

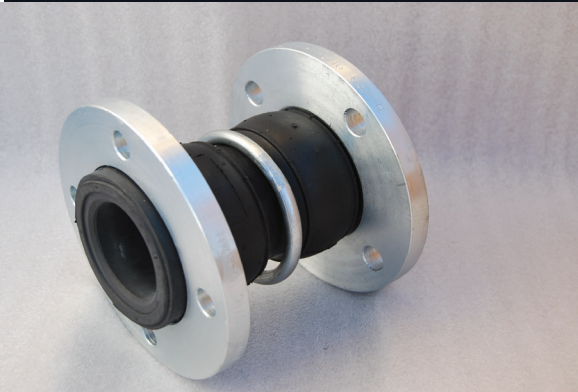
RUBBER EXPANSION JOINTS

THAT SATISFIES



GROUP
300

MANUFACTURE
BROCHURE

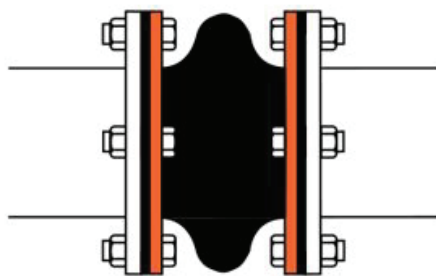




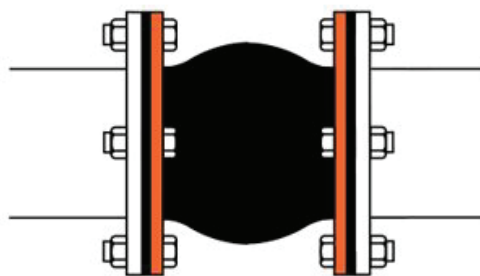
RUBBER EXPANSION JOINTS

A rubber expansion joint is a flexible connector manufactured of natural or synthetic elastomers and fabrics, if necessary, metallic reinforcements to provide stress relief in piping systems due to thermal and mechanical vibrations and / or movements. Noteworthy performance features include flexibility and concurrent movements in either single or multiple arch type construction, isolation of vibration and noise resistance to abrasion and chemical erosion.

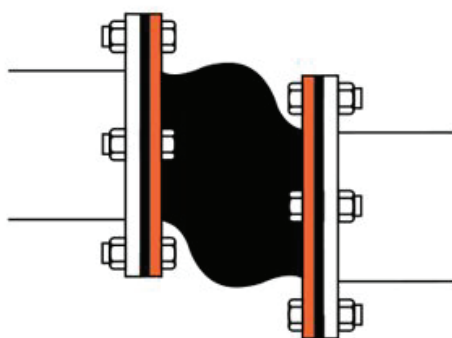
AXIAL COMPRESSION



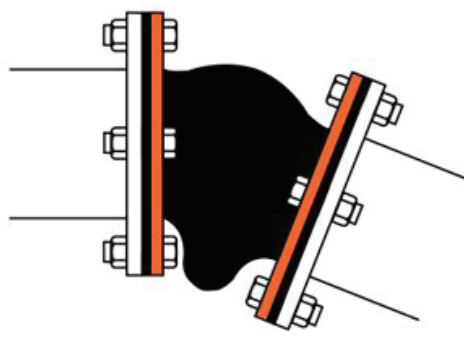
AXIAL ELONGATION



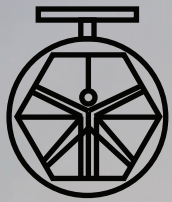
TRANSVERSE



ANGULAR



BASIC MOVEMENT ILLUSTRATIONS



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FUNCTIONS

Engineers can solve anticipated problems of vibration, noise, shock, corrosion, abrasion, stresses and space incorporating rubber expansion joints into designed piping system.

Reduce Vibrations

Rubber expansion joints isolate or reduce vibration caused by equipment.

Some equipment requires more vibration control than others. Reciprocating pumps and compressors, f.e., generate greater unbalanced forces than centrifugal equipment. However rubber pipe and expansion joints dampen undesirable disturbances including harmonic overtones and vibrations caused by centrifugal pump and fan blade frequency.

Dampen Sound Transmission

Subsequent to going on stream, normal wear, corrosion, abrasion and erosion eventually bring about imbalance in relative equipment, generating undesirable noises transmitted to occupied areas. Rubber expansion joints tend to dampen transmission of sound because of the steel rubber interface of joints and mating flanges. Thick wall rubber expansion joints, compared with their metallic counterparts, reduce considerably the transmission sound.

Compensate Lateral, Torsional and Angular Movements

Pumps, compressors, fans, piping and related equipment move out of alignment due to wear, load stresses, relaxation and setting of supporting foundations. Rubber expansion joints compensate for lateral, torsional and angular movements -preventing damage and undue downtime of plant.

Compensate Axial Movements

Expansion and contraction movements due to the thermal changes or hydraulic surge effects are compensated for with strategically located rubber expansion joints. They act such as helix springs, compensating for axial movements.

Movement Diagram for Combined Movement Absorption (axial and lateral) for EXPANSION JOINTS

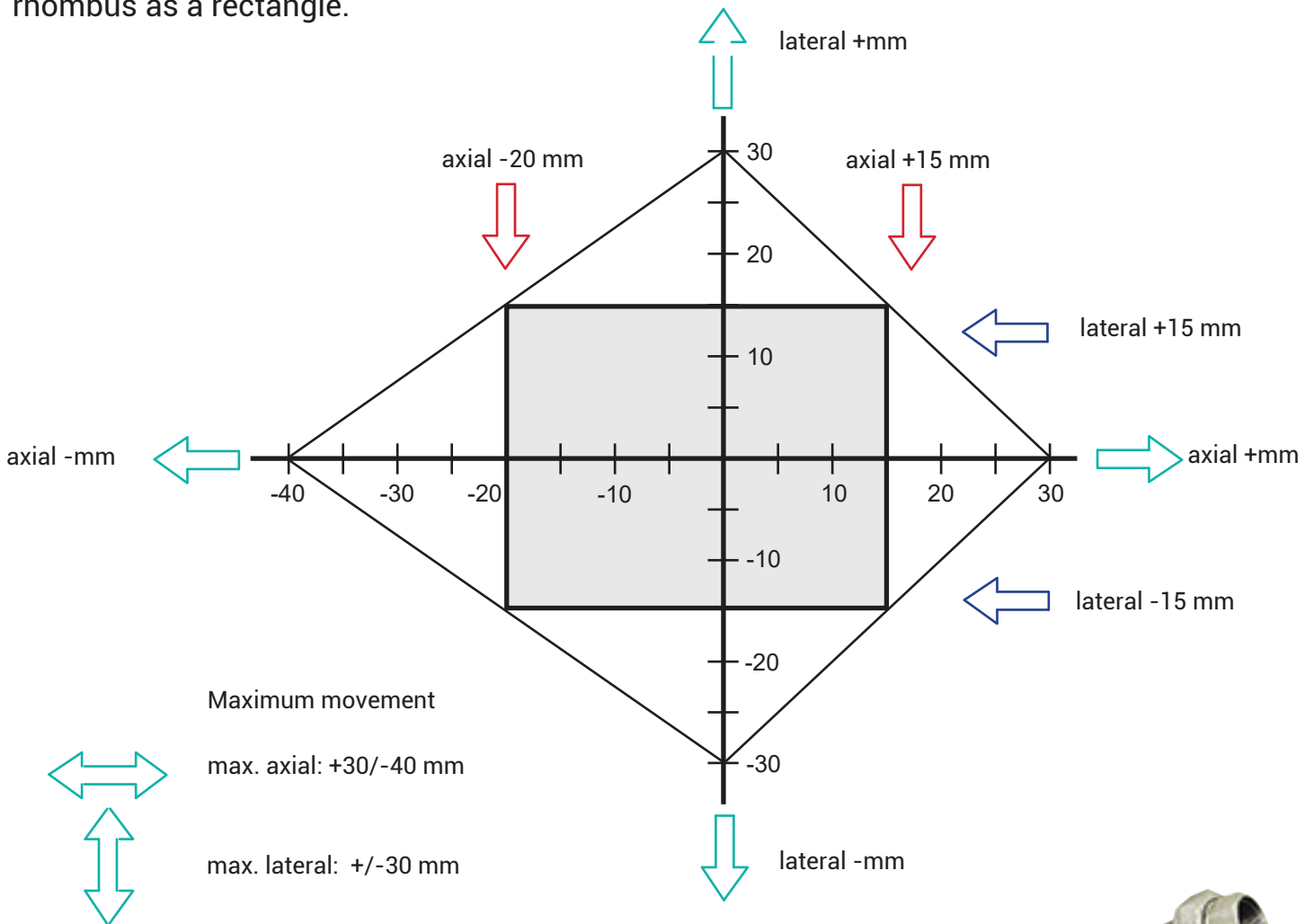
The rhombus below illustrates how a permissible combination of movement absorption can be represented for expansion joints.

The combination of lateral and axial movement may result in a maximum of 100 % utilisation for the expansion joint as a whole.

The combined movements must fit into the rhombus as a rectangle.

Example:

For movement of -20 mm and +15 mm axially, the expansion joint can absorb another +/-15 mm laterally. This rhombus can be used for all nominal diameters and sizes if the corresponding permissible maximum values for the expansion joint are plotted in the rhombus.



Any combination of movements can be found in this diagram.

The combined current movements must fit into the rhombus as a rectangle.

Example: axial -20 mm
 axial +15 mm

lateral max. +/-15 mm

Advantages of Rubber Expansion Joint

The industry has allied itself with designers, architects, contractors and erectors in designing and fabricating rubber expansion joints under rigid standards to meet present-day operating conditions. The industry has kept abreast of the technological advances in rubber compounding and synthetic fabrics to provide rubber expansion joints having advantages not available in other materials.

1. Minimal Face-to-Face Dimensions.

Minimal face-to-face dimensions in rubber expansion joints offer untold economies compared with costly expansion bends or loops. The relative cost of the pipe itself may be less or no more than a rubber expansion joint; however, total costs are higher when considering plant space, installation labor, supports and pressure drops.

2. Lightweight.

Rubber Expansion joints are relatively light in weight, requiring no special handling equipment to positions, contributing to lower installation labor costs.

3. Low Movement Forces Required.

The inherent flexibility of rubber expansion joints permits almost unlimited flexing to recover from imposed movements, requiring relatively less force to move, thus preventing damage to motive equipment.

4. Reduced Fatigue Factor.

The inherent characteristics of natural and synthetic elastomers are not subject to fatigue breakdown or embrittlement and prevent any electrolytic action because of the steel-rubber interface of joints and mating flanges.

5. Reduced Heat Loss.

Rubber expansion joints reduce heat loss, giving long maintenance-free service. The added piping required for loops contribute to higher operating costs after going on stream due to increase in heat losses.

6. Corrosion, Erosion Resistant.

A wide variety of natural, synthetic and special-purpose elastomers and fabrics are available to the industry. Materials are treated and combined to meet a wide range of practical pressure/temperature operating conditions, corrosive attack, abrasion and erosion. Standard and special sizes of rubber expansion joints are available with TFE/FEP liners, fabricated to the configuration of the joint body, as added insurance against corrosive attack. Teflon possesses unusual and unique characteristics of thermal stability, non-sticking surface, extremely low coefficient of friction and resistance to practically all corrosive fluids and forms of chemical attack.

7. No Gaskets.

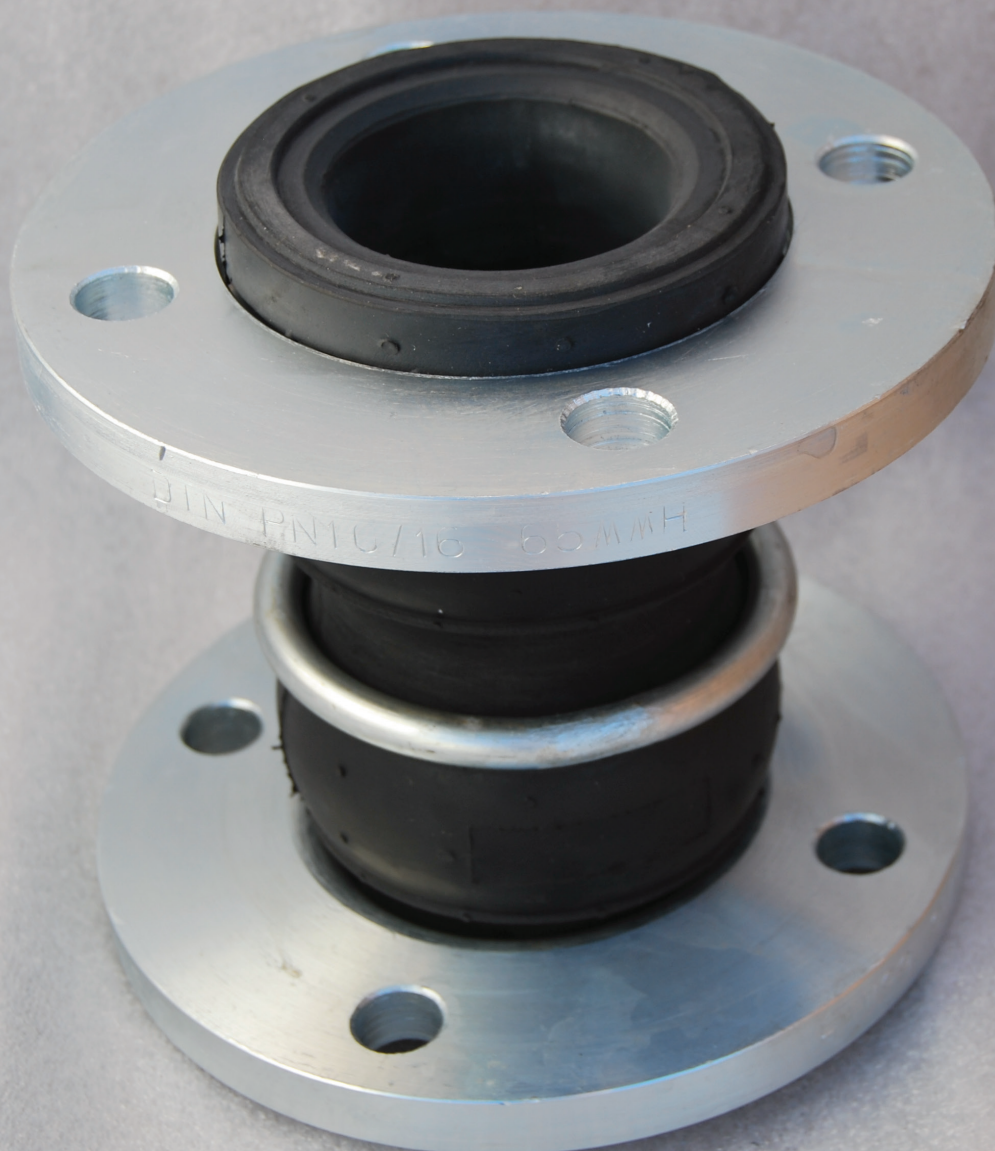
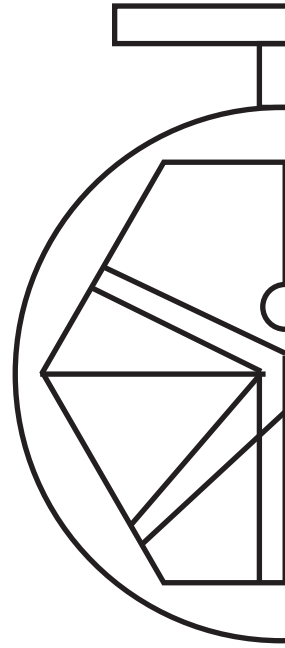
Elastomeric expansion joints are supplied with flanges of vulcanized rubber and fabric integrated with the tube, making the use of gaskets unnecessary. The sealing surfaces of the expansion joint equalize uneven surfaces of the pipe flange to provide a fluid- and gas-tight seal. A ring gasket may be required for raised face flanges. Consult manufacturer about specific applications.

8. Acoustical Impedance.

Elastomeric expansion joints significantly reduce noise transmission in piping systems because the elastomeric composition of the joint acts as a dampener that absorbs the greatest percentage of noise and vibration.

9. Greater Shock Resistance.

The elastomeric type expansion joints provide good resistance against shock stress from excessive hydraulic surge, water hammer or pump cavitation.





COMPONENTS

1. Tube.

A protective, leakproof lining made of synthetic or natural rubber as the service dictates. This is a seamless tube that extends through the bore to the outside edges of the flanges. Its purpose is to eliminate the possibility of the materials being handled penetrating the carcass and weakening the fabric. These tubes can be designed to cover service conditions for chemical petroleum, sewage, gaseous and abrasive materials.

2. Cover.

The exterior surface of the joint is formed from natural or synthetic rubber, depending on service requirements. The prime function of the cover is to protect the carcass from outside damage or abuse. Special polymers can be supplied to resist chemicals, oils, sunlight, acid fumes and ozone. Also, a protective coating may be applied to the exterior of the joint for additional protection. Construction Details of Rubber Expansion Joint Component

3. Carcass.

The carcass or body of the expansion joint consists of fabric and, when necessary, metal reinforcement.

3.A. Fabric Reinforcement. The carcass fabric reinforcement is the flexible and supporting member between the tube and cover. Standard constructions normally utilize high quality synthetic fabric. Natural fabrics can also be used at some pressures and temperatures. All fabric plies are impregnated with rubber or synthetic compounds to permit flexibility between the fabric plies.

3.B. Metal Reinforcement. Wire or solid steel ring imbedded in the carcass are frequently used as strengthening members of the joint. The use of metal sometimes raises the rated working pressure and can supply rigidity to the joint for vacuum service.

4. Split Metal Retaining Rings.

Retaining rings must be used to distribute the bolting load and assure a pressure tight seal. They are coated for corrosion resistance and drilled as specified. The rings are installed directly against the back of the flanges of the joint and bolted through to the mating flange of the pipe. Steel washer are recommended under the bolt heads against the retaining rings. Rings are normally 3/8" thick, but can vary due to conditions. The ring I.D. edge installed next to the rubber flange should be broken or beveled to prevent cutting of the rubber. Special retaining rings may be required for many of the expansion joint types depicted in this Chapter.

5. Control Unit Assemblies.

See Chapter IV for information regarding the definition, purpose and recommendations concerning the use of control rod assemblies. Many manufacturers presently brand their expansion joint products with the following label identification:

WARNING "Control Units Must Be Used To Protect This Part From Excessive Movement If Piping is Not Properly Anchored.



DAVINCI
VALVES™

QUALITY THAT SATISFIES





DAVINCI MATERIALS

Rubber expansion joints are available in a wide range of materials selected to suit the application, commonly used elastomers with their identification colours are listed below. Please feel free to discuss the application and material choice with our engineers.

EPDM

(Ethylene-propylene-terpolymerisat)
Good heat resistance and suitable for alkaline waste water, compressed air (oil free) and chemicals, weather-resistant, good gas tightness. Not suitable for use with hydrocarbons.

Temperature range: -25°C up to +130° C
Not suitable for oils or fatty media.

NBR

(Acrylnitrile-butadiene-rubber)
Oil and fuel quality, also suitable for gasses, solvents and fats. High abrasion resistance.
Temperature Range: -25°C up to +90°C (120° C)
Not suitable for steam of hot water.

NBR Oil Fuel

(Acrylnite-butadiene-rubber)
Oil and fuel quality, also suitable for gasses, solvents and fats acc. DIN51622. High abrasion resistance. Temperature Range: -20°C up to +90°C. Not suitable for steam of hot water.

YNBRH

(Acrylnite-butadiene-rubber)
Oil and fuel quality, also suitable for gasses, solvents, fats, cooling water and sea water. High abrasion resistance.
Temperature Range: -20°C up to +90°C (120° C)

White, Perbunan NBR

(Acrylnitrile-butadiene-rubber)
Foodstuff quality in acc. with RAL guidelines, good for pulps, fats, flours, juices, wines.
Temperature range: -20°C up to +80°C

CR Neoprene

(Chloroprene Rubber)
Water quality. Weather resistant.
Suitable for some small groups of lyes equal as compressed air and lightly oil-related media.
Temperature range: -20°C up to +70°C

Buty R

(Butyl Rubber)
Good heat resistance, suitable for alkaline waste water, compressed air (oil free) Chemicals and special hydraulic oils, weather-resistant.
Temperature range: -25°C up to +90°C.
Drinking water quality.

Viton FPM

(Fluorine Polymer)
Particularly suited for high temperatures. Good resistance to chemicals and oils, combustibles and solvents.
Temperature range: -10°C up to +150°C
Not suitable for ketones and chlorine.

PTFE

(Polytetrafluorine-ethylene)
Total resistance to all media.
Temperatura resistance: -50°C up to +230°C
Suitable for alkali metals in molten state and reaction formed amides.



DAVINCI EXPANSION RUBBER JOINT QUALITY STANDARDS

Interior Rubber Structure Layers are three:

- > **Inner Layer Glue** = protection effect
- > **Middle Skeleton Layer** = pressure effect
- > **Outer Layer Glue** = antiaging effect

All in High quality materials: Virgin rubber with EPDM



Steel Wire

The reinforcing steel wire at both ends of the rubber pipe body avoids the rubber plate from pulling out of the flange slot and also strength, just as prevention of any kind of removing.
Strong fabric reinforcement and rings until min 50 bars for break point.

Possibility to supply all types of tie rods.

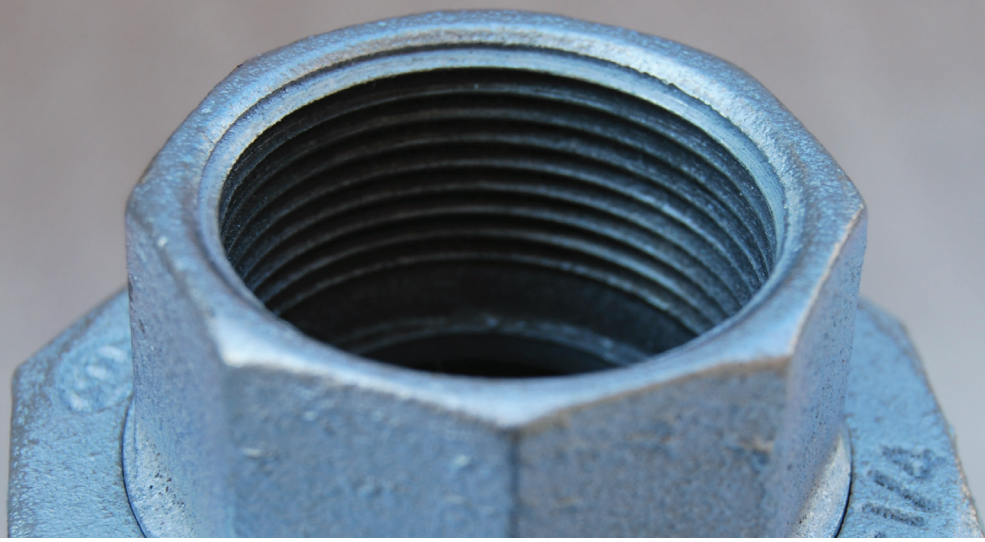


Galvanized flanged

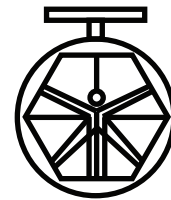
The **galvanized flanged rubber joint** is cold galvanized by forging flanges then combined with rubber pipes. Galvanized flange has a certain corrosion resistance.

Flanges according DIN standard.





Optimum Solution for narrow spaces, still able to absorb large movements due to the flexible bellows. Absorb axial-, lateral-, and angular movements. Reduce water shock. Safe, reliable, durable and maintenance free. Temperature-, chemical-, and corrosion resistant.



DAVINCI VALVES™

Managing flexibility and pressure is optimised. Low spring rates. Vacuum and pressure proof. Can accommodate line misalignment. Sound effects.



TAKE CARE WITH OTHER SUPPLIERS:

- > They may use recycle rubber instead of natural rubber +EPDM
- > Flange thickness might be lower than standard ones to reduce the price, what is very dangerous because can break very easy.
- > With weak ring in the rubber connection with flange, body can get off from flange.
- > Weak fabric reinforcement in rubber using other materials different as Nylon or polyester, possibility to break out with low pressure.

APPLICATIONS

Expansion joints have usage in various sectors, like energy productions, paper industry, chemical industry, water treatment, oil and gas. Everywhere where exist pipelines and occurs thermal movements or vibration, then expansion joints can be used.



Recommended applications are:

Air conditioning, heating, ventilating systems in industrial building and vessels.

Central and ancillary power generating.

Stations in industrial buildings, factories, ships and offshore applications.

Sewage disposal and water treatment, pumps, etc.

Process piping in pulp and paper plants.

Piping systems for chilled or hot water. Cooling systems for power generation.

Feed water and draining lines for water works, sewage, sanitary piping system, etc.

Oil lines for industrial plants, shipyards, phosphate plants, etc.

Our qualified engineers design a suitable expansion joints in accordance to your technical needs. Also a wide range of different types of our standard expansion joints are carried in stock.

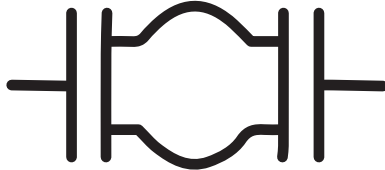
OUR EXPANSION JOINTS are used in pipelines, on armatures and on pumps to compensate:

- > Thermal expansion
- > Mechanical vibrations

- > Acoustic oscillations
- > Tensions

It's always very important to know Maximum Operating Temperature because the permissible operating pressure falls when the temperature rises, please pay attention to the pressure/temperature specifications for the respective expansion joint.

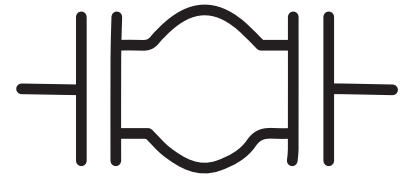
During continuous operation, the maximum temperatures stipulated such in the following table and may be exceeded by 10 % in the short term.



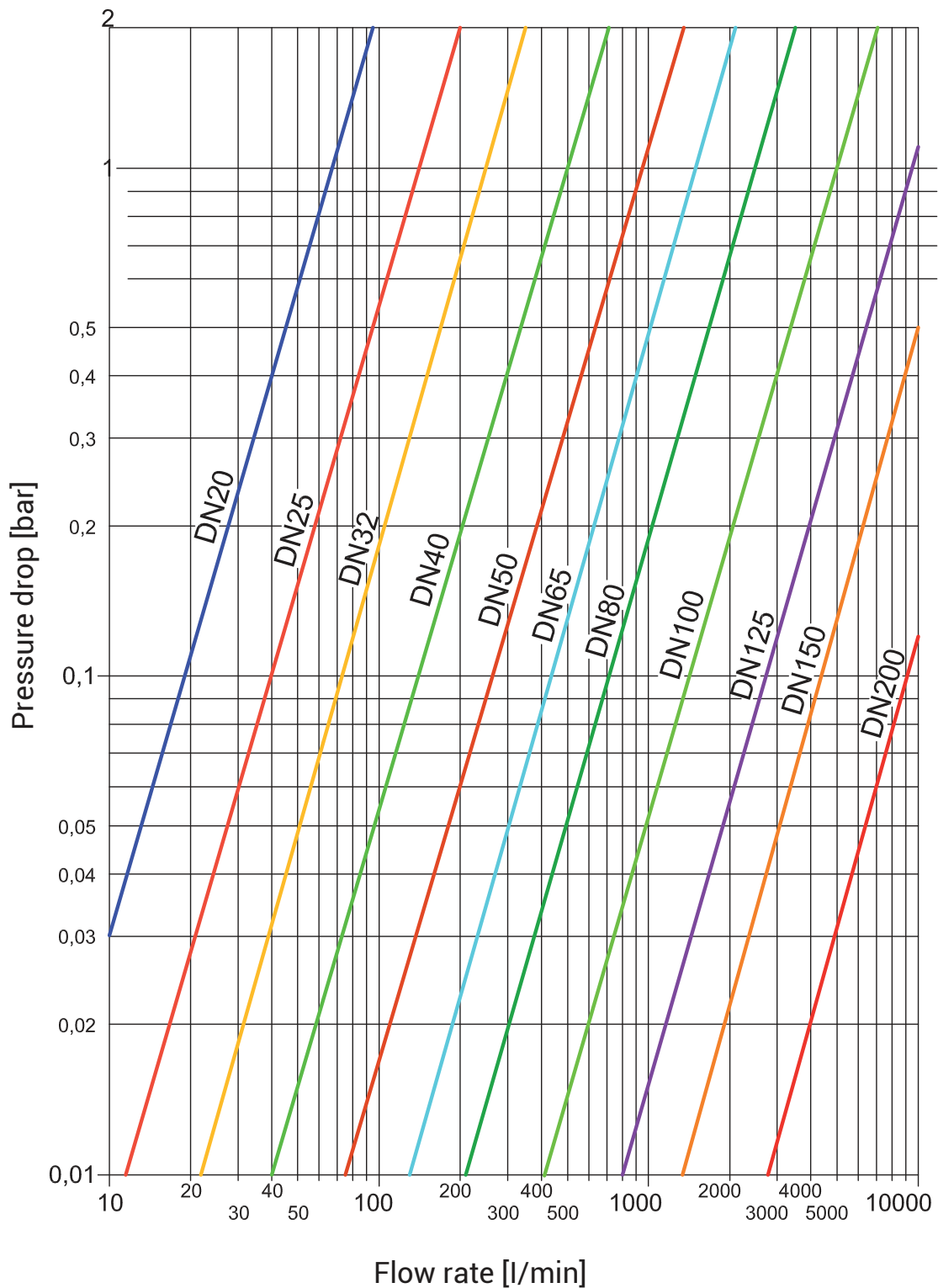
Core	Rein- forcement	Temperature							
		80 °C	90 °C	100 °C	110 °C	130 °C	150 °C	200 °C	230 °C
EPDM ht	Aramid	█	█	█	█	█	█	█	█
EPDM	Aramid	█	█	█	█	█	█	█	█
EPDM	Polyamide	█	█	█	█	█	█	█	█
NBR	Polyamide	█	█	█	█	█	█	█	█
CSM	Polyamide	█	█	█	█	█	█	█	█
FPM	Aramid	█	█	█	█	█	█	█	█
CR	Polyamide	█	█	█	█	█	█	█	█
NBR (beige)	Polyamide	█	█	█	█	█	█	█	█
Si	Glass fabric	█	█	█	█	█	█	█	█
EPDM	Polyamide	█	█	█	█	█	█	█	█
EPDM	Aramid	█	█	█	█	█	█	█	█
IIR	Polyamide	█	█	█	█	█	█	█	█
NBR	Polyamide	█	█	█	█	█	█	█	█
NBR	Polyamide	█	█	█	█	█	█	█	█
CSM	Polyamide	█	█	█	█	█	█	█	█
NBR	Polyamide	█	█	█	█	█	█	█	█
EPDM	Aramid	█	█	█	█	█	█	█	█
IIR	Polyamide	█	█	█	█	█	█	█	█
NBR	Polyamide	█	█	█	█	█	█	█	█
NBR	Polyamide	█	█	█	█	█	█	█	█
NBR	Polyamide	█	█	█	█	█	█	█	█
CSM	Polyamide	█	█	█	█	█	█	█	█
FPM	Polyamide	█	█	█	█	█	█	█	█
NBR	Steel cord	█	█	█	█	█	█	█	█
NBR	Steel cord	█	█	█	█	█	█	█	█
HNBR	Steel cord	█	█	█	█	█	█	█	█
CR	Polyamide	█	█	█	█	█	█	█	█
IIR	Aramid	█	█	█	█	█	█	█	█
NBR	Aramid	█	█	█	█	█	█	█	█
CSM	Aramid	█	█	█	█	█	█	█	█
FPM	Aramid	█	█	█	█	█	█	█	█
EPDM ht	Aramid	█	█	█	█	█	█	█	█
EPDM	Aramid	█	█	█	█	█	█	█	█
EPDM	Polyamide	█	█	█	█	█	█	█	█
NBR	Polyamide	█	█	█	█	█	█	█	█
CSM	Polyamide	█	█	█	█	█	█	█	█
FPM	Aramid	█	█	█	█	█	█	█	█
CR	Polyamide	█	█	█	█	█	█	█	█
NBR	Polyamide	█	█	█	█	█	█	█	█
Si	Glass fabric	█	█	█	█	█	█	█	█
EPDM	-	█	█	█	█	█	█	█	█
CR	Polyamide	█	█	█	█	█	█	█	█
EPDM	Polyamide	█	█	█	█	█	█	█	█
FPM	Glasfabric	█	█	█	█	█	█	█	█
NBR	Polyamide	█	█	█	█	█	█	█	█
CR	Polyamide	█	█	█	█	█	█	█	█
PTFE	-	█	█	█	█	█	█	█	█
PTFE	-	█	█	█	█	█	█	█	█

DAVINCI RUBBER EXPANSION JOINTS are also usefull for:

- > Sound isolation
- > As dismantling joints on pipeline armatures
- > To assimilate assembly tolerances
- > To seal pipeline wall penetrations
- > Eliminate electrolysis between dissimilar metals



And depending on the liquid viscosity of 1mm² you will have to have find very usefull the following table for Pressure Loss in Expansion Joints Rubber:



MANUFACTURE

In DAVINCI VALVES we manufacture the best quality rubber expansion joints and our manufacture programm includes our technical service through all the different steps necessary to get your product just the way you need.

1 a

RAW MATERIAL.1



1 b

RAW MATERIAL.2



2 a

ELASTOMERS.1



2 b

ELASTOMERS.2



3 a

FABRIC LAYER.1



3 b

FABRIC LAYER.2



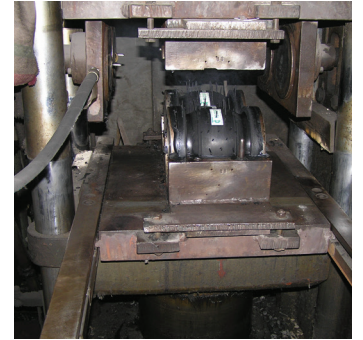
4

CONSTRUCTION



5 a

VULCANIZE.1



5 b

VULCANIZE.2



6

ASSEMBLY



7

TESTING



8

PACKING



"Quality that satisfies"

TESTING



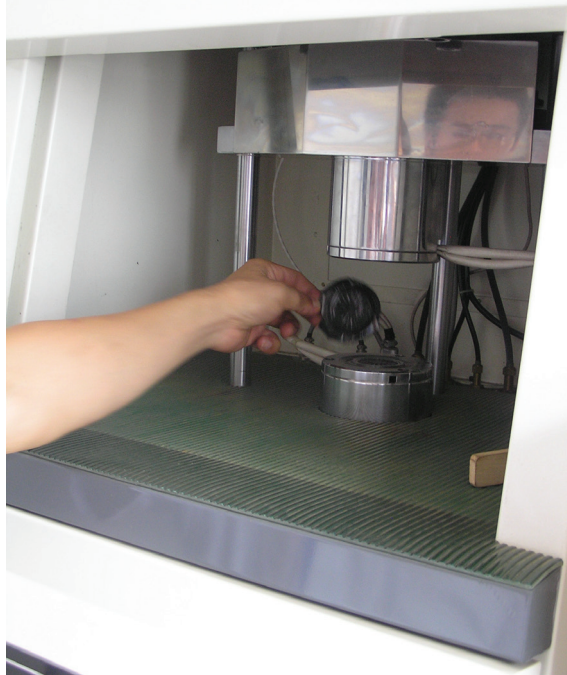
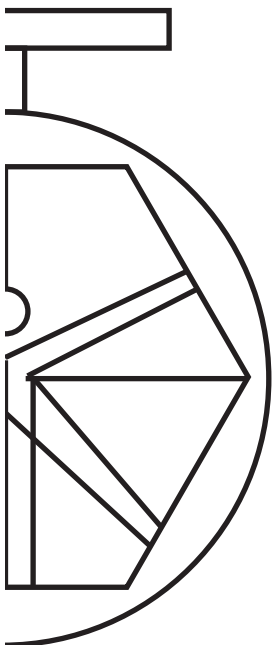
If you need specific certification for the different types of tests that verify the measurements, the quantities, the weights, in addition to the tests that check both, the components and the final product, this is the absolute guarantee service of DAVINCI VALVES LTD, through which it is ensured that the order sent to you is the one actually contracted.



The consumption of time, resources and efforts in the import process is overwhelming due to the complexity it requires and it is highly recommended to be advised by experts in this field. Avoiding possible delays and unnecessary complications you will have enough room to dedicate your time to matters of greater importance in your company. In DAVINCI VALVES LTD we offer you a personalized service adapted to your requirements.



While the import process lasts, you will know the status of your goods with all detailed information.



RUBBER EXPANSION JOINTS



Rubber Expansion Joints Single Sphere Flanged End Ref. 63-300A/PN10-16

Range from ND32 up to ND600
 Designed to absorb dilatation movements, vibrations in fluid conduction pipelines.
 Single wave construction with low load loss.
 Absorbs sound and isolates vibrations from any direction.

Not need assembly joints.



Rubber Expansion Joints Single Sphere Flanged End High Pressure Ref. 63-301A/PN10-16-25-40

Range from ND150 up ND3000
 Designed to absorb dilatation movements, vibration in fluid conduction pipelines.
 Single wave construction with low load loss.
 Absorbs sound and isolates vibrations from any direction.

No need assembly joints.

Mounting Flanges: EN1092 1 PN10/
 PN16/ANSI150
 Side Flanges Acc. to ISO7005 1.
 Pressure Test EN 122561 Class A



Rubber Expansion Joints Single Sphere Flanged End Ref. 63.1-300A/ PN10-16

Maximum Working Pressure: 16 Bar
 Explosion Pressure: 50 Bar
 Working Temperature: 10° C+100° C
 See correction acc. Temperature
 Vacuum KP(mmHg) 65 (490)

Mouting with Flanges: EN1092 PN10/
 PN16 / ANSI 150.
 Side Flanges acc. ISO 7005 1
 Pressure Test EN 12266 1 Class A
 Body: 24 Bars



Rubber Expansion Joints Single Sphere Flanged End High Pressure Ref. 64-300A /PN 10-16

Working Pressure PN10 / PN16 /PN25 / PN40
 Burst Pressure Bar 30 / 48 / 55 / 65
 Vacuum (mmHg) 400 / 650 / 750 / 830
 Cover Material: EPDM
 Reinforcing Fabric: Nylon
 Tube: EPDM
 Retain Rings: Steel
 Flange: Carbon Steel

RUBBER EXPANSION JOINTS



Rubber Expansion Joints Twin Sphere Flanged End Ref. 64.1-300A / PN10-16

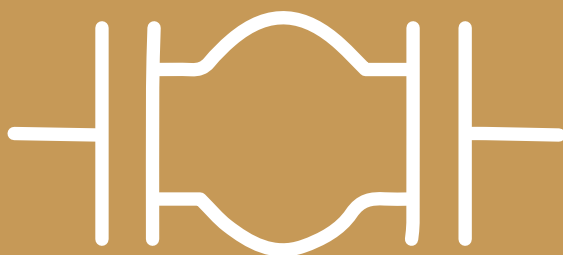
Range from ND32 up to ND600
Designed to absorb dilatation movements, vibrations in fluid conduction pipelines.
Twin Wave Construction Low load loss.
Absorbs sound and isolate vibrations from any direction.
Not need assembly joints.

Rubber Expansion Joints Twin Sphere Threaded End Ref. 65-300A / PN10

Range from ND15 up to ND80
Designed to absorb dilatation movements, vibrations in fluid conduction pipelines.
Double wave construction with low load loss.
Absorbs sound and isolate vibrations from any direction.
Not need assembly joints.

Tie Rods For Rubber Expansion Joints Ref. 67-300A

Always includes nuts and washers.

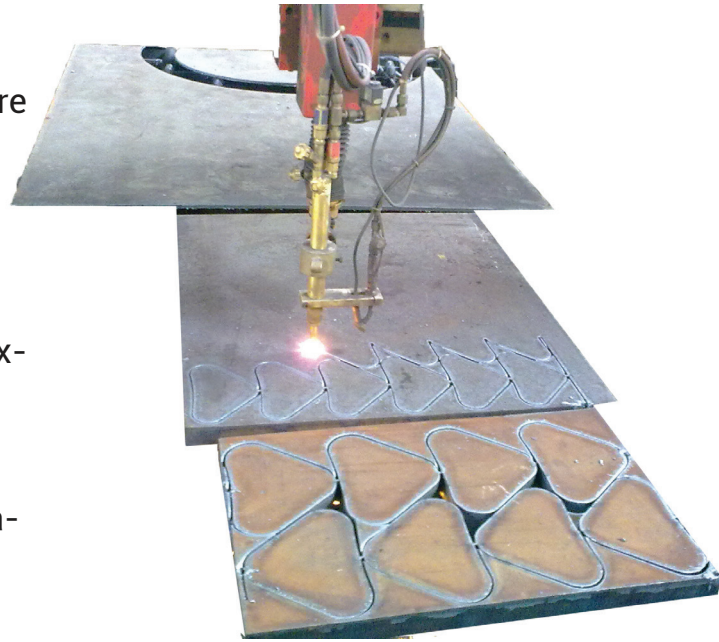


CONTROL TIE RODS

DEFINITION

A control unit assembly is a system of two or more control rod units (limit rods, or compression sleeves) placed across an expansion joint from flange to flange to minimize possible damage caused by excessive motion of a pipeline.

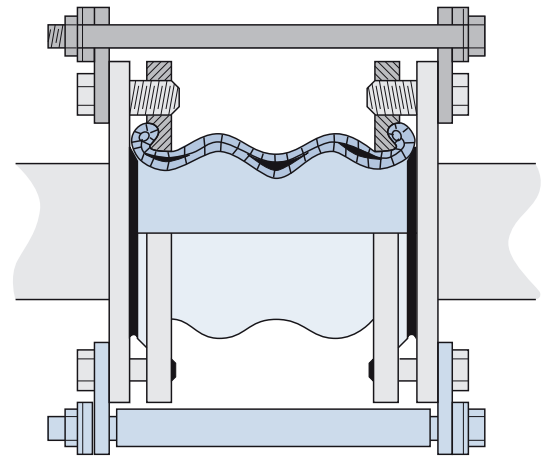
The control unit assemblies can be set at the maximum allowable expansion and/or contraction of the rubber expansion joint. When used in this manner, control units are an additional safety factor and can minimize possible damage to adjacent equipment.



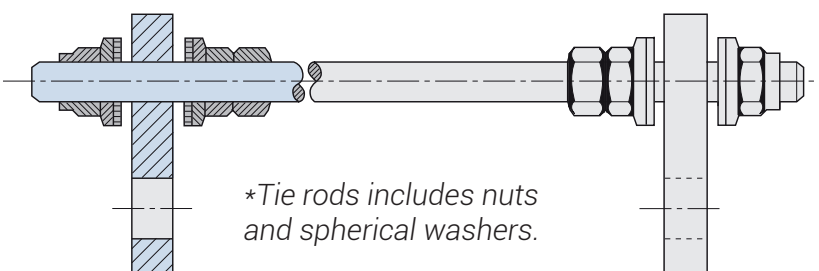
USE OF CONTROL TIE RODS UNITS WITH RUBBER EXPANSION JOINTS

Rubber expansion joints must be installed between two fixed anchor points in a piping system.

The pipe system must be rigidly anchored on both sides of the expansion joint to control expansion or contraction of the line. Piping anchors must be capable of withstanding the line thrusts generated by internal pressure or wide temperature fluctuations.

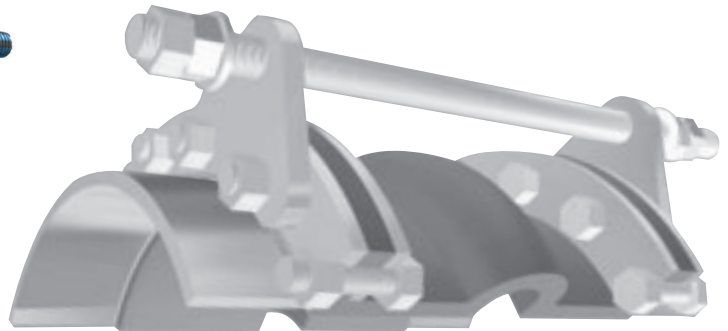
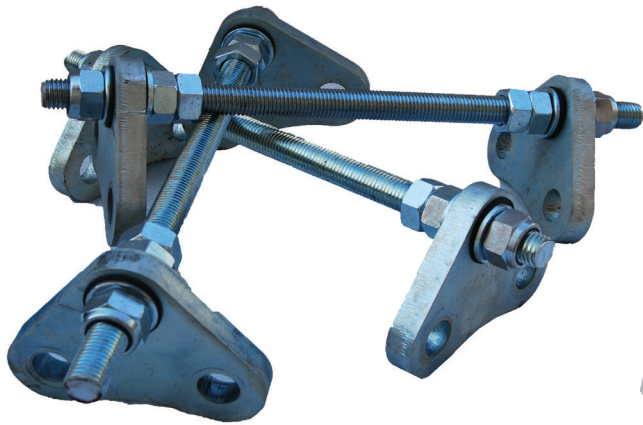


When proper anchoring cannot be provided, CONTROL UNITS ARE REQUIRED.



ND	N° OF TIE RODS	
	NP10	NP16
40	-	2
50	-	2
65	-	2
80	-	2
100	-	2
125	-	2
150	-	2
200	4	2
250	4	2
300	4	4
350	4	4
400	4	4
450	4	4
500	4	4
600	4	4

**Tie rods necessary for correct assembly.*



The following unit configurations supplied by DAVINCI VALVES LTD are commonly used with rubber expansion joints in piping systems.

I. "LIMIT ROD"

This control unit configuration allow an expansion joint to extend to a predetermined extension setting. Nuts shall be field set to no more than the maximum allowable extension movement of a rubber expansion joint.

Always consult the systems engineer to proper nut setting prior to the system operation.

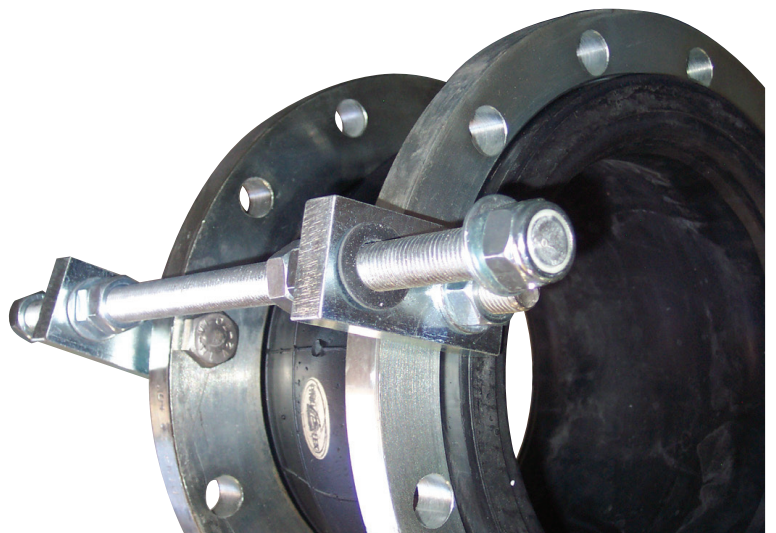
II. "CONTROL ROD"

This control unit configuration is used to allow specified pipe expansion (expansion joint axial compression) and pipe contraction (expansion joint axial extension) movements. Nuts shall be field set to no more than the maximum allowable extension or compression of the rubber expansion joint. Internal and external nuts can also be field set to allow for no movement in the horizontal plane. This setting will allow the rubber to move laterally while keeping expansion joint thrust forces low on adjacent equipment.

Spherical washers can also be furnished (upon request) to combat any potential "nut to plate" binding during offset.

Always consult your system engineer for proper nut settings prior to system operation.

DN	BAR			
	5	7	10	15
40	-	-	-	•
50	-	-	-	•
65	-	-	-	•
80	-	-	-	•
100	-	-	•	•
125	-	-	•	•
150	-	-	•	•
200	-	•	•	•
250	-	•	-	-
300	-	•	-	-
350	-	•	-	-
400	•	-	-	-
450	•	-	-	-
500	•	-	-	-
600	•	-	-	-



* Pressure and DN Indicators of Tie Rods

GROUP

300

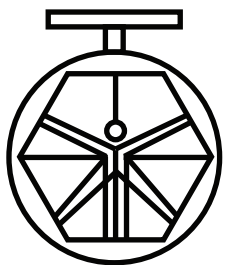
RUBBER EXPANSION JOINTS

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