. should be avoided.

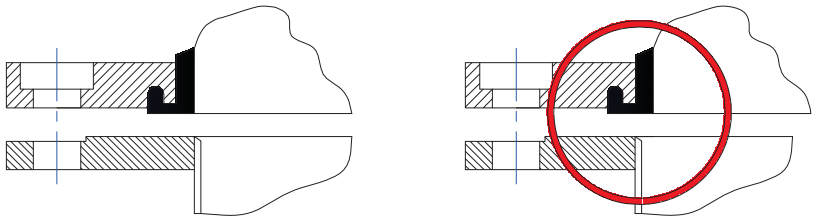


Yanlış Doğru

- RUBBER EXPANSION JOINT MOUNTING INSTRUCTIONS -

1- Mounting of KAYSE rubber expansion joints requires no additional seals.

2- In case counter flange has angle shape and is sized over standards, you might have to cut the rubber. Therefore, it is quite important that counter flanges create no pointed corners.



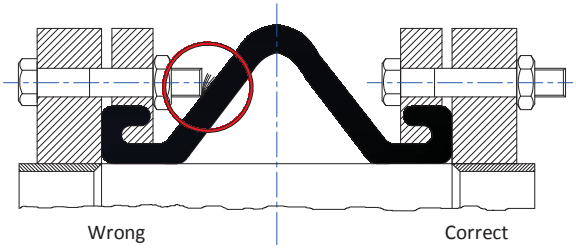
3- Follow the order given below to prevent over-tightening of flange bolts:

- First, manually remove the nut gaps.
- Then pre-tighten bolts reciprocally up to 50 Nm.
- Finally, tighten bolts reciprocally up to 100 Nm.

This torque provides 1.5-2 mm pressure on rubber surface and yields pressure sealing of 16 bars. If you don't have a torque meter, tighten bolts by 3-4 turns to ensure sealing.

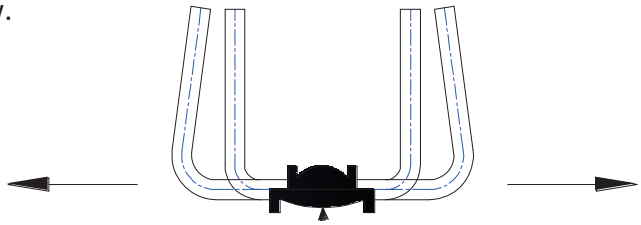
4- Do not use any pointed tools during mounting. In case of welding, protect from welding heat and sparks.

5- Mounting bolts should be selected such that they shall not project from the inner surface of the expansion joint. Long bolt projections might touch the rubber during operation and this friction can cause damage.

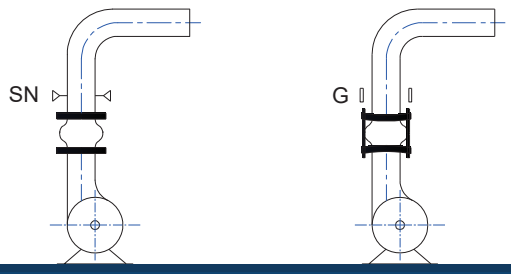


6- Sliding supports must be placed such that no extra load is introduced on the expansion joint.

7- Measures should be taken for pressure opening forces. Otherwise, expansion joint would deform and get damaged as shown below.

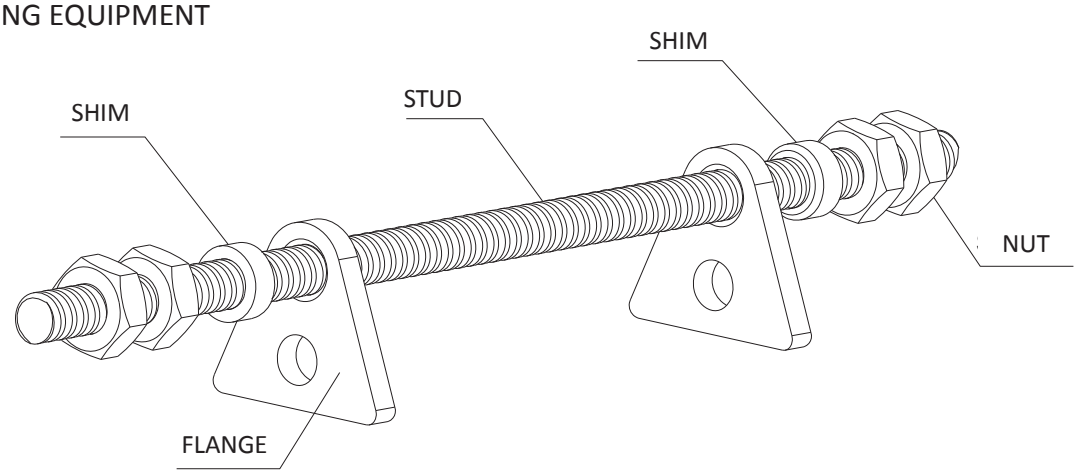


8- Measures should be taken for pressure opening forces at pump outlets to prevent opening of expansion joints.

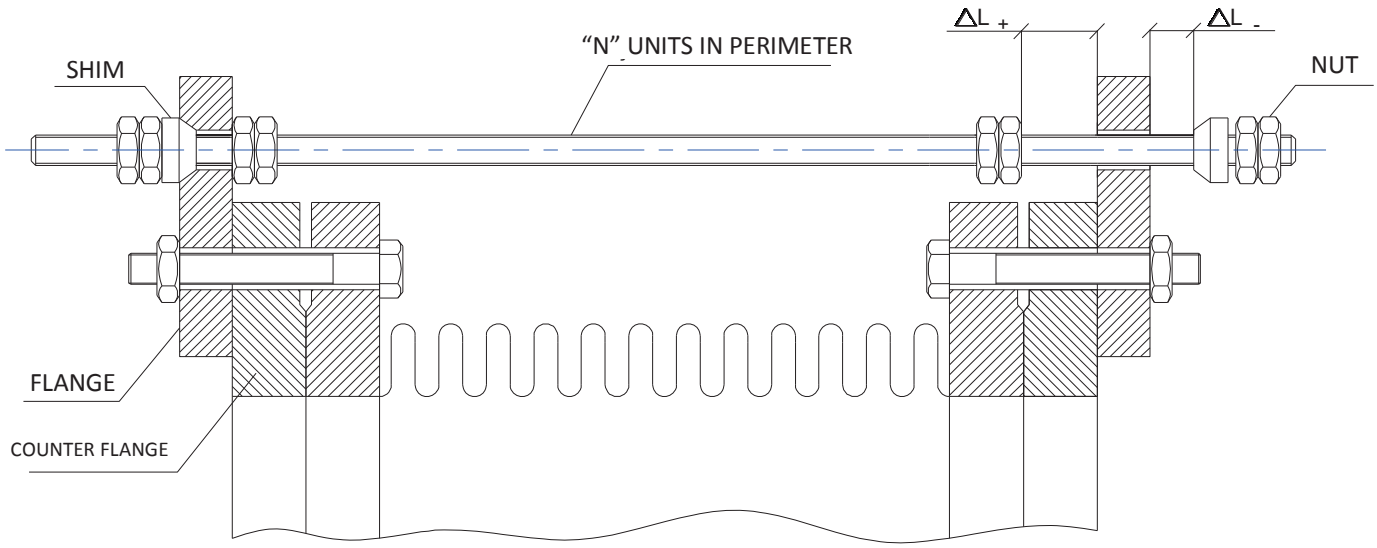


- LIMIT ROD METAL EXPANSION JOINT MOUNTING INSTRUCTIONS -

1- MOUNTING EQUIPMENT



2- MOUNTING



$\Delta L_1 = \alpha \cdot (T_{mount} - T_{min.}) \cdot L$

$\Delta L_2 = \alpha \cdot (T_{max.} - T_{mount}) \cdot L$

T_{mount} = Mounting Temperature

$T_{min.}$ = Minimum Temperature

Tmax.= Maximum Temperature

L = Pipe Length

α = Heat Expansion Coefficient

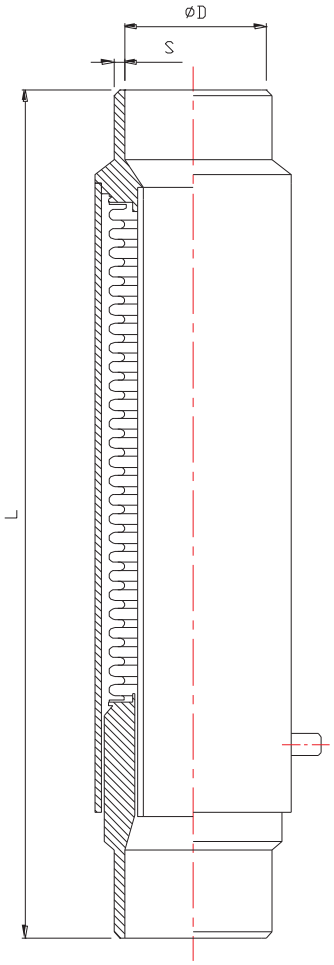
3- Number of tie-rods recommended to be used according to the expansion joint diameters are given below.

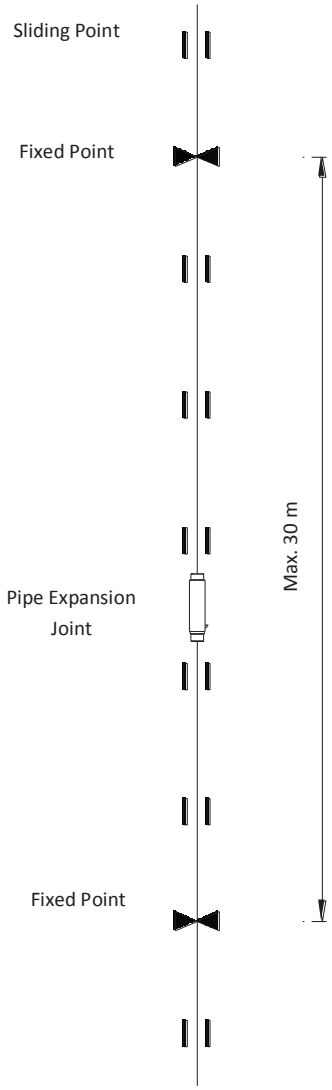
NÇ 25	NÇ 32	NÇ 40	NÇ 50	NÇ 65	NÇ 80	NÇ 100	NÇ 125	NÇ 150	NÇ 200	NÇ 250
M16 ÇEVREDE 2 ADET									M16 ÇEVREDE 4 ADET	

Example 1: For an expansion joint with nominal diameter of 100, 2 in perimeter (with 180° difference)Example 2: For an expansion joint with nominal diameter of 200, 4 in perimeter (with 90° difference)

- PIPE EXPANSION JOINT (DECORATIVE TYPE) MOUNTING INSTRUCTIONS -

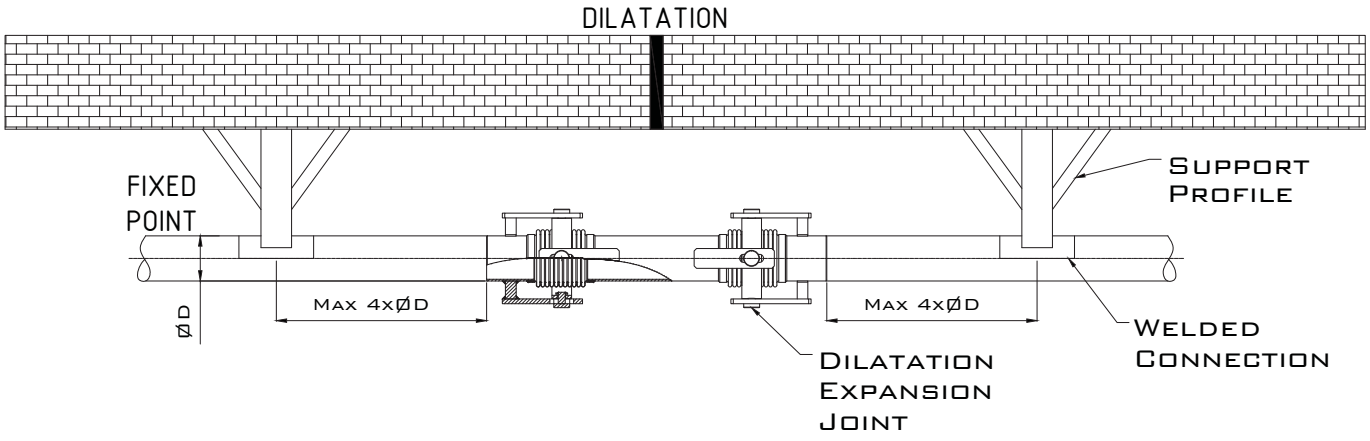
DIMENSIONS										
		1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
Outer Diameter	D	35	42	52	60	63	70	99	114	139
Length	L	260	260	260	260	260	260	260	260	260



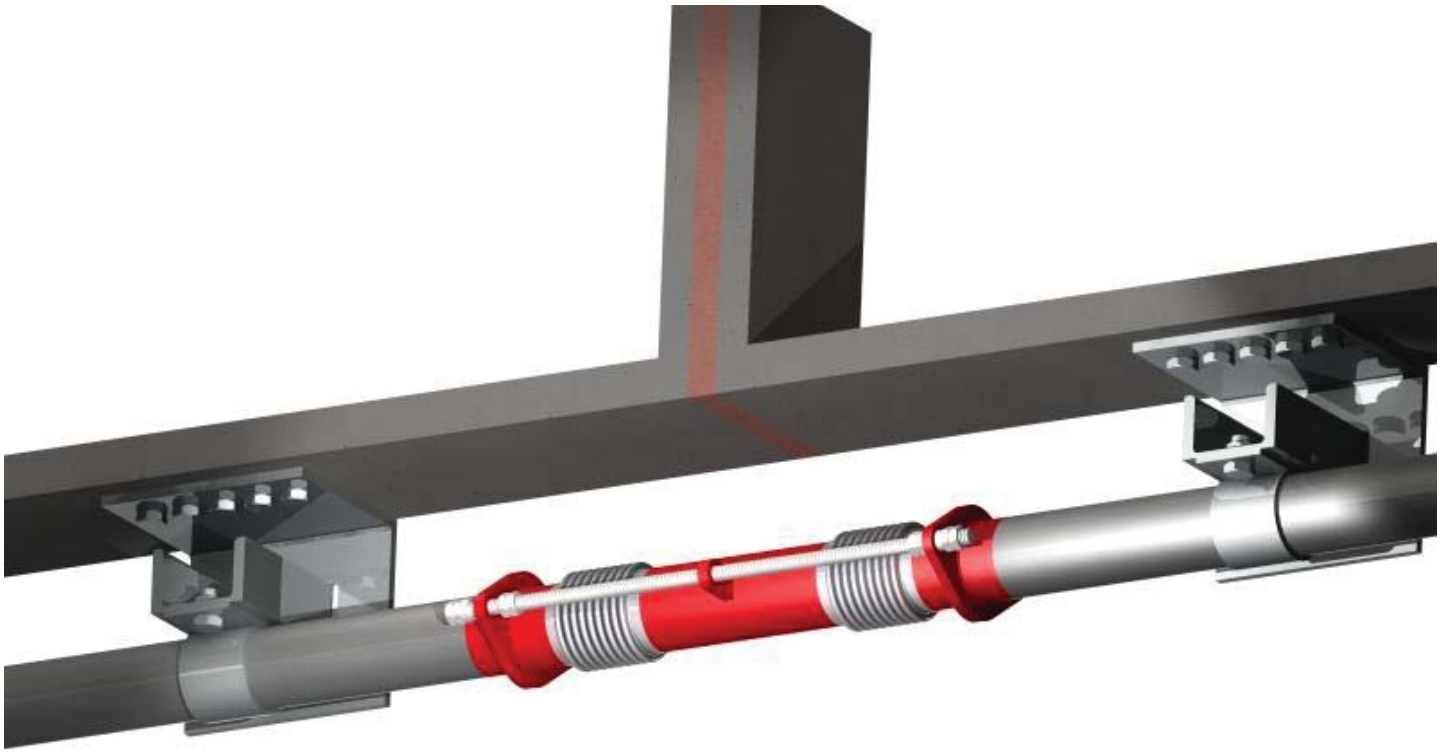


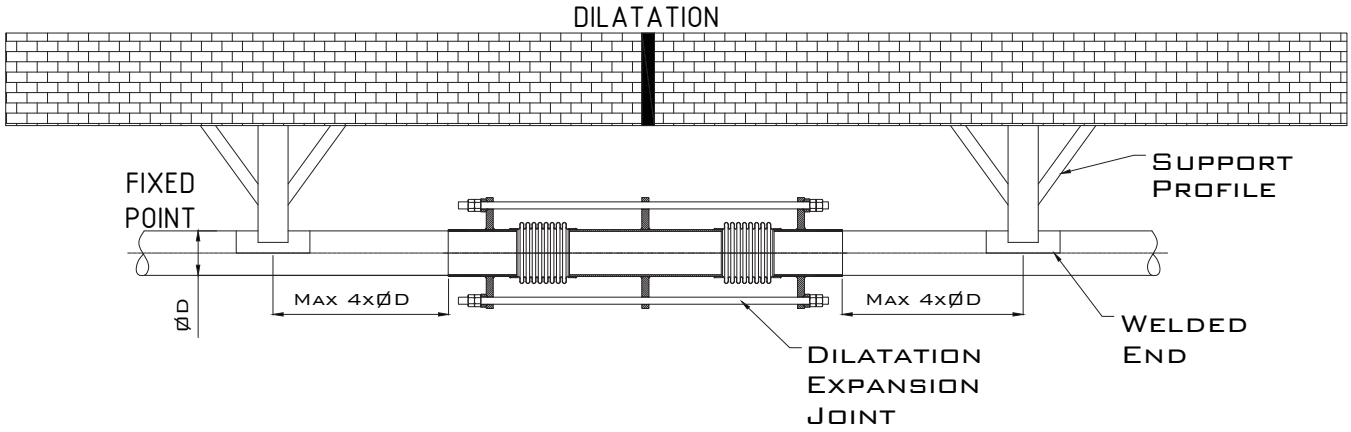
- Decorative type expansion joints should be mounted at points close to the ceiling, on the floor between two fixed points once in every 7 floors (appx. 25-30 m).

- UNIVERSAL EXPANSION JOINT MOUNTING INSTRUCTIONS -



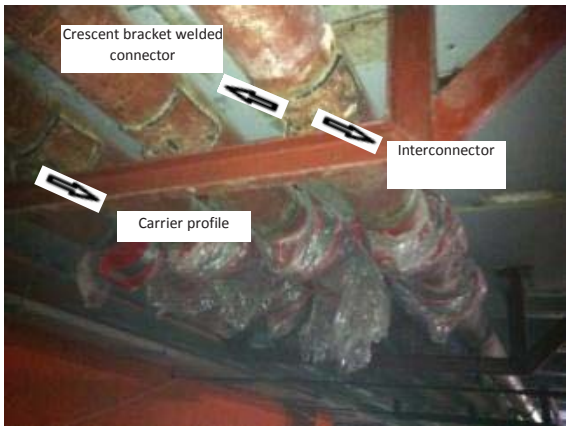
- LIMIT ROD EXPANSION JOINT MOUNTING INSTRUCTIONS -





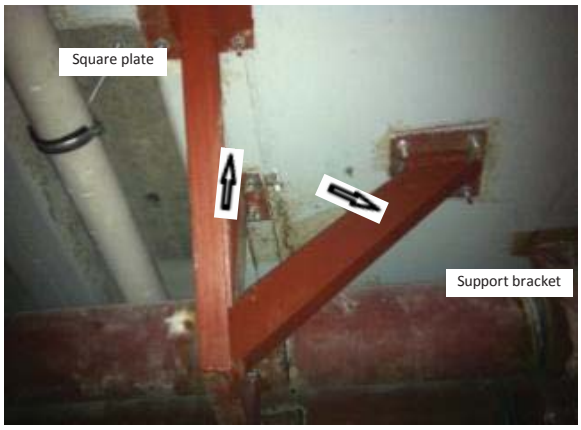
There is no standard implementation for mounting of expansion joints. Different solutions would apply according to the unique conditions of each construction site. As a general rule, both sides of expansion joint should be fixed with a weld connection and these fixed points should be placed at both sides of the expansion joint. Examples of different implementations made in different construction sites are given below.

IMPORTANT: Variables such as thickness of main carrier profile to be used at fixed points during expansion joint mounting , sheet thickness of square plate to be attached to the ceiling, diameter of expansion bolts and plugs and loads at fixed points should be calculated and selected by a specialist engineering firm.



Example of fixed point made with crescent shaped connector welded on earthquake universal joint used in fire pipeline.

Crescent shaped 20-30 cm long connector, cut with a diameter one grade higher than pipe diameter, is fixed on the pipe in main pipeline via perimeter welding. Insulation space of 5 cm is left between connector and main carrier profile (box section is preferred) and connection is made via welding with profile material (preferred) or 2-3 diameter grade smaller pipe material.



Different solutions are applied during fixation of main carrier to the ceiling, depending on the number of pipes in the line, pipe diameter and distance between pipe and ceiling.

If distance between pipe and ceiling is > 30 cm, support brackets should be used for reinforcement. Support brackets mounted outwards would allow greater load bearing.

For mounting of support brackets and main carrier onto the ceiling, loads on expansion joint should be calculated and 4-hole square plate with 80-10 mm thickness should be used. Watch out that the square plate has expansion bolts in all holes and refrain from mounting with only 2-3 bolts. Loads to be exerted on the expansion joint should be considered for selecting the diameters of the hole on square plate and the expansion bolt to be used.

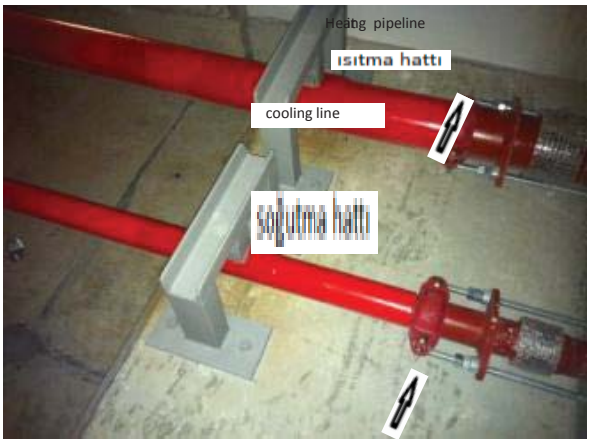
Fixed points should be created before and after elbows. Interconnector fixing the pipe to main carrier profile should be as long as the insulation space. Interconnectors made of the same material as the main carrier profile should be preferred.

A sample fixed point. The pipe is fixed onto the main carrier profile at 3 different points. It is recommended that the main carrier profile is in box shape. A BOX PROFILE can be obtained by connecting 2 NPU profiles. NPU iron thickness must be selected by considering the load to be borne.

An example where fixed at 2 different points.

In case pipeline is close to ceiling, fixing can be done without using support brackets.

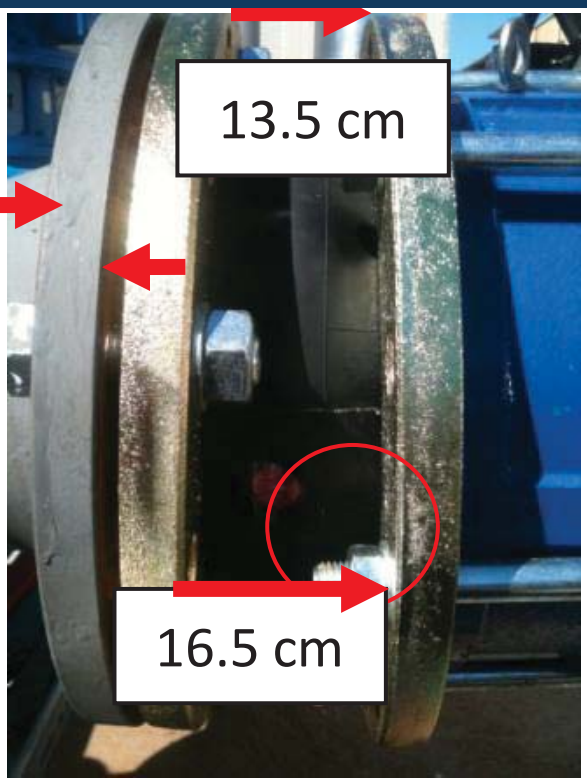
In systems with one single line, mounting could be done via fixing at both sides of expansion joint with welded connection.



Note that fixed points of expansion joints on heating/cooling lines should NOT be on the same carrier. Expansion joints of heating line and cooling line should be fixed onto different carriers. The system's operation in different modes cause different loads on the main carrier. In such case, moments applied to the different parts of the profile can cause deflection in the carrier profile.

On lines arriving at a turning point, both sides of the elbow should be fixed.

Otherwise, expansion joint would be twisted and main carriers of the fixed point would be deflected due to the pressure applied on the fixed point by elbows.



Points to observe for connection of rubber expansion joints on the line are provided below:

In case counter flange has angle shape and is sized over standards, you might have to cut the rubber. Therefore, it is quite important that counter flanges create no pointed corners.

Mounting bolts should be selected such that they shall not project from the inner surface of the expansion joint. Long bolt projections might touch the rubber during operation and this friction can cause damage.

Sliding supports must be placed such that no extra load is introduced on the expansion joint.

Measures should be taken for pressure opening forces at pump outlets to prevent opening of expansion joints.

Mounting should be performed in compliance with the length L indicated on the expansion joint label. In case the length is extended, rubbers shall not ensure sealing and pressure bleed shall take place through flange channels.

Of expansion joints with diameters over DN50 are to be used in natural gas pipelines, 2 standard axial expansion joints should be used, which should both be fixed at both sides of the line with welded connection.

For installations of free floating type system, a sliding rail system should be installed after the fixed point and the expansion joint to prevent deviations from the axis (provided that channel length shall not be shorter than the expansion value).

EXAMPLES OF FIXED POINT FOR SHAFT LINES

The most appropriate expansion joint type for column lines is external pressure type. Expansion joints should be installed once in every 10 floors (appx.), at a location close to the line center and clear to access. Flanges would ensure convenience for repair in case of potential problems. Expansion joints should be located in the flow direction as indicated by the arrow and expansion and pressure values on the label must be observed. Prestress rods must be removed after installation.

Detail of fixed point designed to be mounted on the wall in shaft lines.

Expansion joints used in vertical lines must definitely be fixed with welded connection and then supported with sliding supports.

Welding area, plate thickness, number and diameter of expansion bolts should be determined through calculation of loads to be applied onto the expansion joint. See on the left: the pipeline is fixed onto the plate on the wall via welding (recommended mounting form).

Example of a fixed point specially designed for shaft line.

2 crescent connectors are fixed onto the pipe with perimeter welding and support plates (3 or 4, depending on diameter) fixed onto the carrier via welding again.

In Omega Flex applications, mounting should be performed between two fixed points like expansion joints.

(fixed point available on the right, which cannot be seen in the picture)

In V Flex applications, again there should be fixed points on both sides. F Flexes with same diameters are pushed inside each other for mounting. V Flex should be hung on the ceiling with a rod by using the fixing pin on the elbow, and L profile should be removed during installation.

EXAMPLES OF MOUNTING MISTAKES

Limit rod nuts should be loosened by 1 nut length after installation.

Nuts left tight would restrict movement of bellows during testing and cause deviation from axis.

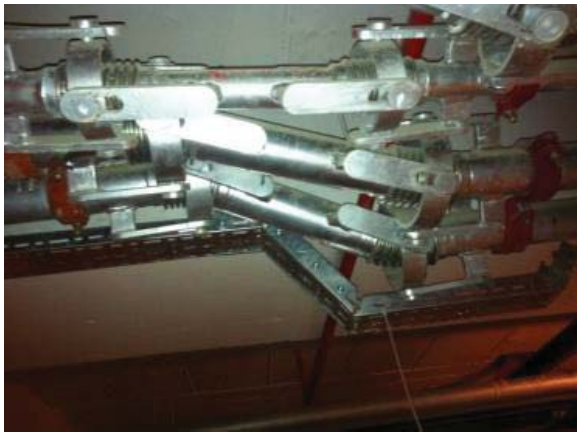
Failure of mounting between two fixed points, which is the main principle of expansion joint mounting, bellows would first be extended and then deviated from the axis.

In fixed point applications made with U bolts, deformations occur in bellows during testing.

Therefore, in these applications TWO U BOLST should be used, main carrier should be made of NPI IRON, U bolt should be fixed onto the pipe at both sides via peripheral welding and nuts should be spot welded.

Care should be taken to avoid arc sparks falling onto the bellows during mounting.

Bellows are made of double layer thin sheet, so high temperature arc sparks would cause perforations in the bellow.



For expansion joint mounting on galvanized pipes, fixed points should be applied at a distance of L/2 of expansion joint length by taking special precautions.

Threaded or grooved connection should be preferred.

All expansion joints should be mounted in the axis direction between two pipes.

Avoid deviations in the axis during mounting.

Position single expansion joint on quadruple pipeline without fixed point goes in during testing.

Fixed points should be created before and after elbows for expansion joints mounted after the elbows. Variables such as thickness of plates, welding area, diameter of expansion bolts and loads at fixed points should be calculated by a specialist engineering firm.

Welding quality must be observed during mounting. Loads applied onto the expansion joints can ruin or remove a weak welding application, in which case the fixed point and the line beyond would deviate from the axis and deformations would occur on bellows.

Heat expansion coefficients of plastic based aquatherm pipes are higher compared to steel pipes, therefore this should be observed when selecting the expansion joint and calculating expansion value. Natural omega should be applied in the first place in such lines.

EXPANSION JOINT TYPES	LINE TO MOUNT EXPANSION JOINTS									
	FIRE LINE	HOT-COLD WATER (EXP.JONT)	GALVANIZED LINES (EXP.JONT)	CAST IRON PIPE (EXP.JONT)	HOT WATER (HORIZONTAL)	COLD WATER (HORIZONTAL)	HOT WATER (VERTICAL SHAFT)	COLD WATER (VERTICAL SHAFT)	PIPE CONNECTIONS	DEVICE CONNECTIONS
UNIVERSAL EXPANSION JOINT	√	√		NO EXPANSION JOINT USED		SHOULD BE USED ACCORDING TO EXPANSION CALCULATION RESULT IN LONG LINES		SHOULD BE USED ACCORDING TO EXPANSION CALCULATION RESULT IN LONG LINES		
LIMIT ROD EXPANSION JOINT		√								
OMEGA TYPE U & V FLEX	√	√								
GALVANIZED LIMIT ROD EXPANSION JOINT (TOOTHED & THREADED)			√							
GALVANIZED UNIVERSAL EXPANSION JOINT (TOOTHED & THREADED)			√							
EXTERNAL PRESSURE EXPANSION JOINT					√		√			
AXIAL STANDARD EXPANSION JOINT					√					
DECORATIVE EXPANSION JOINT										
RUBBER EXPANSION JOINT									√	
DOUBLE JOINT TOOTHED EXPANSION JOINT									√	
DOUBLE LAYER BELLOW TYPE VIBRATION DAMPER									√	√

kayse®

KALITE SABR. YARATIM

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