Garlock Rubber Expansion Joints
Safe – Reliable – Durable
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Garlock Rubber Expansion Joints: Safe – Reliable – Durable
Garlock Rubber Expansion Joints

Dependable absorption of movements and vibrations in piping system

An expansion joint is a specially engineered product inserted in a piping system in order to protect it. For example, movements due to thermal expansion, vibrations of pumps and misalignments due to installation tolerances can be compensated by expansion joints. Therefore they must be resistant to the process conditions and the external influences. Due to many years of experience, Garlock offers solutions for various areas. Garlock rubber expansion joints have been successfully used in the various industries (chemical, petrochemical, water / wastewater, power plants, etc.) for many years.

 Movements within the piping system

Axial Movement
The axial movement of the pipe changes the distance between the two flanges.

Lateral Movement
Lateral movements generate an axial offset of the pipeline components.

Angular Movement
Angular changes of the flange surfaces to each other are generated in the piping system by a combination of length changes, bearings and axis offset.

Torsional Movement
Torsion movements are caused by simultaneous rotation of both flanges in opposing motion due to manufacturing tolerances of the pipe sections or by unfavorable arrangements of the pipe guides.

Vibrations / Oscillations / Noises
Vibrations, oscillations and noises can be brought into the system by pumps and other components. Expansion joints prevent vibrations, oscillations and noise from spreading in the piping system.
Garlock Rubber Expansion Joints: Safe – Reliable – Durable

Garlock Rubber Expansion Joints

Our styles

Garlock offers a variety of different expansion joints as well as accessories (UV protection panels / flange protection hoods, etc.). Also the design / calculation of expansion joints (as soft as possible and as stable as necessary) is part of our portfolio. This brochure is giving an overview of the most common styles of our product range.

Universal expansion joints

with abrupt arch

Universal compensators, which are characterized by a short design with simultaneous good longitudinal changes in the axial direction. The permissible movement can be adapted to the required range by the number of arches.

<table>
<thead>
<tr>
<th>Style</th>
<th>Special Feature</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>204 (-EUD)</td>
<td>Standard design</td>
<td>Stiffer design</td>
</tr>
<tr>
<td>204 HP (-EUD)</td>
<td>High pressure design</td>
<td>Stiffer design</td>
</tr>
<tr>
<td>204 EVS (-EUD)</td>
<td>Extreme vacuum design</td>
<td>Internal back-up rings</td>
</tr>
<tr>
<td>404 (-EUD)</td>
<td>High abrasive resistance</td>
<td></td>
</tr>
<tr>
<td>404-HP (-EUD)</td>
<td>High pressure design</td>
<td>Stiffer design</td>
</tr>
</tbody>
</table>

Universal expansion joints

with flowing arch

This design can be used as a universal, lateral and angular compensator. Its self-flushing arch design eliminates media build up and reduces turbulence. The permissible movement can be adapted to the required range by the number of arches. The pressure range can be extended by the use of inner or outer back-up rings.

<table>
<thead>
<tr>
<th>Style</th>
<th>Special Feature</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>206 EZ-FLO / 206-EUD</td>
<td>Standard design</td>
<td></td>
</tr>
<tr>
<td>306 EZ-FLO / 306-EUD</td>
<td>FEP-Liner</td>
<td>The inner seamless FEP liner extends to the outer edge of the flange and is completely fused with the compensator body</td>
</tr>
<tr>
<td>406 EZ-FLO / 406-EUD</td>
<td>High abrasive resistance</td>
<td></td>
</tr>
</tbody>
</table>
Garlock Rubber Expansion Joints: Safe – Reliable – Durable

Garlock Rubber Expansion Joints

Our styles

Universal expansion joints with rotary flanges

These joints are characterized by rotatable flanges, whereby the hole patterns of the two flanges can be offset. They can be used as an universal or lateral compensator. The streamlined flowing arch design reduces turbulence and allows smooth, quiet flow. The permissible movement can be adapted to the required range by the number of arches.

<table>
<thead>
<tr>
<th>Style</th>
<th>Special Feature</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>8100 (-EUE)</td>
<td>Standard design</td>
<td>Available in standardized lengths</td>
</tr>
<tr>
<td>8100 (-EUD)</td>
<td>Special design</td>
<td>Available lengths according to customer requirements</td>
</tr>
</tbody>
</table>

Specials
Garlock Rubber Expansion Joints: Safe – Reliable – Durable

Garlock Rubber Expansion Joints

Basic Design

The different applications, as well as the operating conditions for the rubber compensators, make it necessary to adapt the bellows according to the application. The inside area comes into contact with the medium and must therefore be chemically resistant to them.

The compensator absorbs the forces caused by the process pressure and the movements. The outer shell is exposed to environmental influences. Depending on the application, different materials are combined.

<table>
<thead>
<tr>
<th>Tube / Cover Material</th>
<th>Temperature</th>
<th>Tube / Cover Variations</th>
<th>Tube / Cover Characteristics</th>
</tr>
</thead>
</table>
| EPDM                  | - 40 °C to + 150 °C | » Conductive  
» Food suitable  
» Abrasion resistant | » Very good chemical resistance, weather-resistant, thus covering a wide range of applications |
| CIR                   | - 20 °C to + 150 °C | » Abrasion resistant | » Very good chemical resistance, weather-resistant |
| FKM                   | - 20 °C to + 205 °C | » Food suitable | » Very good general resistance, especially against mineral oils, fuels, animal and vegetable fats, chlorinated, aromatic and aliphatic solvents |
| CR                    | - 20 °C to + 82 °C | | » Good resistance to grease, ozone, weathering, light and flame |
| CSM                   | - 20 °C to + 100 °C | | » Very good resistance to strong oxidizing agents, sea water, salt solutions and alcohols, as well as good resistance to many oils |
| NBR                   | - 30 °C to + 100 °C | | » Good resistance to oils, animal and vegetable fats, hydrocarbons and gas |
| NR                    | - 20 °C to + 82 °C | | » High combination of tensile strength / elasticity is possible  
» Very good abrasion resistance  
» Medium resistance to sea water, acid |

<table>
<thead>
<tr>
<th>Body Wire Fabric</th>
<th>Temperature</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass</td>
<td>- 40 °C to + 205 °C</td>
<td>» Particularly stable and temperature resistant</td>
</tr>
<tr>
<td>Steel</td>
<td>- 40 °C to + 205 °C</td>
<td>» Particularly stable and temperature resistant</td>
</tr>
<tr>
<td>Aramid</td>
<td>- 40 °C to + 180 °C</td>
<td>» Excellent shock absorption, tensile, abrasion and tear strength</td>
</tr>
<tr>
<td>Polyester</td>
<td>- 40 °C to + 120 °C</td>
<td>» Low-cost, high durability</td>
</tr>
<tr>
<td>Nylon</td>
<td>- 40 °C to + 120 °C</td>
<td>» Low-cost alternative</td>
</tr>
</tbody>
</table>
Piping Examples

Types of Pipe Movements

When designing a piping system, the piping system should not provide a statically rigid system. Combinations of anchor, pipe guides and expansion joints give the system the necessary adaptability to movements of the piping system. The different combinations of anchor, pipe guides and pipeline layouts lead to necessary requirements for the expansion joint. With these requirements, the joints can be better adapted to the required movements.

Universal expansion joint

Universal expansion joints can handle different movements at the same time. In the shown installation layout, the pipe guides only allow an axial movement.

Axial expansion joint with limited axial movement

To protect the joint against excessive motion or damage, control units are always recommended.
Piping Examples

Types of Pipe Movements

Lateral expansion joint

Lateral expansion joints can handle movements crosswise to the piping system. In this case, the control units are supplied with spherical washers and bevel washers.

In the shown installation layout, the pipe guides only allow a lateral movement.

Due to the operating pressure and the active joint cross-section, the compensator generates axial forces. These are absorbed by the control unit and are not transmitted to the pipeline.

The lateral flexibility of the control unit is ensured by the use of spherical washers and bevel washers.
Piping Examples

Types of Pipe Movements

Angular expansion joint

Angular expansion joints absorb only angular movements. Special control units with a fixed pivot point support this movement. In the shown installation layout, with the installed pipe guides and angular expansion joints, both joints only allow an angular movement.

The pivot ensures that the resulting axial forces of the expansion joint are not passed on to the pipeline.
Installation

Guideline for installation

Preparation

**Check compensator**
» Check outside joint cover for damage

**Check alignment**
» Check the piping system for misalignment, as misalignment reduces the working range of the expansion joint

**Check support**
» Weight must not be carried by joint
» Support with hangers or anchors

**Check flanges**
» Clean all mating flanges surfaces
» Do not scratch or damage surfaces during cleaning

Installation

**Lubricants**
» There is no lubricant needed

**Insert bolts from arch side**
» Set bolt heads next to the arch
» The bolts must not have contact to the arch of the joint

**Tighten bolts**
» Tighten gradually and equally in a star-like crossing patterns around flange
» The tightening torque must not exceed the maximum allowed torque of the joint or flange.

Life expectancy of rubber expansion joints

The service life of rubber expansion joints depends on process conditions as well as environmental influences. If the expansion joint demonstrates signs of external damage, deformations or visible alteration, replace it as soon as possible. To check natural aging, the Shore hardness of the joints can be used as an indicator.
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Application Data Sheet

Service
Of course you can contact Garlock for an application-specific construction any time. To get this service as fast as possible, please order our application data sheet, which also can be found on our website www.garlock.com.
Note:

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