WILLBRANDT **Bracings**

Rubber expansion joints are to be considered as elastic elements in the pipework. In the unrestrained version ‘A’, the rubber expansion joint generates reaction forces in the direction of expansion (effective area x operating pressure) under pressure and forces in the direction of compression under negative pressure.

These forces must be absorbed by the nearest fixed points, transverse plain bearings or the aggregate flange.

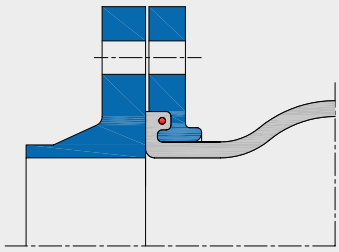
If this is not possible, there are a number of different bracing options that absorb the corresponding reaction forces but do not restrict the freedom of movement of the expansion joint, with the exception of axial expansion or compression.

In the case of a braced design, only the adjustment forces from the rubber bellows and the frictional forces from the bearings need to be taken into account for the fixed points. We have shown you a number of examples of bracing below:

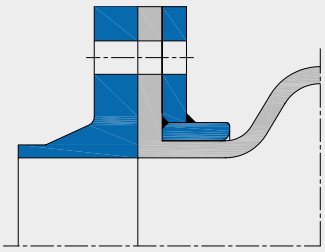
Design A

Rubber expansion joints without tie rods, with swivel flanges or solid rubber flanges, suitable for movement absorption in any direction.

Fixed point load: Reaction force plus stiffness rates
Production: 1. DN 20 - DN 1000
2. DN 40 - DN 5000



Swivel flange (1.)

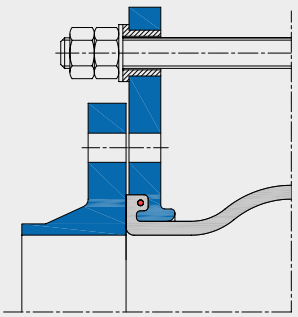


Solid rubber flange (2.)

Design B

Rubber expansion joint with length limiter to absorb the reaction force. Tie rods mounted in rubber bushes, secured with lock nuts. Suitable for noise and vibration damping and for lateral movement absorption.

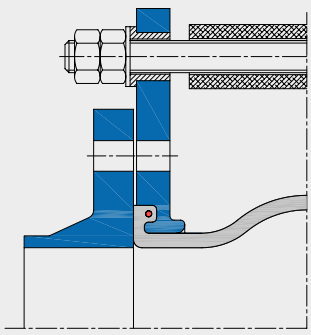
Fixed point load: Lateral stiffness rate plus bearing stiffness rate
Production: DN 20 - DN 200
Permissible pressure: DN 20 - DN 150: 16 bar
DN 200: 10 bar



Design C

Rubber expansion joint with length limiter to absorb the reaction force. Tie rods mounted in rubber bushes, secured with lock nuts and with thrust limiter (plastic bushing) to secure the bellow. Suitable for noise and vibration damping and for lateral movement absorption.

Fixed point load: Lateral stiffness rate plus bearing stiffness rate
Production: DN 20 - DN 200
Permissible pressure: DN 20 - DN 150: 16 bar
DN 200: 10 bar



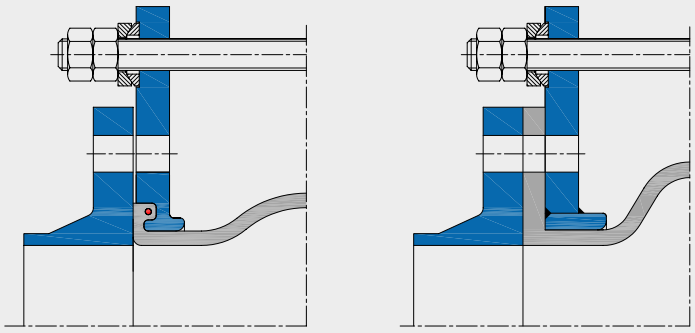
WILLBRANDT **Bracings**

Design E

Rubber expansion joint with length limiter to absorb the reaction force. Tie rods mounted in external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces) and secured with lock nuts. Suitable for lateral movement absorption.

Fixed point load: Lateral stiffness rate plus bearing stiffness rate

Production: 1. DN 200 - DN 1000
2. DN 40 - DN 5000



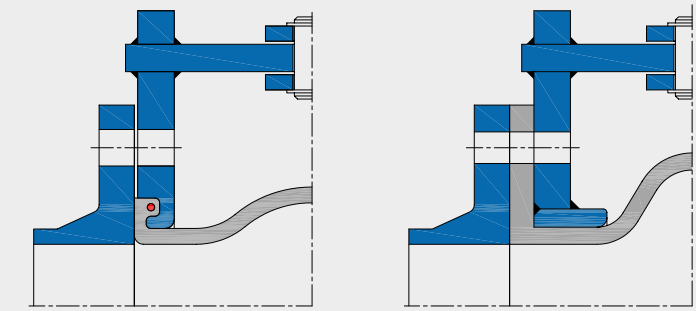
Swivel flange (1.) Solid rubber flange (2.)

Design F

Rubber expansion joint with hinge bracing to absorb the reaction force, suitable for angular movement absorption in one plane. Two hinge expansion joints with intermediate tube can absorb very large lateral expansions. In a combination of three, soft corners can be created to absorb movements from two planes (see installation examples).

Fixed point load: Angular stiffness torque and frictional torque from bearings

Production: 1. DN 32 - DN 1000
2. DN 200 - DN 5000



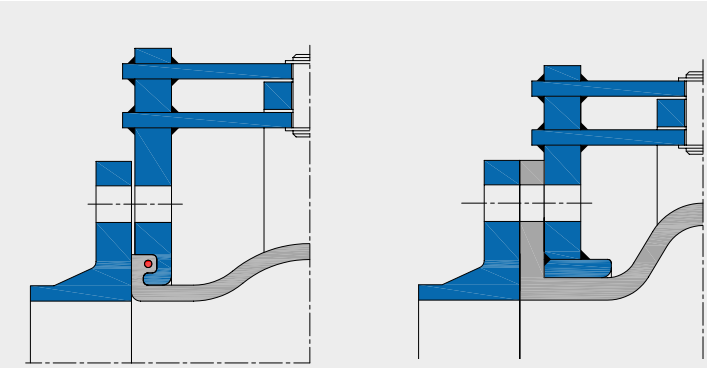
Swivel flange (1.) Solid rubber flange (2.)

Design G

Rubber expansion joint with cardan hinge bracing to absorb the reaction force, suitable for angular movement absorption in a circular plane. Two cardan hinge expansion joints with intermediate tube can absorb very large lateral movements from two planes. In a 3-way combination, soft corners can be created to absorb expansion from three planes (see installation examples).

Fixed point load: Angular stiffness torque and frictional torque from bearings

Production: 1. DN 32 - DN 1000
2. DN 200 - DN 5000



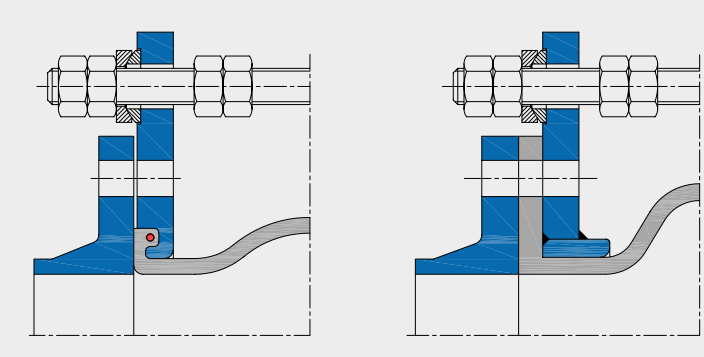
Swivel flange (1.) Solid rubber flange (2.)

Design H

Rubber expansion joints with tie rods to absorb the reaction force. Tie rods are mounted in external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces), secured with lock nuts and with adjustable internal stop (lock nuts) to secure the bellow. Suitable for large lateral movement absorption.

Fixed point load: Lateral stiffness rates plus bearing stiffness rates

Production: 1. DN 200 - DN 1000
2. DN 40 - DN 5000



Swivel flange (1.) Solid rubber flange (2.)

WILLBRANDT **Bracings**

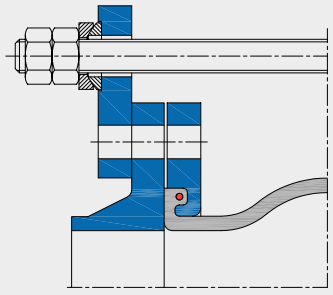
Design K

Segment bracing from counter flange to counter flange, with tie rods to absorb the reaction force of the expansion joint. Tie rods mounted in external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces) and secured with lock nuts. Suitable for lateral expansion absorption.

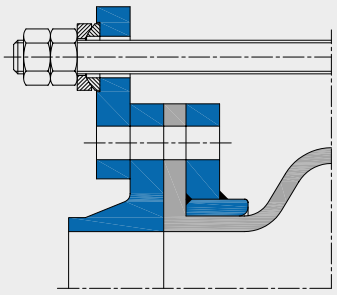
Fixed point load: Lateral stiffness rates plus bearing stiffness rates

Production: 1. DN 200 - DN 1000
2. DN 40 - DN 5000

Note: In the case of large expansion joints and high pressure, the undulating load on the rubber flange must be taken into account.



Swivel flange (1.)



Solid rubber flange (2.)

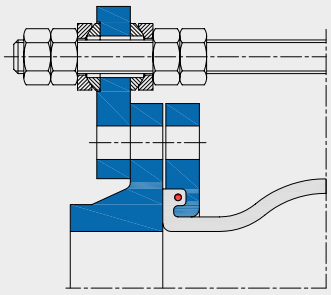
Design L

Segment bracing from counter flange to counter flange, with tie rods to absorb thrust and tensile forces (reaction force). Tie rods mounted in internal and external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces) and secured with lock nuts. Suitable for large, lateral movement absorption in the pressure and vacuum range.

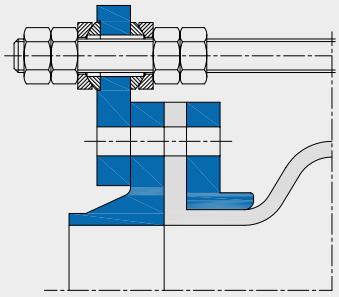
Fixed point load: Lateral stiffness rates plus bearing stiffness rates

Production: 1. DN 200 - DN 1000
2. DN 40 - DN 5000

Note: In the case of large expansion joints and high pressure, the undulating load on the rubber flange must be taken into account.



Swivel flange (1.)



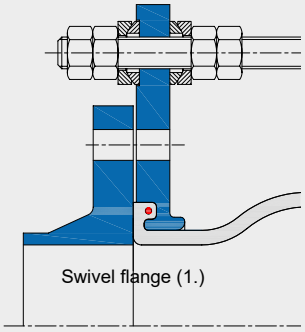
Solid rubber flange (2.)

Design M

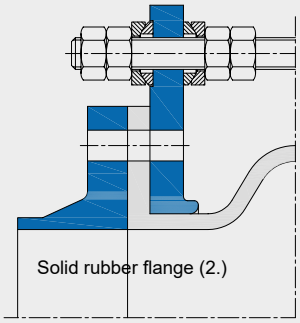
Rubber expansion joint with tie rods to absorb thrust and tensile forces (reaction force). Tie rods mounted in internal and external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces) and secured with lock nuts. Suitable for large, lateral movement absorption in the pressure and vacuum range.

Fixed point load: Lateral stiffness rate plus bearing stiffness rate

Production: 1. DN 200 - DN 1000
2. DN 40 - DN 5000



Swivel flange (1.)



Solid rubber flange (2.)

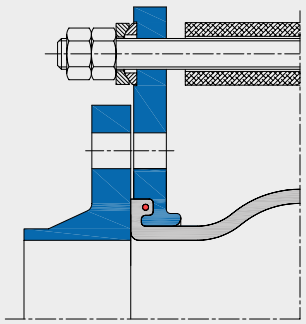
WILLBRANDT **Bracings**

Design S

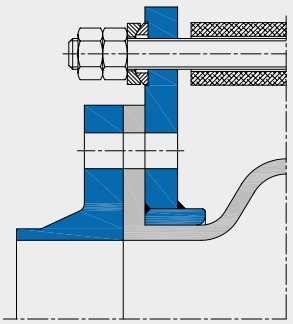
Rubber expansion joint with tie rods to absorb the reaction force. Tie rods mounted in external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces), secured with lock nuts and with thrust limiter (plastic bushing) to secure the bellow. Suitable for large, lateral expansion mounts.

Fixed point load: For external end stops, lateral stiffness rates and bearing stiffness rates, full reaction force and axial stiffness rates in the case of compression.

Production: 1. DN 200 - DN 500
2. DN 40 - DN 500



Swivel flange (1.)



Solid rubber flange (2.)

Design R

Segment bracing from counter flange to counter flange, with tie rods to absorb the reaction force of the expansion joint. Tie rods mounted in rubber bushes and secured with lock nuts. Suitable for noise and vibration damping and for lateral expansion absorption.

Production: DN 20 - DN 200
Max. operating pressure: 10 bar