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RUBBER EXPANSION JOINTS

PENETRATION SEALS

DOG BONE EXPANSION JOINTS

RUBBER MOULDED PARTS

FABRIC EXPANSION JOINTS

Content

Your Partner - ditec Dichtungstechnik GmbH

Through specialisation, our company has positioned itself as a worldwide leading manufacturer of rubber and textile expansion joints. As a developer and manufacturer, we focus on our customers' demands. We make the seemingly impossible possible – with a high degree of technical expertise and commitment, combined with decades of experience. We rise to every challenge.

In our state-of-the-art production plant in Kitzingen, we produce tailor-made solutions and serial items. Each expansion joint is individually designed and its tolerance is precisely calculated with reference to the Pressure Equipment Directive. Even when the specific requirements in terms of operating parameters vary only slightly, it is only by taking these into account accurately that a long service life and failure-free use of your expansion joint solution can be guaranteed.

Just describe your needs to us, and we will provide you with personalised advice. With your project team, we develop an efficient solution for you - both in the field of standard devices and for special applications - with our characteristic combination of know-how, innovation and flexibility.

You can rely on your order to be processed rapidly and on schedule – even if it is urgent. We provide support not only as a supplier, but also as problem solvers.

This catalogue provides you with an overview of our product range and an invaluable base of technical details and planning tools.


ditec


ditec
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Adam GmbH Metallbau
ditec-adam.de
An der Staustufe 6
97318 Kitzingen

Innovation - made in Germany

On a site extending to 17,600 m², we produce all expansion joints in the same place where we develop them. Our commitment to our German production location forms the core of our philosophy, which privileges the very highest quality above all else. Thanks to the high degree of vertical integration in our own product plant, we achieve highly efficient production processes.

Our design of models puts us in a position to respond rapidly to orders at extremely short notice, and to produce single pieces as well.

We have our own calendar plant and our own appropriately dimensioned vulcanisation plants. A metalworking company directly integrated in the production plant manufactures all the steel accessories we require. This concentration in a single location is evident: we are able to make all the essential components in-house and are therefore largely independent of vendors.

High-tech all along the line

Founded in 1973, we at ditec have been on a growth course ever since and today convince worldwide as a high-tech company with quality products. Then as now, we rely on our values, which make us an internationally active manufacturer: partnership, safety and individuality are attributes for ditec, which are lived from development to the finished product. Together with you as our customer, we develop more than products, we create solutions – for every application, every industry and every problem.

Find out more on our website at
www.ditec-adam.de/qr/pipeline-planning

Pipeline Planning

Service

Our engineers possess in-depth knowledge of rubber and fabric materials and can provide industrial planners, designers and partners not just with products, but also with consulting services and individual technologies. Our performance and our success are based on the courage to provide solutions for the most extreme specifications.

Ask our employees about your new developments for elastic components! We advise you on the basis of innovative thinking and engineering services; we manufacture our products in keeping with certified quality guidelines that can help you turn your ideas into reality.

Our highly efficient manufacturing process for expansion joints addresses the following demands on the market:
> **abnormal dimensions,**
> **high temperatures,**
> **corrosive media and**
> **large movements**

Calculation is performed individually based on the operating conditions present. Internal dimension, installation length, shape and flange dimensions can be selected freely for both round and rectangular rubber and fabric expansion joints.

Our rubber expansion joint designs always comply with the European Pressure Equipment Directive PED 2014/68/EU for the specified operating conditions, follow the guidelines of the Fluid Sealing Association (FSA) Technical Handbook for Non-Metallic Expansion Joints and ASTM F1123 - 87 Standard Specification for Non-Metallic Expansion Joints.

The selection and application of expansion joints plays a significant role in system performance, quality and reliability. Leveraging our extensive industry experience since 1973, ditec uses a systematic approach to finding the optimal solutions for any piping system. We apply the most sophisticated analysis and calculation software tools such as Finite Element Analysis (FEA), 3D Modelling and CAD to select the most appropriate expansion joint to fit into the corresponding pipeline system.

Already during the preparation of our offers the project engineering team design each rubber expansion joint to the maximum final extend and check with our unique 3D modelling software programme dimensional irregularities prior release. The ready 3D model is handed out to our clients already during the engineering phase to include the rubber expansion joint in its own pipeline design. At your request, we will inspect the expansion joints installed in your facilities with respect to functionality and operational safety.

Our optimally equipped installation team will provide complete installation services for new construction or retrofitting activities; we can also appoint a field supervisor to train your workers and to support and monitor installation activities. Our technicians and installers are also authorised to access nuclear facilities, and can perform on-site project planning and assembly work.

We have trained representatives in almost all European countries as well as in many non-European countries who can provide you with expert on-site advice.

The purpose of this publication is to provide a reference source of pertinent information and factual data as well as a guideline for piping engineers to specify expansion joints for their purchase joints.

Certifications

The focus on quality has always been a central part of the ditec's mission. We strive to provide services of consistently high quality that fully meet the expectations of our customers. Implementation and adherence to recognized quality assurance systems ensures that all processes have been accurately performed – starting from the initial review of the submitted specifications to their design, manufacturing, testing and documentation in accordance with the customers' requirements. The accreditations and certificates we possess enable us to shorten lead times and optimize resources by performing testing and inspection procedures in-house.

Our quality management system in accordance with DIN EN ISO 9001 successfully passed an audit performed by TÜV Management Service GmbH in 1998. Since June 2008, our company has introduced an occupational health and safety management system which complies today the ISO 45001:2018 regulation.

We possess a KTA 1401 certification and are an authorised supplier for Nuclear Power Plants. All rubber expansion joints are calculated in keeping with Pressure Equipment Directive PED 2014/68/EU; we are CE-certified up to category III. The design and dimensioning are performed in accordance with all applicable international standards such as DIN, ANSI, AWWA and BS. Special dimensions can easily be accommodated at the customer's request.

In manufacturing steel accessory components, we adhere to the welding guidelines set forth in DIN EN ISO 3834-3, AD2000 Merkblatt HP 0, EN 1090-2 and DNV rules. Furthermore we prove welding procedure qualication reports (WPQR) for all our important weldings.

Certificates

> Quality Management System ISO 9001:2015

> Safety and Health Management System ISO 45001:2018

> Approved Nuclear Supplier KTA 1401 & IAEA 50-C-Q

> European Pressure Equipment Directive PED 2014/68/EU

> Standard Welding Quality Requirements EN ISO 3834-3

> Basic Safety Requirements in accordance with Pressure Equipment Directive AD2000 HP 0

> Structural Components and Kits for Steel Structures EN1090-2 EX2

The latest certificate can be downloaded from our website at **www.ditec-adam.de/qr/certificates**

Download certificates

Testing and Documentation

ditec Expansion Joints undergo a series of controls and tests at each of the different steps in the manufacturing process and before they leave the factory. Our product is shipped to the customer until its quality and conformance to customer specifications is assured only.

If stipulated in the contract following properties of the processed rubber compound and fabric reinforcement is documented in test reports and works certificates:

- Tensile Strength
- Elongation at break
- Hardness
- Electrical properties
- Temperature resistance
- Fluid compatibility (e.g. drinking water or food approvals)
- Aging / ozone resistance
- Abrasion resistance
- Gamma ray influence
- Decontamination possibility

Innovations in our testing capabilities allow ditec to provide more testing options including, but not limited to:

- Hydrostatic pressure testing
- Vacuum testing
- Leakage test
- Burst pressure testing
- Cycle life testing
- Axial, lateral displacement under pressure

These tests are carried out in line with the procedures and guidelines approved by the Quality Control Department which certifies such tests. Inspection may be carried out, monitored and/or certified in presence of independent inspection companies or laboratories.

We generate for our products the necessary documentation. Depending on the specification, all acceptances and tests can be performed at our factory with the customer or their appointed expert present.

The typical scope of documentation for expansion joints may comprise of:

- Proof of manufacturing prerequisite
- Quality assurance program
- Inspection & test plan with hold, review and witness points
- Time schedule / progress report
- Technical data sheet
- Drawings
- Inspection certificates for traced raw materials
- Welding certifications
- Visual inspection and measurement protocol
- Manufacturing acceptance document
- Pressure equipment confirmation
- Installation, operation and maintenance instruction
- Packing list
- Confirmation of compliance
- Quality release certificate

Applications

Every industry and application has its own specific requirements on expansion joint and sealing technology. For us, it is therefore a matter of course to take these customer-specific requirements into account as early as the development stage. The result is high-quality expansion joints that are ideally suited to the application, specially developed for demanding areas.

Expansion joints assimilate
> thermal growth,
> mechanical vibrations,
> acoustic oscillations
> and tensions
in pipelines, on armatures and on pumps.

They are also used
> for sound insulation,
> as dismantling joints on pipeline armatures,
> to assimilate assembly tolerances and
> to seal pipeline wall penetrations.

The use of expansion joints in numerous applications has prooven their outstanding advantages such as

> minimal face to face dimensions in expansion joints offer untold economies compared with costly expansion bends or loops.

> expansion joints are relatively light in weight and require no special handling equipment for installation.

> the inherent flexibility of expansion joints permit almost unlimited flexing to recover from movements and require relative less force to move.

> rubber elastomers are not subject to fatigue breakdown or embrittlement in comparison to steel.

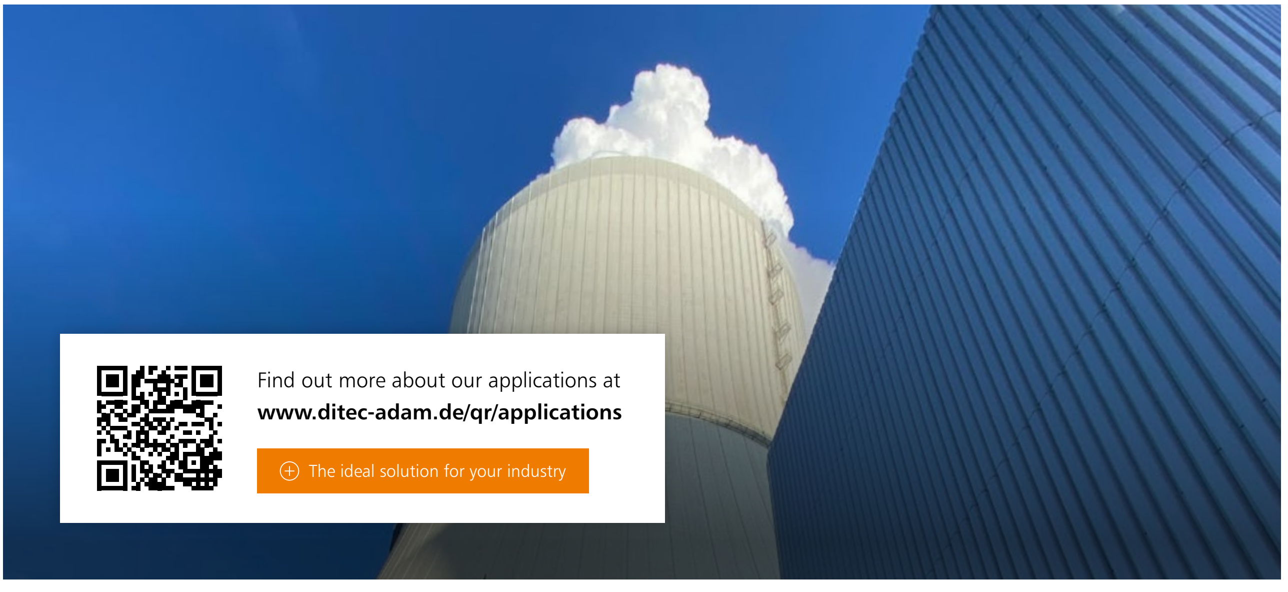
> the use of extra gaskets are unnecessary because rubber bellows come with vulcanized rubber flanges.

> a wide variety of different rubber compounds are available which are resistant against corrosive fluids and forms of chemical attack.

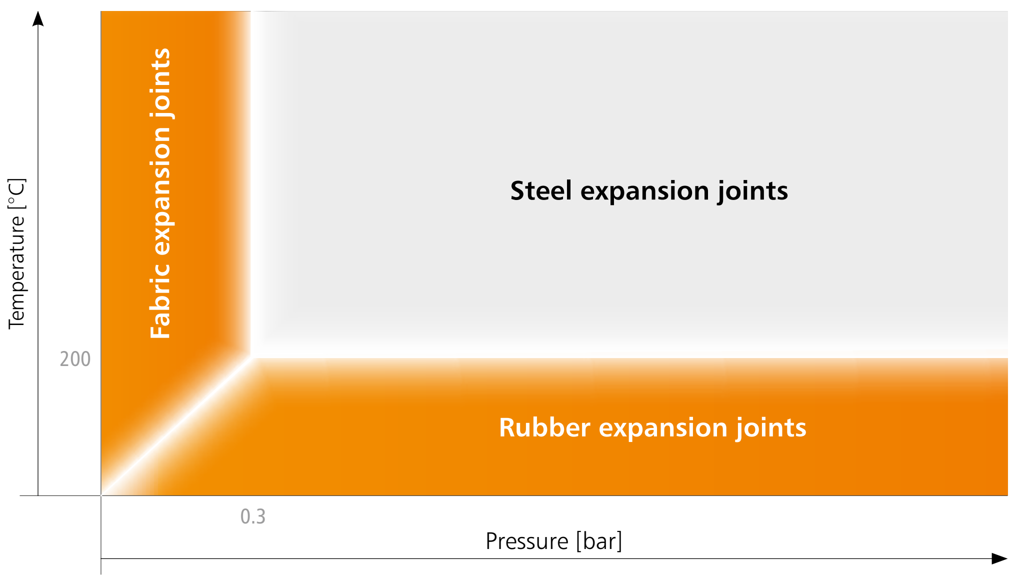
> rubber expansion joints significantly reduce noise transmission in piping systems.

> if designed accordingly rubber expansion joints can take shock stress from excessive hydraulic surge, water hammer or pump cavitation.

Typical industries where expansion joints are used:
> Conventional and nuclear power plant technology
> Industry and plant engineering
> Water treatment technology
> Rubbish and slurry incineration facilities
> The chemical industry
> Pharmaceutical and refinery technology
> Gas and water supply
> Apparatus, machine tool and engine construction
> The cement and mineral processing industry
> Shipbuilding
> Ventilation, air conditioning and building technology
> Smelters, steel mills and roller mills
> The paper and food processing industries
> Loading technology



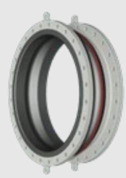
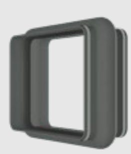
Fabric and rubber expansion joints as well as steel expansion joints are used in nearly all industries. Their usage limitations depend on the operating pressure and temperature, as shown in the following diagram:

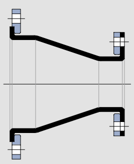
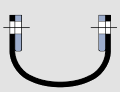


Fabric expansion joints can be used for pressures of up to 0.3 bar and, as long as the duct has an internal lining, up to a temperature of 1,200 °C. The application area of rubber expansion joints ranges up to temperatures of 200 °C and to pressures of over 0.3 bar, depending on the rubber grade. Temperatures of over 200 °C and high pressures are the classic application area of steel expansion joints. The transitions between the individual types are naturally fluid. The darker the colour, the deeper you are getting in the application range of the respective expansion joint variant.

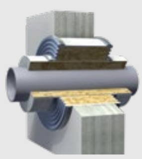
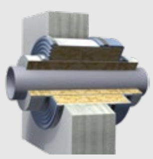
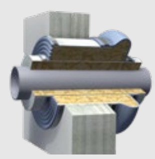
We concentrate on the production of rubber and fabric expansion joints and specialise in offering technically mature expansion joint solutions for even the most demanding transition areas.

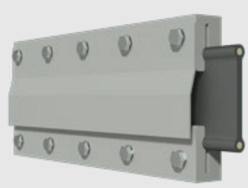
Type U125M double arch lateral expansion joint of size ∅ 3,000 mm, design pressure 3 bar, full vacuum, 70 mm lateral displacement

	RUBBER EXPANSION JOINTS						
	Universal			Lateral		Angular	
	full faced rubber flanges	swivel flanges	clamped fixing	full faced rubber flanges	swivel flanges	full faced rubber flanges	swivel flanges
Cylindrical Rubber Expansion Joints without Arch 	U100A  > Page 62	D100A  > Page 150	B100  > Page 172	U100...  > Page 200	D100...  > Page 250		
	U900A  > Page 142		B900  > Page 172				
Single Arch Rubber Expansion Joints 	U110A  > Page 70	D110A  > Page 154	B110  > Page 176	U110...  > Page 206	D110...  > Page 256	U110F  > Page 280	D110F  > Page 288
	U216A  > Page 82	D210A  > Page 160		U216...  > Page 218	D210...  > Page 264		
	U910A  > Page 144		B910  > Page 176	customized products available			
Double Arch Rubber Expansion Joints 	U120A  > Page 106	D120A  > Page 164	B120  > Page 182	U120...  > Page 236	D120...  > Page 270	customized products available	customized products available
Triple or Multiple Arch Rubber Expansion Joints 	U130A  > Page 116	customized products available	B130  > Page 188	customized products available	customized products available		

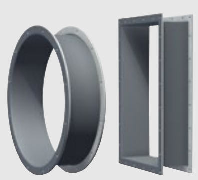
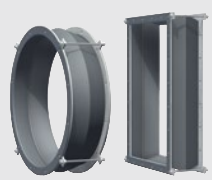
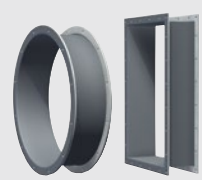
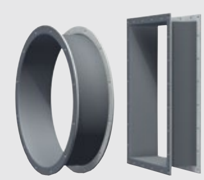
	RUBBER EXPANSION JOINTS						
	Universal			Lateral		Angular	
	full faced rubber flanges	swivel flanges	clamped fixing	full faced rubber flanges	swivel flanges	full faced rubber flanges	swivel flanges
Reducer Rubber Expansion Joints	U300A  > Page 124	D300  > Page 124	B300  > Page 194	customized products available	customized products available		
	U110A  > Page 70	customized products available		U110...  > Page 206	customized products available		
Donut Rubber Expansion Joints	U400A  > Page 130						
	U500A  > Page 136						
Rubber Flanged Pipes	U100A RFP  > Page 66	customized products available		customized products available	customized products available		
Two Ply Testable Rubber Bellows	U110A 2P  > Page 98			customized products available			
FDA Rubber Expansion Joints	All styles of cylindrical, single, double, triple or multiple arch(es), reducer or donut expansion joints and rubber flanged pipes > Page 102						

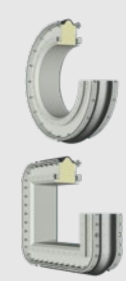
PENETRATION SEALS					
High Pressure Ground Water Seals			Low Pressure Air-Tight Membranes		
full faced rubber flanges		clamped fixing	full faced rubber flanges	clamped fixing	
W100FF  > Page 304	W110FF  > Page 304	customized products available	customized products available	W200SS  > Page 312	W300SS  > Page 312

Fire Penetration Seals			
full faced rubber flanges	clamped fixing		
customized products available	W200SS + W200SS  > Page 324	W200SS + W400SS  > Page 328	W200SS + W410SS  > Page 328

DOG BONE EXPANSION JOINTS
 > Page 336

RUBBER MOULDED PARTS		
Disc Bellows	Vulcanized Rubber Gaskets	Custom Moulded Rubber Parts
 > Page 340	 > Page 342	 > Page 344

FABRIC EXPANSION JOINTS					
Flange Expansion Joints		Expansion Joints for Smoke Escape, Ventilation and EX Protection Zones			
without arch	single or multiple arch(es)	Flexible expansion joints for smoke escape ventilators at 600 °C for 120 min.	Expansion joints in smoke escape ducts at 600 °C for 120 min.	Expansion joints for air conditioning and ventilation technology up to 200 °C	Expansion joints for EX protection zones
GU100  > Page 366	GU110  > Page 368	BGS600  > Page 388	BGK611  > Page 390	LT100 LT200  > Page 392	EX100  > Page 394

Belt Expansion Joints					
without arch	single or multiple arch(es)	on duct angles without arch	on duct angles with single or multiple arch(es)	on duct angles with pre-insulation, without arch	on duct angles with pre-insulation, with single or multiple arch(es)
GB100  > Page 372	GB110  > Page 374	GB200  > Page 376	GB210  > Page 378	GB300  > Page 380	GB310  > Page 382

Type key

	Type		Arches	Support ring variant > page 56		Tie rod variant for type U and D > page 54	
Rubber expansion joints	U1	Expansion joint with full face rubber flange	0	0	Without	A	No tie rod
	U2	Expansion joint with full face rubber flange and support rings at the arch foot	1	1	On the inside of the arch apex	B	Exterior: rubber bushings
	U3	Expansion joint with full face rubber flange, conical reducer	2	2	Embedded in the arch apex	C	Exterior: rubber bushings Interior: thrust limiter
	U4	Expansion joint with full face rubber flange and one arch facing inward	3	3	External in the arch trough	E	Exterior: spherical bearings/ball disks
	U5	Expansion joint with full face rubber flange and one arch facing outward	…	4	Internally in the arch apex, externally in the arch trough	F	Hinge tie rod
	U9	Expansion joints with full face rubber flange, rectangular		5	Embedded in the arch apex external in the arch trough	G	Cardan joint tie rod
	D1	Expansion joint with swivel flange		6	Embedded in the arch foot	M	Exterior: spherical bearings/ball disks Interior: spherical bearings/ball disks
	D2	Expansion joint with swivel flange with threaded holes		7	Spring-wire helix	S	Exterior: spherical bearings/ball disks Interior: thrust limiter
	D3	Expansion joint with swivel flange, conical				R	Segment tie rod Exterior: rubber bushings
	B1	Belt expansion joint for clamped fixing				K	Segment tie rod Exterior: spherical bearings/ball disks
	B3	Belt expansion joint for clamped fixing, conical reducer				L	Segment tie rod Exterior: spherical bearings/ball disks Interior: spherical bearings/ball disks
	B9	Belt expansion joint for clamped fixing, rectangular					
	UD1	Expansion joint with full face rubber flange and swivel flange					
	UB1	Expansion joint with full face rubber flange and for clamped fixing					
Penetration seals	W1	Wall sealing expansion joint					
	W2	Wall sealing membrane					
	W3	Wall sealing membrane with steam barrier					
	W4	Fire penetration expansion joint					
Fabric expansion joints	GU1	Flange expansion joint					
	GB1	Belt expansion joint					
	GB2	Belt expansion joint on duct angles					
	GB3	Belt expansion joint on duct angles with pre-insulation					
	BGS6	Flexible expansion joints for smoke escape ventilators					
	BGK6	Expansion joint for smoke escape ducts					
	LT1 LT2	Expansion joint for air conditioning and ventilation technology					
	EX1	Expansion joint for EX protection zones					
Example **U110A**	U1	with full faced rubber flange	1 arch	0	without support ring	A	no tie rod

Fixing variant for type W	
SS	On D1: Clamp On D1-2: Clamp
FS	On D1: Flange On D1-2: Clamp
SF	On D1: Clamp On D1-2: Flange

Type derivates	
RFP	**R**ubber **F**langed **P**ipe
UDJ	**U**niversal **D**ismantling **J**oint
LDJ	**L**ateral **D**ismantling **J**oint
AO	**A**ngular **O**ffset
LO	**L**ateral **O**ffset
2P	**2 P**ly Testable Rubber Bellow
FDA	**F**ood **D**rug **A**ssociation
IPB	**I**n-line **P**ressure **B**alanced
EPB	**E**lbow **P**ressure **B**alanced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Rubber expansion joints

Technical information

Pipeline Planning

Expansion Joint Technology

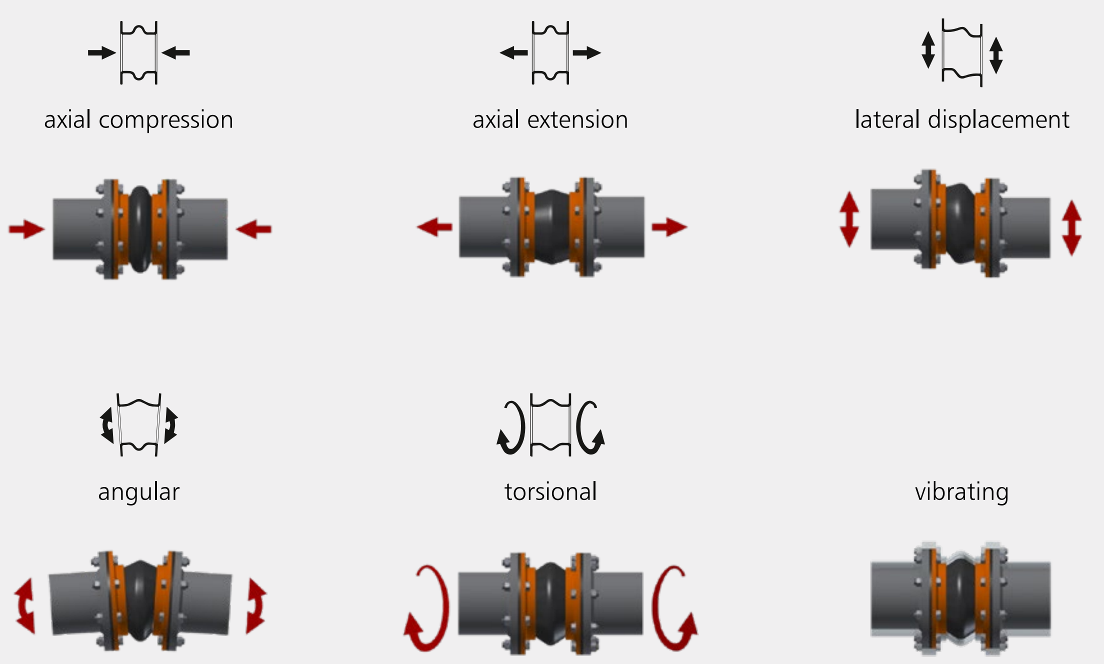
Pipeline planning > Rubber expansion joint variants

A rubber expansion joint is a flexible connector fabricated of synthetic elastomers and fabrics to provide stress relief in piping systems due to vibration and/or movements. They effectively dampen and insulate against the transmission of noise and vibration generated by mechanical equipment. ditec's rubber expansion joints have a cycle life in the tens of millions. The highly compliant and resilient characteristics make them ideally suited for earthquake, as well as pressure-surge and water hammer dampening. Given the inherent characteristics of synthetic elastomers, they are not subject to fatigue breakdown or embrittlement. A wide variety of synthetic elastomers and fabrics are available to the industries. Materials are treated and combined to meet a wide range of practical pressure/temperature operating conditions, corrosive attack, abrasion and erosion. ditec offers a variety of elastomers and construction materials chosen specifically to meet the needs of even the most demanding applications. Minimal face-to-face dimensions in rubber expansion joints offer advantages, compared with costly expansion bends, loops or metal expansion joints. It is common in both new construction and replacement applications to encounter pipe misalignment. Minor misalignment can be taken up with standard rubber expansion joints, and custom units can be fabricated with large permanent offsets.

Find out more on our website at
www.ditec-adam.de/qr/movements

Movements

Rubber expansion joints take over



movements as a result of thermal changes in pipeline length, prevent the transfer of mechanical vibrations from machines, apparatus or pumps on the connected pipeline and compensate for tensions or assembly imprecision.

Combined movement calculation

The potential axial, lateral and angular movements are specified for the respective expansion joint systems. In the event of combined axial extension and lateral displacement, the values drop as follows:

Permitted lateral displacement for a given axial extension

$$l_{per} = l_{max} * \left(1 - \frac{ae_{eff}}{ae_{max}}\right)$$

Permitted lateral displacement for a given axial compression

$$l_{per} = \frac{l_{max}}{2} * \left(2 - \frac{A}{ac_{max} * 0{,}75}\right)$$

with $A = ac_{eff} - ac_{max} * 0{,}25$ in case of $A < 0 \rightarrow$ insert 0

Permitted axial extension for a given lateral displacement

$$ae_{per} = ae_{max} * \left(1 - \frac{l_{eff}}{l_{max}}\right)$$

Permitted axial compression for a given lateral displacement

$$ac_{per} = \frac{ac_{max}}{4} * \left(4 - \frac{3 * B}{l_{max} * 0{,}5}\right)$$

with $B = l_{eff} - l_{max} * 0{,}5$ in case of $B < 0 \rightarrow$ insert 0

ac_{eff}	[mm]	given axial compression
ae_{eff}	[mm]	given axial extension
l_{eff}	[mm]	given lateral displacement
ac_{max}	[mm]	maximum axial compression
ae_{max}	[mm]	maximum axial extension
l_{max}	[mm]	maximum lateral displacement
ac_{per}	[mm]	permitted axial compression
ae_{per}	[mm]	permitted axial extension
l_{per}	[mm]	permitted lateral displacement

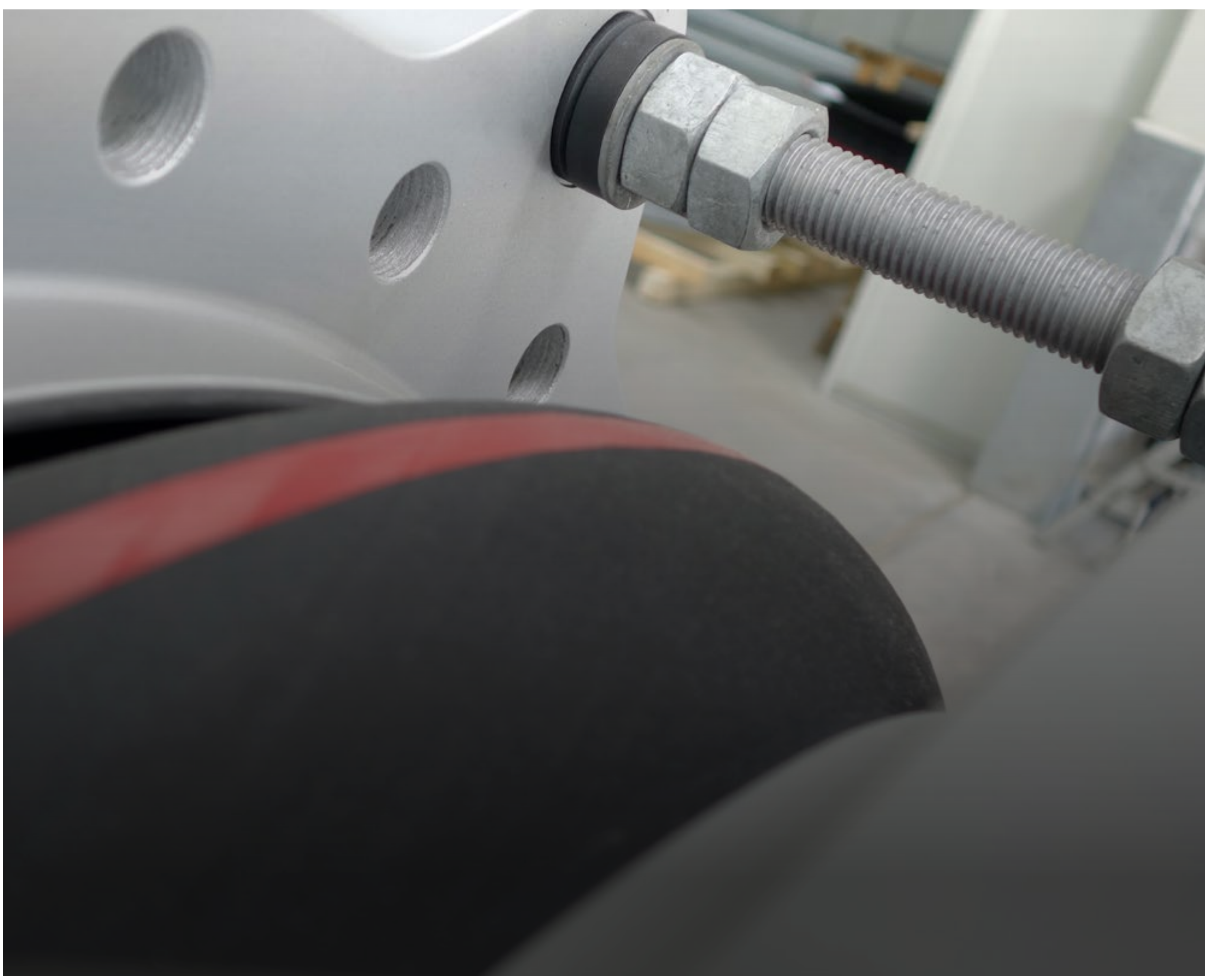
Example

For an expansion joint with a given axial compression of ac_{eff} = 25 mm, the permitted lateral displacement l_{per} is searched. The maximum values for the movements of the expansion joint are:

ac_{max}	[mm]	40
ae_{max}	[mm]	15
l_{max}	[mm]	30

$$A = ae_{eff} - ac_{max} * 0{,}25 \quad = \quad 25\,\text{mm} - 40\,\text{mm} * 0{,}25 = 15\,\text{mm}$$

$$l_{per} = \frac{l_{max}}{2} * \left(2 - \frac{A}{ac_{max} * 0{,}75}\right) \quad = \quad \frac{30\,\text{mm}}{2} * \left(2 - \frac{15\,\text{mm}}{40\,\text{mm} * 0{,}75}\right) = 22{,}5\,\text{mm}$$



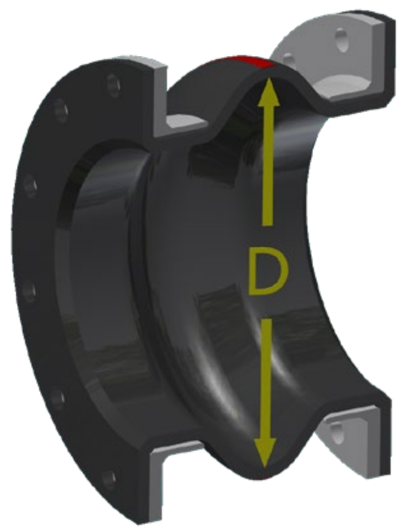
Expansion joint thrust calculation

Thermal movements along with other external forces and displacements, including ground settlement can quickly exceed allowable pipe and anchor stresses. Rubber expansion joints absorb these stresses and replace them with their own low stiffness (spring rate). 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 motion equipment.

When expansion joints are installed in the pipeline, the static portion of the thrust is calculated as a product of the area of the inner diameter of the arch of the expansion joint times the maximum pressure that will occur with the line. The result is a force expressed in Newton which causes stress on the adjacent pipeline anchors. In order to reduce the forces, a lower arch can be used in case of small movements.

$$T = \frac{\pi * D^2}{4} * P$$

T	[N]	thrust
D	[mm]	inner diameter of the arch
P	[MPa]	pressure



Expansion joint spring rates

The force to deflect an expansion joint is defined as, the total load required to deflect the expansion joint a distance equal to the maximum rated movement of the product. This force figure is expressed in Newton for compression, elongation and lateral movements. The force is expressed in Newtonmeter for angular deflection.

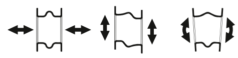
The spring rate is defined as the force in Newton required to deflect an expansion joint one millimeter in compression and elongation or in lateral direction. For angular movement the spring rate is the force needed in Nm to deflect the expansion joint one degree. These forces should be considered only as approximates which may vary with the elastomers and fabrics used in fabrication and depend from the specific construction type.

The spring rate for a filled arch type expansion joint is approximately 4 times that of a standard single arch type. This rate is dependent upon the material used in the filled arch section of the expansion joint.

The spring rate of a multi-arch type expansion joint is equal to the spring rate for a single arch type divided by the number of arches.

Spring rates can be found in the technical appendix (> page 296).

Universal expansion joint

Movement: 

Universal expansion joints are installed in piping systems that are anchored on both sides of the joint. No tie rods are necessary. If tie rods are installed as a safety measure, the locking nuts must be backed off with a clearance equal to the specified axial movement. This construction, as a standalone expansion joint, represents the most cost-effective arrangement when used in rigid piping systems with main anchors and numerous guides at specific spacing.

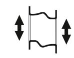
Bellows: Expansion joint with one or more moulded arches.

Tie rod: None

Pressure: The expansion joint will exert a thrust force on the anchors. The pressure from the active bellows cross-section causes stress on the adjacent pipeline anchors. In order to reduce the forces, a lower arch can be used for small movements.

Stiffness rate: Movements give rise to forces that rise under pressure and need to be taken into account in dimensioning the pipeline. Axial and lateral stiffness rates to move the expansion joint under pressure can be found in the appendix. (> page 296)

Lateral expansion joint

Movement: 

Lateral expansion joints are installed in unanchored piping or connected to isolated equipment. Tie rods are necessary. Once tie rods are installed the joint will no longer act as an expansion joint, since the pressure will extend the joint to the nuts of the tie rods. The joint will no longer take up axial movement. It will make up for misalignment, lateral and possibly angular movement. The nuts of the tie rods should be threaded against tie rod bearings, thereby preventing joint from extending.

Bellows: Expansion joint with one or more moulded arches.

Tie rod: Several threaded rods mounted around the circumference receive pressure from the active bellows cross-section.

Pressure: The tie rods assimilate the axial stresses of the expansion joint.

Stiffness rate: Movements give rise to forces that rise under pressure and which need to be taken into account in dimensioning the pipeline. Lateral stiffness rates to move the expansion joint under pressure can be found in the technical appendix. (> page 296)

Friction: Frictional forces arise in the tie rod bearings and must be overcome in addition to the stiffness rates.

Angular expansion joint

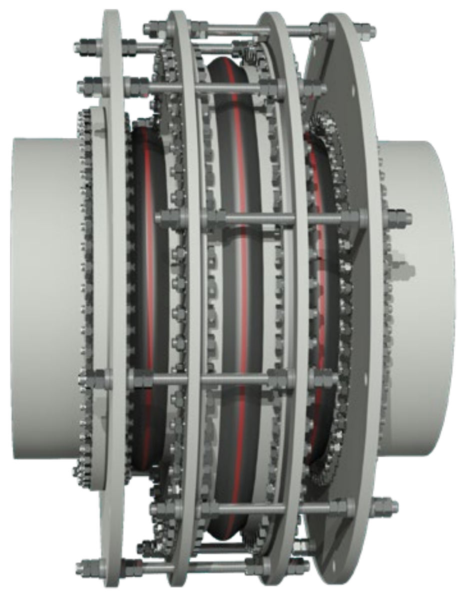
Movement:

An angular rubber expansion joint is designed to facilitate and isolate angular rotation in one plane. The arrangement consists of a pair of hinge plates connected with pins and attached to the internal hardware of the expansion joint. The hinge assembly must be designed for the internal pressure thrust forces of the system. They can be used in sets of two to absorb large lateral movements in a single plane. This optimally designed arrangement is an effective solution for absorbing large axial thermal movements from an adjacent pipe run. They are commonly used when the support structure or adjacent equipment have load limitations.

Bellows:	Expansion joint with one moulded arch.
Joint:	The angular joints bear the pressure forces from the active bellows cross-section. Angular joints for movement on one plane. Cardan joints for movement on two planes.
Pressure:	The joints bear the axial reaction forces of the expansion joint.
Friction:	Frictional forces arise in the joint bearings and must be overcome in addition to the stiffness rates.

In-line pressure balanced expansion joint

Movement:



In-line pressure balanced rubber expansion joints are the only effective solution for directly absorbing large axial movements while continuously self-restraining the pressure thrust forces.

They are designed to absorb all-directional movement, compensate for misalignments and relieve pipe and anchor stresses.

Bellows:	The two outer main rubber expansion joints need to have the same effective area as the center balancing rubber expansion joint.
Tie rod/ Pressure:	This arrangement consists of tie rods inter-connecting its balancing joint to its opposing two main joints and is commonly used when the support structure or adjacent equipment have load limitations.
Friction:	Frictional forces arise in the tie rod bearings and must be overcome in addition to the stiffness rates.

Pipeline planning > Installation of expansion joints, sliding points and fixed points

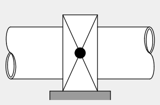
The selection and application of expansion joints plays a significant role in system performance, quality and reliability. Leveraging our extensive industry experience since 1973, ditec uses a systematic approach to finding the optimal solutions for any piping system. We apply the most sophisticated analysis and calculation software tools such as Finite Element Analysis (FEA), 3D Modelling and CAD to select the most appropriate expansion joint to fit into the corresponding pipeline system.

The pressure in the line gives rise to forces that may lead to line instability if no sliding points and fixed points are provided. If movements occur in different directions inside a pipeline, these need to be divided by planning anchors at suitable intervals. If stable anchors are not possible, the expansion joints need to be mounted such that the axial movement is diverted and can be received by tied lateral expansion joints. The correct mounting of universal, lateral and angular expansion joints is crucial to the functionality of the entire pipeline system.

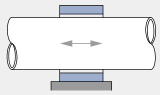
Pipeline systems should be fitted with ventilation equipment at high points and draining equipment at low points in order to avoid uncontrolled water ingress or vacuum.

Pressure and vacuum safety mechanisms in the lines prevent the expansion joints from being overloaded. Likewise, the medium temperature should be monitored using appropriate means. Information about the maximum operating temperatures and pressures is specified based on the respective expansion joint types.

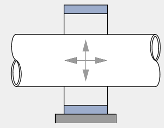
Fixed point



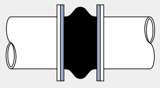
Sliding point



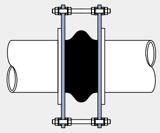
Guidance



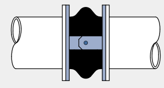
Universal expansion joint



Lateral expansion joint

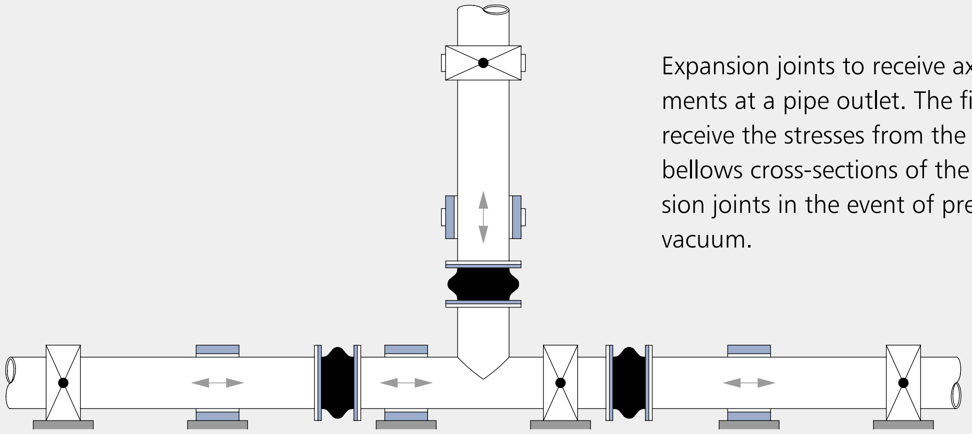


Angular expansion joint

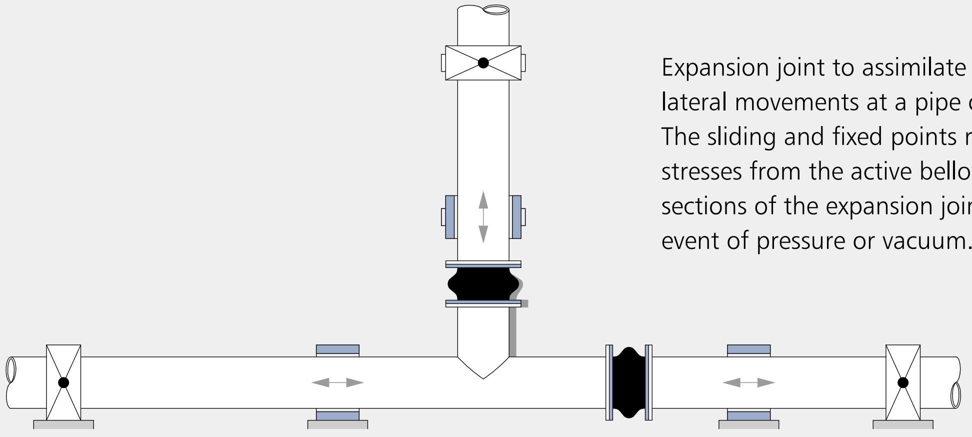


Universal expansion joints for axial, lateral and angular movement

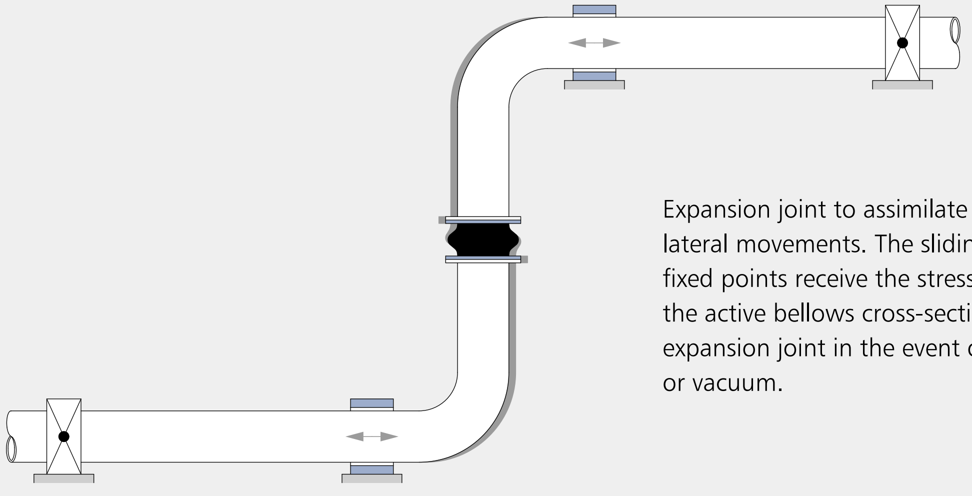
Expansion joint to receive axial movements along the pipeline axis. The fixed points receive the stresses from the active bellows cross-section of the expansion joint in the event of pressure or vacuum. In the event of large axial movements, the pipeline should be subdivided into several sections using sliding and fixed points.



Expansion joints to receive axial movements at a pipe outlet. The fixed points receive the stresses from the active bellows cross-sections of the expansion joints in the event of pressure or vacuum.



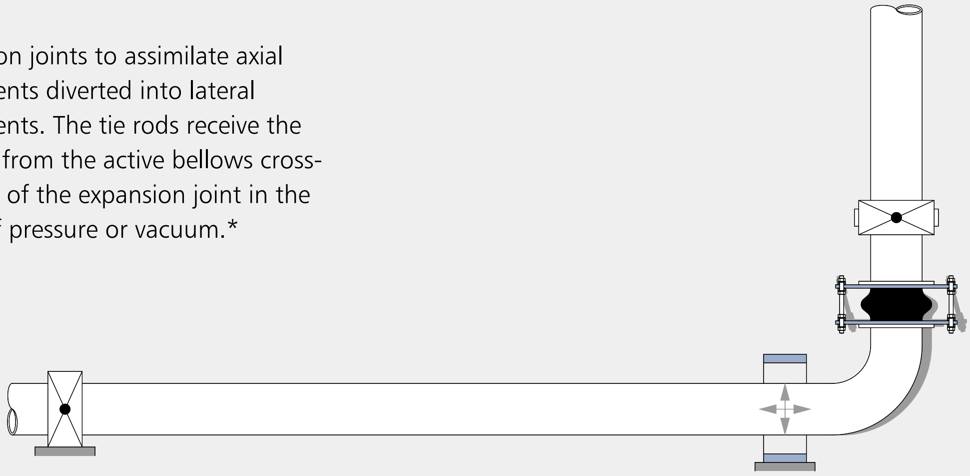
Expansion joint to assimilate axial and lateral movements at a pipe outlet. The sliding and fixed points receive the stresses from the active bellows cross-sections of the expansion joints in the event of pressure or vacuum.



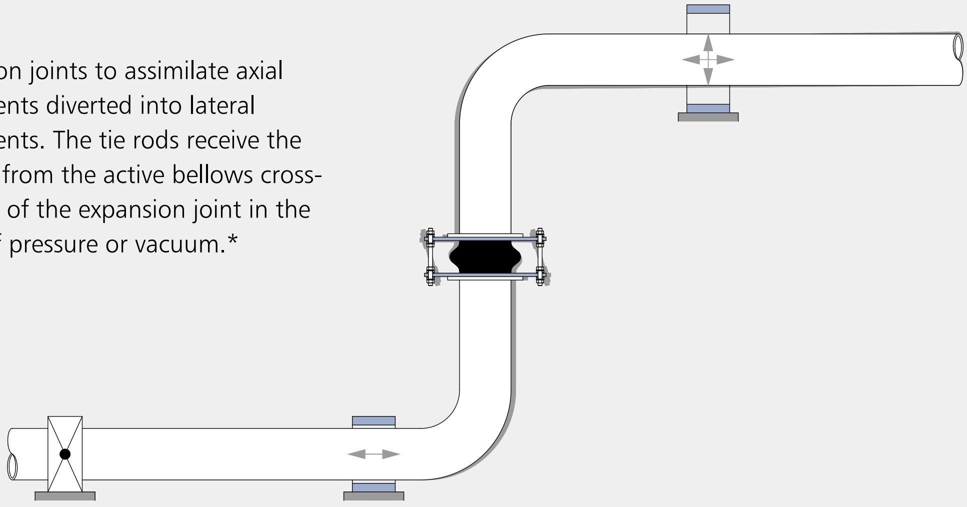
Expansion joint to assimilate axial and lateral movements. The sliding and fixed points receive the stresses from the active bellows cross-section of the expansion joint in the event of pressure or vacuum.

Lateral expansion joints for lateral movement

Expansion joints to assimilate axial movements diverted into lateral movements. The tie rods receive the stresses from the active bellows cross-sections of the expansion joint in the event of pressure or vacuum.*



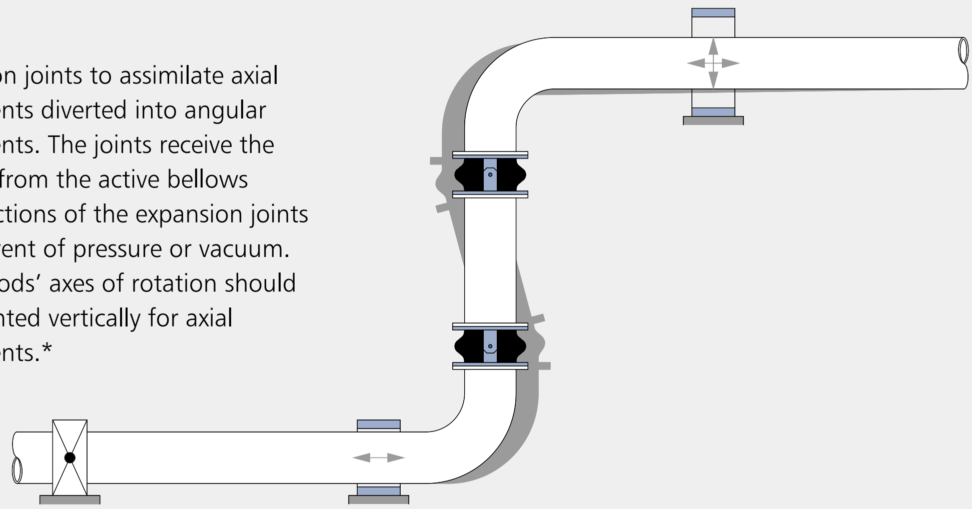
Expansion joints to assimilate axial movements diverted into lateral movements. The tie rods receive the stresses from the active bellows cross-sections of the expansion joint in the event of pressure or vacuum.*

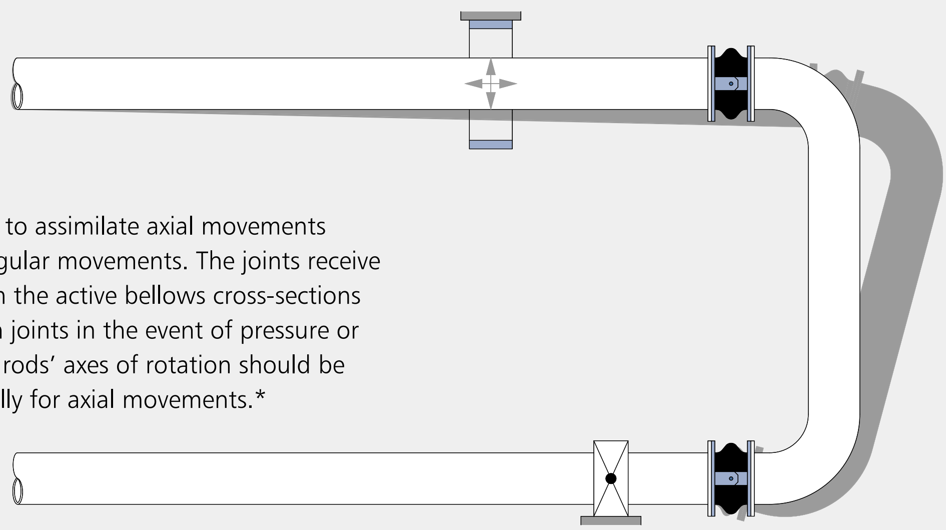


* Tie rods and hinges are designed to absorb the reaction forces of the expansion joint under pressure. Additional forces (e.g. weight forces) to be transmitted by the expansion joints must be specified.

Angular expansion joints for angular movement

Expansion joints to assimilate axial movements diverted into angular movements. The joints receive the stresses from the active bellows cross-sections of the expansion joints in the event of pressure or vacuum. The tie rods' axes of rotation should be mounted vertically for axial movements.*

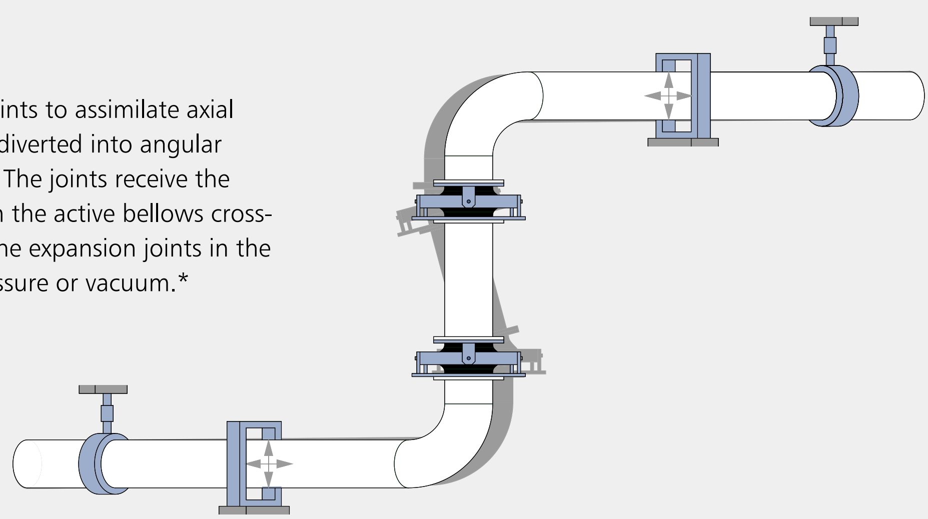




Expansion joints to assimilate axial movements diverted into angular movements. The joints receive the stresses from the active bellows cross-sections of the expansion joints in the event of pressure or vacuum. The tie rods' axes of rotation should be mounted vertically for axial movements.*

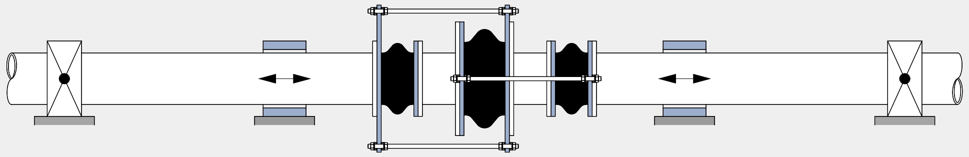
Cardan joint expansion joints

Expansion joints to assimilate axial movements diverted into angular movements. The joints receive the stresses from the active bellows cross-sections of the expansion joints in the event of pressure or vacuum.*



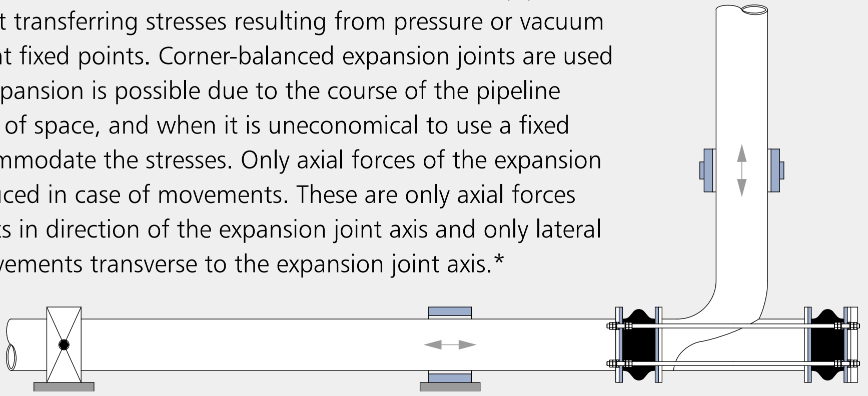
* Tie rods and hinges are designed to absorb the reaction forces of the expansion joint under pressure. Additional forces (e.g. weight forces) to be transmitted by the expansion joints must be specified.

Pressure balanced expansion joints

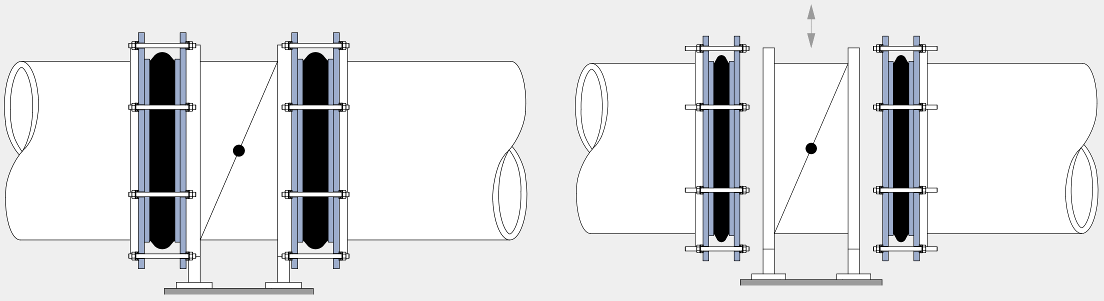


Expansion joints for the assimilation of axial movements without transferring stresses resulting from pressure or vacuum to the adjacent fixed points, apparatus or machines. The difference between the active bellows cross-sections of a large and small expansion joint corresponds to the active bellows cross-section surface area of a small expansion joint. If the tie rods are installed so that they intersect, the stresses will cancel each other out. Only axial forces of the expansion joints are induced in case of movements.*

Expansion joints for the assimilation of axial movements in a pipeline elbow without transferring stresses resulting from pressure or vacuum to the adjacent fixed points. Corner-balanced expansion joints are used if only axial expansion is possible due to the course of the pipeline or due to lack of space, and when it is uneconomical to use a fixed point to accommodate the stresses. Only axial forces of the expansion joints are induced in case of movements. These are only axial forces for movements in direction of the expansion joint axis and only lateral forces for movements transverse to the expansion joint axis.*



Dismantling joints

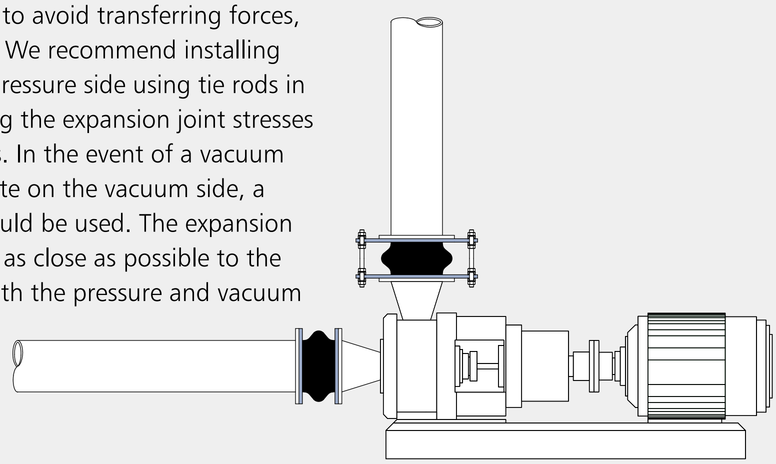


In order to compensate for installation imprecision or to simplify connection and disconnection, tied expansion joints can be used. On the one hand, the tie rods prevent the transfer of stresses to the connected armature. On the other hand, after the flange connection is loosened using the tie rod flange, the rubber bellows can be compressed by its maximum potential axial movement capability in order to create clearance for dismantling of the armature.*

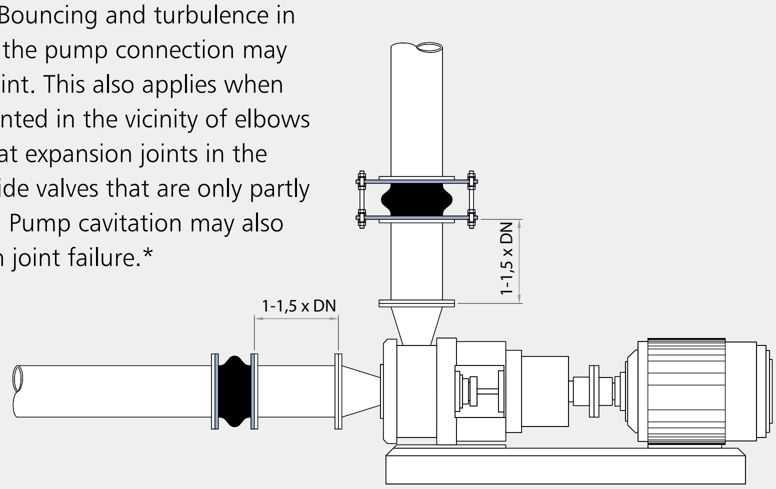
* Tie rods and hinges are designed to absorb the reaction forces of the expansion joint under pressure. Additional forces (e.g. weight forces) to be transmitted by the expansion joints must be specified.

Pump connection

Expansion joints are used to disconnect pumps from pipeline systems in order to avoid transferring forces, tensions and oscillations. We recommend installing expansion joints on the pressure side using tie rods in order to avoid transferring the expansion joint stresses to the pump connections. In the event of a vacuum exceeding 0.8 bar absolute on the vacuum side, a vacuum support ring should be used. The expansion joints should be installed as close as possible to the pump connections on both the pressure and vacuum sides.



For the transport of abrasive media (liquids containing solids), a distance of 1 to 1.5 x the pipeline diameter should be maintained between the pump connections and the expansion joint. Bouncing and turbulence in the immediate vicinity of the pump connection may damage the expansion joint. This also applies when expansion joints are mounted in the vicinity of elbows and outlets. Also note that expansion joints in the vicinity of flap gates or slide valves that are only partly closed may be destroyed. Pump cavitation may also lead to sudden expansion joint failure.*

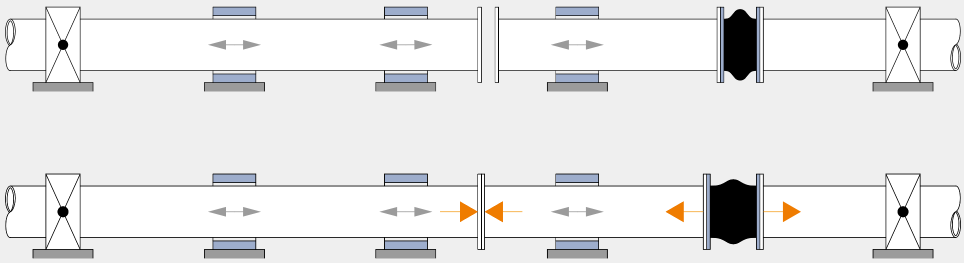


* Tie rods and hinges are designed to absorb the reaction forces of the expansion joint under pressure. Additional forces (e.g. weight forces) to be transmitted by the expansion joints must be specified.

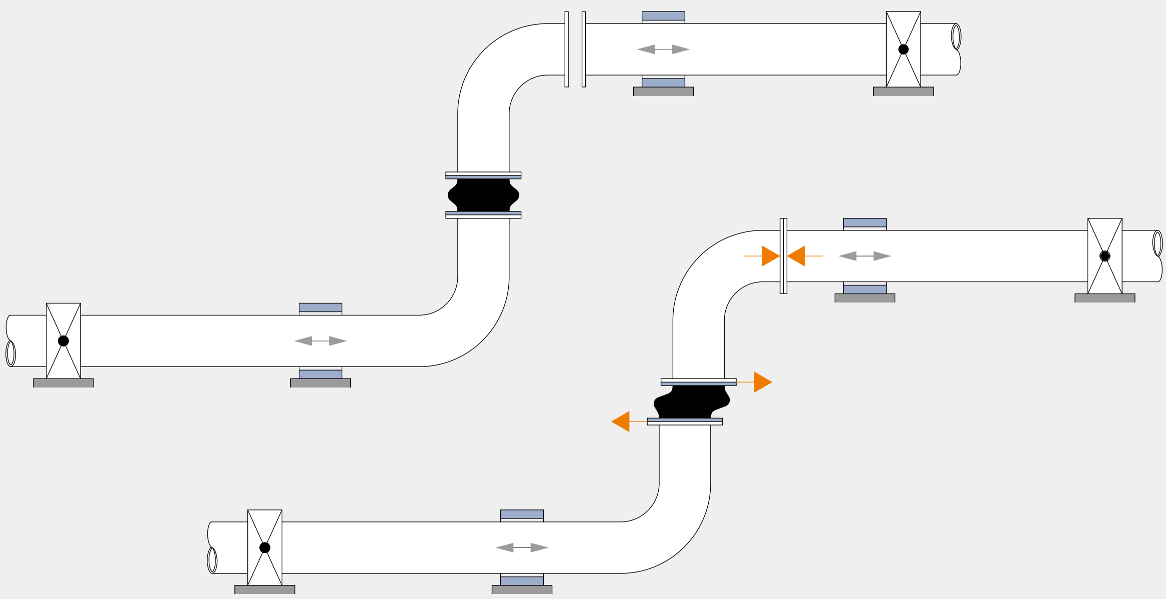
Expansion joint preload

Large axial and lateral movements can be reduced by presetting the line against the direction of movement.

In order to increase axial movement, the expansion joint can be pre-loaded to its maximum extension during installation. There is a risk, however, that for expansion joints with swivel flanges, the sealing bead will spring free of the groove of the backing flange and that for expansion joints with full-faced rubber flanges, the latter cannot be positioned so as to be congruent with the pipe flange. If pre-loads of more than 10 mm are needed, a flange connection will need to be disconnected at another location. Now the expansion joint can be installed free of tension and the flange disconnection sites that were opened before can be closed again.



In order to increase lateral movement, the expansion joint can be pre-loaded to its maximum lateral displacement against the direction of flow during installation. During operation, it will move back to the opposite side through the zero point. In this way, the lateral movement can be increased by up to 100%. There is a risk, however, that for expansion joints with swivel flanges, the sealing bead will spring free of the groove of the backing flange and that for expansion joints with full-faced rubber flanges, the latter cannot be positioned so as to be congruent with the pipe flange. If pre-loads of more than 5 mm are needed, a flange connection will need to be disconnected at another location. Now the expansion joint can be installed free of tension and the flange disconnection sites that were opened before can be closed again.



Expansion joint technology > Bellows construction

Our rubber expansion joint designs always comply with the European Pressure Equipment Directive PED 2014/68/EU for the specified operating conditions, follow the guidelines of the Fluid Sealing Association (FSA) Technical Handbook for Non-Metallic Expansion Joints and ASTM F1123 - 87 Standard Specification for Non-Metallic Expansion Joints.

An expansion joint is constructed as follows:
> medium-resistant internal layer (bore)
> pressure-resistant fabric insert
> weather, ozone and UV-resistant external layer (cover)
Suitable rubber blends and fabric grades are available to meet your specific requirements.

The dimensions and movements listed for the expansion joint types are values that are commonly found on the market, yet they are not binding and can be adjusted to suit your application.

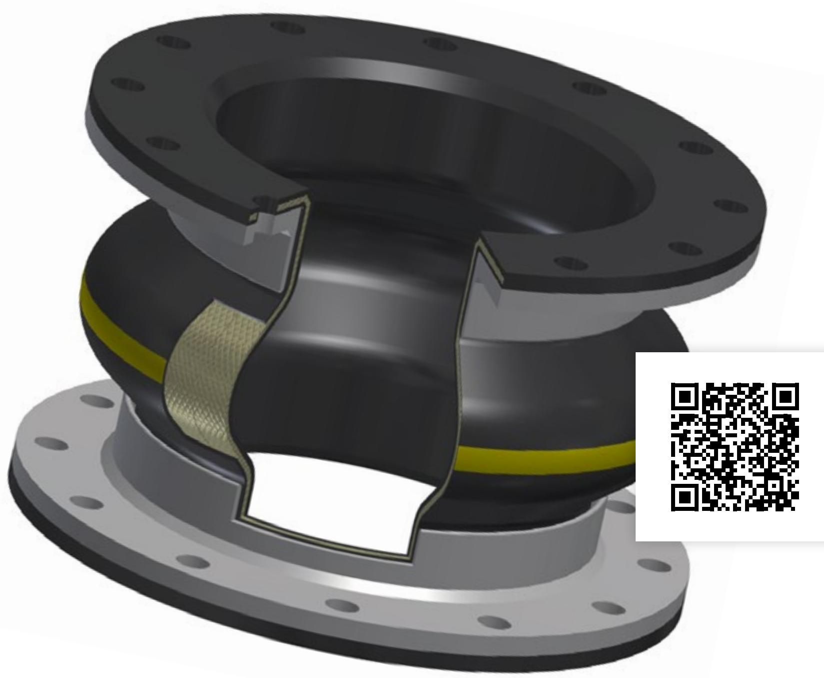
In this catalogue, we distinguish between:

Rubber expansion joint variants
Universal expansion joints
Lateral expansion joints
Angular expansion joints
Pressure balanced expansion joints
Dismantling expansion joints
Expansion joints with offset
Donut expansion joints
Rubber flanged pipes
Two ply testable bellows
FDA expansion joints
Penetration seals
Dog Bone expansion joints
Rubber moulded parts

Fixing variants
Full faced rubber flanges
Swivel flanges
Clamped fixing

Bellows shape
Cylindrical
Single or multiple arches
Conical

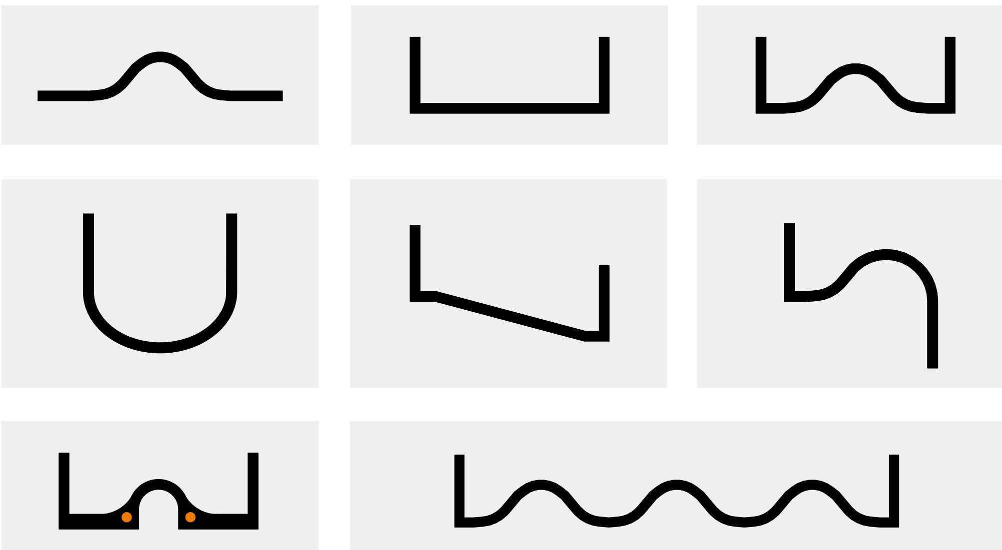
Support ring variants
Internal
Embedded
External



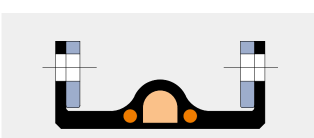
Find out more on our website at
www.ditec-adam.de/qr/bellows-construction
Bellows constructions

Bellows cross-sections

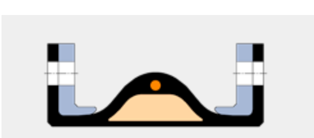
Dimensions, pressure and movement require special designs. Our manufacturing process allows us to produce a great variety of bellows cross-sections in order to provide optimal solutions to any application you may have. The designs shown are simply a rough overview.



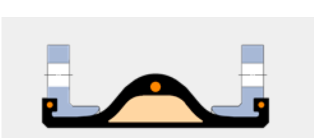
Filled arch



The open arch design of the standard spool type expansion joint may be modified to reduce possible turbulence and to prevent the collection of solid materials that may settle from the solution handled and remain in the archway.



Arch-type expansion joints with embedded vacuum ring(s) may be supplied with a bonded-in-place soft rubber filler to provide a smooth interior bore. Filled arch joints also have a seamless tube so the arch filler cannot be dislodged during service. Filled arch, built as an integral part of the carcass, significantly restricts the flexibility of the joint and shall be used only when necessary. Movements of expansion joints with filled arch are limited to 50% of the normal movements of comparable size expansion joints with unfilled open arches.



Most of ditec’s expansion joint type listed have streamlined, self-cleaning arch contours which help to constantly flush out solid matter. A filled arch is therefore only needed for rare applications.

Rubber grades

The rubber blends adapted to our requirements are obtained from reputable manufacturers. We work with them continuously to further develop and optimize the blends.

The physical and chemical properties are specified in detail in the materials datasheets and every batch of rubber delivered is subjected to extensive goods receipt inspections.

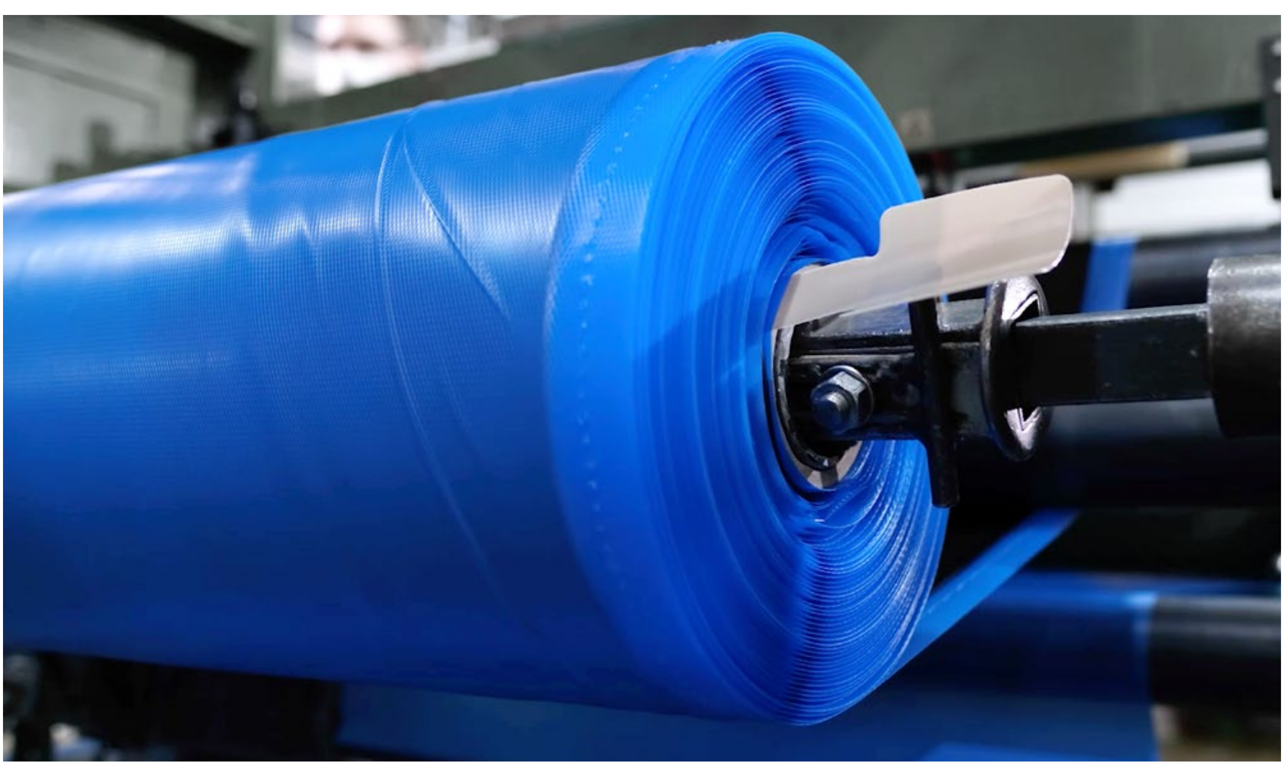
The expansion joint bellows are made using individual rubber films and reinforcements and are vulcanised after moulding. Vulcanisation refers to cross-linking the rubber by subjecting it to high pressure and temperature. The rubber is converted from its original plastic state into an elastic state by molecular bridge bonding using sulphur or peroxides.

All rubber grades are subject to natural aging that reduces elasticity and raises Shore hardness. Under normal conditions, one can assume that the Shore hardness increases on average by 1° Shore A per year. This value may rise at higher temperatures. For this reason, we recommend that you inspect the Shore hardness at regular intervals and replace the expansion joints when the value reaches approximately 80° Shore A. Assuming a Shore hardness of approximately 60° Shore A, the component lifetime will be 15 to 20 years. Wear and external influences such as UV radiation and ozone damage are also involved here.

Discover our shore hardness test video at
www.ditec-adam.de/qr/rubber-grades

Rubber grades

We will select the appropriate rubber grade for your application from a wide variety of different blends depending on the composition of the medium and the operating temperature:



Rubber	Marking	Temperatur range °C	Characteristics and application
EPDM Ethylene propylene diene monomer		-40 to +100	> Excellent resistance against aging, UV, ozone, sunlight and weathering. Ideal for outdoor service. > Good gas tightness. > Outstanding hot water and vapor resistance. > Good resistance to heat, ozone, alkalis and oxygenated solvents. > Highly soak-resistant and chemical resistant to dilute acids, bases, acetone and alcohol. > Good general purpose elastomer. > Standard blend: conductive with ATEX certification. > Do **not** use with petroleum oil service such as aliphatic, aromatic or chlorinated hydrocarbons.
EPDMht Ethylene propylene diene monomer		-40 to +140	> Permanent high temperature resistant up to 140°C. > Excellent resistance against aging, UV, ozone, sunlight and weathering. Ideal for outdoor service. > Good gas tightness. > Outstanding hot water and vapor resistance. > Good resistance to heat, ozone, alkalis and oxygenated solvents. > Highly soak-resistant and chemical resistant to dilute acids, bases, acetone and alcohol. > Do **not** use with petroleum oil service such as aliphatic, aromatic or chlorinated hydrocarbons.
EPDMwras Ethylene propylene diene monomer		-40 to +100	> Drinking water approval according to British WRAS, German KTW and French ACS standard. > United states FDA compliant. > Outstanding hot water and vapor resistance.
EPDMbeige Ethylene propylene diene monomer		-40 to +100	> Bright rubber grade for fat free foodstuff. > Can be used in direct contact with food, beverage, and pharmaceutical products. > United states FDA and German BfR compliant. > Non-conductive.
IIR Isobutylene isoprene rubber		-20 to +100	> Lowest permeability. > Very good resistance to water, heat, animal fats, veg. oils, greases, ozone, alkalis, sunlight, and oxygenated solvents. > Highly resistant to many dilute acids and bases. > **Not** very resistant to aliphatic, aromatic and chlorinated hydrocarbons.
CSM Chloro-sulfonated polyethylene rubber		-20 to +100	> Outstanding resistance to weather, particularly sunlight and ozone. > Superior flame and abrasion resistance as well as excellent resistance to acids, alkalis and oxidation. > Good general oil resistance, also at elevated oil temperatures e.g. to be used for air compressors with oil aerosols.
NBR Nitrile butadiene rubber		-30 to +100	> Good heat and aging resistance, especially if air is kept out (e.g. in oil). > Excellent soak-resistance against non-polar or slightly polar media, e.g. fuels, butane and propane, mineral oils, hydrocarbon solvents, dilute acids, alkalis, lubricants, greases, vegetable and animal fats or oils. > Moderate aging properties.
NBRbeige Nitrile butadiene rubber		-30 to +100	> Bright rubber grade for fatty and oily foodstuff. > Can be used in direct contact with food, beverage, and pharmaceutical products. > United states FDA and German BfR compliant. > Non-conductive.

Rubber	Marking	Temperatur range °C	Characteristics and application
CR Chloroprene rubber		-20 to +90	> Very good UV, ozone and weather resistance. > Flame retardant, as well as abrasion resistant. > Resists alkalis, inorganic acids, and salt solutions. > Chemical resistance against alkalis, dilute acids, aqueous salt solutions and reductive agents. > Good resistance to animal and vegetable oils. > Adequate resistance to paraffinic, naphthenic and high-molecular oils. Moderate resistance to petroleum oils. > **Not** suitable for oxidizing materials and concentrated mineral acids.
NR Natural rubber		-20 to +70	> Excellent resilience and rebound elasticity of up to 600 % with high tensile strength. > Excellent resistance to tear and abrasion. > Satisfactory heat aging and ozone resistance. > Low resistance to hot water and steam. > Poor resistance to solvents and petroleum products.. > **Not** resistant to chlorinated hydrocarbons, aromatics, esters and ketones.
FPM Fluorine polymer		-20 to +180	> Excellent aging, UV, ozone and weather resistance. > Most universal chemical resistance. > Excellent resistance to aggressive chemicals, solvents, and halogenated hydrocarbons, also hot oils, aliphates and aromatics. > Excellent resistance to steam up to 120°C, aqueous acids, amines and concentrated caustics/bases/alkalis. > High gas-tightness. > Non-conductive.
FPMbeige Fluorine polymer		-20 to +180	> Bright rubber grade with excellent chemical and temperature resistance. > Can be used in direct contact with food, beverage, and pharmaceutical products. > United states FDA compliant. > Non-conductive.
Q Silicone		-60 to +200	> Excellent resistance to aging, UV, ozone and weather. > Bright rubber grade can be used in direct contact with food, beverage, and pharmaceutical products. United states FDA and German BfR compliant. > Satisfactory resistance to oils of alphatic nature. > Should not be used permanently with steam over 120°C. > Not resistant to fuels, chlorinated hydrocarbons, esters, ketones or ether. > Highly susceptible to acids and bases. > Satisfactory gas-tightness. > Non-conductive.

Let us know your requirement specification at **www.ditec-adam.de/en/contact**

Online form

PTFE lining

If it is not possible to select a rubber grade that will endure for the long term due to the corrosiveness of the medium or the diversity of materials being conveyed, we can provide expansion joints with an interior fluoroplastic lining of PTFE / FEP. Fluoroplastic offers exceptional resistance to almost all chemicals within the temperature range of the expansion joint body construction. The lining is fabricated as an integral part of the expansion joint during manufacture, covers all wetted surfaces in the tube and flange area and is firmly connected to the exterior rubber bellow. A detailed specification of the operating conditions is required when considering employing a PTFE/FEP-lined rubber expansion joint. Generally movement capability of some expansion joint types with fluoroplastic liner is limited to 60 to 70 % of the normal movements of comparable size expansion joints without lining.

Fabric reinforcements

The reinforcements of the rubber bellows are high-quality synthetic fabrics which bear the forces from the internal pressure or vacuum. The type, quantity and arrangement of the reinforcements are designed in keeping with Pressure Equipment Directive PED 2014/68/EU. All carriers are impregnated with rubber, completely embedded in the bellows and are firmly connected to the body.

The following fabrics are used depending on the bellows design temperature:

up to 100 °C:	Polyamide fabric Polyester fabric
up to 180 °C:	Aramide fabric
up to 200 °C:	Glass fabric Steel mesh

Metal reinforcements

Wire or solid steel rings made from carbon or stainless steel embedded in the bellows construction are used as strengthening members of the expansion joint.

A steel ring embedded in the top of the arch prevents the expansion joint body from collapsing under vacuum; it has no media contact and is not washed around by flow turbulence. Special packing and transport means must be considered for very large dimensions because the bellow with embedded steel ring cannot be squeezed anymore.

Requirement specification

We need the following information in order to select a rubber expansion joint:

Expansion joint variants
> Universal expansion joint
> Lateral expansion joint
> Angular expansion joint
> Penetration seal

Fixing type
> Full faced rubber flange
> Swivel flange
> Clamped fixing

Dimensions
> Diameter
> Installation length
> Flange norm

Medium
> Composition
> Aggregation state
> Proportion of solids

Temperature
> Minimum and maximum operating temperature
> Accident temperature and duration
> Design temperature

Pressure
> Pressure and vacuum
> Pressure surge
> Alternating pressure
> Design pressure
> Test pressure

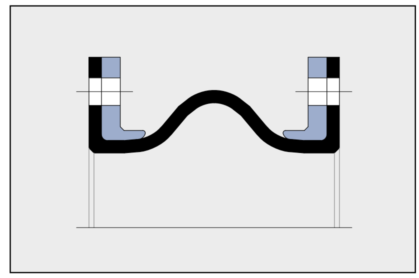
Movement
> Axial compression
> Axial extension
> Lateral displacement
> Angular movement
> Torsion
> Oscillation frequency and amplitude

Expansion joint technology > Fixing types

Flanged fixing

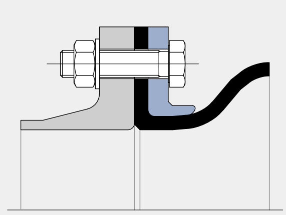
With full faced rubber flanges and backing flanges

A full face integral rubber flange design with backing flanges is available for types without, with single and multiple arch design. The rubber flange of the bellows is molded in an equal thickness to the flange diameter. The backing flanges are designed as flat press-on flanges with or without support collars. The manufacturing process is economical for very large diameters also. For transport reasons, the backing flanges can also be delivered in a split construction. Hereto special measurements such as cutting through the holes or end plates to connect the backing flange parts to form an integral flange on-site need to be taken.

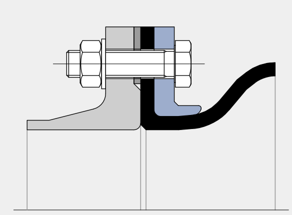


The fixing of the expansion joint needs to be performed in keeping with specific rules in order to assure reliable sealing of the flange connection. Ideally full face rubber flanges shall be clamped to flat face pipe flanges. It is essentially required that any recess or raised face of pipe flanges must be equalized in order to avoid damaging of the rubber flange surface. If the recess or raised face is specified in advance ditec can offer to integrate the negative of the recess or raised face into the rubber flange. Then no extra measurements such as separate steel plates or additional rubber gaskets to flatten the surface need to be taken onsite.

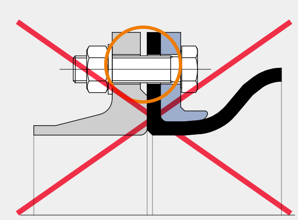
Full face rubber expansion joints are self-sealing. So an additional separate gasket is not required.



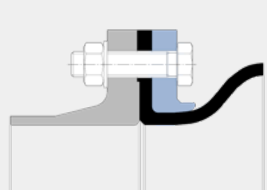
ideal flat face fixing
optimal screw head/nut position



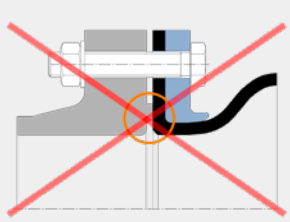
raised face of mating flange to be equalized
with separate gasket or metal plate



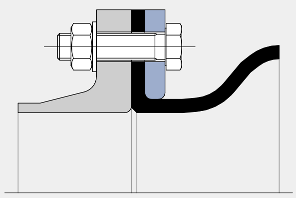
raised face of mating flange cuts into
rubber flange



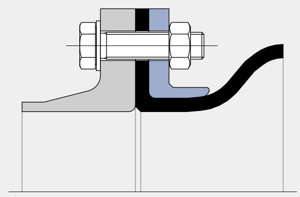
optionally raised face compensation
integrated in rubber flange



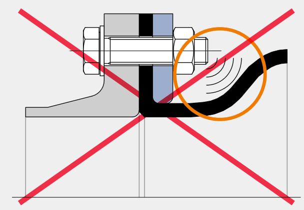
sharp raised face cuts into the rubber
flange



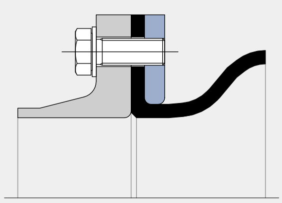
ideally insert screw from bellow side



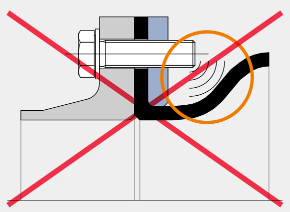
screw can be inserted from mating flange side if protected by collar



excessive screw length must not touch rubber bellow under pressure



control length of screw

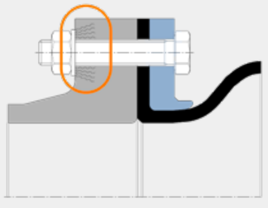


excessive screw length must not touch rubber bellow under pressure

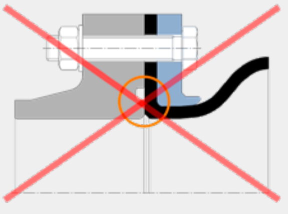
Glass reinforced epoxy piping (GRP) specialities

Flanges of glass reinforced epoxy piping cannot withstand the required tightening torques of full-faced rubber expansion joint fixed to without cracking depending from design pressure and pipe standard. In order to avoid special measurements on the GRP pipe flange ditec has developed a special sealing technology in the bellows rubber flange to lower the torques by approx. 50 %. This also eliminates the need for any grooves for O-rings in the GRP flange and the most economic flat face GRP flange can be applied.

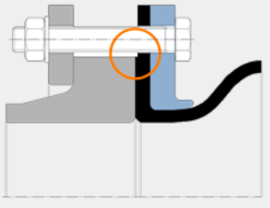
In case of expansion joints in GRP pipelines with collar flange fixing and backed steel rings the rubber flange surface shall have a raised face up to the outer diameter of the GRP stub to avoid cutting of sharp edges into the rubber.



ditec's special rubber flange design lowers bolt torques by 50% to avoid flange cracks

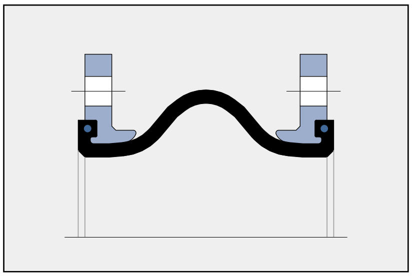


bellows rubber flange is selfsealing



raised face rubber flange avoids cracks

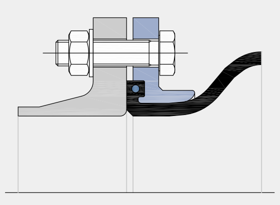
With self-sealing rubber bulges and swivel backing flanges



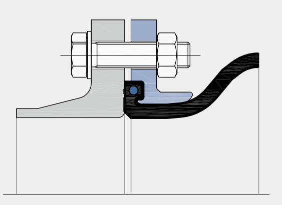
An expansion joint design with self-sealing rubber bulges and swivel backing flanges is available for types without, with single and multiple arches. The rubber flange of the bellows is designed as a sealing bulge with an embedded steel core. The swivel backing flanges can be made with or without support collars and can be used to simplify the installation of the expansion joint for misaligned flange bores. Standard sizes are offered up to a diameter of ∅ 1,200 mm. For larger dimensions, the costs associated with turning the groove into the steel flange rise sharply, but can be offered on request. Backing flanges will always be delivered in a one-piece construction except for some rare applications with Fluoroplastic liner. Hereto special measurements such as cutting through the holes or end plates to connect the backing flange parts to form an integral flange need to be taken.

The fixing of the expansion joint needs to be performed in keeping with specific rules in order to assure reliable sealing of the flange connection. Rubber expansion joints with swivel flanges maybe installed on raised-face or flat-face mating flanges. Caution shall be taken that sealing bead sits in full width on the raised face surface to avoid cutting into the rubber bulges when torqueing.

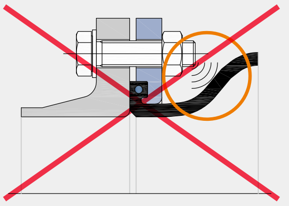
The seal bead eliminates any requirement for gaskets between mating flanges.



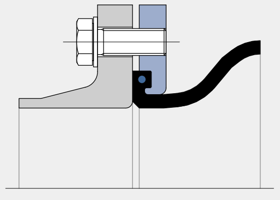
ideally insert screw from bellow side



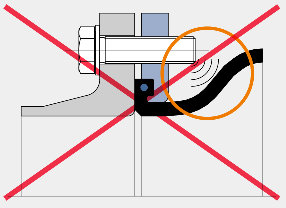
screw can be inserted from mating flange side if protected by collar



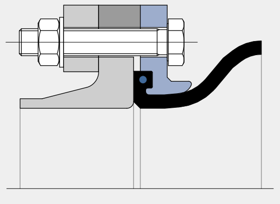
excessive screw length must not touch rubber bellow under pressure



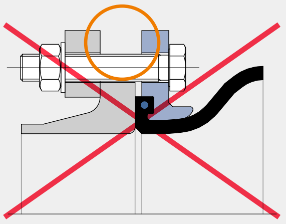
control length of screw



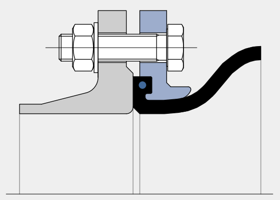
excessive screw length must not touch rubber bellow under pressure



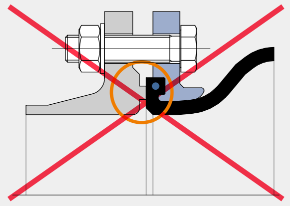
insert steel ring to avoid bending moment for collar flanges with backed steel ring



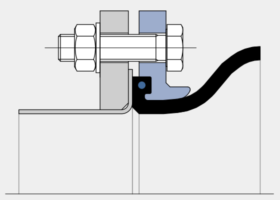
avoid bending moment for collar flanges with backed steel ring



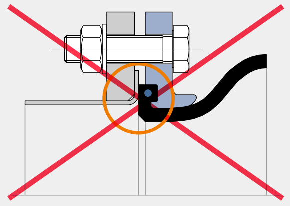
sealing bulge must completely sit on raised face



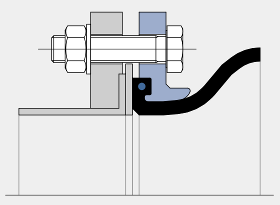
sharp raised face will damage sealing bulge



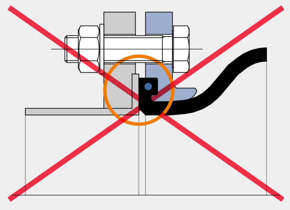
sealing bulge must fully sit on fixing surface



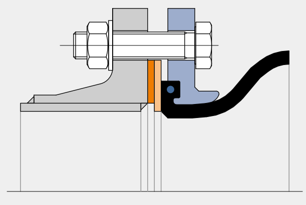
damage of sealing bulge and/or leakage problems



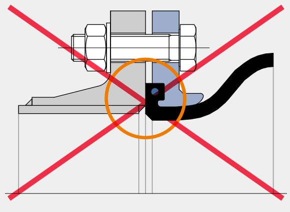
install metal plate between rubber lining and sealing bulge



loss of tightness when direct contact between rubber lining and sealing bulge



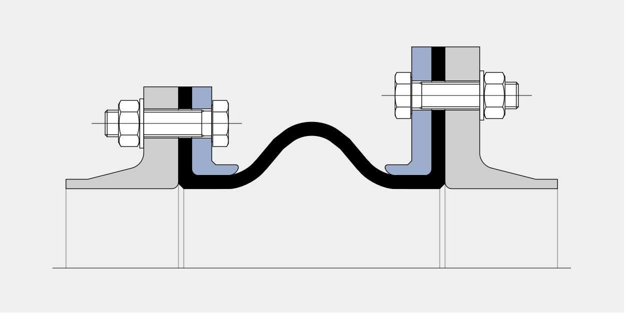
sealing bulge must completely sit on fixing surface

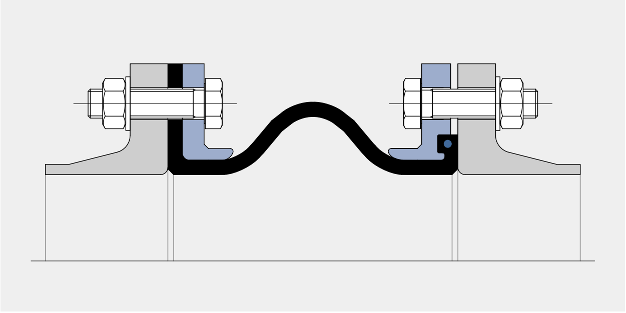


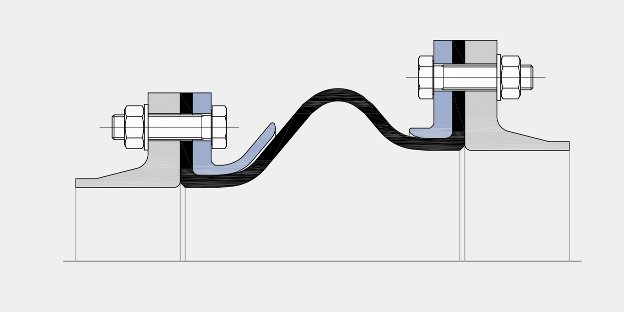
damage of sealing bulge and/or leakage problems

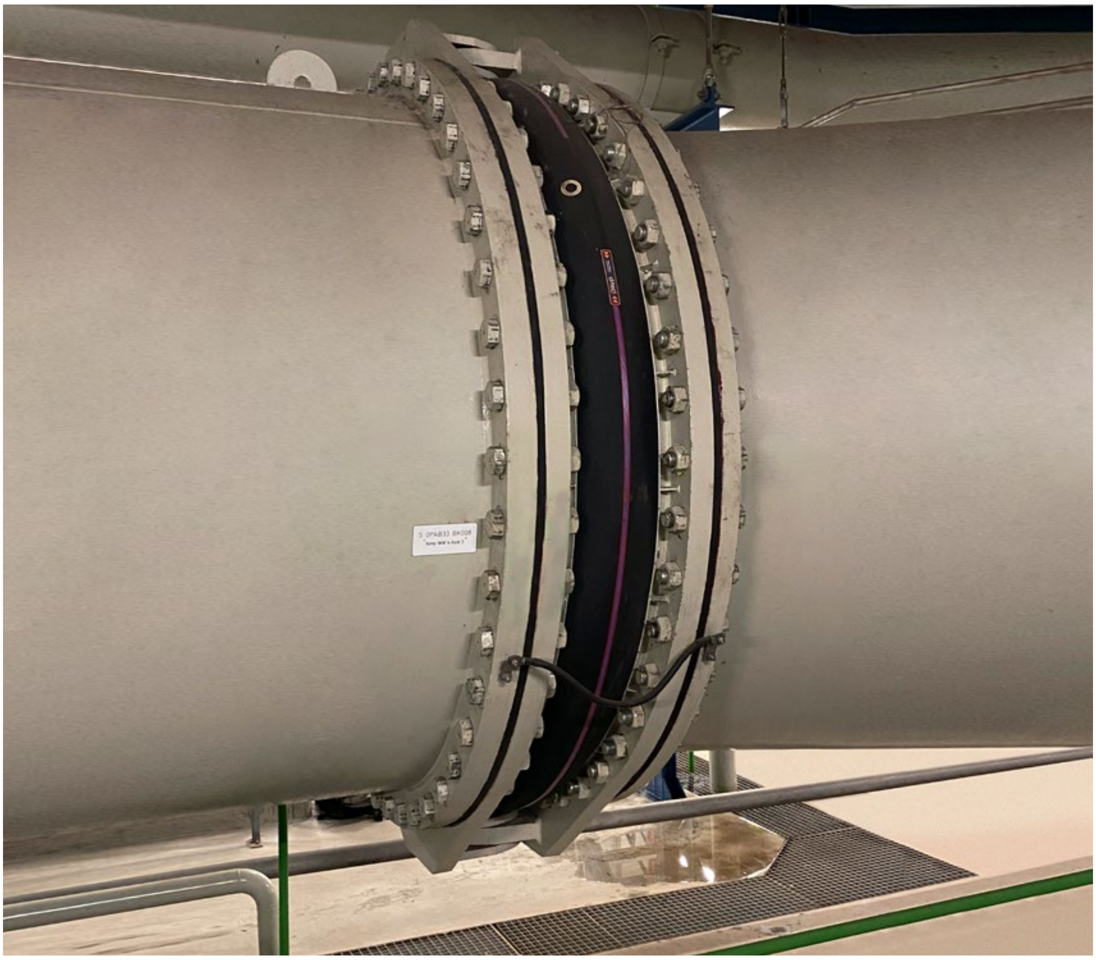
Different flange dimensions and diameter change

The flange dimensions can be designed in keeping with all the international norms, such as DIN, ANSI, AWWA, BS or JIS. Special dimensions can be accommodated. This also applies to expansion joints with different flange dimensions or with diameter jumps. The bores of the backing flanges can be manufactured as threaded holes or clearance holes as required.







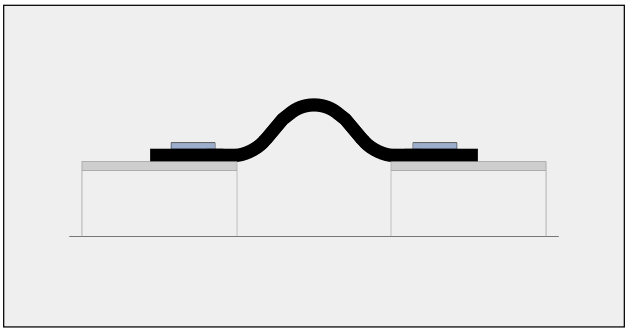


Universal rubber expansion joint Typ U110A ∅ 2,000 PN 6 in a cooling water line of a power plant

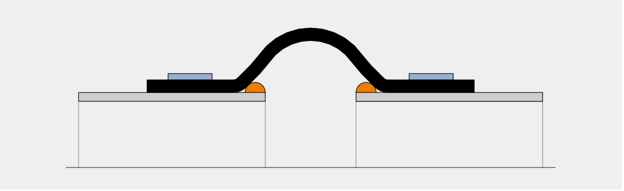
Clamped fixing

Belt expansion joints have cylindrical ends (sleeves) that are clamped to the pipeline ends using clamping clips.

The capped sleeve ends have an inner diameter dimension equal to the outer diameter of the pipe. These joints are designed to slip over the straight ends of the open pipe and be held securely in place with clamps. This type of joint is recommended only for low to medium pressure and vacuum service because of the difficulty of obtaining adequate clamp sealing.

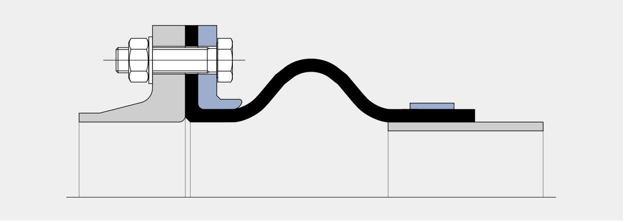


At higher pressures (1 bar) and greater diameters (> ∅ 500 mm), the fixing of a sleeve expansion joint may lead to sealing problems. There is also the risk that the expansion joint will be pulled off the pipeline. For this reason, we recommend that you attach a welding bead or a wire to the pipeline ends.



We can manufacture all our slip-on sleeve rubber expansion joint types exactly customized to the outer diameter of the piping. If needed, the expansion joint can be made using flange fixing on one side and a sleeve on the other side.

Slip-on sleeve rubber expansion joints are self-sealing. So an additional separate gasket is not required.



Clamping clips

Design:	Depending on pressure and the diameter, endless clamp belt, screw thread belt, small clamps or hinge bolt clamps. At higher pressures, 2 adjacent clamps per fastening side.	
Width:	Endless clamp belt:	¾“
	Screw thread belt:	½“
	Small clamp:	depending on Ø: 9–12 mm
	Hinge bolt clamp:	depending on Ø: 18–30 mm
Materials:	Endless clamp belt with screw lugs (tongs):	1.7300
	Screw thread belt with threaded screw lugs:	1.4310
	Small clamp, belt and housing:	1.4016 (Screw steel galvanised)
	Hinge bolt clamp, belt and housing:	1.4016 (Screw steel galvanised)

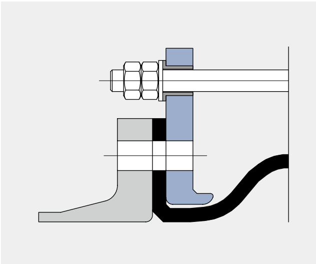
Expansion joint technology > Tie rod design

Rubber expansion joints cause force on the adjacent sliding or fixed points when under pressure (active bellows cross-section surface area x operating pressure). The force created by this pressure is designated as pressure thrust. Where the pipe supports are not designed to absorb this force, tie-rods must be incorporated across the joint from flange to flange so that the expansion joint is restrained in axial direction and can move lateral only. It can be eliminated also by using angular expansion joints with hinges and pin, such that the pipe anchors and guides are unburdened accordingly.

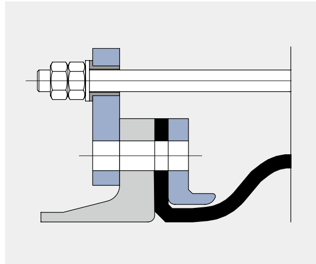
Based on the Pressure Equipment Directive PED 2014/68/EU the number and size of tie-rods must be calculated to take the full pressure thrust plus extra safety margins at the required hydraulic pressure test. Most commonly tie-rods are directly integrated into the backing flanges which influences their construction thickness depending from the design pressure and dimensions. The use of gusset plates placed behind the mating flange is an alternative but introduces pointwise forces into the flange. This technology works for steel pipes but their use is not allowed for glass reinforced epoxy (GRP) flanges which could break under these extra unconsidered forces.

Tie rods:	Several threaded rods mounted around the circumference assimilate pressure from the active bellows cross-section. Pipe flanges need to be parallel aligned for lateral expansion joints
Pressure:	The tie rods assimilate the axial stresses of the expansion joint
Stiffness rate:	Movements give rise to forces that rise under pressure and need to be taken into account in dimensioning the pipeline. Lateral stiffness rates to move the expansion joint under pressure can be found in the technical appendix; you may also enquire directly with us
Design:	Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive
Pipeline:	For laterally stayed expansion joints the flange diameter of the pipeline must not be bigger than as defined in the norm, as otherwise the tie rod touches against the side of the flange and the lateral movement is restricted
Materials:	Tie rod materials can be according to DIN or ASTM standard which defines slightly different tensile and yield strength which is considered in our calculation
Coating:	Spherical bearings and ball disks PTFE-coated Tie rods galvanised, hot-dip galvanised or PTFE-coated

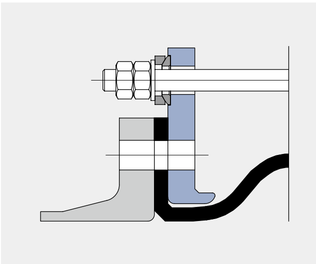
The following tie rod designs are used depending on the requirements:



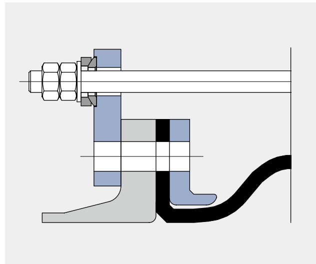
Design: B
Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



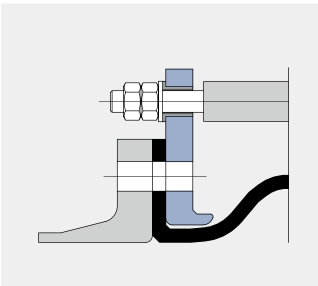
Design: R
Gusset plates: Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



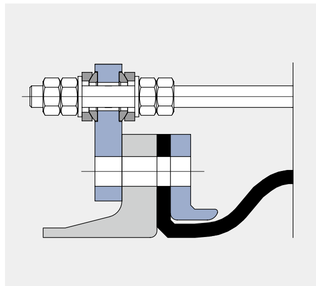
Design: E
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



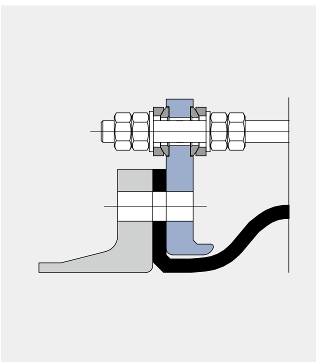
Design: K
Gusset plates: Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



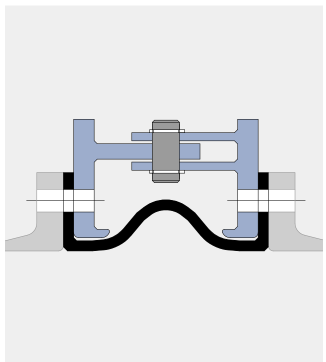
Design: C
Tie rods mounted outside in rubber bushing and inside with compression sleeve to accommodate pressure/vacuum thrust forces



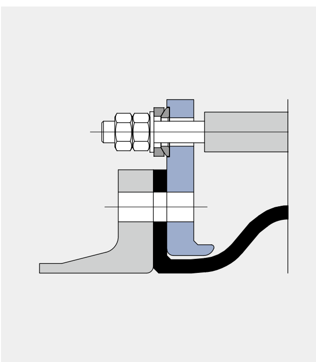
Design: L
Gusset plates: Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/ vacuum thrust forces



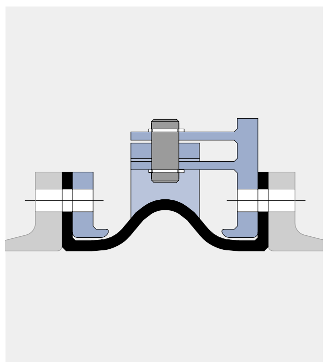
Design: M
Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/ vacuum thrust forces



Design: F
Hinge for angular movements on one plane with plates and pins to absorb the reaction forces from pressure and vacuum. Rotation axis in the center of the installation gap



Design: S
Tie rods mounted outside in spherical washers and ball disks with compression sleeve to accommodate pressure/ vacuum thrust forces



Design: G
Cardan joint for angular movements on two planes with plates and pins to absorb the reaction forces from pressure axis and vacuum. Rotation in the center of the installation gap

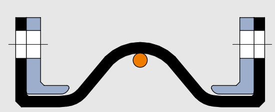
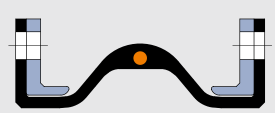
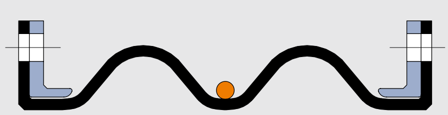
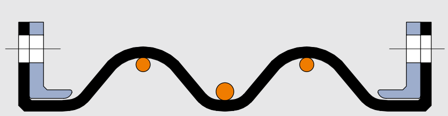
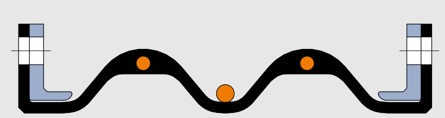
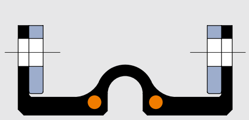
Note: Additional forces (e. g. weight forces) to be transmited by the expansion joints must be specified.

Expansion joint technology > Vacuum and support rings

Rubber expansion joints can be equipped with internal vacuum spirals, vacuum rings and/or external support rings/ropes to protect against deformation of the expansion joint bellows depending on the operating pressure. The diameters of the rings are individually designed and calculated against deformation under full vacuum respectively against test pressure considering extra safety margins.

Vacuum rings / spirals can be placed inside of the arch apex and are in contact with the medium flow. Special grades of stainless and super duplex steel with suitable corrosion resistance are used for the corresponding application. More and more common is the design of expansion joints with steel rings embedded in the rubber. It has no media contact, is not washed around by flow turbulence and a cost-effective standard carbon steel grade with high tensile strength and therefore reduced diameter can be embedded. The movement capability of an expansion joint with embedded vacuum ring in the top of the arch is approx. 25% lower than a loose ring inside of the arch. Large bore rubber expansion joints at high design pressures and vacuum are mostly furnished with loose internal vacuum ring which is supplied in several parts. Because of design limits for the ring diameter and transportation issues embedded vacuum rings are in this case uneconomically.

External carbon or stainless steel support rings and ropes are only applicable for multiple arch expansion joint types. Carbon steel support rings are hot-dip galvanized or rubber coated to resist environmental impacts.

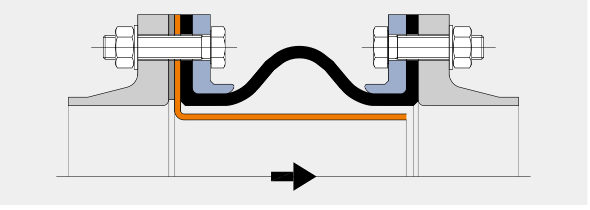
Design		Vacuum ring	Support ring	Pressure
1 With internal vacuum ring		Medium contact, inside the arch apex	Without	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute
2 With embedded vacuum ring		No medium contact, embedded into the arch apex of the rubber bellows	Without	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute
3 No vacuum ring, with support ring in the arch trough		Without	External in the arch trough	Depending on the diameter up to 40 bar, slight vacuum
4 With internal vacuum ring and external support ring in the arch trough		Medium contact, inside the arch apex	External in the arch trough	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute
5 With embedded vacuum ring and external support ring in the arch trough		No medium contact, embedded into the arch apex of the rubber bellows	External in the arch trough	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute
6 With embedded support rings in the arch foot		No medium contact, embedded into the arch foot of the rubber bellows		Depending on the diameter up to 16 bar, for vacuum up to 0.5 bar absolute

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

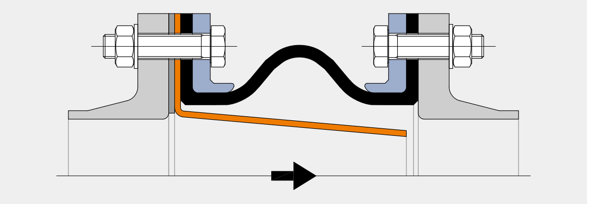
Expansion joint technology > Flow liners

Rubber expansion joints have streamlined arch contours in order to reduce pressure drop (resistance coefficient), turbulence and flow losses. In most cases it is possible to use them without an additional flow liner. This is only needed for abrasive media and for flow speeds of more than 5 m/s. The expansion joint bellows should then be fully protected by the flow liner. The sleeve extends through the bore of the expansion joint with a full faced flange on one end. It is constructed of metal, fluoroplastic or GRP. It reduces frictional wear of the expansion joint and provides smooth flow, reducing turbulence. The lateral displacement needs to be taken into account in dimensioning the flow liner and can in some circumstances lead to severe narrowing of the pipeline cross-section. The medium's direction of flow must be taken into account during installation. To avoid deposits between the flow liner and the expansion joint, the tube can be perforated multiple times around its circumference, so that the intermediate space is flushed out and no deposits are able to form in the dead spots. This type of sleeve should not be used where high viscosity fluids, such as tars, are being transmitted. These fluids may cause packing or caking of the open arch or arches, which reduces movements and in turn may cause premature expansion joint failures.

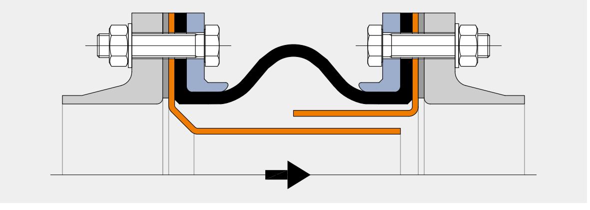
The flow liners are installed along with the expansion joint. An additional seal is required between the flow liner flange and the pipeline flange. This extra seal is workshop-side fixed on the flange of the flow liner already. Expansion joints with a full faced rubber flange need a flow liner flange with holes while for expansion joints with a sealing bead the flow liner flange can be centered with the screws.



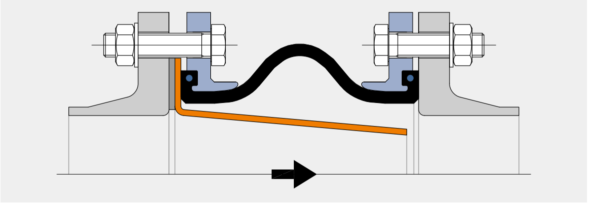
Cylindrical flow liner



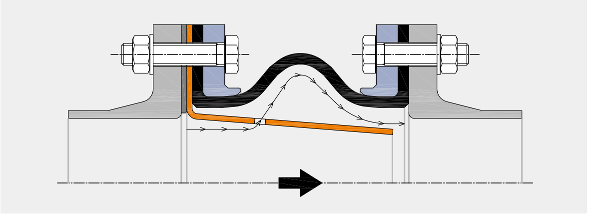
Conical flow liner
Streamlined



Telescoping flow liner
Complete bellows protection



Flow liners with a centring flange
For expansion joints with a sealing bulge

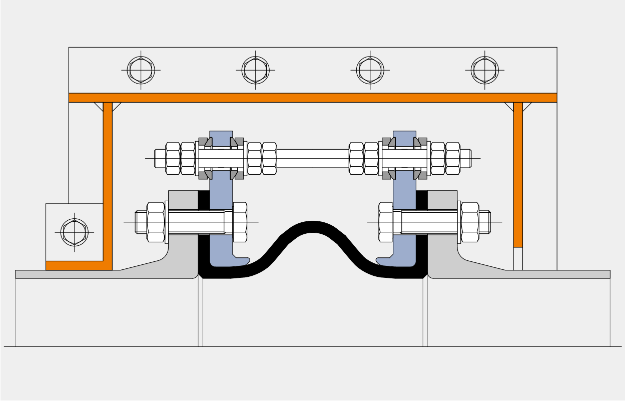


Flow liners with flushing holes
To avoid caking of medium between flow liner and bellow

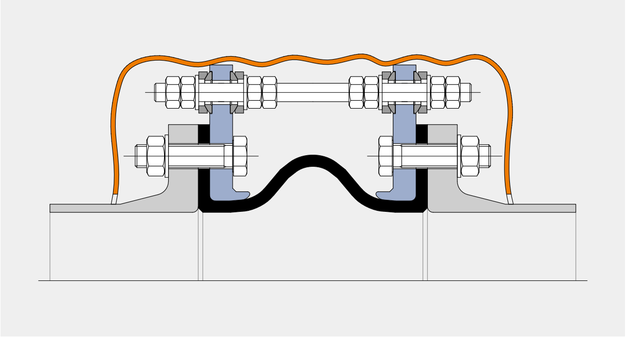
Expansion joint technology > Expansion joint protective covers

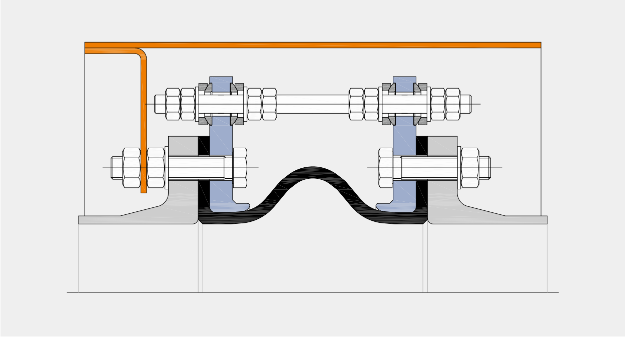
Extreme external influences require that the expansion joints be protected by special measures. Appropriate protective covers have been developed to this end: Ground protective shield, UV protective shield or cover, fire and splash protective cover. These types of shields/ covers, when manufactured from metal, have one end which is bolted to or clamped to the mating pipe flange. The other end is free, designed to handle the movements of the expansion joint.

Caution: Protection / spray covers have some insulating properties. It is not recommended to insulate over elastomeric expansion joints. Because temperature containment can accelerate the aging of the rubber and makes required inspections difficult.

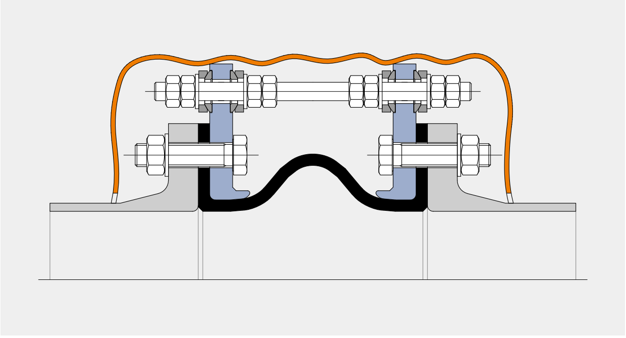


Ground protective shield
A protective shield of metal is required when an expansion joint is installed underground. It protects against damage to bellows, dirt and earth pressure. Specified loads strength and static calculations define the thickness of the shield as well as numbers and dimensioning of the stiffeners. Made from galvanized / paint coated carbon or stainless steel, in two or more parts, affixes to the medium pipe with an integrated clamp.





Protective shield or cover
Protective covers should be used on expansion joints that carry high temperature, corrosive media or to prevent from exterior damage such as extreme solar radiation or weather effects, mechanical impacts or chemicals. This cover will also protect personnel or adjacent equipment in the event of leakage or splash. Metal shields do not enclose the expansion joint and still allow ventilation while wrap around protective covers of impregnated fiberglass fully shield the expansion joint. Protective shields from metal are made from galvanized / paint coated sheets, with two or more parts, multiple one-sided attachment on the circumference.



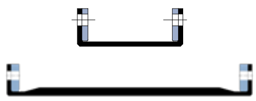
Fire protective cover
Made from coated glass fibre fabric and insulating layers. Protects against the effects of flame up to 800 °C for a duration of 30 minutes.
Used in ships and for fire water supply lines in plant buildings.

Ground protective shield supplied in 2 halves

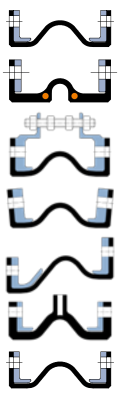
Metal protective cover against solar radiation

Universal expansion joints with full faced rubber flange

Cylindrical Expansion Joints without Arch



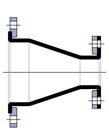
Single Arch Expansion Joints



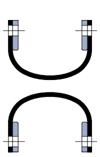
Double Arch Expansion Joints

Triple or Multiple Arch Expansion Joints

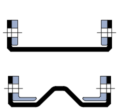
Reducer Expansion Joints



Donut Expansion Joints



Rectangular Expansion Joints

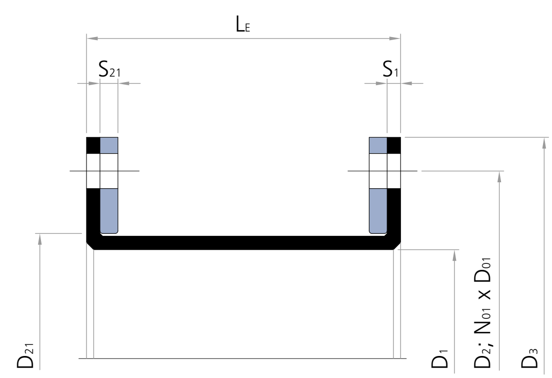


U100A ∅ 80 - 4,000 mm

> Type U100A

Type key > page 22
U1 0 0 A
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section U100A



Universal expansion joint without arch

Design: Streamlined, cylindrical rubber bellows with full faced rubber flanges, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single- or multi-part backing flanges. Optional with embedded support ring(s). In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ∅ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 150 to 400 mm (> page 64–65)
Custom length on request

Pressure: Up to 16 bar depending on diameter and length
Vacuum stability on request

Movement: For small axial and lateral movements
(> page 64–65)

Application:
Plant construction, sand/gravel extraction industry, dredgers, food processing e. g. as suction/pressure hoses, in conveying lines, on pumps and vessels

PED 2014/68/EU
KTW WRAS
FDA
<10⁶ Ohm
EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 64–65)

Backing flanges

Design: Single- or multi-part, round backing flanges with clearance holes

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

U100A
> without arch

Installation length (L_E) at design pressure															
	up to 10 bar L_E = 150 mm					up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	8	5	10	0	79	10	6	13	0	79	13	8	17	0	79
125	8	5	10	0	123	10	6	13	0	123	13	8	16	0	123
150	8	5	9	0	177	10	6	12	0	177	13	8	15	0	177
175	8	5	9	0	254	10	6	12	0	254	13	8	15	0	254
200	8	5	9	0	314	10	6	12	0	314	13	8	14	0	314
250	8	5	8	0	491	10	6	11	0	491	13	8	14	0	491
300	8	5	8	0	716	10	6	11	0	716	13	8	13	0	716
350	8	5	8	0	990	10	6	10	0	990	13	8	13	0	990
400	8	5	8	0	1,269	10	6	10	0	1,269	13	8	13	0	1,269
450	8	5	7	0	1,612	10	6	10	0	1,612	13	8	12	0	1,612
500	8	5	7	0	1,987	10	6	10	0	1,987	13	8	12	0	1,987
550	8	5	7	0	2,376	10	6	9	0	2,376	13	8	12	0	2,376
600	8	5	7	0	2,856	10	6	9	0	2,856	13	8	12	0	2,856
650	8	5	7	0	3,318	10	6	9	0	3,318	13	8	11	0	3,318
700	8	5	7	0	3,893	10	6	9	0	3,893	13	8	11	0	3,893
750	8	5	7	0	4,418	10	6	9	0	4,418	13	8	11	0	4,418
800	8	5	7	0	5,090	10	6	9	0	5,090	13	8	11	0	5,090
850	8	5	6	0	5,675	10	6	9	0	5,675	13	8	11	0	5,675
900	8	5	6	0	6,433	10	6	9	0	6,433	13	8	11	0	6,433
950	8	5	6	0	7,088	10	6	8	0	7,088	13	8	11	0	7,088
1000	8	5	6	0	7,933	10	6	8	0	7,933	13	8	10	0	7,933
1050	8	5	6	0	8,659	10	6	8	0	8,659	13	8	10	0	8,659
1100	8	5	6	0	9,607	10	6	8	0	9,607	13	8	10	0	9,607
1150	8	5	6	0	10,387	10	6	8	0	10,387	13	8	10	0	10,387
1200	8	5	6	0	11,404	10	6	8	0	11,404	13	8	10	0	11,404
1250	8	5	6	0	12,272	10	6	8	0	12,272	13	8	10	0	12,272
1300	8	5	6	0	13,376	10	6	8	0	13,376	13	8	10	0	13,376
1350	8	5	6	0	14,314	10	6	8	0	14,314	13	8	10	0	14,314
1400	8	5	6	0	15,504	10	6	8	0	15,504	13	8	10	0	15,504
1450	8	5	6	0	16,513	10	6	8	0	16,513	13	8	10	0	16,513
1500	8	5	6	0	17,789	10	6	8	0	17,789	13	8	10	0	17,789
1600	8	5	6	0	20,232	10	6	8	0	20,232	13	8	10	0	20,232
1650	8	5	6	0	21,382	10	6	8	0	21,382	13	8	9	0	21,382
1700	8	5	6	0	22,832	10	6	8	0	22,832	13	8	9	0	22,832
1800	8	5	6	0	25,617	10	6	7	0	25,617	13	8	9	0	25,617
1900	8	5	6	0	28,502	10	6	7	0	28,502	13	8	9	0	28,502
1950	8	5	5	0	29,865	10	6	7	0	29,865	13	8	9	0	29,865
2000	8	5	5	0	31,573	10	6	7	0	31,573	13	8	9	0	31,573
2100	8	5	5	0	34,801	10	6	7	0	34,801	13	8	9	0	34,801
2200	8	5	5	0	38,186	10	6	7	0	38,186	13	8	9	0	38,186
2250	8	5	5	0	39,761	10	6	7	0	39,761	13	8	9	0	39,761
2300	8	5	5	0	41,728	10	6	7	0	41,728	13	8	9	0	41,728
2400	8	5	5	0	45,428	10	6	7	0	45,428	13	8	9	0	45,428
2500	8	5	5	0	49,284	10	6	7	0	49,284	13	8	9	0	49,284
2550	8	5	5	0	51,071	10	6	7	0	51,071	13	8	9	0	51,071
2600	8	5	5	0	53,297	10	6	7	0	53,297	13	8	9	0	53,297
2700	8	5	5	0	57,468	10	6	7	0	57,468	13	8	9	0	57,468
2800	8	5	5	0	61,795	10	6	7	0	61,795	13	8	9	0	61,795
2850	8	5	5	0	63,794	10	6	7	0	63,794	13	8	8	0	63,794
2900	8	5	5	0	66,280	10	6	7	0	66,280	13	8	8	0	66,280
3000	8	5	5	0	70,922	10	6	7	0	70,922	13	8	8	0	70,922
3100	8	5	5	0	75,720	10	6	7	0	75,720	13	8	8	0	75,720
3150	8	5	5	0	77,931	10	6	7	0	77,931	13	8	8	0	77,931
3200	8	5	5	0	80,676	10	6	7	0	80,676	13	8	8	0	80,676
3300	8	5	5	0	85,789	10	6	7	0	85,789	13	8	8	0	85,789
3400	8	5	5	0	91,059	10	6	7	0	91,059	13	8	8	0	91,059
3450	8	5	5	0	93,482	10	6	7	0	93,482	13	8	8	0	93,482
3600	8	5	5	0	102,071	10	6	6	0	102,071	13	8	8	0	102,071
3800	8	5	5	0	113,710	10	6	6	0	113,710	13	8	8	0	113,710
4000	8	5	5	0	125,978	10	6	6	0	125,978	13	8	8	0	125,978

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %.
Larger movements see type U110A.

U100A

> without arch

Installation length (L_E) at design pressure

higher pressures on request

up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
15	9	20	0	79	18	11	23	0	79	20	12	27	0	79	**100**
15	9	19	0	123	18	11	22	0	123	20	12	25	0	123	**125**
15	9	18	0	177	18	11	21	0	177	20	12	24	0	177	**150**
15	9	18	0	254	18	11	21	0	254	20	12	24	0	254	**175**
15	9	17	0	314	18	11	20	0	314	20	12	23	0	314	**200**
15	9	17	0	491	18	11	19	0	491	20	12	22	0	491	**250**
15	9	16	0	716	18	11	19	0	716	20	12	21	0	716	**300**
15	9	15	0	990	18	11	18	0	990	20	12	21	0	990	**350**
15	9	15	0	1,269	18	11	18	0	1,269	20	12	20	0	1,269	**400**
15	9	15	0	1,612	18	11	17	0	1,612	20	12	20	0	1,612	**450**
15	9	14	0	1,987	18	11	17	0	1,987	20	12	19	0	1,987	**500**
15	9	14	0	2,376	18	11	17	0	2,376	20	12	19	0	2,376	**550**
15	9	14	0	2,856	18	11	16	0	2,856	20	12	19	0	2,856	**600**
15	9	14	0	3,318	18	11	16	0	3,318	20	12	18	0	3,318	**650**
15	9	13	0	3,893	18	11	16	0	3,893	20	12	18	0	3,893	**700**
15	9	13	0	4,418	18	11	16	0	4,418	20	12	18	0	4,418	**750**
15	9	13	0	5,090	18	11	15	0	5,090	20	12	18	0	5,090	**800**
15	9	13	0	5,675	18	11	15	0	5,675	20	12	17	0	5,675	**850**
15	9	13	0	6,433	18	11	15	0	6,433	20	12	17	0	6,433	**900**
15	9	13	0	7,088	18	11	15	0	7,088	20	12	17	0	7,088	**950**
15	9	13	0	7,933	18	11	15	0	7,933	20	12	17	0	7,933	**1000**
15	9	12	0	8,659	18	11	15	0	8,659	20	12	17	0	8,659	**1050**
15	9	12	0	9,607	18	11	14	0	9,607	20	12	16	0	9,607	**1100**
15	9	12	0	10,387	18	11	14	0	10,387	20	12	16	0	10,387	**1150**
15	9	12	0	11,404	18	11	14	0	11,404	20	12	16	0	11,404	**1200**
15	9	12	0	12,272	18	11	14	0	12,272	20	12	16	0	12,272	**1250**
15	9	12	0	13,376	18	11	14	0	13,376	20	12	16	0	13,376	**1300**
15	9	12	0	14,314	18	11	14	0	14,314	20	12	16	0	14,314	**1350**
15	9	12	0	15,504	18	11	14	0	15,504	20	12	16	0	15,504	**1400**
15	9	12	0	16,513	18	11	14	0	16,513	20	12	16	0	16,513	**1450**
15	9	12	0	17,789	18	11	14	0	17,789	20	12	15	0	17,789	**1500**
15	9	11	0	20,232	18	11	13	0	20,232	20	12	15	0	20,232	**1600**
15	9	11	0	21,382	18	11	13	0	21,382	20	12	15	0	21,382	**1650**
15	9	11	0	22,832	18	11	13	0	22,832	20	12	15	0	22,832	**1700**
15	9	11	0	25,617	18	11	13	0	25,617	20	12	15	0	25,617	**1800**
15	9	11	0	28,502	18	11	13	0	28,502	20	12	15	0	28,502	**1900**
15	9	11	0	29,865	18	11	13	0	29,865	20	12	15	0	29,865	**1950**
15	9	11	0	31,573	18	11	13	0	31,573	20	12	15	0	31,573	**2000**
15	9	11	0	34,801	18	11	13	0	34,801	20	12	14	0	34,801	**2100**
15	9	11	0	38,186	18	11	13	0	38,186	20	12	14	0	38,186	**2200**
15	9	11	0	39,761	18	11	12	0	39,761	20	12	14	0	39,761	**2250**
15	9	11	0	41,728	18	11	12	0	41,728	20	12	14	0	41,728	**2300**
15	9	11	0	45,428	18	11	12	0	45,428	20	12	14	0	45,428	**2400**
15	9	10	0	49,284	18	11	12	0	49,284	20	12	14	0	49,284	**2500**
15	9	10	0	51,071	18	11	12	0	51,071	20	12	14	0	51,071	**2550**
15	9	10	0	53,297	18	11	12	0	53,297	20	12	14	0	53,297	**2600**
15	9	10	0	57,468	18	11	12	0	57,468	20	12	14	0	57,468	**2700**
15	9	10	0	61,795	18	11	12	0	61,795	20	12	14	0	61,795	**2800**
15	9	10	0	63,794	18	11	12	0	63,794	20	12	14	0	63,794	**2850**
15	9	10	0	66,280	18	11	12	0	66,280	20	12	14	0	66,280	**2900**
15	9	10	0	70,922	18	11	12	0	70,922	20	12	13	0	70,922	**3000**
15	9	10	0	75,720	18	11	12	0	75,720	20	12	13	0	75,720	**3100**
15	9	10	0	77,931	18	11	12	0	77,931	20	12	13	0	77,931	**3150**
15	9	10	0	80,676	18	11	12	0	80,676	20	12	13	0	80,676	**3200**
15	9	10	0	85,789	18	11	12	0	85,789	20	12	13	0	85,789	**3300**
15	9	10	0	91,059	18	11	11	0	91,059	20	12	13	0	91,059	**3400**
15	9	10	0	93,482	18	11	11	0	93,482	20	12	13	0	93,482	**3450**
15	9	10	0	102,071	18	11	11	0	102,071	20	12	13	0	102,071	**3600**
15	9	10	0	113,710	18	11	11	0	113,710	20	12	13	0	113,710	**3800**
15	9	10	0	125,978	18	11	11	0	125,978	20	12	13	0	125,978	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available

U100A RFP ⌀ 80 - 4,000 mm

> **Type U100A RFP**
without steel inserts

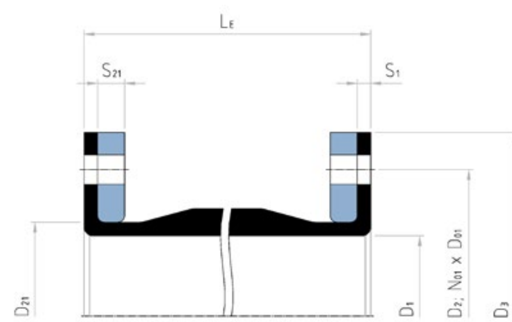
> **Type U102A RFP**
with embedded steel rings

> **Type U107A RFP**
with embedded spring-wire helix

Type key > page 22

U1 0 0 A RFP
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section U102A RFP



Rubber flanged pipe

Design: Straight rubber pipe connectors are specifically engineered for your particular application, compensate all-directional movements and have a cycle life in the tens of millions. Rubber pipes are constructed with a smooth interior tube of different thickness depending on the later use, specially compounded from an elastomer that satisfies the chemical and abrasion requirements of your application. Multiple layers of high-strength cord, helical spring steel wire or steel rings and a seamless cover are embedded into the pipe wall during the manufacturing process, resulting in a product precisely designed for your pressure and vacuum requirements. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Depending on the pressure and diameter end fittings can come with full face rubber flange or with sealing bulge with a metal core and swivel backing flanges.

Flexible rubber pipes should always be installed in piping systems that are properly anchored. So that the connectors are not required to absorb compression or elongation piping movements. If axial forces can act in the system to compress or elongate the rubber pipe, tie rods will be required to prevent axial movement.

Application:
Paper & pulp plants, transportation of mineral ores and slurries, sand and gravel plants, chemical-petrochemical and industrial process piping systems, steel mills, marine services, sewage treatment plants e.g. pump in- or outlets, dredgers, compressors, cooling towers

CE PED 2014/68/EU · KTW WRAS · FDA · <10⁸ Ohm · EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Diameters: ∅ 80 to 4,000 mm, custom diameters possible

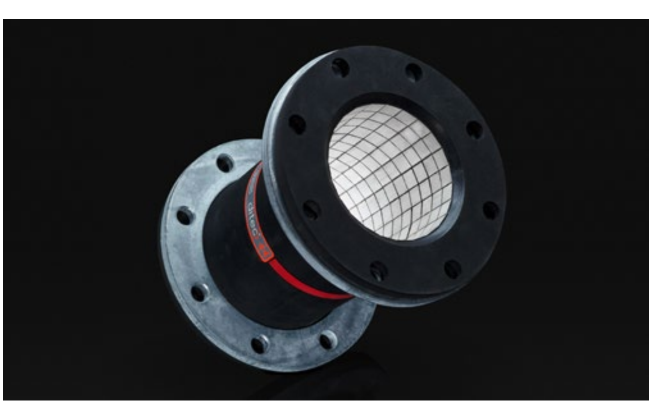
Length: Up to 7,000 mm
Custom length on request

Pressure: Up to 40 bar depending on diameter and length
Helical-wound steel reinforcements or individual steel rings embedded in the carcass to provide strength for high pressure operations, to prevent collapse under vacuum and to offer tight bending radiuses without buckling or kinking.

Movement: For lateral movements and angular deflection
Reduction of noise and vibration

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology



Rubber pipe with high wear resistant ceramic liner

Backing flanges

Design: Single-part, round backing flanges with clearance holes

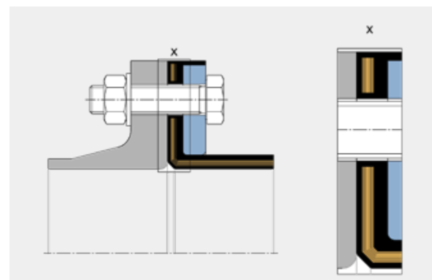
Flange norms: DIN, ANSI, EN, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

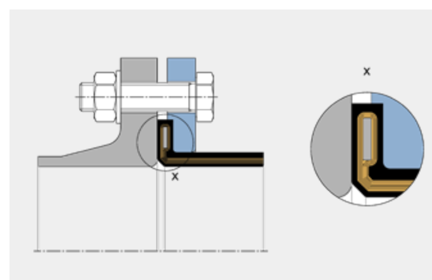
Coating: Primed, hot-dip galvanised, special paint

End fitting

Flanged type: The most common type of rubber pipe incorporates a full face flange integral with the body of the pipe. The flange is drilled to conform to the bolt pattern of the companion metal flange of the pipeline. This type of rubber faced flange, backed with a steel flange, is of sufficient thickness to form a tight seal against the companion flange without the use of a gasket.



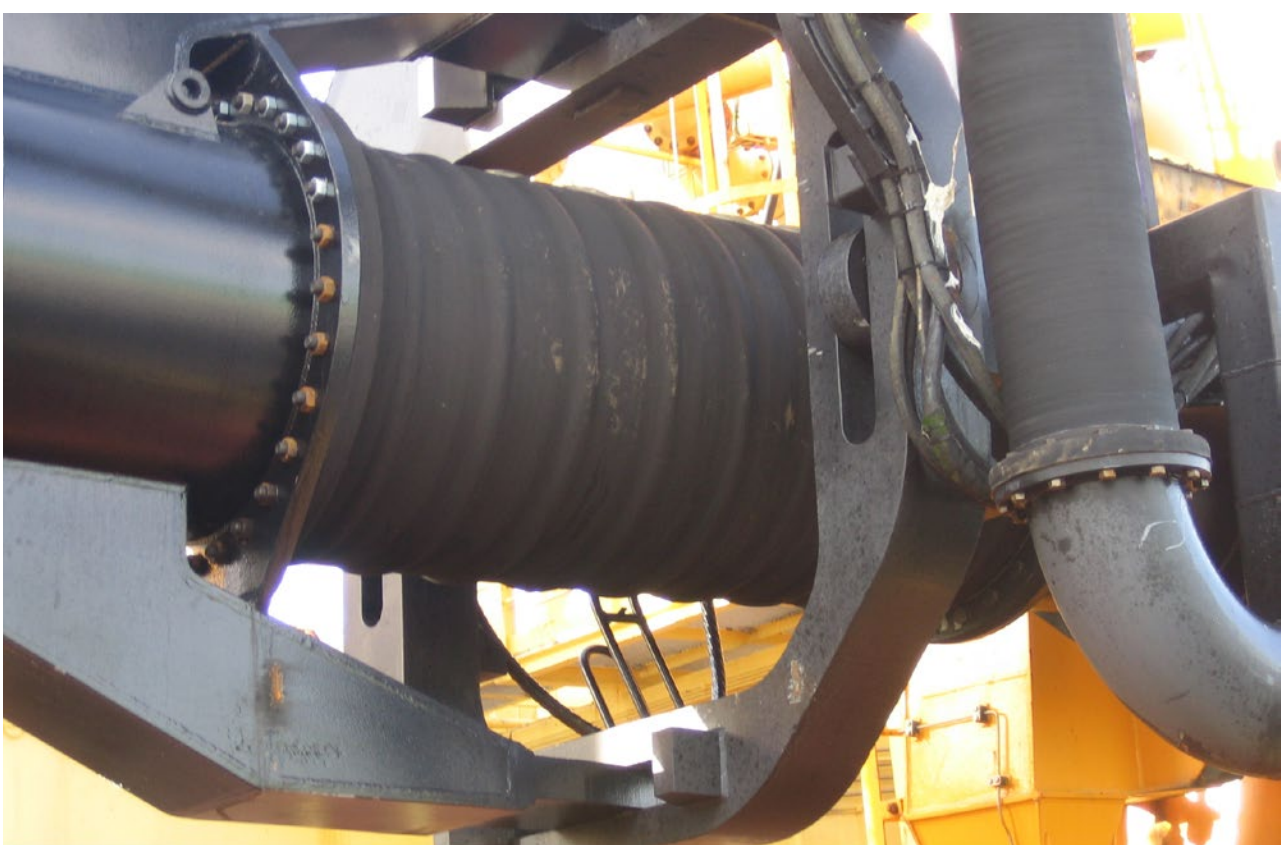
Swivel flange type: This design has a sealing bulge which forms a line pressure with the steel core insert and anchors the cord fabrics for very high pressure requirements. It has a solid floating metallic flange, drilled according to the mating pipe flange.



Vacuum / Pressure inserts

TYPE	Support rings	Steel insert
U100A RFP		Without steel reinforcement. Discharge pipe can be used for many different dredging applications, as a connecting hose between a dredger and its discharge line, or a flexible joint between rigid pipe elements.
U102A RFP		Suction & discharge rubber pipe with steel rings, designed for rugged applications, offer a tight bending radius under severe working conditions without buckling or kinking.
U107A RFP		Suction and discharge rubber pipe with spring-wire helix offer a weight saving alternative to rubber pipes with round steel-rings.

Replaced rubber flanged pipe in operation of a paper mill



Rubber flanged pipe with embedded steel rings installed on dredger ship

U110A ⌀ 80 - 4,000 mm

- **Type U110A**
  without vacuum ring
- **Type U111A**
  with internal vacuum ring
- **Type U112A**
  with embedded vacuum ring

Type key > page 22
U1 1 0 A
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Universal expansion joint with one arch

Design: High elastic, streamlined, single wide arch rubber bellows with full faced rubber flanges, designed to compensate all-directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and backing flanges with support collar. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 150 to 400 mm (> page 74–79)
Custom length on request

Pressure: Up to 100 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For large axial, lateral and angular movements
(> page 74–79)

Spring rate: Axial and lateral spring rates (> page 296)

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

PED 2014/68/EU KTW WRAS FDA <10⁶ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
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NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 74–79)

Backing flanges

Design: Single- or multi-part, round backing flanges with support collar and clearance holes

Flange norms: DIN, ANSI, EN, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

Accessories

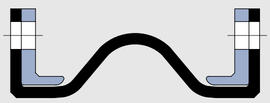
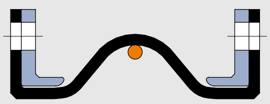
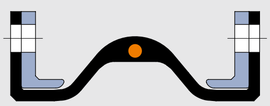
Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

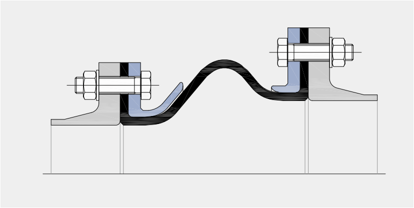
(> page 42)

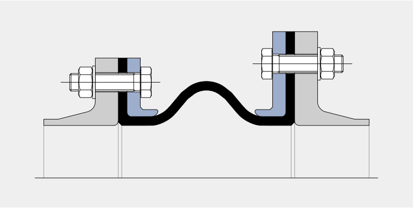
Support rings

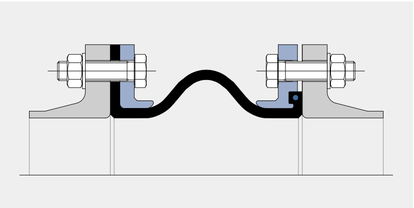
TYPE	Support rings	Vacuum ring	Pressure	Movement
U110A		None	Depending on the diameter up to 100 bar, vacuum stability on request	> page 74
U111A		Medium contact, inside the arch	Depending on the diameter up to 100 bar, for vacuum up to 0.05 bar absolute	> page 76
U112A		No medium contact, embedded in the arch	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute	> page 78

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

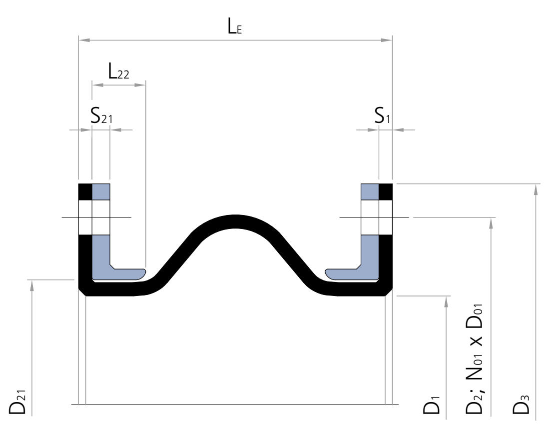
Specials


Customized reducer style

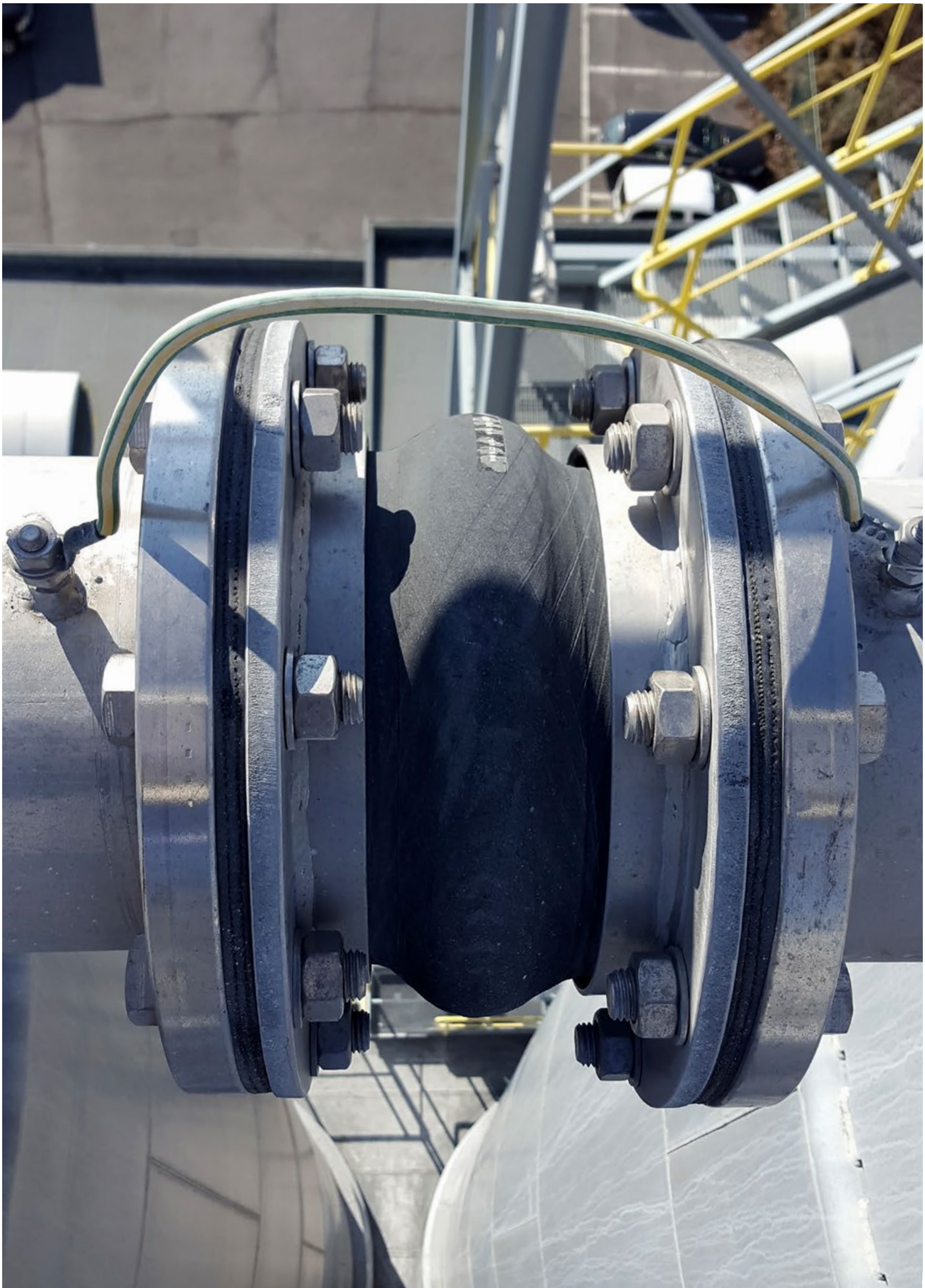

Different flange dimensions


Different end fitting

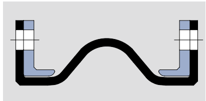
Cross section U110A




Example: Type U111A



Type U110A single arch rubber expansion joint ∅ 300 mm PN6



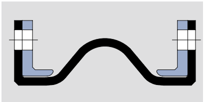
U110A

> without vacuum ring

Installation length (L_E) at design pressure															
	up to 10 bar L_E = 150 mm					up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	31	10	19	11.3	177	40	20	28	21.8	254	44	20	30	21.8	260
125	31	10	19	9.1	241	40	20	28	17.7	330	44	20	30	17.7	337
150	31	10	18	7.6	314	40	20	27	14.9	415	44	20	29	14.9	423
175	31	10	18	6.5	415	40	20	27	12.9	531	44	20	29	12.9	539
200	31	10	18	5.7	491	40	20	26	11.3	616	44	20	29	11.3	625
250	31	10	18	4.6	707	40	20	26	9.1	855	44	20	28	9.1	866
300	31	10	17	3.8	973	40	20	26	7.6	1,146	44	20	27	7.6	1,158
350	31	10	17	3.3	1,288	40	20	25	6.5	1,486	44	20	27	6.5	1,500
400	31	10	17	2.9	1,605	40	20	25	5.7	1,825	44	20	27	5.7	1,840
450	31	10	17	2.5	1,987	40	20	25	5.1	2,231	44	20	26	5.1	2,248
500	31	10	17	2.3	2,402	40	20	24	4.6	2,669	44	20	26	4.6	2,688
550	31	10	16	2.1	2,827	40	20	24	4.2	3,117	44	20	26	4.2	3,137
600	31	10	16	1.9	3,349	40	20	24	3.8	3,664	44	20	26	3.8	3,685
650	31	10	16	1.8	3,848	40	20	24	3.5	4,185	44	20	26	3.5	4,208
700	31	10	16	1.6	4,465	40	20	24	3.3	4,827	44	20	25	3.3	4,852
750	31	10	16	1.5	5,027	40	20	23	3.1	5,411	44	20	25	3.1	5,437
800	31	10	16	1.4	5,741	40	20	23	2.9	6,151	44	20	25	2.9	6,179
850	31	10	16	1.3	6,362	40	20	23	2.7	6,793	44	20	25	2.7	6,822
900	31	10	16	1.3	7,163	40	20	23	2.5	7,620	44	20	25	2.5	7,651
950	31	10	16	1.2	7,854	40	20	23	2.4	8,332	44	20	25	2.4	8,365
1000	31	10	16	1.1	8,742	40	20	23	2.3	9,246	44	20	25	2.3	9,280
1050	31	10	15	1.1	9,503	40	20	23	2.2	10,029	44	20	25	2.2	10,064
1100	31	10	15	1.0	10,496	40	20	23	2.1	11,047	44	20	24	2.1	11,085
1150	31	10	15	1.0	11,310	40	20	23	2.0	11,882	44	20	24	2.0	11,921
1200	31	10	15	1.0	12,370	40	20	22	1.9	12,969	44	20	24	1.9	13,009
1250	31	10	15	0.9	13,273	40	20	22	1.8	13,893	44	20	24	1.8	13,935
1300	31	10	15	0.9	14,420	40	20	22	1.8	15,066	44	20	24	1.8	15,109
1350	31	10	15	0.8	15,394	40	20	22	1.7	16,061	44	20	24	1.7	16,106
1400	31	10	15	0.8	16,627	40	20	22	1.6	17,320	44	20	24	1.6	17,366
1450	31	10	15	0.8	17,671	40	20	22	1.6	18,385	44	20	24	1.6	18,433
1500	31	10	15	0.8	18,991	40	20	22	1.5	19,731	44	20	24	1.5	19,781
1600	31	10	15	0.7	21,512	40	20	22	1.4	22,299	44	20	24	1.4	22,352
1650	31	10	15	0.7	22,698	40	20	22	1.4	23,506	44	20	24	1.4	23,561
1700	31	10	15	0.7	24,190	40	20	22	1.3	25,025	44	20	23	1.3	25,081
1800	31	10	15	0.6	27,055	40	20	22	1.3	27,937	44	20	23	1.3	27,996
1900	31	10	15	0.6	30,018	40	20	22	1.2	30,946	44	20	23	1.2	31,009
1950	31	10	15	0.6	31,416	40	20	22	1.2	32,365	44	20	23	1.2	32,429
2000	31	10	15	0.6	33,168	40	20	21	1.1	34,143	44	20	23	1.1	34,209
2100	31	10	15	0.5	36,474	40	20	21	1.1	37,497	44	20	23	1.1	37,565
2200	31	10	14	0.5	39,938	40	20	21	1.0	41,007	44	20	23	1.0	41,079
2250	31	10	14	0.5	41,548	40	20	21	1.0	42,638	44	20	23	1.0	42,712
2300	31	10	14	0.5	43,558	40	20	21	1.0	44,675	44	20	23	1.0	44,750
2400	31	10	14	0.5	47,336	40	20	21	1.0	48,500	44	20	23	1.0	48,578
2500	31	10	14	0.5	51,271	40	20	21	0.9	52,482	44	20	23	0.9	52,563
2550	31	10	14	0.4	53,093	40	20	21	0.9	54,325	44	20	23	0.9	54,408
2600	31	10	14	0.4	55,363	40	20	21	0.9	56,621	44	20	23	0.9	56,706
2700	31	10	14	0.4	59,612	40	20	21	0.8	60,917	44	20	23	0.8	61,005
2800	31	10	14	0.4	64,018	40	20	21	0.8	65,370	44	20	22	0.8	65,461
2850	31	10	14	0.4	66,052	40	20	21	0.8	67,426	44	20	22	0.8	67,518
2900	31	10	14	0.4	68,581	40	20	21	0.8	69,981	44	20	22	0.8	70,075
3000	31	10	14	0.4	73,301	40	20	21	0.8	74,748	44	20	22	0.8	74,845
3100	31	10	14	0.4	78,179	40	20	21	0.7	79,673	44	20	22	0.7	79,773
3150	31	10	14	0.4	80,425	40	20	21	0.7	81,940	44	20	22	0.7	82,041
3200	31	10	14	0.4	83,213	40	20	21	0.7	84,754	44	20	22	0.7	84,857
3300	31	10	14	0.3	88,405	40	20	21	0.7	89,993	44	20	22	0.7	90,099
3400	31	10	14	0.3	93,753	40	20	20	0.7	95,388	44	20	22	0.7	95,498
3450	31	10	14	0.3	96,211	40	20	20	0.7	97,868	44	20	22	0.7	97,979
3600	31	10	14	0.3	104,922	40	20	20	0.6	106,651	44	20	22	0.6	106,767
3800	31	10	14	0.3	116,718	40	20	20	0.6	118,542	44	20	22	0.6	118,664
4000	31	10	14	0.3	129,143	40	20	20	0.6	131,061	44	20	22	0.6	131,190

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %; angular movement: -66 %.
When the axial compression and extension is changed to the mean value, it is possible to increase the angular movement (for values see type U110F).
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For larger movements see type U120A or U123A.



U110A

> without vacuum ring

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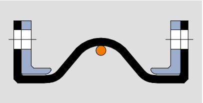
Installation length (L_E) at design pressure															
up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
53	31	39	31.8	353	69	43	53	40.7	491	78	53	62	46.7	616	**100**
53	31	39	26.4	441	69	43	51	34.5	594	78	53	60	40.3	731	**125**
53	31	38	22.5	539	69	43	51	29.8	707	78	53	59	35.2	855	**150**
53	31	37	19.5	670	69	43	50	26.2	855	78	53	58	31.2	1,018	**175**
53	31	37	17.2	765	69	43	49	23.3	962	78	53	58	27.9	1,134	**200**
53	31	36	13.9	1,029	69	43	48	19.0	1,257	78	53	57	23.0	1,452	**250**
53	31	36	11.7	1,346	69	43	48	16.0	1,605	78	53	56	19.5	1,825	**300**
53	31	35	10.0	1,713	69	43	47	13.8	2,003	78	53	55	16.8	2,248	**350**
53	31	35	8.8	2,075	69	43	46	12.1	2,393	78	53	54	14.8	2,660	**400**
53	31	34	7.8	2,507	69	43	46	10.8	2,856	78	53	54	13.3	3,147	**450**
53	31	34	7.1	2,971	69	43	45	9.8	3,349	78	53	53	12.0	3,664	**500**
53	31	34	6.4	3,442	69	43	45	8.9	3,848	78	53	53	10.9	4,185	**550**
53	31	33	5.9	4,015	69	43	45	8.2	4,453	78	53	52	10.0	4,815	**600**
53	31	33	5.4	4,560	69	43	44	7.5	5,027	78	53	52	9.3	5,411	**650**
53	31	33	5.1	5,230	69	43	44	7.0	5,728	78	53	52	8.6	6,138	**700**
53	31	33	4.7	5,836	69	43	44	6.5	6,362	78	53	51	8.0	6,793	**750**
53	31	33	4.4	6,604	69	43	43	6.1	7,163	78	53	51	7.5	7,620	**800**
53	31	32	4.2	7,268	69	43	43	5.8	7,854	78	53	51	7.1	8,332	**850**
53	31	32	3.9	8,123	69	43	43	5.5	8,742	78	53	50	6.7	9,246	**900**
53	31	32	3.7	8,858	69	43	43	5.2	9,503	78	53	50	6.4	10,029	**950**
53	31	32	3.5	9,799	69	43	43	4.9	10,477	78	53	50	6.1	11,029	**1000**
53	31	32	3.4	10,605	69	43	42	4.7	11,310	78	53	50	5.8	11,882	**1050**
53	31	32	3.2	11,652	69	43	42	4.5	12,390	78	53	49	5.5	12,989	**1100**
53	31	32	3.1	12,509	69	43	42	4.3	13,273	78	53	49	5.3	13,893	**1150**
53	31	31	3.0	13,623	69	43	42	4.1	14,420	78	53	49	5.0	15,066	**1200**
53	31	31	2.8	14,569	69	43	42	3.9	15,394	78	53	49	4.8	16,061	**1250**
53	31	31	2.7	15,770	69	43	42	3.8	16,627	78	53	49	4.7	17,320	**1300**
53	31	31	2.6	16,787	69	43	41	3.6	17,671	78	53	49	4.5	18,385	**1350**
53	31	31	2.5	18,074	69	43	41	3.5	18,991	78	53	48	4.3	19,731	**1400**
53	31	31	2.4	19,162	69	43	41	3.4	20,106	78	53	48	4.2	20,867	**1450**
53	31	31	2.4	20,536	69	43	41	3.3	21,512	78	53	48	4.0	22,299	**1500**
53	31	31	2.2	23,154	69	43	41	3.1	24,190	78	53	48	3.8	25,025	**1600**
53	31	31	2.2	24,384	69	43	41	3.0	25,447	78	53	48	3.7	26,302	**1650**
53	31	30	2.1	25,930	69	43	41	2.9	27,026	78	53	48	3.6	27,907	**1700**
53	31	30	2.0	28,893	69	43	40	2.7	30,049	78	53	47	3.4	30,978	**1800**
53	31	30	1.9	31,952	69	43	40	2.6	33,168	78	53	47	3.2	34,143	**1900**
53	31	30	1.8	33,394	69	43	40	2.5	34,636	78	53	47	3.1	35,633	**1950**
53	31	30	1.8	35,199	69	43	40	2.5	36,474	78	53	47	3.0	37,497	**2000**
53	31	30	1.7	38,603	69	43	40	2.3	39,938	78	53	47	2.9	41,007	**2100**
53	31	30	1.6	42,164	69	43	40	2.2	43,558	78	53	46	2.8	44,675	**2200**
53	31	30	1.6	43,818	69	43	40	2.2	45,239	78	53	46	2.7	46,377	**2250**
53	31	30	1.5	45,882	69	43	40	2.1	47,336	78	53	46	2.6	48,500	**2300**
53	31	29	1.5	49,757	69	43	39	2.1	51,271	78	53	46	2.5	52,482	**2400**
53	31	29	1.4	53,789	69	43	39	2.0	55,363	78	53	46	2.4	56,621	**2500**
53	31	29	1.4	55,655	69	43	39	1.9	57,256	78	53	46	2.4	58,535	**2550**
53	31	29	1.4	57,979	69	43	39	1.9	59,612	78	53	46	2.3	60,917	**2600**
53	31	29	1.3	62,325	69	43	39	1.8	64,018	78	53	46	2.2	65,370	**2700**
53	31	29	1.3	66,829	69	43	39	1.8	68,581	78	53	45	2.2	69,981	**2800**
53	31	29	1.2	68,906	69	43	39	1.7	70,686	78	53	45	2.1	72,107	**2850**
53	31	29	1.2	71,489	69	43	39	1.7	73,301	78	53	45	2.1	74,748	**2900**
53	31	29	1.2	76,307	69	43	39	1.6	78,179	78	53	45	2.0	79,673	**3000**
53	31	29	1.1	81,282	69	43	38	1.6	83,213	78	53	45	2.0	84,754	**3100**
53	31	29	1.1	83,571	69	43	38	1.6	85,530	78	53	45	1.9	87,092	**3150**
53	31	29	1.1	86,413	69	43	38	1.5	88,405	78	53	45	1.9	89,993	**3200**
53	31	29	1.1	91,702	69	43	38	1.5	93,753	78	53	45	1.8	95,388	**3300**
53	31	29	1.0	97,148	69	43	38	1.4	99,259	78	53	45	1.8	100,941	**3400**
53	31	29	1.0	99,650	69	43	38	1.4	101,788	78	53	45	1.8	103,491	**3450**
53	31	28	1.0	108,511	69	43	38	1.4	110,741	78	53	44	1.7	112,518	**3600**
53	31	28	0.9	120,503	69	43	38	1.3	122,852	78	53	44	1.6	124,723	**3800**
53	31	28	0.9	133,123	69	43	38	1.2	135,591	78	53	44	1.5	137,556	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



U111A

> with internal vacuum ring

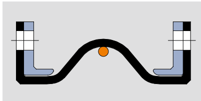
Installation length (L_E) at design pressure

higher pressures on request

∅	up to 10 bar L_E = 150 mm					up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	31	3	19	11.3	177	40	7	28	21.8	254	44	7	30	21.8	260
125	31	3	19	9.1	241	40	7	28	17.7	330	44	7	30	17.7	337
150	31	3	18	7.6	314	40	7	27	14.9	415	44	7	29	14.9	423
175	31	3	18	6.5	415	40	7	27	12.9	531	44	7	29	12.9	539
200	31	3	18	5.7	491	40	7	26	11.3	616	44	7	29	11.3	625
250	31	3	18	4.6	707	40	7	26	9.1	855	44	7	28	9.1	866
300	31	3	17	3.8	973	40	7	26	7.6	1,146	44	7	27	7.6	1,158
350	31	3	17	3.3	1,288	40	7	25	6.5	1,486	44	7	27	6.5	1,500
400	31	3	17	2.9	1,605	40	7	25	5.7	1,825	44	7	27	5.7	1,840
450	31	3	17	2.5	1,987	40	7	25	5.1	2,231	44	7	26	5.1	2,248
500	31	3	17	2.3	2,402	40	7	24	4.6	2,669	44	7	26	4.6	2,688
550	31	3	16	2.1	2,827	40	7	24	4.2	3,117	44	7	26	4.2	3,137
600	31	3	16	1.9	3,349	40	7	24	3.8	3,664	44	7	26	3.8	3,685
650	31	3	16	1.8	3,848	40	7	24	3.5	4,185	44	7	26	3.5	4,208
700	31	3	16	1.6	4,465	40	7	24	3.3	4,827	44	7	25	3.3	4,852
750	31	3	16	1.5	5,027	40	7	23	3.1	5,411	44	7	25	3.1	5,437
800	31	3	16	1.4	5,741	40	7	23	2.9	6,151	44	7	25	2.9	6,179
850	31	3	16	1.3	6,362	40	7	23	2.7	6,793	44	7	25	2.7	6,822
900	31	3	16	1.3	7,163	40	7	23	2.5	7,620	44	7	25	2.5	7,651
950	31	3	16	1.2	7,854	40	7	23	2.4	8,332	44	7	25	2.4	8,365
1000	31	3	16	1.1	8,742	40	7	23	2.3	9,246	44	7	25	2.3	9,280
1050	31	3	15	1.1	9,503	40	7	23	2.2	10,029	44	7	25	2.2	10,064
1100	31	3	15	1.0	10,496	40	7	23	2.1	11,047	44	7	24	2.1	11,085
1150	31	3	15	1.0	11,310	40	7	23	2.0	11,882	44	7	24	2	11,921
1200	31	3	15	1.0	12,370	40	7	22	1.9	12,969	44	7	24	1.9	13,009
1250	31	3	15	0.9	13,273	40	7	22	1.8	13,893	44	7	24	1.8	13,935
1300	31	3	15	0.9	14,420	40	7	22	1.8	15,066	44	7	24	1.8	15,109
1350	31	3	15	0.8	15,394	40	7	22	1.7	16,061	44	7	24	1.7	16,106
1400	31	3	15	0.8	16,627	40	7	22	1.6	17,320	44	7	24	1.6	17,366
1450	31	3	15	0.8	17,671	40	7	22	1.6	18,385	44	7	24	1.6	18,433
1500	31	3	15	0.8	18,991	40	7	22	1.5	19,731	44	7	24	1.5	19,781
1600	31	3	15	0.7	21,512	40	7	22	1.4	22,299	44	7	24	1.4	22,352
1650	31	3	15	0.7	22,698	40	7	22	1.4	23,506	44	7	24	1.4	23,561
1700	31	3	15	0.7	24,190	40	7	22	1.3	25,025	44	7	23	1.3	25,081
1800	31	3	15	0.6	27,055	40	7	22	1.3	27,937	44	7	23	1.3	27,996
1900	31	3	15	0.6	30,018	40	7	22	1.2	30,946	44	7	23	1.2	31,009
1950	31	3	15	0.6	31,416	40	7	22	1.2	32,365	44	7	23	1.2	32,429
2000	31	3	15	0.6	33,168	40	7	21	1.1	34,143	44	7	23	1.1	34,209
2100	31	3	15	0.5	36,474	40	7	21	1.1	37,497	44	7	23	1.1	37,565
2200	31	3	14	0.5	39,938	40	7	21	1.0	41,007	44	7	23	1	41,079
2250	31	3	14	0.5	41,548	40	7	21	1.0	42,638	44	7	23	1	42,712
2300	31	3	14	0.5	43,558	40	7	21	1.0	44,675	44	7	23	1	44,750
2400	31	3	14	0.5	47,336	40	7	21	1.0	48,500	44	7	23	1	48,578
2500	31	3	14	0.5	51,271	40	7	21	0.9	52,482	44	7	23	0.9	52,563
2550	31	3	14	0.4	53,093	40	7	21	0.9	54,325	44	7	23	0.9	54,408
2600	31	3	14	0.4	55,363	40	7	21	0.9	56,621	44	7	23	0.9	56,706
2700	31	3	14	0.4	59,612	40	7	21	0.8	60,917	44	7	23	0.8	61,005
2800	31	3	14	0.4	64,018	40	7	21	0.8	65,370	44	7	22	0.8	65,461
2850	31	3	14	0.4	66,052	40	7	21	0.8	67,426	44	7	22	0.8	67,518
2900	31	3	14	0.4	68,581	40	7	21	0.8	69,981	44	7	22	0.8	70,075
3000	31	3	14	0.4	73,301	40	7	21	0.8	74,748	44	7	22	0.8	74,845
3100	31	3	14	0.4	78,179	40	7	21	0.7	79,673	44	7	22	0.7	79,773
3150	31	3	14	0.4	80,425	40	7	21	0.7	81,940	44	7	22	0.7	82,041
3200	31	3	14	0.4	83,213	40	7	21	0.7	84,754	44	7	22	0.7	84,857
3300	31	3	14	0.3	88,405	40	7	21	0.7	89,993	44	7	22	0.7	90,099
3400	31	3	14	0.3	93,753	40	7	20	0.7	95,388	44	7	22	0.7	95,498
3450	31	3	14	0.3	96,211	40	7	20	0.7	97,868	44	7	22	0.7	97,979
3600	31	3	14	0.3	104,922	40	7	20	0.6	106,651	44	7	22	0.6	106,767
3800	31	3	14	0.3	116,718	40	7	20	0.6	118,542	44	7	22	0.6	118,664
4000	31	3	14	0.3	129,143	40	7	20	0.6	131,061	44	7	22	0.6	131,190

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %.
When axial compression and extension are changed to the mean value, it is possible to increase the angular movement (for values see type U111F).
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For larger movements see type U121A or U124A.



U111A

> with internal vacuum ring

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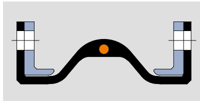
Installation length (L_E) at design pressure

higher pressures on request

up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					Ø
Movement				A	Movement				A	Movement				A	
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
53	10	39	31.8	353	69	14	53	40.7	491	78	17	62	46.7	616	**100**
53	10	39	26.4	441	69	14	51	34.5	594	78	17	60	40.3	731	**125**
53	10	38	22.5	539	69	14	51	29.8	707	78	17	59	35.2	855	**150**
53	10	37	19.5	670	69	14	50	26.2	855	78	17	58	31.2	1,018	**175**
53	10	37	17.2	765	69	14	49	23.3	962	78	17	58	27.9	1,134	**200**
53	10	36	13.9	1,029	69	14	48	19	1,257	78	17	57	23	1,452	**250**
53	10	36	11.7	1,346	69	14	48	16	1,605	78	17	56	19.5	1,825	**300**
53	10	35	10	1,713	69	14	47	13.8	2,003	78	17	55	16.8	2,248	**350**
53	10	35	8.8	2,075	69	14	46	12.1	2,393	78	17	54	14.8	2,660	**400**
53	10	34	7.8	2,507	69	14	46	10.8	2,856	78	17	54	13.3	3,147	**450**
53	10	34	7.1	2,971	69	14	45	9.8	3,349	78	17	53	12	3,664	**500**
53	10	34	6.4	3,442	69	14	45	8.9	3,848	78	17	53	10.9	4,185	**550**
53	10	33	5.9	4,015	69	14	45	8.2	4,453	78	17	52	10	4,815	**600**
53	10	33	5.4	4,560	69	14	44	7.5	5,027	78	17	52	9.3	5,411	**650**
53	10	33	5.1	5,230	69	14	44	7	5,728	78	17	52	8.6	6,138	**700**
53	10	33	4.7	5,836	69	14	44	6.5	6,362	78	17	51	8	6,793	**750**
53	10	33	4.4	6,604	69	14	43	6.1	7,163	78	17	51	7.5	7,620	**800**
53	10	32	4.2	7,268	69	14	43	5.8	7,854	78	17	51	7.1	8,332	**850**
53	10	32	3.9	8,123	69	14	43	5.5	8,742	78	17	50	6.7	9,246	**900**
53	10	32	3.7	8,858	69	14	43	5.2	9,503	78	17	50	6.4	10,029	**950**
53	10	32	3.5	9,799	69	14	43	4.9	10,477	78	17	50	6.1	11,029	**1000**
53	10	32	3.4	10,605	69	14	42	4.7	11,310	78	17	50	5.8	11,882	**1050**
53	10	32	3.2	11,652	69	14	42	4.5	12,390	78	17	49	5.5	12,989	**1100**
53	10	32	3.1	12,509	69	14	42	4.3	13,273	78	17	49	5.3	13,893	**1150**
53	10	31	3	13,623	69	14	42	4.1	14,420	78	17	49	5	15,066	**1200**
53	10	31	2.8	14,569	69	14	42	3.9	15,394	78	17	49	4.8	16,061	**1250**
53	10	31	2.7	15,770	69	14	42	3.8	16,627	78	17	49	4.7	17,320	**1300**
53	10	31	2.6	16,787	69	14	41	3.6	17,671	78	17	49	4.5	18,385	**1350**
53	10	31	2.5	18,074	69	14	41	3.5	18,991	78	17	48	4.3	19,731	**1400**
53	10	31	2.4	19,162	69	14	41	3.4	20,106	78	17	48	4.2	20,867	**1450**
53	10	31	2.4	20,536	69	14	41	3.3	21,512	78	17	48	4	22,299	**1500**
53	10	31	2.2	23,154	69	14	41	3.1	24,190	78	17	48	3.8	25,025	**1600**
53	10	31	2.2	24,384	69	14	41	3	25,447	78	17	48	3.7	26,302	**1650**
53	10	30	2.1	25,930	69	14	41	2.9	27,026	78	17	48	3.6	27,907	**1700**
53	10	30	2	28,893	69	14	40	2.7	30,049	78	17	47	3.4	30,978	**1800**
53	10	30	1.9	31,952	69	14	40	2.6	33,168	78	17	47	3.2	34,143	**1900**
53	10	30	1.8	33,394	69	14	40	2.5	34,636	78	17	47	3.1	35,633	**1950**
53	10	30	1.8	35,199	69	14	40	2.5	36,474	78	17	47	3	37,497	**2000**
53	10	30	1.7	38,603	69	14	40	2.3	39,938	78	17	47	2.9	41,007	**2100**
53	10	30	1.6	42,164	69	14	40	2.2	43,558	78	17	46	2.8	44,675	**2200**
53	10	30	1.6	43,818	69	14	40	2.2	45,239	78	17	46	2.7	46,377	**2250**
53	10	30	1.5	45,882	69	14	40	2.1	47,336	78	17	46	2.6	48,500	**2300**
53	10	29	1.5	49,757	69	14	39	2.1	51,271	78	17	46	2.5	52,482	**2400**
53	10	29	1.4	53,789	69	14	39	2	55,363	78	17	46	2.4	56,621	**2500**
53	10	29	1.4	55,655	69	14	39	1.9	57,256	78	17	46	2.4	58,535	**2550**
53	10	29	1.4	57,979	69	14	39	1.9	59,612	78	17	46	2.3	60,917	**2600**
53	10	29	1.3	62,325	69	14	39	1.8	64,018	78	17	46	2.2	65,370	**2700**
53	10	29	1.3	66,829	69	14	39	1.8	68,581	78	17	45	2.2	69,981	**2800**
53	10	29	1.2	68,906	69	14	39	1.7	70,686	78	17	45	2.1	72,107	**2850**
53	10	29	1.2	71,489	69	14	39	1.7	73,301	78	17	45	2.1	74,748	**2900**
53	10	29	1.2	76,307	69	14	39	1.6	78,179	78	17	45	2	79,673	**3000**
53	10	29	1.1	81,282	69	14	38	1.6	83,213	78	17	45	2	84,754	**3100**
53	10	29	1.1	83,571	69	14	38	1.6	85,530	78	17	45	1.9	87,092	**3150**
53	10	29	1.1	86,413	69	14	38	1.5	88,405	78	17	45	1.9	89,993	**3200**
53	10	29	1.1	91,702	69	14	38	1.5	93,753	78	17	45	1.8	95,388	**3300**
53	10	29	1	97,148	69	14	38	1.4	99,259	78	17	45	1.8	100,941	**3400**
53	10	29	1	99,650	69	14	38	1.4	101,788	78	17	45	1.8	103,491	**3450**
53	10	28	1	108,511	69	14	38	1.4	110,741	78	17	44	1.7	112,518	**3600**
53	10	28	0.9	120,503	69	14	38	1.3	122,852	78	17	44	1.6	124,723	**3800**
53	10	28	0.9	133,123	69	14	38	1.2	135,591	78	17	44	1.5	137,556	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



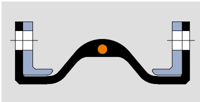
U112A

> with embedded vacuum ring

Installation length (L_E) at design pressure															
	up to 10 bar L_E = 150 mm					up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	20	2	18	8.0	150	26	6	27	19.8	222	29	6	29	19.8	232
125	20	2	18	6.4	209	26	6	26	16.1	293	29	6	29	16.1	305
150	20	2	17	5.3	278	26	6	26	13.5	373	29	6	28	13.5	387
175	20	2	17	4.6	373	26	6	26	11.6	483	29	6	28	11.6	499
200	20	2	17	4.0	445	26	6	25	10.2	564	29	6	28	10.2	581
250	20	2	16	3.2	651	26	6	25	8.2	794	29	6	27	8.2	814
300	20	2	16	2.7	908	26	6	24	6.8	1,075	29	6	27	6.8	1,099
350	20	2	16	2.3	1,213	26	6	24	5.9	1,405	29	6	26	5.9	1,432
400	20	2	16	2.0	1,521	26	6	24	5.1	1,735	29	6	26	5.1	1,765
450	20	2	16	1.8	1,893	26	6	23	4.6	2,132	29	6	26	4.6	2,165
500	20	2	15	1.6	2,299	26	6	23	4.1	2,561	29	6	25	4.1	2,597
550	20	2	15	1.5	2,715	26	6	23	3.7	3,000	29	6	25	3.7	3,039
600	20	2	15	1.3	3,227	26	6	23	3.4	3,536	29	6	25	3.4	3,578
650	20	2	15	1.2	3,718	26	6	23	3.2	4,049	29	6	25	3.2	4,094
700	20	2	15	1.1	4,324	26	6	23	2.9	4,681	29	6	25	2.9	4,729
750	20	2	15	1.1	4,877	26	6	22	2.7	5,255	29	6	24	2.7	5,307
800	20	2	15	1.0	5,581	26	6	22	2.6	5,986	29	6	24	2.6	6,041
850	20	2	15	0.9	6,193	26	6	22	2.4	6,619	29	6	24	2.4	6,677
900	20	2	15	0.9	6,984	26	6	22	2.3	7,436	29	6	24	2.3	7,497
950	20	2	15	0.8	7,667	26	6	22	2.2	8,139	29	6	24	2.2	8,203
1000	20	2	15	0.8	8,544	26	6	22	2.1	9,043	29	6	24	2.1	9,110
1050	20	2	14	0.8	9,297	26	6	22	2.0	9,817	29	6	24	2	9,887
1100	20	2	14	0.7	10,279	26	6	22	1.9	10,825	29	6	24	1.9	10,899
1150	20	2	14	0.7	11,085	26	6	22	1.8	11,652	29	6	24	1.8	11,728
1200	20	2	14	0.7	12,135	26	6	21	1.7	12,728	29	6	23	1.7	12,808
1250	20	2	14	0.6	13,029	26	6	21	1.6	13,643	29	6	23	1.6	13,726
1300	20	2	14	0.6	14,166	26	6	21	1.6	14,806	29	6	23	1.6	14,892
1350	20	2	14	0.6	15,131	26	6	21	1.5	15,792	29	6	23	1.5	15,881
1400	20	2	14	0.6	16,354	26	6	21	1.5	17,041	29	6	23	1.5	17,134
1450	20	2	14	0.6	17,390	26	6	21	1.4	18,098	29	6	23	1.4	18,194
1500	20	2	14	0.5	18,699	26	6	21	1.4	19,433	29	6	23	1.4	19,532
1600	20	2	14	0.5	21,201	26	6	21	1.3	21,983	29	6	23	1.3	22,088
1650	20	2	14	0.5	22,379	26	6	21	1.2	23,181	29	6	23	1.2	23,289
1700	20	2	14	0.5	23,861	26	6	21	1.2	24,689	29	6	23	1.2	24,801
1800	20	2	14	0.4	26,706	26	6	21	1.1	27,582	29	6	23	1.1	27,700
1900	20	2	14	0.4	29,651	26	6	21	1.1	30,573	29	6	22	1.1	30,698
1950	20	2	14	0.4	31,040	26	6	21	1.1	31,984	29	6	22	1.1	32,111
2000	20	2	14	0.4	32,781	26	6	21	1.0	33,751	29	6	22	1	33,882
2100	20	2	14	0.4	36,069	26	6	20	1.0	37,086	29	6	22	1	37,223
2200	20	2	14	0.4	39,514	26	6	20	0.9	40,578	29	6	22	0.9	40,721
2250	20	2	14	0.4	41,115	26	6	20	0.9	42,200	29	6	22	0.9	42,346
2300	20	2	13	0.3	43,116	26	6	20	0.9	44,227	29	6	22	0.9	44,376
2400	20	2	13	0.3	46,875	26	6	20	0.9	48,033	29	6	22	0.9	48,188
2500	20	2	13	0.3	50,791	26	6	20	0.8	51,996	29	6	22	0.8	52,158
2550	20	2	13	0.3	52,604	26	6	20	0.8	53,831	29	6	22	0.8	53,995
2600	20	2	13	0.3	54,864	26	6	20	0.8	56,116	29	6	22	0.8	56,284
2700	20	2	13	0.3	59,094	26	6	20	0.8	60,393	29	6	22	0.8	60,568
2800	20	2	13	0.3	63,481	26	6	20	0.7	64,828	29	6	22	0.7	65,008
2850	20	2	13	0.3	65,506	26	6	20	0.7	66,874	29	6	22	0.7	67,058
2900	20	2	13	0.3	68,025	26	6	20	0.7	69,419	29	6	22	0.7	69,606
3000	20	2	13	0.3	72,727	26	6	20	0.7	74,168	29	6	22	0.7	74,361
3100	20	2	13	0.3	77,585	26	6	20	0.7	79,073	29	6	21	0.7	79,273
3150	20	2	13	0.3	79,823	26	6	20	0.7	81,332	29	6	21	0.7	81,534
3200	20	2	13	0.3	82,601	26	6	20	0.6	84,136	29	6	21	0.6	84,342
3300	20	2	13	0.2	87,773	26	6	20	0.6	89,356	29	6	21	0.6	89,568
3400	20	2	13	0.2	93,103	26	6	20	0.6	94,733	29	6	21	0.6	94,951
3450	20	2	13	0.2	95,553	26	6	20	0.6	97,203	29	6	21	0.6	97,425
3600	20	2	13	0.2	104,234	26	6	19	0.6	105,958	29	6	21	0.6	106,188
3800	20	2	13	0.2	115,993	26	6	19	0.5	117,811	29	6	21	0.5	118,054
4000	20	2	13	0.2	128,380	26	6	19	0.5	130,292	29	6	21	0.5	130,548

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -0 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %.
When the axial compression and extension is changed to the mean value, it is possible to increase the angular movement (for values see type U112F).
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For larger movements see type U122A or U125A.



U112A

> with embedded vacuum ring

Installation length (L_E) at design pressure

up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
35	9	38	30.1	320	46	13	51	38	423	51	16	60	44.4	539	**100**
35	9	38	24.9	405	46	13	50	32	519	51	16	59	38.1	647	**125**
35	9	37	21.1	499	46	13	49	27.5	625	51	16	58	33.2	765	**150**
35	9	36	18.3	625	46	13	48	24	765	51	16	57	29.2	919	**175**
35	9	36	16.2	716	46	13	48	21.3	866	51	16	56	26.1	1,029	**200**
35	9	35	13.1	973	46	13	47	17.3	1,146	51	16	55	21.4	1,333	**250**
35	9	35	10.9	1,282	46	13	46	14.6	1,479	51	16	54	18.1	1,691	**300**
35	9	34	9.4	1,640	46	13	45	12.6	1,863	51	16	53	15.6	2,099	**350**
35	9	34	8.3	1,995	46	13	45	11	2,240	51	16	53	13.8	2,498	**400**
35	9	33	7.3	2,419	46	13	44	9.8	2,688	51	16	52	12.3	2,971	**450**
35	9	33	6.6	2,875	46	13	44	8.9	3,167	51	16	52	11.1	3,473	**500**
35	9	33	6	3,339	46	13	44	8.1	3,653	51	16	51	10.1	3,982	**550**
35	9	33	5.5	3,904	46	13	43	7.4	4,243	51	16	51	9.3	4,596	**600**
35	9	32	5.1	4,441	46	13	43	6.8	4,803	51	16	50	8.6	5,178	**650**
35	9	32	4.7	5,102	46	13	43	6.4	5,489	51	16	50	8	5,890	**700**
35	9	32	4.4	5,701	46	13	42	5.9	6,110	51	16	50	7.4	6,533	**750**
35	9	32	4.1	6,461	46	13	42	5.6	6,896	51	16	50	7	7,344	**800**
35	9	32	3.9	7,118	46	13	42	5.2	7,574	51	16	49	6.6	8,044	**850**
35	9	31	3.7	7,964	46	13	42	5	8,446	51	16	49	6.2	8,942	**900**
35	9	31	3.5	8,692	46	13	41	4.7	9,195	51	16	49	5.9	9,712	**950**
35	9	31	3.3	9,625	46	13	41	4.5	10,153	51	16	49	5.6	10,696	**1000**
35	9	31	3.2	10,423	46	13	41	4.2	10,973	51	16	48	5.3	11,537	**1050**
35	9	31	3	11,461	46	13	41	4.1	12,037	51	16	48	5.1	12,628	**1100**
35	9	31	2.9	12,311	46	13	41	3.9	12,908	51	16	48	4.9	13,519	**1150**
35	9	31	2.8	13,417	46	13	41	3.7	14,040	51	16	48	4.7	14,677	**1200**
35	9	31	2.7	14,356	46	13	40	3.6	15,001	51	16	48	4.5	15,659	**1250**
35	9	30	2.6	15,548	46	13	40	3.4	16,218	51	16	47	4.3	16,902	**1300**
35	9	30	2.5	16,559	46	13	40	3.3	17,250	51	16	47	4.2	17,955	**1350**
35	9	30	2.4	17,837	46	13	40	3.2	18,554	51	16	47	4	19,285	**1400**
35	9	30	2.3	18,918	46	13	40	3.1	19,656	51	16	47	3.9	20,409	**1450**
35	9	30	2.2	20,283	46	13	40	3	21,047	51	16	47	3.7	21,825	**1500**
35	9	30	2.1	22,885	46	13	40	2.8	23,697	51	16	47	3.5	24,522	**1600**
35	9	30	2	24,108	46	13	39	2.7	24,941	51	16	46	3.4	25,787	**1650**
35	9	30	2	25,645	46	13	39	2.6	26,504	51	16	46	3.3	27,377	**1700**
35	9	30	1.8	28,592	46	13	39	2.5	29,498	51	16	46	3.1	30,419	**1800**
35	9	29	1.7	31,636	46	13	39	2.4	32,589	51	16	46	3	33,556	**1900**
35	9	29	1.7	33,071	46	13	39	2.3	34,045	51	16	46	2.9	35,033	**1950**
35	9	29	1.7	34,867	46	13	39	2.2	35,867	51	16	46	2.8	36,881	**2000**
35	9	29	1.6	38,256	46	13	39	2.1	39,303	51	16	45	2.7	40,364	**2100**
35	9	29	1.5	41,801	46	13	38	2	42,895	51	16	45	2.6	44,003	**2200**
35	9	29	1.5	43,447	46	13	38	2	44,563	51	16	45	2.5	45,692	**2250**
35	9	29	1.4	45,503	46	13	38	1.9	46,645	51	16	45	2.4	47,800	**2300**
35	9	29	1.4	49,363	46	13	38	1.9	50,551	51	16	45	2.3	51,754	**2400**
35	9	29	1.3	53,379	46	13	38	1.8	54,615	51	16	45	2.2	55,864	**2500**
35	9	29	1.3	55,238	46	13	38	1.8	56,495	51	16	45	2.2	57,766	**2550**
35	9	29	1.3	57,553	46	13	38	1.7	58,836	51	16	44	2.2	60,132	**2600**
35	9	28	1.2	61,883	46	13	38	1.7	63,213	51	16	44	2.1	64,557	**2700**
35	9	28	1.2	66,371	46	13	38	1.6	67,748	51	16	44	2	69,139	**2800**
35	9	28	1.2	68,442	46	13	37	1.6	69,840	51	16	44	2	71,252	**2850**
35	9	28	1.1	71,016	46	13	37	1.5	72,440	51	16	44	1.9	73,878	**2900**
35	9	28	1.1	75,818	46	13	37	1.5	77,289	51	16	44	1.9	78,775	**3000**
35	9	28	1.1	80,777	46	13	37	1.4	82,295	51	16	44	1.8	83,828	**3100**
35	9	28	1.1	83,060	46	13	37	1.4	84,599	51	16	44	1.8	86,153	**3150**
35	9	28	1	85,893	46	13	37	1.4	87,459	51	16	44	1.8	89,038	**3200**
35	9	28	1	91,166	46	13	37	1.4	92,779	51	16	44	1.7	94,406	**3300**
35	9	28	1	96,597	46	13	37	1.3	98,256	51	16	43	1.7	99,930	**3400**
35	9	28	1	99,091	46	13	37	1.3	100,772	51	16	43	1.6	102,467	**3450**
35	9	28	0.9	107,928	46	13	37	1.2	109,682	51	16	43	1.6	111,450	**3600**
35	9	28	0.9	119,888	46	13	37	1.2	121,736	51	16	43	1.5	123,599	**3800**
35	9	27	0.8	132,477	46	13	36	1.1	134,419	51	16	43	1.4	136,376	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available

Installation of a rubber expansion joint ∅ 1,600 mm to the pump nozzle, 16 bar design pressure

FPM rubber joint ∅ 300 mm for 1 bar operating pressure and 180° C,
installed on an ash chute

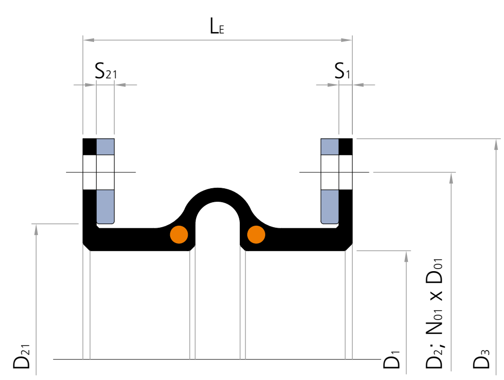
Single arch reducer made from NBR rubber with embedded vacuum ring,
type U112A ∅ 1,400 mm / ∅ 1,200 mm, design pressure 5 bar

U216A ⌀ 100 - 4,000 mm

> Type U216A

Type key > page 22
U2 1 6 A
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section U216A



Universal expansion joint with one arch

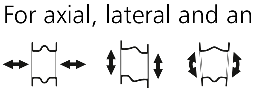
Design: Thick-walled, single arch rubber bellows with full faced rubber flanges, designed to compensate all-directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, with support rings at the arch foot and split backing flanges. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 100 to 4,000 mm, custom diameters possible

Length: Standard L_E = 250 to 350 mm (> page 84)
Custom length on request

Pressure: Up to 25 bar depending on diameter and length
Vacuum-proof

Movement: For axial, lateral and angular movements

 (> page 84)

Spring rate: The embedded support rings and reinforcements generate large spring rates

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e.g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

PED 2014/68/EU KTW WRAS FDA <10⁶ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Multi-part, round backing flanges with clearance holes

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

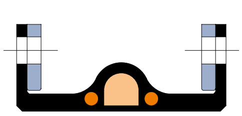
Coating: Primed, hot-dip galvanised, special paint

Accessories

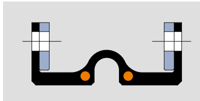
Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:



(> page 42)



U216A

> with one arch

Installation length (L_E) at design pressure															
	up to 10 bar L_E = 250 mm					up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	35	15	27	16.7	346	41	21	35	22.8	460	47	24	40	25.6	573
125	35	15	25	13.5	434	41	21	34	18.6	560	47	24	39	21	683
150	35	15	25	11.3	531	41	21	33	15.6	670	47	24	37	17.7	804
175	35	15	24	9.7	661	41	21	32	13.5	814	47	24	36	15.3	962
200	35	15	23	8.5	755	41	21	31	11.9	919	47	24	35	13.5	1,075
250	35	15	22	6.8	1,018	41	21	30	9.5	1,207	47	24	34	10.9	1,385
300	35	15	22	5.7	1,333	41	21	29	8.0	1,548	47	24	33	9.1	1,750
350	35	15	21	4.9	1,698	41	21	28	6.8	1,940	47	24	32	7.8	2,165
400	35	15	21	4.3	2,059	41	21	27	6.0	2,324	47	24	31	6.8	2,570
450	35	15	20	3.8	2,489	41	21	27	5.3	2,781	47	24	31	6.1	3,048
500	35	15	20	3.4	2,951	41	21	26	4.8	3,267	47	24	30	5.5	3,557
550	35	15	19	3.1	3,421	41	21	26	4.4	3,761	47	24	29	5	4,072
600	35	15	19	2.9	3,993	41	21	25	4.0	4,359	47	24	29	4.6	4,693
650	35	15	19	2.6	4,536	41	21	25	3.7	4,927	47	24	29	4.2	5,281
700	35	15	19	2.5	5,204	41	21	25	3.4	5,621	47	24	28	3.9	5,999
750	35	15	18	2.3	5,809	41	21	24	3.2	6,249	47	24	28	3.7	6,648
800	35	15	18	2.1	6,576	41	21	24	3.0	7,044	47	24	28	3.4	7,466
850	35	15	18	2.0	7,238	41	21	24	2.8	7,729	47	24	27	3.2	8,171
900	35	15	18	1.9	8,091	41	21	24	2.7	8,610	47	24	27	3.1	9,076
950	35	15	18	1.8	8,825	41	21	23	2.5	9,366	47	24	27	2.9	9,852
1000	35	15	17	1.7	9,764	41	21	23	2.4	10,333	47	24	26	2.7	10,843
1050	35	15	17	1.6	10,568	41	21	23	2.3	11,159	47	24	26	2.6	11,690
1100	35	15	17	1.6	11,613	41	21	23	2.2	12,233	47	24	26	2.5	12,788
1150	35	15	17	1.5	12,469	41	21	23	2.1	13,110	47	24	26	2.4	13,685
1200	35	15	17	1.4	13,581	41	21	22	2.0	14,250	47	24	26	2.3	14,849
1250	35	15	17	1.4	14,527	41	21	22	1.9	15,218	47	24	25	2.2	15,837
1300	35	15	17	1.3	15,725	41	21	22	1.9	16,445	47	24	25	2.1	17,087
1350	35	15	17	1.3	16,742	41	21	22	1.8	17,483	47	24	25	2	18,146
1400	35	15	16	1.2	18,027	41	21	22	1.7	18,796	47	24	25	2	19,483
1450	35	15	16	1.2	19,113	41	21	22	1.7	19,906	47	24	25	1.9	20,612
1500	35	15	16	1.1	20,485	41	21	22	1.6	21,305	47	24	25	1.8	22,035
1600	35	15	16	1.1	23,100	41	21	21	1.5	23,970	47	24	24	1.7	24,745
1650	35	15	16	1.0	24,328	41	21	21	1.5	25,221	47	24	24	1.7	26,016
1700	35	15	16	1.0	25,873	41	21	21	1.4	26,793	47	24	24	1.6	27,612
1800	35	15	16	1.0	28,832	41	21	21	1.3	29,804	47	24	24	1.5	30,666
1900	35	15	16	0.9	31,889	41	21	21	1.3	32,910	47	24	24	1.4	33,816
1950	35	15	15	0.9	33,329	41	21	21	1.2	34,373	47	24	23	1.4	35,299
2000	35	15	15	0.9	35,133	41	21	20	1.2	36,204	47	24	23	1.4	37,154
2100	35	15	15	0.8	38,533	41	21	20	1.1	39,655	47	24	23	1.3	40,649
2200	35	15	15	0.8	42,091	41	21	20	1.1	43,263	47	24	23	1.2	44,301
2250	35	15	15	0.8	43,744	41	21	20	1.1	44,938	47	24	23	1.2	45,996
2300	35	15	15	0.7	45,806	41	21	20	1.0	47,028	47	24	23	1.2	48,111
2400	35	15	15	0.7	49,678	41	21	20	1.0	50,950	47	24	23	1.1	52,077
2500	35	15	15	0.7	53,707	41	21	20	1.0	55,030	47	24	22	1.1	56,200
2550	35	15	15	0.7	55,572	41	21	20	0.9	56,917	47	24	22	1.1	58,107
2600	35	15	15	0.7	57,893	41	21	19	0.9	59,266	47	24	22	1.1	60,481
2700	35	15	15	0.6	62,237	41	21	19	0.9	63,660	47	24	22	1	64,918
2800	35	15	14	0.6	66,737	41	21	19	0.9	68,210	47	24	22	1	69,513
2850	35	15	14	0.6	68,813	41	21	19	0.8	70,309	47	24	22	1	71,631
2900	35	15	14	0.6	71,394	41	21	19	0.8	72,918	47	24	22	0.9	74,264
3000	35	15	14	0.6	76,209	41	21	19	0.8	77,783	47	24	22	0.9	79,173
3100	35	15	14	0.6	81,181	41	21	19	0.8	82,805	47	24	22	0.9	84,239
3150	35	15	14	0.5	83,469	41	21	19	0.8	85,116	47	24	21	0.9	86,570
3200	35	15	14	0.5	86,309	41	21	19	0.8	87,984	47	24	21	0.9	89,462
3300	35	15	14	0.5	91,595	41	21	19	0.7	93,320	47	24	21	0.8	94,842
3400	35	15	14	0.5	97,038	41	21	19	0.7	98,813	47	24	21	0.8	100,379
3450	35	15	14	0.5	99,538	41	21	19	0.7	101,336	47	24	21	0.8	102,922
3600	35	15	14	0.5	108,395	41	21	18	0.7	110,270	47	24	21	0.8	111,924
3800	35	15	14	0.5	120,380	41	21	18	0.6	122,356	47	24	21	0.7	124,098
4000	35	15	14	0.4	132,993	41	21	18	0.6	135,070	47	24	21	0.7	136,900

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with filled arch:
axial compression: -50 %; axial extension: -75 %; lateral displacement: -50 %; angular movement: -75 %.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).

Customised products available

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Rubber bellow ∅ 1,600 mm of type U216A for a drinking water line

U110A UDJ ⌀ 80 - 4,000 mm

> **Type U110A UDJ**
> without vacuum ring

> **Type U111A UDJ**
> with internal vacuum ring

> **Type U112A UDJ**
> with embedded vacuum ring

Type key > page 22

U1 1 0 A UDJ
- A UDJ → Tie rod variant
- 0 → Support ring variant
- 1 → Number of arches
- U1 → Type

Universal dismantling joint

Design:

Rubber expansion joints as dismantling joints play a decisive role in the design and layout of pipelines and valves. They are an essential aid during the installation and removal of pipe sections and piping equipment. Without a dismantling joint offering axial, lateral and angular adjustments, it is almost impossible to insert a valve exactly into a pipe section. Thanks to this all-directional adjustability, the valve can be fitted next to the dismantling joint, and the rubber expansion joint can compensate for installation tolerances prior to being securely connected to the mating flanges.

ditec`s dismantling rubber expansion joints are specifically designed for self-retraction to facilitate access to piping and equipment as well as for unmatched ease of installation and subsequent removal. Only the rubber bellow with its close to unlimited medium compatibility is in contact with the fluid so that the use of costly stainless steel materials or special coatings are unnecessary.

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions, flue gas cleaning plants e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

Request assembly instructions at:
www.ditec-adam.de/en/contact

Dismantling rubber expansion joints are high elastic, streamlined, have depending from expected installation tolerances or movements single or multiple wide arches with full faced rubber flanges or swivel flanges with sealing bulge, are designed to compensate all-directional movements, have a cycle life in the tens of millions, are constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and backing flanges with support collar. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

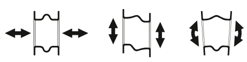
Universal dismantling joints have light-weight restraints only capable to retract the expansion joints but not designed to take thrust forces of the bellow. Restraints must be loosened for operation and hydraulic testing.

Diameters: ∅ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 150 to 400 mm (> page 74–79)
Custom length on request

Pressure: Up to 100 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For large axial, lateral and angular movements
For movement capabilities refer to type U110A (> page 74–79)



Spring rate: Axial and lateral spring rates (> page 296)

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 74–79)

Backing flanges

Design: Single-part, round backing flanges with several tie rod holder, support collar and clearance holes

Flange norms: DIN, ANSI, EN, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

Accessories

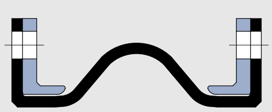
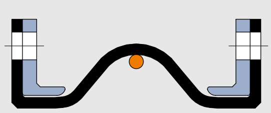
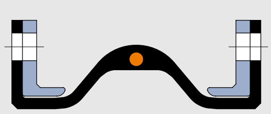
Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

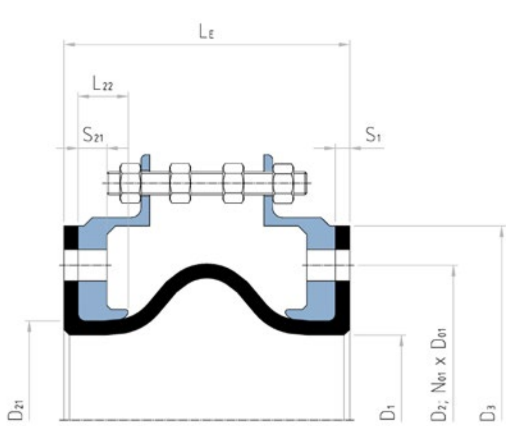
(> page 42)

Support rings

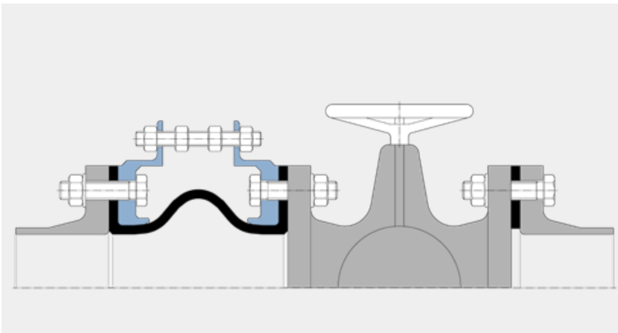
TYPE	Support rings	Vacuum ring	Pressure	Movement
U110A UDJ		None	Depending on the diameter up to 100 bar, vacuum stability on request	> page 74
U111A UDJ		Medium contact, inside the arch	Depending on the diameter up to 100 bar, for vacuum up to 0.05 bar absolute	> page 76
U112A UDJ		No medium contact, embedded in the arch	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute	> page 78

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

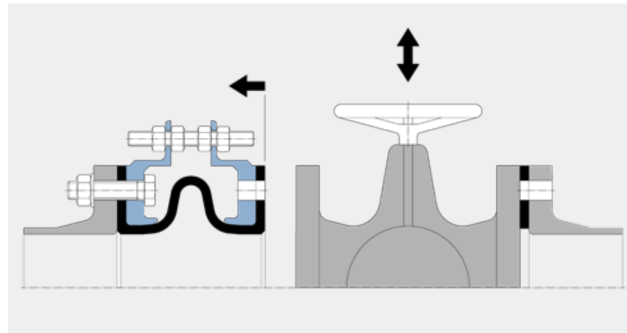
Cross section U110A UDJ



Working principle of a dismantling joint



in operation



for maintenance

Double arch EPDM rubber expansion joints with PTFE lining
for GRP gas ducts of a sulphuric acid plant as dismantling joint

U110A AO ⌀ 80 - 4,000 mm

> **Type U110A AO**
> without vacuum ring

> **Type U111A AO**
> with internal vacuum ring

> **Type U112A AO**
> with embedded vacuum ring

Type key > page 22
U1 1 0 A AO
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Universal single arch expansion joint with angular offset

Design: Type U110A AO rubber expansion joints are manufactured with built-in angular offsets to accommodate non-standard construction site conditions. They provide ease of installation without compromising any performance capabilities. E.g. because of foundation or building settlements the replacement of long-term installed rubber expansion joints may require built-in offsets to accommodate non-standard site conditions. Due to relaxed installation the new expansion joint is capable to compensate further movements in the future.

High elastic, streamlined, single wide arch rubber bellows with full faced rubber flanges or swivel flanges with sealing bulge, designed to compensate all-directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and backing flanges with support collar. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Tie rods can be externally or internally attached when the support structure or adjacent equipment have load limitations to take over the thrust forces of the expansion joint bellow under pressure.

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

PED 2014/68/EU · KTW WRAS · FDA · <10⁵ Ohm · EX

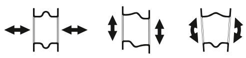
Request assembly instructions at:
www.ditec-adam.de/en/contact

Diameters: ∅ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 150 to 400 mm (> page 74–79)
Custom length on request

Pressure: Up to 100 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For large axial, lateral and angular movements
For approx. movement capabilities refer to type U110A (> page 74–79)



Spring rate: Axial and lateral spring rates (> page 296)

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 74–79)

Backing flanges

Design:	Single-part, round backing flanges with support collar and clearance holes
Flange norms:	DIN, ANSI, EN, AWWA, BS, JIS, special measurements (> page 298)
Materials:	Carbon steel, stainless steel or aluminium
Coating:	Primed, hot-dip galvanised, special paint

Accessories

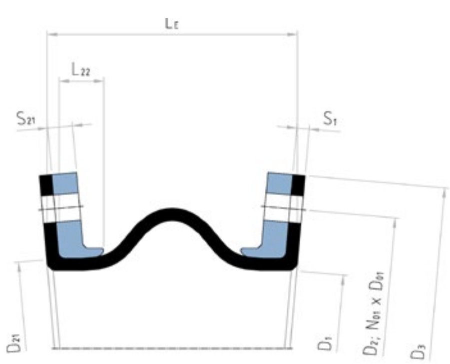
Protective covers:	Ground protective shield Protective shield or cover Fire protective cover (> page 58)
Flow liners:	Cylindrical flow liner Conical flow liner Telescoping flow liner (> page 57)
Filled arch:	 (> page 42)

Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
U110A AO		None	Depending on the diameter up to 100 bar, vacuum stability on request	> page 74
U111A AO		Medium contact, inside the arch	Depending on the diameter up to 100 bar, for vacuum up to 0.05 bar absolute	> page 76
U112A AO		No medium contact, embedded in the arch	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute	> page 78

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

Cross section U110A AO



Tied lateral rubber expansion joint with built in angular offset
installed in a bypass drinking water line

U110A LO ⌀ 80 - 4,000 mm

> **Type U110A LO**
> without vacuum ring

> **Type U111A LO**
> with internal vacuum ring

> **Type U112A LO**
> with embedded vacuum ring

Type key > page 22
U1 1 0 A LO
- A LO → Tie rod variant
- 0 → Support ring variant
- 1 → Number of arches
- U1 → Type

Universal single arch expansion joint with lateral offset

Design: Type U110A LO rubber expansion joints are manufactured with built-in lateral offsets to accommodate non-standard construction site conditions. They provide ease of installation without compromising any performance capabilities. E.g. because of foundation or building settlements the replacement of long-term installed rubber expansion joints may require built-in offsets to accommodate non-standard site conditions. Due to relaxed installation the new expansion joint is capable to compensate further movements in the future.

High elastic, streamlined, single wide arch rubber bellows with full faced rubber flanges or swivel flanges with sealing bulge, designed to compensate all-directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and backing flanges with support collar. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Tie rods can be externally or internally attached when the support structure or adjacent equipment have load limitations to take over the thrust forces of the expansion joint bellow under pressure.

Diameters: ⌀ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 150 to 400 mm (> page 74–79)
Custom length on request

Pressure: Up to 100 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Movement: For large axial, lateral and angular movements
For approx. movement capabilities refer to type U110A (> page 74–79)

Spring rate: Axial and lateral spring rates (> page 296)

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 74–79)

Backing flanges

Design: Single-part, round backing flanges with support collar and clearance holes

Flange norms: DIN, ANSI, EN, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

Accessories

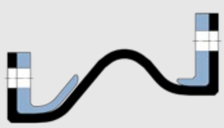
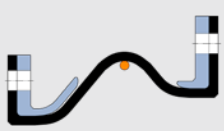
Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

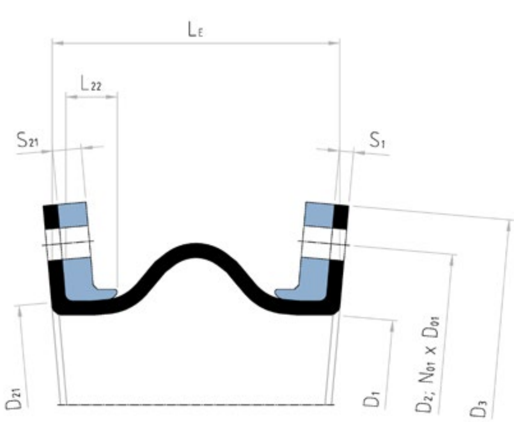
(> page 42)

Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
U110A LO		None	Depending on the diameter up to 100 bar, vacuum stability on request	> page 74
U111A LO		Medium contact, inside the arch	Depending on the diameter up to 100 bar, for vacuum up to 0.05 bar absolute	> page 76
U112A LO		No medium contact, embedded in the arch	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute	> page 78

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

Cross section U110A LO



Rubber expansion joints with built in lateral offset
to compensate pipeline misalignment

U110A 2P ⌀ 80 - 4,000 mm

- > **Type U110A 2P**
  without vacuum ring
- > **Type U111A 2P**
  with internal vacuum ring
- > **Type U112A 2P**
  with embedded vacuum ring

Type key > page 22

U1 1 0 A 2P
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Two ply testable rubber bellow

Design: For critical services or when the rubber expansion joint reliability is utmost important two ply testable rubber bellows are an option for applications. In two ply testable bellows each bellow is designed for the full operating conditions. For this reason, bellows design incorporates a redundant pressure retaining ply combined with a leak detection hardware.

Typically the bellow is composed of two plies of a material that is capable of handling the full operating pressure alone. Both plies are vulcanized together in the flange. The expansion joint is also able to withstand vacuum with a support ring. The inner ply retains the pressure under normal circumstances. If the inner ply develops a leak, the outer ply then retains the pressure. If this happens the pressure between the plies is ported to a gauge that will then indicate a reading. This alerts personnel to take precautions to replace a failing bellows as soon as possible. The two ply testable rubber bellows also allows inspectors to pressure test the inner and outer ply during shutdowns.

Main benefits: early warning leak detection, two ply allow for 100% redundancy and the expansion joint will be working while a replacment can be arranged.

Application:
For refineries, chemical and pharmaceutical industry, ore dressing e.g. whenever critical media in pipelines, in pumps, to vessels or tanks are conveyed

Request assembly instructions at:
www.ditec-adam.de/en/contact

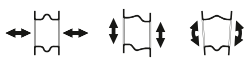
High elastic, streamlined, single wide arch rubber bellows with full faced rubber flanges, designed to compensate all-directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and backing flanges with support collar. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ∅ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 150 to 400 mm (> page 74–79)
Custom length on request

Pressure: Up to 100 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For large axial, lateral and angular movements
For approx. movement capabilities refer to type U110A (> page 74–79)



Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single-part, round backing flanges with support collar and clearance holes

Flange norms: DIN, ANSI, EN, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

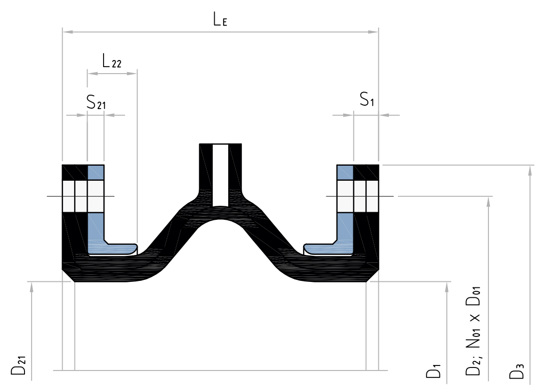
Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
U110A 2P		None	Depending on the diameter up to 100 bar, vacuum stability on request	> page 74
U111A 2P		Medium contact, inside the arch	Depending on the diameter up to 100 bar, for vacuum up to 0.05 bar absolute	> page 76
U112A 2P		No medium contact, embedded in the arch	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute	> page 78

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

Cross section U110A 2P



A moulded connection port

B pressure gauge

C bellows outer ply

D bellows inner ply

Homogen vulcanized two ply testable rubber bellow of size ∅ 300 mm
made from FPM rubber for a chemical plant

B100 B110 U100A U110A FDA

⌀ 80 - 4,000 mm
⌀ up to 4,000 x 4,000 mm
⌀ up to 6,000 x 3,000 mm

> **Type U110A FDA**
> without vacuum ring

> **Type U112A FDA**
> with embedded vacuum ring

Type key > page 22
U1 1 0 A FDA
- Tie rod variant
- Support ring variant
- Number of arches
- Type

FDA rubber expansion joint

Design: High elastic, streamlined, cylindrical, single or multiple arch bellows with dead space free slip-on sleeve ends (type B100 and B110), full faced rubber flanges (type U100A and U110A) or Tri-clamp hygienic flange connection vulcanized to the rubber body, designed to compensate all directional movements, have a cycle life in the tens of millions, individually constructed depending from the service pressure and temperature with a high-grade leak-proof tube, single or multiple layers of fabric(s) and a seamless cover. Fixing accessories furnished according to end fitting such as clamps or backing flanges. Optional with embedded support ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Rubber bellows are individually mold-manufactured from single or multiple unvulcanized rubber sheets and appropriate elastomer laminated reinforcements and hot vulcanized afterwards to a homogenous expansion joint without seam or gluing. Standard internal surface of the bellow is smooth.

Large range of different foodstaff-compliant elastomers on stock individually chosen for the service medium, in conformity with food regulations according FDA or EU 1935/2004.

Tie rods can be externally or internally attached when the support structure or adjacent piping equipment have load limitations to take over the thrust forces of the expansion joint bellow under pressure.

Application:
Rubber expansion joints for applications in meat processing, dairy and bakery technology, chocolate and vegetable oil processing, beverage industry, brewery technology and pharmaceutical industry e.g. for pipelines, CIP systems, on pumps, fittings, apparatus and weighing containers

CE PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX

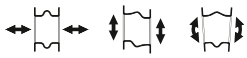
Request assembly instructions at:
www.ditec-adam.de/en/contact

Sizes: ∅ 80 to 4,000 mm
⌀ up to 4,000 x 4,000 mm or 6,000 x 3,000 mm
Custom sizes possible

Length: Standard L_E = 150 to 400 mm
Custom length on request

Pressure: Up to 100 bar depending on diameter and length
Vacuum stability on request, with embedded vacuum ring up to 0.05 bar absolute

Movement: For large axial, lateral and angular movements
For movement capabilities refer to the specific type



Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology
PTFE-lining: Specific styles are available with fluoroplastic lining which covers all wetted surfaces in the tube and flange areas				

Backing flanges

Design: Single- or multi-part round or rectangular backing flanges with clearance or threaded holes, depending from pressure with or without support collar. Optionally integral backing flanges with tie rod holders

Flange norms: DIN, ANSI, EN, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

Clamps

Design: Depending on pressure and the diameter, endless clamp belt, screw thread belt, small clamps or hinge bolt clamps. At higher pressures, 2 parallel clamps per side

Width: Endless clamp belt: ¾“
Screw thread belt: ½“
Small clamp: depending on Ø: 9–12 mm
Hinge bolt clamp: depending on Ø: 18–30 mm

Materials: Endless clamp belt with screw lugs (tongs): 1.7300
Screw thread belt with threaded screw lugs: 1.4310
Small clamp, belt and housing: 1.4016 (Screw steel galvanised)
Hinge bolt clamp, belt and housing: 1.4016 (Screw steel galvanised)

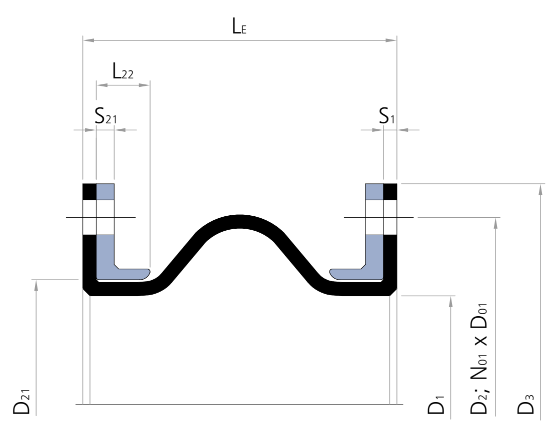
Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

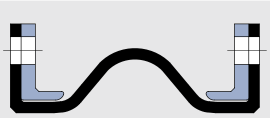
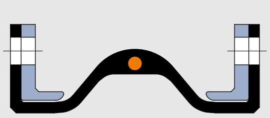
Filled arch:

(> page 42)

Cross section U110A



Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
U110A FDA		None	Depending on the diameter up to 100 bar, vacuum stability on request	> page 74
U112A FDA		No medium contact, embedded in the arches	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute	> page 76

Materials	
Stainless steel, embedded	Carbon steel, embedded

Silicon rubber expansion joints for food applications
with aramid inserts and Tri-clamp end fittings

U120A ⌀ 80 - 4,000 mm

- **Type U120A**
  without vacuum rings
- **Type U121A**
  with internal vacuum rings
- **Type U122A**
  with embedded vacuum rings
- **Type U123A**
  without vacuum rings,
  with external support ring
- **Type U124A**
  with internal vacuum rings,
  with external support ring
- **Type U125A**
  with embedded vacuum rings,
  with external support ring

Type key > page 22
U1 2 3 A
- A → Tie rod variant
- 3 → Support ring variant
- 2 → Number of arches
- U1 → Type

Universal expansion joint with two arches

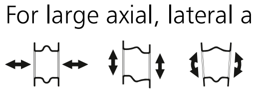
Design: High elastic, streamlined, double wide arch rubber bellows with full faced rubber flanges, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and backing flanges with support collar. Optional with vacuum rings and/or external support ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 350 to 600 mm (> page 110–115)
Custom length on request

Pressure: Up to 40 bar depending on diameter and length
Vacuum not allowed without vacuum rings, with vacuum rings up to 0.05 bar absolute

Movement: For large axial, lateral and angular movements

 (> page 110–115)

Spring rate: To calculate the axial and lateral spring rate for double arch joints, divide our single arch values of type U110A by the number of arches (> page 296)

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

CE PED 2014/68/EU KTW WRAS FDA
<10⁶ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 110–115)

Backing flanges

Design: Single- or multi-part, round backing flanges with support collars and clearance holes

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

Accessories

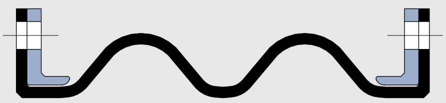
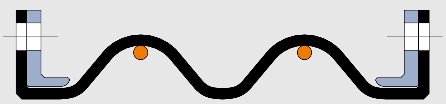
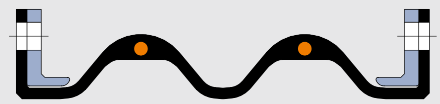
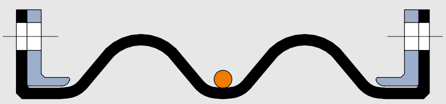
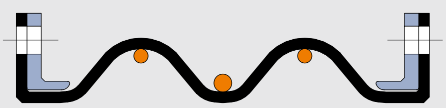
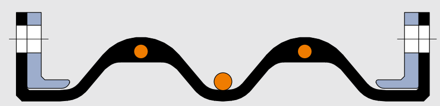
Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

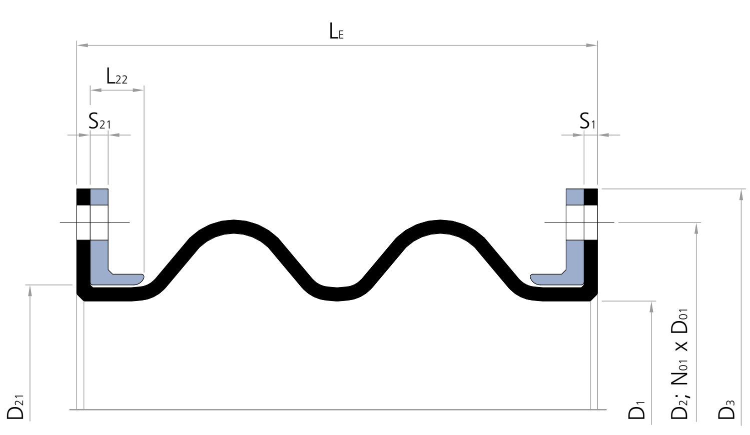
(> page 42)

Support rings

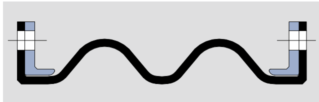
TYPE	Support rings	Vacuum ring	Support ring	Pressure	Movement
U120A		None	None	Low pressure, vacuum stability on request	> page 110–111
U121A		Medium contact, inside the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 112–113
U122A		No medium contact, embedded in the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 114–115
U123A		None	External between the arches	Depending on the diameter up to 40 bar, slight vacuum	> page 110–111
U124A		Medium contact, inside the arches	External between the arches	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute	> page 112–113
U125A		No medium contact, embedded in the arches	External between the arches	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 114–115

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

Cross section U120A

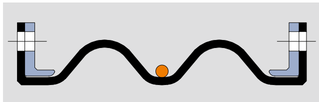


Lateral expansion joints type U121E
for a marine supply line
∅ 2,000 mm, +2 / -1 bar



U120A

> without vacuum rings



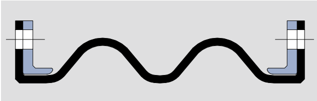
U123A

> without vacuum rings, with external support ring

Installation length (L_E) at design pressure															
	up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					up to 10 bar L_E = 450 mm				
	higher pressures on request														
⌀	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	62	20	38	21.8	177	80	40	56	38.7	254	88	41	61	39.4	260
125	62	20	38	17.7	241	80	40	55	32.6	330	88	41	60	33.3	337
150	62	20	37	14.9	314	80	40	54	28.1	415	88	41	59	28.7	423
175	62	20	36	12.9	415	80	40	54	24.6	531	88	41	58	25.1	539
200	62	20	36	11.3	491	80	40	53	21.8	616	88	41	57	22.3	625
250	62	20	35	9.1	707	80	40	52	17.7	855	88	41	56	18.2	866
300	62	20	35	7.6	973	80	40	51	14.9	1,146	88	41	55	15.3	1,158
350	62	20	34	6.5	1,288	80	40	50	12.9	1,486	88	41	54	13.2	1,500
400	62	20	34	5.7	1,605	80	40	50	11.3	1,825	88	41	54	11.6	1,840
450	62	20	33	5.1	1,987	80	40	49	10.1	2,231	88	41	53	10.3	2,248
500	62	20	33	4.6	2,402	80	40	49	9.1	2,669	88	41	52	9.3	2,688
550	62	20	33	4.2	2,827	80	40	48	8.3	3,117	88	41	52	8.5	3,137
600	62	20	33	3.8	3,349	80	40	48	7.6	3,664	88	41	52	7.8	3,685
650	62	20	32	3.5	3,848	80	40	48	7.0	4,185	88	41	51	7.2	4,208
700	62	20	32	3.3	4,465	80	40	47	6.5	4,827	88	41	51	6.7	4,852
750	62	20	32	3.1	5,027	80	40	47	6.1	5,411	88	41	51	6.2	5,437
800	62	20	32	2.9	5,741	80	40	47	5.7	6,151	88	41	50	5.9	6,179
850	62	20	32	2.7	6,362	80	40	46	5.4	6,793	88	41	50	5.5	6,822
900	62	20	31	2.5	7,163	80	40	46	5.1	7,620	88	41	50	5.2	7,651
950	62	20	31	2.4	7,854	80	40	46	4.8	8,332	88	41	49	4.9	8,365
1000	62	20	31	2.3	8,742	80	40	46	4.6	9,246	88	41	49	4.7	9,280
1050	62	20	31	2.2	9,503	80	40	46	4.4	10,029	88	41	49	4.5	10,064
1100	62	20	31	2.1	10,496	80	40	45	4.2	11,047	88	41	49	4.3	11,085
1150	62	20	31	2.0	11,310	80	40	45	4.0	11,882	88	41	49	4.1	11,921
1200	62	20	31	1.9	12,370	80	40	45	3.8	12,969	88	41	48	3.9	13,009
1250	62	20	30	1.8	13,273	80	40	45	3.7	13,893	88	41	48	3.8	13,935
1300	62	20	30	1.8	14,420	80	40	45	3.5	15,066	88	41	48	3.6	15,109
1350	62	20	30	1.7	15,394	80	40	45	3.4	16,061	88	41	48	3.5	16,106
1400	62	20	30	1.6	16,627	80	40	44	3.3	17,320	88	41	48	3.4	17,366
1450	62	20	30	1.6	17,671	80	40	44	3.2	18,385	88	41	48	3.2	18,433
1500	62	20	30	1.5	18,991	80	40	44	3.1	19,731	88	41	47	3.1	19,781
1600	62	20	30	1.4	21,512	80	40	44	2.9	22,299	88	41	47	2.9	22,352
1650	62	20	30	1.4	22,698	80	40	44	2.8	23,506	88	41	47	2.8	23,561
1700	62	20	30	1.3	24,190	80	40	44	2.7	25,025	88	41	47	2.8	25,081
1800	62	20	29	1.3	27,055	80	40	43	2.5	27,937	88	41	47	2.6	27,996
1900	62	20	29	1.2	30,018	80	40	43	2.4	30,946	88	41	46	2.5	31,009
1950	62	20	29	1.2	31,416	80	40	43	2.3	32,365	88	41	46	2.4	32,429
2000	62	20	29	1.1	33,168	80	40	43	2.3	34,143	88	41	46	2.3	34,209
2100	62	20	29	1.1	36,474	80	40	43	2.2	37,497	88	41	46	2.2	37,565
2200	62	20	29	1.0	39,938	80	40	43	2.1	41,007	88	41	46	2.1	41,079
2250	62	20	29	1.0	41,548	80	40	42	2.0	42,638	88	41	46	2.1	42,712
2300	62	20	29	1.0	43,558	80	40	42	2.0	44,675	88	41	46	2.0	44,750
2400	62	20	29	1.0	47,336	80	40	42	1.9	48,500	88	41	45	2.0	48,578
2500	62	20	29	0.9	51,271	80	40	42	1.8	52,482	88	41	45	1.9	52,563
2550	62	20	29	0.9	53,093	80	40	42	1.8	54,325	88	41	45	1.8	54,408
2600	62	20	29	0.9	55,363	80	40	42	1.8	56,621	88	41	45	1.8	56,706
2700	62	20	28	0.8	59,612	80	40	42	1.7	60,917	88	41	45	1.7	61,005
2800	62	20	28	0.8	64,018	80	40	42	1.6	65,370	88	41	45	1.7	65,461
2850	62	20	28	0.8	66,052	80	40	42	1.6	67,426	88	41	45	1.6	67,518
2900	62	20	28	0.8	68,581	80	40	42	1.6	69,981	88	41	45	1.6	70,075
3000	62	20	28	0.8	73,301	80	40	41	1.5	74,748	88	41	45	1.6	74,845
3100	62	20	28	0.7	78,179	80	40	41	1.5	79,673	88	41	44	1.5	79,773
3150	62	20	28	0.7	80,425	80	40	41	1.5	81,940	88	41	44	1.5	82,041
3200	62	20	28	0.7	83,213	80	40	41	1.4	84,754	88	41	44	1.5	84,857
3300	62	20	28	0.7	88,405	80	40	41	1.4	89,993	88	41	44	1.4	90,099
3400	62	20	28	0.7	93,753	80	40	41	1.3	95,388	88	41	44	1.4	95,498
3450	62	20	28	0.7	96,211	80	40	41	1.3	97,868	88	41	44	1.4	97,979
3600	62	20	28	0.6	104,922	80	40	41	1.3	106,651	88	41	44	1.3	106,767
3800	62	20	28	0.6	116,718	80	40	41	1.2	118,542	88	41	44	1.2	118,664
4000	62	20	27	0.6	129,143	80	40	40	1.1	131,061	88	41	43	1.2	131,190

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %; angular movement: -66 %.
Angular movement only possible with guided external support ring.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For large movements see type U130A or U133A.



U120A

> without vacuum rings

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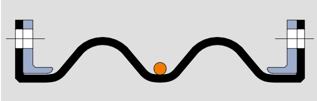


U123A

> without vacuum rings, with external support ring

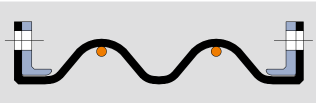
Installation length (L_E) at design pressure

higher pressures on request

up to 10 bar L_E = 500 mm					up to 10 bar L_E = 550 mm					up to 10 bar L_E = 600 mm					
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm^2	mm	mm	±mm	±°	cm^2	mm	mm	±mm	±°	cm^2	mm
106	61	79	50.7	353	124	82	97	58.6	460	138	85	105	59.5	491	**100**
106	61	77	44.3	441	124	82	95	52.7	560	138	85	103	53.7	594	**125**
106	61	76	39.1	539	124	82	93	47.6	670	138	85	101	48.6	707	**150**
106	61	75	34.9	670	124	82	92	43.1	814	138	85	100	44.2	855	**175**
106	61	74	31.4	765	124	82	91	39.4	919	138	85	99	40.4	962	**200**
106	61	72	26.0	1,029	124	82	89	33.3	1,207	138	85	97	34.2	1,257	**250**
106	61	71	22.1	1,346	124	82	88	28.7	1,548	138	85	95	29.5	1,605	**300**
106	61	70	19.2	1,713	124	82	86	25.1	1,940	138	85	94	25.9	2,003	**350**
106	61	69	17.0	2,075	124	82	85	22.3	2,324	138	85	93	23.0	2,393	**400**
106	61	69	15.2	2,507	124	82	84	20.0	2,781	138	85	92	20.7	2,856	**450**
106	61	68	13.7	2,971	124	82	84	18.2	3,267	138	85	91	18.8	3,349	**500**
106	61	67	12.5	3,442	124	82	83	16.6	3,761	138	85	90	17.2	3,848	**550**
106	61	67	11.5	4,015	124	82	82	15.3	4,359	138	85	89	15.8	4,453	**600**
106	61	66	10.6	4,560	124	82	82	14.2	4,927	138	85	89	14.7	5,027	**650**
106	61	66	9.9	5,230	124	82	81	13.2	5,621	138	85	88	13.7	5,728	**700**
106	61	66	9.2	5,836	124	82	81	12.3	6,249	138	85	87	12.8	6,362	**750**
106	61	65	8.7	6,604	124	82	80	11.6	7,044	138	85	87	12.0	7,163	**800**
106	61	65	8.2	7,268	124	82	80	10.9	7,729	138	85	86	11.3	7,854	**850**
106	61	64	7.7	8,123	124	82	79	10.3	8,610	138	85	86	10.7	8,742	**900**
106	61	64	7.3	8,858	124	82	79	9.8	9,366	138	85	86	10.1	9,503	**950**
106	61	64	7.0	9,799	124	82	79	9.3	10,333	138	85	85	9.6	10,477	**1000**
106	61	64	6.6	10,605	124	82	78	8.9	11,159	138	85	85	9.2	11,310	**1050**
106	61	63	6.3	11,652	124	82	78	8.5	12,233	138	85	84	8.8	12,390	**1100**
106	61	63	6.1	12,509	124	82	78	8.1	13,110	138	85	84	8.4	13,273	**1150**
106	61	63	5.8	13,623	124	82	77	7.8	14,250	138	85	84	8.1	14,420	**1200**
106	61	63	5.6	14,569	124	82	77	7.5	15,218	138	85	84	7.7	15,394	**1250**
106	61	62	5.4	15,770	124	82	77	7.2	16,445	138	85	83	7.5	16,627	**1300**
106	61	62	5.2	16,787	124	82	76	6.9	17,483	138	85	83	7.2	17,671	**1350**
106	61	62	5.0	18,074	124	82	76	6.7	18,796	138	85	83	6.9	18,991	**1400**
106	61	62	4.8	19,162	124	82	76	6.5	19,906	138	85	82	6.7	20,106	**1450**
106	61	62	4.6	20,536	124	82	76	6.2	21,305	138	85	82	6.5	21,512	**1500**
106	61	61	4.4	23,154	124	82	75	5.9	23,970	138	85	82	6.1	24,190	**1600**
106	61	61	4.2	24,384	124	82	75	5.7	25,221	138	85	81	5.9	25,447	**1650**
106	61	61	4.1	25,930	124	82	75	5.5	26,793	138	85	81	5.7	27,026	**1700**
106	61	61	3.9	28,893	124	82	74	5.2	29,804	138	85	81	5.4	30,049	**1800**
106	61	60	3.7	31,952	124	82	74	4.9	32,910	138	85	80	5.1	33,168	**1900**
106	61	60	3.6	33,394	124	82	74	4.8	34,373	138	85	80	5.0	34,636	**1950**
106	61	60	3.5	35,199	124	82	74	4.7	36,204	138	85	80	4.9	36,474	**2000**
106	61	60	3.3	38,603	124	82	73	4.5	39,655	138	85	80	4.6	39,938	**2100**
106	61	59	3.2	42,164	124	82	73	4.3	43,263	138	85	79	4.4	43,558	**2200**
106	61	59	3.1	43,818	124	82	73	4.2	44,938	138	85	79	4.3	45,239	**2250**
106	61	59	3.0	45,882	124	82	73	4.1	47,028	138	85	79	4.2	47,336	**2300**
106	61	59	2.9	49,757	124	82	72	3.9	50,950	138	85	79	4.1	51,271	**2400**
106	61	59	2.8	53,789	124	82	72	3.8	55,030	138	85	78	3.9	55,363	**2500**
106	61	59	2.7	55,655	124	82	72	3.7	56,917	138	85	78	3.8	57,256	**2550**
106	61	59	2.7	57,979	124	82	72	3.6	59,266	138	85	78	3.7	59,612	**2600**
106	61	58	2.6	62,325	124	82	72	3.5	63,660	138	85	78	3.6	64,018	**2700**
106	61	58	2.5	66,829	124	82	71	3.4	68,210	138	85	78	3.5	68,581	**2800**
106	61	58	2.5	68,906	124	82	71	3.3	70,309	138	85	77	3.4	70,686	**2850**
106	61	58	2.4	71,489	124	82	71	3.2	72,918	138	85	77	3.4	73,301	**2900**
106	61	58	2.3	76,307	124	82	71	3.1	77,783	138	85	77	3.2	78,179	**3000**
106	61	58	2.3	81,282	124	82	71	3.0	82,805	138	85	77	3.1	83,213	**3100**
106	61	58	2.2	83,571	124	82	71	3.0	85,116	138	85	77	3.1	85,530	**3150**
106	61	57	2.2	86,413	124	82	71	2.9	87,984	138	85	77	3.0	88,405	**3200**
106	61	57	2.1	91,702	124	82	70	2.8	93,320	138	85	76	2.9	93,753	**3300**
106	61	57	2.1	97,148	124	82	70	2.8	98,813	138	85	76	2.9	99,259	**3400**
106	61	57	2.0	99,650	124	82	70	2.7	101,336	138	85	76	2.8	101,788	**3450**
106	61	57	1.9	108,511	124	82	70	2.6	110,270	138	85	76	2.7	110,741	**3600**
106	61	57	1.8	120,503	124	82	70	2.5	122,356	138	85	75	2.6	122,852	**3800**
106	61	56	1.7	133,123	124	82	69	2.3	135,070	138	85	75	2.4	135,591	**4000**

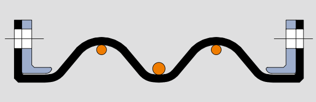
The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



U121A

> with internal vacuum rings



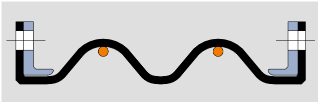
U124A

> with internal vacuum rings, with external support ring

Installation length (L_E) at design pressure															
	up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					up to 10 bar L_E = 450 mm				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	62	7	38	21.8	177	80	13	56	38.7	254	88	13	61	39.4	260
125	62	7	38	17.7	241	80	13	55	32.6	330	88	13	60	33.3	337
150	62	7	37	14.9	314	80	13	54	28.1	415	88	13	59	28.7	423
175	62	7	36	12.9	415	80	13	54	24.6	531	88	13	58	25.1	539
200	62	7	36	11.3	491	80	13	53	21.8	616	88	13	57	22.3	625
250	62	7	35	9.1	707	80	13	52	17.7	855	88	13	56	18.2	866
300	62	7	35	7.6	973	80	13	51	14.9	1,146	88	13	55	15.3	1,158
350	62	7	34	6.5	1,288	80	13	50	12.9	1,486	88	13	54	13.2	1,500
400	62	7	34	5.7	1,605	80	13	50	11.3	1,825	88	13	54	11.6	1,840
450	62	7	33	5.1	1,987	80	13	49	10.1	2,231	88	13	53	10.3	2,248
500	62	7	33	4.6	2,402	80	13	49	9.1	2,669	88	13	52	9.3	2,688
550	62	7	33	4.2	2,827	80	13	48	8.3	3,117	88	13	52	8.5	3,137
600	62	7	33	3.8	3,349	80	13	48	7.6	3,664	88	13	52	7.8	3,685
650	62	7	32	3.5	3,848	80	13	48	7.0	4,185	88	13	51	7.2	4,208
700	62	7	32	3.3	4,465	80	13	47	6.5	4,827	88	13	51	6.7	4,852
750	62	7	32	3.1	5,027	80	13	47	6.1	5,411	88	13	51	6.2	5,437
800	62	7	32	2.9	5,741	80	13	47	5.7	6,151	88	13	50	5.9	6,179
850	62	7	32	2.7	6,362	80	13	46	5.4	6,793	88	13	50	5.5	6,822
900	62	7	31	2.5	7,163	80	13	46	5.1	7,620	88	13	50	5.2	7,651
950	62	7	31	2.4	7,854	80	13	46	4.8	8,332	88	13	49	4.9	8,365
1000	62	7	31	2.3	8,742	80	13	46	4.6	9,246	88	13	49	4.7	9,280
1050	62	7	31	2.2	9,503	80	13	46	4.4	10,029	88	13	49	4.5	10,064
1100	62	7	31	2.1	10,496	80	13	45	4.2	11,047	88	13	49	4.3	11,085
1150	62	7	31	2.0	11,310	80	13	45	4.0	11,882	88	13	49	4.1	11,921
1200	62	7	31	1.9	12,370	80	13	45	3.8	12,969	88	13	48	3.9	13,009
1250	62	7	30	1.8	13,273	80	13	45	3.7	13,893	88	13	48	3.8	13,935
1300	62	7	30	1.8	14,420	80	13	45	3.5	15,066	88	13	48	3.6	15,109
1350	62	7	30	1.7	15,394	80	13	45	3.4	16,061	88	13	48	3.5	16,106
1400	62	7	30	1.6	16,627	80	13	44	3.3	17,320	88	13	48	3.4	17,366
1450	62	7	30	1.6	17,671	80	13	44	3.2	18,385	88	13	48	3.2	18,433
1500	62	7	30	1.5	18,991	80	13	44	3.1	19,731	88	13	47	3.1	19,781
1600	62	7	30	1.4	21,512	80	13	44	2.9	22,299	88	13	47	2.9	22,352
1650	62	7	30	1.4	22,698	80	13	44	2.8	23,506	88	13	47	2.8	23,561
1700	62	7	30	1.3	24,190	80	13	44	2.7	25,025	88	13	47	2.8	25,081
1800	62	7	29	1.3	27,055	80	13	43	2.5	27,937	88	13	47	2.6	27,996
1900	62	7	29	1.2	30,018	80	13	43	2.4	30,946	88	13	46	2.5	31,009
1950	62	7	29	1.2	31,416	80	13	43	2.3	32,365	88	13	46	2.4	32,429
2000	62	7	29	1.1	33,168	80	13	43	2.3	34,143	88	13	46	2.3	34,209
2100	62	7	29	1.1	36,474	80	13	43	2.2	37,497	88	13	46	2.2	37,565
2200	62	7	29	1.0	39,938	80	13	43	2.1	41,007	88	13	46	2.1	41,079
2250	62	7	29	1.0	41,548	80	13	42	2.0	42,638	88	13	46	2.1	42,712
2300	62	7	29	1.0	43,558	80	13	42	2.0	44,675	88	13	46	2	44,750
2400	62	7	29	1.0	47,336	80	13	42	1.9	48,500	88	13	45	2	48,578
2500	62	7	29	0.9	51,271	80	13	42	1.8	52,482	88	13	45	1.9	52,563
2550	62	7	29	0.9	53,093	80	13	42	1.8	54,325	88	13	45	1.8	54,408
2600	62	7	29	0.9	55,363	80	13	42	1.8	56,621	88	13	45	1.8	56,706
2700	62	7	28	0.8	59,612	80	13	42	1.7	60,917	88	13	45	1.7	61,005
2800	62	7	28	0.8	64,018	80	13	42	1.6	65,370	88	13	45	1.7	65,461
2850	62	7	28	0.8	66,052	80	13	42	1.6	67,426	88	13	45	1.6	67,518
2900	62	7	28	0.8	68,581	80	13	42	1.6	69,981	88	13	45	1.6	70,075
3000	62	7	28	0.8	73,301	80	13	41	1.5	74,748	88	13	45	1.6	74,845
3100	62	7	28	0.7	78,179	80	13	41	1.5	79,673	88	13	44	1.5	79,773
3150	62	7	28	0.7	80,425	80	13	41	1.5	81,940	88	13	44	1.5	82,041
3200	62	7	28	0.7	83,213	80	13	41	1.4	84,754	88	13	44	1.5	84,857
3300	62	7	28	0.7	88,405	80	13	41	1.4	89,993	88	13	44	1.4	90,099
3400	62	7	28	0.7	93,753	80	13	41	1.3	95,388	88	13	44	1.4	95,498
3450	62	7	28	0.7	96,211	80	13	41	1.3	97,868	88	13	44	1.4	97,979
3600	62	7	28	0.6	104,922	80	13	41	1.3	106,651	88	13	44	1.3	106,767
3800	62	7	28	0.6	116,718	80	13	41	1.2	118,542	88	13	44	1.2	118,664
4000	62	7	27	0.6	129,143	80	13	40	1.1	131,061	88	13	43	1.2	131,190

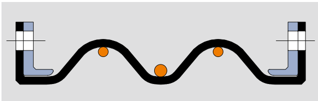
Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %.
Angular movement only possible with guided external support ring.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For large movements see type U131A or U134A.



U121A

> with internal vacuum rings



U124A

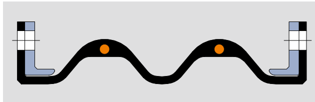
> with internal vacuum rings, with external support ring

Installation length (L_E) at design pressure

up to 10 bar L_E = 500 mm					up to 10 bar L_E = 550 mm					up to 10 bar L_E = 600 mm					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
106	20	79	50.7	353	124	27	97	58.6	460	138	28	105	59.5	491	**100**
106	20	77	44.3	441	124	27	95	52.7	560	138	28	103	53.7	594	**125**
106	20	76	39.1	539	124	27	93	47.6	670	138	28	101	48.6	707	**150**
106	20	75	34.9	670	124	27	92	43.1	814	138	28	100	44.2	855	**175**
106	20	74	31.4	765	124	27	91	39.4	919	138	28	99	40.4	962	**200**
106	20	72	26	1,029	124	27	89	33.3	1,207	138	28	97	34.2	1,257	**250**
106	20	71	22.1	1,346	124	27	88	28.7	1,548	138	28	95	29.5	1,605	**300**
106	20	70	19.2	1,713	124	27	86	25.1	1,940	138	28	94	25.9	2,003	**350**
106	20	69	17	2,075	124	27	85	22.3	2,324	138	28	93	23	2,393	**400**
106	20	69	15.2	2,507	124	27	84	20	2,781	138	28	92	20.7	2,856	**450**
106	20	68	13.7	2,971	124	27	84	18.2	3,267	138	28	91	18.8	3,349	**500**
106	20	67	12.5	3,442	124	27	83	16.6	3,761	138	28	90	17.2	3,848	**550**
106	20	67	11.5	4,015	124	27	82	15.3	4,359	138	28	89	15.8	4,453	**600**
106	20	66	10.6	4,560	124	27	82	14.2	4,927	138	28	89	14.7	5,027	**650**
106	20	66	9.9	5,230	124	27	81	13.2	5,621	138	28	88	13.7	5,728	**700**
106	20	66	9.2	5,836	124	27	81	12.3	6,249	138	28	87	12.8	6,362	**750**
106	20	65	8.7	6,604	124	27	80	11.6	7,044	138	28	87	12	7,163	**800**
106	20	65	8.2	7,268	124	27	80	10.9	7,729	138	28	86	11.3	7,854	**850**
106	20	64	7.7	8,123	124	27	79	10.3	8,610	138	28	86	10.7	8,742	**900**
106	20	64	7.3	8,858	124	27	79	9.8	9,366	138	28	86	10.1	9,503	**950**
106	20	64	7	9,799	124	27	79	9.3	10,333	138	28	85	9.6	10,477	**1000**
106	20	64	6.6	10,605	124	27	78	8.9	11,159	138	28	85	9.2	11,310	**1050**
106	20	63	6.3	11,652	124	27	78	8.5	12,233	138	28	84	8.8	12,390	**1100**
106	20	63	6.1	12,509	124	27	78	8.1	13,110	138	28	84	8.4	13,273	**1150**
106	20	63	5.8	13,623	124	27	77	7.8	14,250	138	28	84	8.1	14,420	**1200**
106	20	63	5.6	14,569	124	27	77	7.5	15,218	138	28	84	7.7	15,394	**1250**
106	20	62	5.4	15,770	124	27	77	7.2	16,445	138	28	83	7.5	16,627	**1300**
106	20	62	5.2	16,787	124	27	76	6.9	17,483	138	28	83	7.2	17,671	**1350**
106	20	62	5	18,074	124	27	76	6.7	18,796	138	28	83	6.9	18,991	**1400**
106	20	62	4.8	19,162	124	27	76	6.5	19,906	138	28	82	6.7	20,106	**1450**
106	20	62	4.6	20,536	124	27	76	6.2	21,305	138	28	82	6.5	21,512	**1500**
106	20	61	4.4	23,154	124	27	75	5.9	23,970	138	28	82	6.1	24,190	**1600**
106	20	61	4.2	24,384	124	27	75	5.7	25,221	138	28	81	5.9	25,447	**1650**
106	20	61	4.1	25,930	124	27	75	5.5	26,793	138	28	81	5.7	27,026	**1700**
106	20	61	3.9	28,893	124	27	74	5.2	29,804	138	28	81	5.4	30,049	**1800**
106	20	60	3.7	31,952	124	27	74	4.9	32,910	138	28	80	5.1	33,168	**1900**
106	20	60	3.6	33,394	124	27	74	4.8	34,373	138	28	80	5	34,636	**1950**
106	20	60	3.5	35,199	124	27	74	4.7	36,204	138	28	80	4.9	36,474	**2000**
106	20	60	3.3	38,603	124	27	73	4.5	39,655	138	28	80	4.6	39,938	**2100**
106	20	59	3.2	42,164	124	27	73	4.3	43,263	138	28	79	4.4	43,558	**2200**
106	20	59	3.1	43,818	124	27	73	4.2	44,938	138	28	79	4.3	45,239	**2250**
106	20	59	3	45,882	124	27	73	4.1	47,028	138	28	79	4.2	47,336	**2300**
106	20	59	2.9	49,757	124	27	72	3.9	50,950	138	28	79	4.1	51,271	**2400**
106	20	59	2.8	53,789	124	27	72	3.8	55,030	138	28	78	3.9	55,363	**2500**
106	20	59	2.7	55,655	124	27	72	3.7	56,917	138	28	78	3.8	57,256	**2550**
106	20	59	2.7	57,979	124	27	72	3.6	59,266	138	28	78	3.7	59,612	**2600**
106	20	58	2.6	62,325	124	27	72	3.5	63,660	138	28	78	3.6	64,018	**2700**
106	20	58	2.5	66,829	124	27	71	3.4	68,210	138	28	78	3.5	68,581	**2800**
106	20	58	2.5	68,906	124	27	71	3.3	70,309	138	28	77	3.4	70,686	**2850**
106	20	58	2.4	71,489	124	27	71	3.2	72,918	138	28	77	3.4	73,301	**2900**
106	20	58	2.3	76,307	124	27	71	3.1	77,783	138	28	77	3.2	78,179	**3000**
106	20	58	2.3	81,282	124	27	71	3	82,805	138	28	77	3.1	83,213	**3100**
106	20	58	2.2	83,571	124	27	71	3	85,116	138	28	77	3.1	85,530	**3150**
106	20	57	2.2	86,413	124	27	71	2.9	87,984	138	28	77	3	88,405	**3200**
106	20	57	2.1	91,702	124	27	70	2.8	93,320	138	28	76	2.9	93,753	**3300**
106	20	57	2.1	97,148	124	27	70	2.8	98,813	138	28	76	2.9	99,259	**3400**
106	20	57	2	99,650	124	27	70	2.7	101,336	138	28	76	2.8	101,788	**3450**
106	20	57	1.9	108,511	124	27	70	2.6	110,270	138	28	76	2.7	110,741	**3600**
106	20	57	1.8	120,503	124	27	70	2.5	122,356	138	28	75	2.6	122,852	**3800**
106	20	56	1.7	133,123	124	27	69	2.3	135,070	138	28	75	2.4	135,591	**4000**

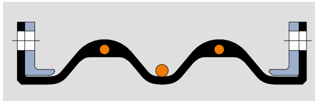
The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



U122A

> with embedded vacuum rings



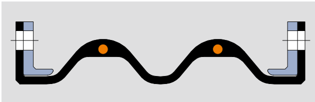
U125A

> with embedded vacuum rings, with external support ring

Installation length (L_E) at design pressure															
	up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					up to 10 bar L_E = 450 mm				
	higher pressures on request														
∅	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	41	5	36	15.6	150	52	12	54	35.0	222	58	12	59	36.5	232
125	41	5	35	12.6	209	52	12	53	29.2	293	58	12	58	30.6	305
150	41	5	35	10.6	278	52	12	52	25.0	373	58	12	57	26.3	387
175	41	5	34	9.1	373	52	12	51	21.8	483	58	12	56	22.9	499
200	41	5	34	8.0	445	52	12	51	19.3	564	58	12	55	20.3	581
250	41	5	33	6.4	651	52	12	50	15.6	794	58	12	54	16.5	814
300	41	5	32	5.3	908	52	12	49	13.1	1,075	58	12	53	13.9	1,099
350	41	5	32	4.6	1,213	52	12	48	11.3	1,405	58	12	52	11.9	1,432
400	41	5	32	4.0	1,521	52	12	48	9.9	1,735	58	12	52	10.5	1,765
450	41	5	31	3.6	1,893	52	12	47	8.8	2,132	58	12	51	9.3	2,165
500	41	5	31	3.2	2,299	52	12	47	8.0	2,561	58	12	51	8.4	2,597
550	41	5	31	2.9	2,715	52	12	46	7.3	3,000	58	12	50	7.7	3,039
600	41	5	30	2.7	3,227	52	12	46	6.7	3,536	58	12	50	7	3,578
650	41	5	30	2.5	3,718	52	12	45	6.1	4,049	58	12	50	6.5	4,094
700	41	5	30	2.3	4,324	52	12	45	5.7	4,681	58	12	49	6	4,729
750	41	5	30	2.1	4,877	52	12	45	5.3	5,255	58	12	49	5.6	5,307
800	41	5	30	2.0	5,581	52	12	45	5.0	5,986	58	12	49	5.3	6,041
850	41	5	30	1.9	6,193	52	12	44	4.7	6,619	58	12	48	5	6,677
900	41	5	29	1.8	6,984	52	12	44	4.4	7,436	58	12	48	4.7	7,497
950	41	5	29	1.7	7,667	52	12	44	4.2	8,139	58	12	48	4.5	8,203
1000	41	5	29	1.6	8,544	52	12	44	4.0	9,043	58	12	48	4.2	9,110
1050	41	5	29	1.5	9,297	52	12	44	3.8	9,817	58	12	47	4	9,887
1100	41	5	29	1.5	10,279	52	12	43	3.6	10,825	58	12	47	3.8	10,899
1150	41	5	29	1.4	11,085	52	12	43	3.5	11,652	58	12	47	3.7	11,728
1200	41	5	29	1.3	12,135	52	12	43	3.3	12,728	58	12	47	3.5	12,808
1250	41	5	29	1.3	13,029	52	12	43	3.2	13,643	58	12	47	3.4	13,726
1300	41	5	28	1.2	14,166	52	12	43	3.1	14,806	58	12	47	3.3	14,892
1350	41	5	28	1.2	15,131	52	12	43	3.0	15,792	58	12	46	3.1	15,881
1400	41	5	28	1.1	16,354	52	12	42	2.9	17,041	58	12	46	3	17,134
1450	41	5	28	1.1	17,390	52	12	42	2.8	18,098	58	12	46	2.9	18,194
1500	41	5	28	1.1	18,699	52	12	42	2.7	19,433	58	12	46	2.8	19,532
1600	41	5	28	1.0	21,201	52	12	42	2.5	21,983	58	12	46	2.6	22,088
1650	41	5	28	1.0	22,379	52	12	42	2.4	23,181	58	12	46	2.6	23,289
1700	41	5	28	0.9	23,861	52	12	42	2.4	24,689	58	12	45	2.5	24,801
1800	41	5	28	0.9	26,706	52	12	41	2.2	27,582	58	12	45	2.4	27,700
1900	41	5	27	0.8	29,651	52	12	41	2.1	30,573	58	12	45	2.2	30,698
1950	41	5	27	0.8	31,040	52	12	41	2.1	31,984	58	12	45	2.2	32,111
2000	41	5	27	0.8	32,781	52	12	41	2.0	33,751	58	12	45	2.1	33,882
2100	41	5	27	0.8	36,069	52	12	41	1.9	37,086	58	12	45	2	37,223
2200	41	5	27	0.7	39,514	52	12	41	1.8	40,578	58	12	44	1.9	40,721
2250	41	5	27	0.7	41,115	52	12	41	1.8	42,200	58	12	44	1.9	42,346
2300	41	5	27	0.7	43,116	52	12	41	1.7	44,227	58	12	44	1.8	44,376
2400	41	5	27	0.7	46,875	52	12	40	1.7	48,033	58	12	44	1.8	48,188
2500	41	5	27	0.6	50,791	52	12	40	1.6	51,996	58	12	44	1.7	52,158
2550	41	5	27	0.6	52,604	52	12	40	1.6	53,831	58	12	44	1.7	53,995
2600	41	5	27	0.6	54,864	52	12	40	1.5	56,116	58	12	44	1.6	56,284
2700	41	5	27	0.6	59,094	52	12	40	1.5	60,393	58	12	44	1.6	60,568
2800	41	5	26	0.6	63,481	52	12	40	1.4	64,828	58	12	43	1.5	65,008
2850	41	5	26	0.6	65,506	52	12	40	1.4	66,874	58	12	43	1.5	67,058
2900	41	5	26	0.6	68,025	52	12	40	1.4	69,419	58	12	43	1.5	69,606
3000	41	5	26	0.5	72,727	52	12	40	1.3	74,168	58	12	43	1.4	74,361
3100	41	5	26	0.5	77,585	52	12	39	1.3	79,073	58	12	43	1.4	79,273
3150	41	5	26	0.5	79,823	52	12	39	1.3	81,332	58	12	43	1.3	81,534
3200	41	5	26	0.5	82,601	52	12	39	1.3	84,136	58	12	43	1.3	84,342
3300	41	5	26	0.5	87,773	52	12	39	1.2	89,356	58	12	43	1.3	89,568
3400	41	5	26	0.5	93,103	52	12	39	1.2	94,733	58	12	43	1.2	94,951
3450	41	5	26	0.5	95,553	52	12	39	1.2	97,203	58	12	43	1.2	97,425
3600	41	5	26	0.4	104,234	52	12	39	1.1	105,958	58	12	42	1.2	106,188
3800	41	5	26	0.4	115,993	52	12	39	1.1	117,811	58	12	42	1.1	118,054
4000	41	5	26	0.4	128,380	52	12	39	1.0	130,292	58	12	42	1.1	130,548

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -0 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %.
Angular movement only possible with guided external support ring.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For large movements see type U132A or U135A.



U122A

> with embedded vacuum rings

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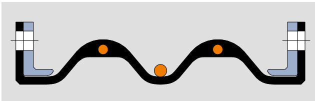


U125A

> with embedded vacuum rings, with external support ring

Installation length (L_E) at design pressure

up to 10 bar L_E = **500 mm**					up to 10 bar L_E = **550 mm**					up to 10 bar L_E = **600 mm**					
higher pressures on request															
Movement				A	Movement				A	Movement				A	⌀
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
70	19	77	48.7	320	82	26	95	57.3	423	91	26	102	57.3	423	**100**
70	19	75	42.4	405	82	26	93	51.3	519	91	26	100	51.3	519	**125**
70	19	74	37.2	499	82	26	91	46.1	625	91	26	98	46.1	625	**150**
70	19	73	33.1	625	82	26	90	41.7	765	91	26	97	41.7	765	**175**
70	19	72	29.7	716	82	26	89	38	866	91	26	95	38	866	**200**
70	19	71	24.5	973	82	26	87	32	1,146	91	26	94	32	1,146	**250**
70	19	69	20.8	1,282	82	26	86	27.5	1,479	91	26	92	27.5	1,479	**300**
70	19	69	18	1,640	82	26	85	24	1,863	91	26	91	24	1,863	**350**
70	19	68	15.9	1,995	82	26	84	21.3	2,240	91	26	90	21.3	2,240	**400**
70	19	67	14.2	2,419	82	26	83	19.1	2,688	91	26	89	19.1	2,688	**450**
70	19	66	12.8	2,875	82	26	82	17.3	3,167	91	26	88	17.3	3,167	**500**
70	19	66	11.7	3,339	82	26	81	15.8	3,653	91	26	87	15.8	3,653	**550**
70	19	65	10.8	3,904	82	26	81	14.6	4,243	91	26	86	14.6	4,243	**600**
70	19	65	9.9	4,441	82	26	80	13.5	4,803	91	26	86	13.5	4,803	**650**
70	19	64	9.2	5,102	82	26	79	12.6	5,489	91	26	85	12.6	5,489	**700**
70	19	64	8.6	5,701	82	26	79	11.7	6,110	91	26	85	11.7	6,110	**750**
70	19	64	8.1	6,461	82	26	78	11	6,896	91	26	84	11	6,896	**800**
70	19	63	7.6	7,118	82	26	78	10.4	7,574	91	26	84	10.4	7,574	**850**
70	19	63	7.2	7,964	82	26	78	9.8	8,446	91	26	83	9.8	8,446	**900**
70	19	63	6.8	8,692	82	26	77	9.3	9,195	91	26	83	9.3	9,195	**950**
70	19	62	6.5	9,625	82	26	77	8.9	10,153	91	26	82	8.9	10,153	**1000**
70	19	62	6.2	10,423	82	26	77	8.5	10,973	91	26	82	8.5	10,973	**1050**
70	19	62	5.9	11,461	82	26	76	8.1	12,037	91	26	82	8.1	12,037	**1100**
70	19	61	5.7	12,311	82	26	76	7.7	12,908	91	26	81	7.7	12,908	**1150**
70	19	61	5.4	13,417	82	26	76	7.4	14,040	91	26	81	7.4	14,040	**1200**
70	19	61	5.2	14,356	82	26	75	7.1	15,001	91	26	81	7.1	15,001	**1250**
70	19	61	5	15,548	82	26	75	6.8	16,218	91	26	81	6.8	16,218	**1300**
70	19	61	4.8	16,559	82	26	75	6.6	17,250	91	26	80	6.6	17,250	**1350**
70	19	60	4.7	17,837	82	26	75	6.4	18,554	91	26	80	6.4	18,554	**1400**
70	19	60	4.5	18,918	82	26	74	6.1	19,656	91	26	80	6.1	19,656	**1450**
70	19	60	4.3	20,283	82	26	74	5.9	21,047	91	26	79	5.9	21,047	**1500**
70	19	60	4.1	22,885	82	26	74	5.6	23,697	91	26	79	5.6	23,697	**1600**
70	19	60	4	24,108	82	26	73	5.4	24,941	91	26	79	5.4	24,941	**1650**
70	19	59	3.8	25,645	82	26	73	5.2	26,504	91	26	79	5.2	26,504	**1700**
70	19	59	3.6	28,592	82	26	73	5	29,498	91	26	78	5	29,498	**1800**
70	19	59	3.4	31,636	82	26	73	4.7	32,589	91	26	78	4.7	32,589	**1900**
70	19	59	3.3	33,071	82	26	72	4.6	34,045	91	26	78	4.6	34,045	**1950**
70	19	58	3.3	34,867	82	26	72	4.5	35,867	91	26	77	4.5	35,867	**2000**
70	19	58	3.1	38,256	82	26	72	4.2	39,303	91	26	77	4.2	39,303	**2100**
70	19	58	3	41,801	82	26	72	4.1	42,895	91	26	77	4.1	42,895	**2200**
70	19	58	2.9	43,447	82	26	71	4	44,563	91	26	77	4	44,563	**2250**
70	19	58	2.8	45,503	82	26	71	3.9	46,645	91	26	76	3.9	46,645	**2300**
70	19	58	2.7	49,363	82	26	71	3.7	50,551	91	26	76	3.7	50,551	**2400**
70	19	57	2.6	53,379	82	26	71	3.6	54,615	91	26	76	3.6	54,615	**2500**
70	19	57	2.6	55,238	82	26	71	3.5	56,495	91	26	76	3.5	56,495	**2550**
70	19	57	2.5	57,553	82	26	71	3.4	58,836	91	26	76	3.4	58,836	**2600**
70	19	57	2.4	61,883	82	26	70	3.3	63,213	91	26	75	3.3	63,213	**2700**
70	19	57	2.3	66,371	82	26	70	3.2	67,748	91	26	75	3.2	67,748	**2800**
70	19	57	2.3	68,442	82	26	70	3.1	69,840	91	26	75	3.1	69,840	**2850**
70	19	57	2.3	71,016	82	26	70	3.1	72,440	91	26	75	3.1	72,440	**2900**
70	19	56	2.2	75,818	82	26	70	3	77,289	91	26	75	3	77,289	**3000**
70	19	56	2.1	80,777	82	26	69	2.9	82,295	91	26	74	2.9	82,295	**3100**
70	19	56	2.1	83,060	82	26	69	2.8	84,599	91	26	74	2.8	84,599	**3150**
70	19	56	2	85,893	82	26	69	2.8	87,459	91	26	74	2.8	87,459	**3200**
70	19	56	2	91,166	82	26	69	2.7	92,779	91	26	74	2.7	92,779	**3300**
70	19	56	1.9	96,597	82	26	69	2.6	98,256	91	26	74	2.6	98,256	**3400**
70	19	56	1.9	99,091	82	26	69	2.6	100,772	91	26	74	2.6	100,772	**3450**
70	19	55	1.8	107,928	82	26	68	2.5	109,682	91	26	73	2.5	109,682	**3600**
70	19	55	1.7	119,888	82	26	68	2.4	121,736	91	26	73	2.4	121,736	**3800**
70	19	55	1.6	132,477	82	26	68	2.2	134,419	91	26	73	2.2	134,419	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available

U130A U140A U150A ⌀ 80 - 4,000 mm

- **Type U130A U140A U150A** without vacuum rings
- **Type U131A U141A U151A** with internal vacuum rings
- **Type U132A U142A U152A** with embedded vacuum rings
- **Type U133A U143A U153A** without vacuum rings, with external support rings
- **Type U134A U144A U154A** with internal vacuum rings, with external support rings
- **Type U135A U145A U155A** with embedded vacuum rings, with external support rings

Type key > page 22

U1 3 3 A
- A → Tie rod variant
- 3 → Support ring variant
- 3 → Number of arches
- U1 → Type

Universal expansion joint with three or more arches

Design: High elastic, streamlined, triple or multiple wide arch rubber bellows with full faced rubber flanges, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and backing flanges with support collar. Optional with vacuum rings and/or external support rings. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 650 with 3 arches, type U130A (> page 120–122)
Standard L_E = 850 with 4 arches, type U140A (> page 120–122)
Standard L_E = 1050 with 5 arches, type U150A (> page 120–122)
Custom length on request

Pressure: Up to 10 bar depending on diameter and length
Vacuum not allowed without vacuum rings, with vacuum rings up to 0.05 bar absolute

Movement: For extremely large axial, lateral and angular movements
(> page 120–122)

Spring rate: To calculate the axial and lateral spring rate for multiple arch joints, divide our single arch values of type U110A by the number of arches (> page 296)

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 110–113)

Backing flanges

Design: Single- or multi-part, round backing flanges with support collars and clearance holes

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

Accessories

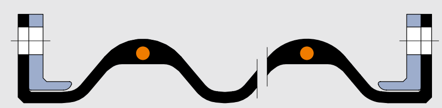
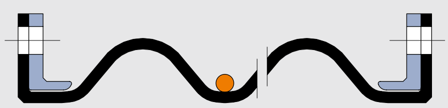
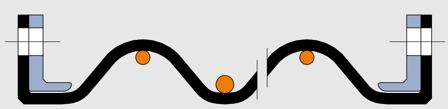
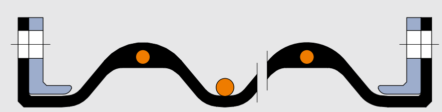
Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

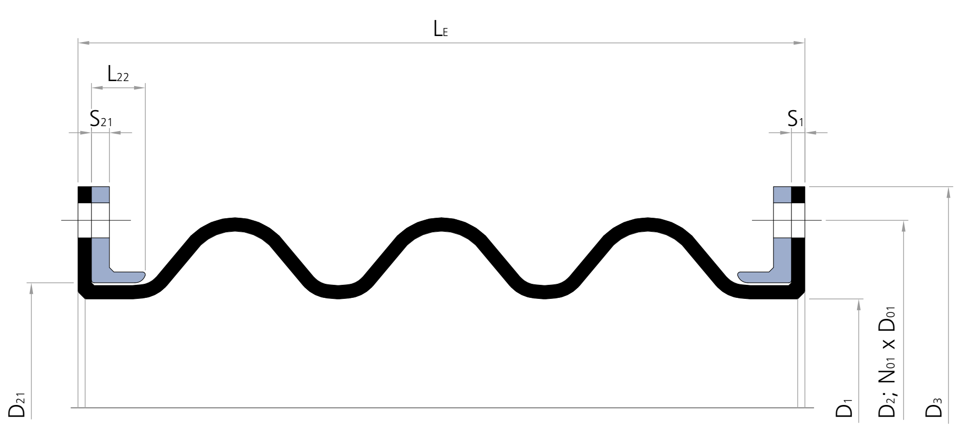
(> page 42)

Support rings

TYPE	Support rings	Vacuum ring	Support ring	Pressure	Movement
U130A U140A U150A		None	None	Low pressure, vacuum stability on request	> page 120
U131A U141A U151A		Medium contact, inside the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 121
U132A U142A U152A		No medium contact, embedded in the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 122
U133A U143A U153A		None	External between the arches	Depending on the diameter up to 10 bar, slight vacuum	> page 120
U134A U144A U154A		Medium contact, inside the arches	External between the arches	Depending on the diameter up to 10 bar, for vacuum up to 0.05 bar absolute	> page 121
U135A U145A U155A		No medium contact, embedded in the arches	External between the arches	Depending on the diameter up to 10 bar, for vacuum up to 0.05 bar absolute	> page 122

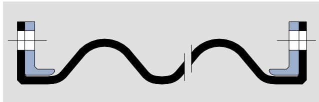
Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

Cross section U130A



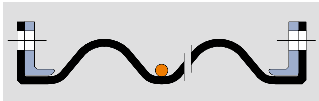
Rubber expansion joint with five arches of size ∅ 3,600 mm
for a submerged cooling water intake line

Extremly flexible multi-arch rubber expansion joint of size ∅ 900 mm
destined for a paper mill



U130A U140A U150A

> without vacuum rings



U133A U143A U153A

> without vacuum rings, with external support rings

Installation length (L_E) at design pressure

higher pressures on request

Ø	up to 6 bar L_E = 650 mm – U130A U133A					up to 6 bar L_E = 850 mm – U140A U143A					up to 6 bar L_E = 1,050 mm – U150A U153A				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	159	92	118	61.5	353	212	123	158	67.9	353	265	154	197	72.0	353
125	159	92	116	55.8	441	212	123	154	63.1	441	265	154	193	67.9	441
150	159	92	114	50.8	539	212	123	152	58.6	539	265	154	190	64.0	539
175	159	92	112	46.4	670	212	123	150	54.6	670	265	154	187	60.4	670
200	159	92	111	42.6	765	212	123	148	50.9	765	265	154	185	57.0	765
250	159	92	109	36.4	1,029	212	123	145	44.5	1,029	265	154	181	50.9	1,029
300	159	92	107	31.5	1,346	212	123	143	39.4	1,346	265	154	178	45.8	1,346
350	159	92	105	27.7	1,713	212	123	141	35.1	1,713	265	154	176	41.3	1,713
400	159	92	104	24.7	2,075	212	123	139	31.6	2,075	265	154	174	37.6	2,075
450	159	92	103	22.2	2,507	212	123	137	28.7	2,507	265	154	172	34.4	2,507
500	159	92	102	20.2	2,971	212	123	136	26.2	2,971	265	154	170	31.6	2,971
550	159	92	101	18.5	3,442	212	123	135	24.1	3,442	265	154	169	29.2	3,442
600	159	92	100	17.0	4,015	212	123	134	22.3	4,015	265	154	167	27.2	4,015
650	159	92	100	15.8	4,560	212	123	133	20.7	4,560	265	154	166	25.4	4,560
700	159	92	99	14.7	5,230	212	123	132	19.4	5,230	265	154	165	23.7	5,230
750	159	92	98	13.8	5,836	212	123	131	18.2	5,836	265	154	164	22.3	5,836
800	159	92	98	13.0	6,604	212	123	130	17.1	6,604	265	154	163	21.1	6,604
850	159	92	97	12.2	7,268	212	123	130	16.1	7,268	265	154	162	19.9	7,268
900	159	92	97	11.6	8,123	212	123	129	15.3	8,123	265	154	161	18.9	8,123
950	159	92	96	11.0	8,858	212	123	128	14.5	8,858	265	154	160	18.0	8,858
1000	159	92	96	10.4	9,799	212	123	128	13.8	9,799	265	154	160	17.1	9,799
1050	159	92	95	9.9	10,605	212	123	127	13.2	10,605	265	154	159	16.3	10,605
1100	159	92	95	9.5	11,652	212	123	127	12.6	11,652	265	154	158	15.6	11,652
1150	159	92	95	9.1	12,509	212	123	126	12.1	12,509	265	154	158	15.0	12,509
1200	159	92	94	8.7	13,623	212	123	126	11.6	13,623	265	154	157	14.4	13,623
1250	159	92	94	8.4	14,569	212	123	125	11.1	14,569	265	154	156	13.8	14,569
1300	159	92	94	8.1	15,770	212	123	125	10.7	15,770	265	154	156	13.3	15,770
1350	159	92	93	7.8	16,787	212	123	124	10.3	16,787	265	154	155	12.9	16,787
1400	159	92	93	7.5	18,074	212	123	124	10.0	18,074	265	154	155	12.4	18,074
1450	159	92	93	7.2	19,162	212	123	124	9.6	19,162	265	154	154	12.0	19,162
1500	159	92	92	7.0	20,536	212	123	123	9.3	20,536	265	154	154	11.6	20,536
1600	159	92	92	6.6	23,154	212	123	122	8.7	23,154	265	154	153	10.9	23,154
1650	159	92	92	6.4	24,384	212	123	122	8.5	24,384	265	154	153	10.6	24,384
1700	159	92	91	6.2	25,930	212	123	122	8.2	25,930	265	154	152	10.3	25,930
1800	159	92	91	5.8	28,893	212	123	121	7.8	28,893	265	154	151	9.7	28,893
1900	159	92	90	5.5	31,952	212	123	121	7.4	31,952	265	154	151	9.2	31,952
1950	159	92	90	5.4	33,394	212	123	120	7.2	33,394	265	154	150	9.0	33,394
2000	159	92	90	5.3	35,199	212	123	120	7.0	35,199	265	154	150	8.8	35,199
2100	159	92	90	5.0	38,603	212	123	119	6.7	38,603	265	154	149	8.3	38,603
2200	159	92	89	4.8	42,164	212	123	119	6.4	42,164	265	154	149	8.0	42,164
2250	159	92	89	4.7	43,818	212	123	119	6.2	43,818	265	154	148	7.8	43,818
2300	159	92	89	4.6	45,882	212	123	118	6.1	45,882	265	154	148	7.6	45,882
2400	159	92	88	4.4	49,757	212	123	118	5.9	49,757	265	154	147	7.3	49,757
2500	159	92	88	4.2	53,789	212	123	118	5.6	53,789	265	154	147	7.0	53,789
2550	159	92	88	4.1	55,655	212	123	117	5.5	55,655	265	154	147	6.9	55,655
2600	159	92	88	4.0	57,979	212	123	117	5.4	57,979	265	154	146	6.8	57,979
2700	159	92	88	3.9	62,325	212	123	117	5.2	62,325	265	154	146	6.5	62,325
2800	159	92	87	3.8	66,829	212	123	116	5.0	66,829	265	154	145	6.3	66,829
2850	159	92	87	3.7	68,906	212	123	116	4.9	68,906	265	154	145	6.2	68,906
2900	159	92	87	3.6	71,489	212	123	116	4.8	71,489	265	154	145	6.1	71,489
3000	159	92	87	3.5	76,307	212	123	116	4.7	76,307	265	154	145	5.9	76,307
3100	159	92	86	3.4	81,282	212	123	115	4.5	81,282	265	154	144	5.7	81,282
3150	159	92	86	3.3	83,571	212	123	115	4.5	83,571	265	154	144	5.6	83,571
3200	159	92	86	3.3	86,413	212	123	115	4.4	86,413	265	154	144	5.5	86,413
3300	159	92	86	3.2	91,702	212	123	115	4.3	91,702	265	154	143	5.3	91,702
3400	159	92	86	3.1	97,148	212	123	114	4.1	97,148	265	154	143	5.2	97,148
3450	159	92	86	3.1	99,650	212	123	114	4.1	99,650	265	154	143	5.1	99,650
3600	159	92	85	2.9	108,511	212	123	114	3.9	108,511	265	154	142	4.9	108,511
3800	159	92	85	2.8	120,503	212	123	113	3.7	120,503	265	154	141	4.6	120,503
4000	159	92	84	2.6	133,123	212	123	113	3.5	133,123	265	154	141	4.4	133,123

Reduction of movement for expansion joints with PTFE lining: axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %; angular movement: -66 %.
Angular movement only possible with guided external support ring.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29). Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN6. In case of deviating flange dimensions, please contact us.

Customised products available

U131A U141A U151A

> with internal vacuum rings

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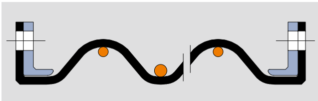


U134A U144A U154A

> with internal vacuum rings, with external support rings

Installation length (L_E) at design pressure

up to 6 bar L_E = 650 mm – U131A U134A					up to 6 bar L_E = 850 mm – U141A U144A					up to 6 bar L_E = 1,050 mm – U151A U154A					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
159	30	118	61.5	353	212	41	158	67.9	353	265	51	197	72.0	353	**100**
159	30	116	55.8	441	212	41	154	63.1	441	265	51	193	67.9	441	**125**
159	30	114	50.8	539	212	41	152	58.6	539	265	51	190	64.0	539	**150**
159	30	112	46.4	670	212	41	150	54.6	670	265	51	187	60.4	670	**175**
159	30	111	42.6	765	212	41	148	50.9	765	265	51	185	57.0	765	**200**
159	30	109	36.4	1,029	212	41	145	44.5	1,029	265	51	181	50.9	1,029	**250**
159	30	107	31.5	1,346	212	41	143	39.4	1,346	265	51	178	45.8	1,346	**300**
159	30	105	27.7	1,713	212	41	141	35.1	1,713	265	51	176	41.3	1,713	**350**
159	30	104	24.7	2,075	212	41	139	31.6	2,075	265	51	174	37.6	2,075	**400**
159	30	103	22.2	2,507	212	41	137	28.7	2,507	265	51	172	34.4	2,507	**450**
159	30	102	20.2	2,971	212	41	136	26.2	2,971	265	51	170	31.6	2,971	**500**
159	30	101	18.5	3,442	212	41	135	24.1	3,442	265	51	169	29.2	3,442	**550**
159	30	100	17.0	4,015	212	41	134	22.3	4,015	265	51	167	27.2	4,015	**600**
159	30	100	15.8	4,560	212	41	133	20.7	4,560	265	51	166	25.4	4,560	**650**
159	30	99	14.7	5,230	212	41	132	19.4	5,230	265	51	165	23.7	5,230	**700**
159	30	98	13.8	5,836	212	41	131	18.2	5,836	265	51	164	22.3	5,836	**750**
159	30	98	13.0	6,604	212	41	130	17.1	6,604	265	51	163	21.1	6,604	**800**
159	30	97	12.2	7,268	212	41	130	16.1	7,268	265	51	162	19.9	7,268	**850**
159	30	97	11.6	8,123	212	41	129	15.3	8,123	265	51	161	18.9	8,123	**900**
159	30	96	11.0	8,858	212	41	128	14.5	8,858	265	51	160	18.0	8,858	**950**
159	30	96	10.4	9,799	212	41	128	13.8	9,799	265	51	160	17.1	9,799	**1000**
159	30	95	9.9	10,605	212	41	127	13.2	10,605	265	51	159	16.3	10,605	**1050**
159	30	95	9.5	11,652	212	41	127	12.6	11,652	265	51	158	15.6	11,652	**1100**
159	30	95	9.1	12,509	212	41	126	12.1	12,509	265	51	158	15.0	12,509	**1150**
159	30	94	8.7	13,623	212	41	126	11.6	13,623	265	51	157	14.4	13,623	**1200**
159	30	94	8.4	14,569	212	41	125	11.1	14,569	265	51	156	13.8	14,569	**1250**
159	30	94	8.1	15,770	212	41	125	10.7	15,770	265	51	156	13.3	15,770	**1300**
159	30	93	7.8	16,787	212	41	124	10.3	16,787	265	51	155	12.9	16,787	**1350**
159	30	93	7.5	18,074	212	41	124	10.0	18,074	265	51	155	12.4	18,074	**1400**
159	30	93	7.2	19,162	212	41	124	9.6	19,162	265	51	154	12.0	19,162	**1450**
159	30	92	7.0	20,536	212	41	123	9.3	20,536	265	51	154	11.6	20,536	**1500**
159	30	92	6.6	23,154	212	41	122	8.7	23,154	265	51	153	10.9	23,154	**1600**
159	30	92	6.4	24,384	212	41	122	8.5	24,384	265	51	153	10.6	24,384	**1650**
159	30	91	6.2	25,930	212	41	122	8.2	25,930	265	51	152	10.3	25,930	**1700**
159	30	91	5.8	28,893	212	41	121	7.8	28,893	265	51	151	9.7	28,893	**1800**
159	30	90	5.5	31,952	212	41	121	7.4	31,952	265	51	151	9.2	31,952	**1900**
159	30	90	5.4	33,394	212	41	120	7.2	33,394	265	51	150	9.0	33,394	**1950**
159	30	90	5.3	35,199	212	41	120	7.0	35,199	265	51	150	8.8	35,199	**2000**
159	30	90	5.0	38,603	212	41	119	6.7	38,603	265	51	149	8.3	38,603	**2100**
159	30	89	4.8	42,164	212	41	119	6.4	42,164	265	51	149	8.0	42,164	**2200**
159	30	89	4.7	43,818	212	41	119	6.2	43,818	265	51	148	7.8	43,818	**2250**
159	30	89	4.6	45,882	212	41	118	6.1	45,882	265	51	148	7.6	45,882	**2300**
159	30	88	4.4	49,757	212	41	118	5.9	49,757	265	51	147	7.3	49,757	**2400**
159	30	88	4.2	53,789	212	41	118	5.6	53,789	265	51	147	7.0	53,789	**2500**
159	30	88	4.1	55,655	212	41	117	5.5	55,655	265	51	147	6.9	55,655	**2550**
159	30	88	4.0	57,979	212	41	117	5.4	57,979	265	51	146	6.8	57,979	**2600**
159	30	88	3.9	62,325	212	41	117	5.2	62,325	265	51	146	6.5	62,325	**2700**
159	30	87	3.8	66,829	212	41	116	5.0	66,829	265	51	145	6.3	66,829	**2800**
159	30	87	3.7	68,906	212	41	116	4.9	68,906	265	51	145	6.2	68,906	**2850**
159	30	87	3.6	71,489	212	41	116	4.8	71,489	265	51	145	6.1	71,489	**2900**
159	30	87	3.5	76,307	212	41	116	4.7	76,307	265	51	145	5.9	76,307	**3000**
159	30	86	3.4	81,282	212	41	115	4.5	81,282	265	51	144	5.7	81,282	**3100**
159	30	86	3.3	83,571	212	41	115	4.5	83,571	265	51	144	5.6	83,571	**3150**
159	30	86	3.3	86,413	212	41	115	4.4	86,413	265	51	144	5.5	86,413	**3200**
159	30	86	3.2	91,702	212	41	115	4.3	91,702	265	51	143	5.3	91,702	**3300**
159	30	86	3.1	97,148	212	41	114	4.1	97,148	265	51	143	5.2	97,148	**3400**
159	30	86	3.1	99,650	212	41	114	4.1	99,650	265	51	143	5.1	99,650	**3450**
159	30	85	2.9	108,511	212	41	114	3.9	108,511	265	51	142	4.9	108,511	**3600**
159	30	85	2.8	120,503	212	41	113	3.7	120,503	265	51	141	4.6	120,503	**3800**
159	30	84	2.6	133,123	212	41	113	3.5	133,123	265	51	141	4.4	133,123	**4000**

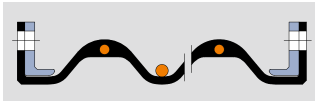
Reduction of movement for expansion joints with PTFE lining: axial compression: -33 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %.
Angular movement only possible with guided external support ring.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29). Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN6. In case of deviating flange dimensions, please contact us.

Customised products available

U132A U142A U152A

> with embedded vacuum rings



U135A U145A U155A

> with embedded vacuum rings, with external support rings

Installation length (L_E) at design pressure

Ø	up to 6 bar L_E = 650 mm – U132A U135A					up to 6 bar L_E = 850 mm – U142A U145A					up to 6 bar L_E = 1,050 mm – U152A U155A				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	105	28	115	59.8	320	140	38	154	66.5	320	175	47	192	70.7	320
125	105	28	113	54.0	405	140	38	150	61.5	405	175	47	188	66.4	405
150	105	28	111	48.9	499	140	38	148	56.9	499	175	47	185	62.3	499
175	105	28	109	44.5	625	140	38	146	52.7	625	175	47	182	58.5	625
200	105	28	108	40.7	716	140	38	144	49.0	716	175	47	180	55.0	716
250	105	28	106	34.5	973	140	38	141	42.6	973	175	47	177	48.8	973
300	105	28	104	29.8	1,282	140	38	139	37.5	1,282	175	47	174	43.6	1,282
350	105	28	103	26.2	1,640	140	38	137	33.3	1,640	175	47	171	39.3	1,640
400	105	28	102	23.3	1,995	140	38	135	29.9	1,995	175	47	169	35.6	1,995
450	105	28	100	20.9	2,419	140	38	134	27.1	2,419	175	47	167	32.4	2,419
500	105	28	99	19.0	2,875	140	38	133	24.7	2,875	175	47	166	29.8	2,875
550	105	28	99	17.4	3,339	140	38	132	22.7	3,339	175	47	164	27.5	3,339
600	105	28	98	16.0	3,904	140	38	130	21.0	3,904	175	47	163	25.5	3,904
650	105	28	97	14.8	4,441	140	38	130	19.5	4,441	175	47	162	23.7	4,441
700	105	28	96	13.8	5,102	140	38	129	18.2	5,102	175	47	161	22.2	5,102
750	105	28	96	12.9	5,701	140	38	128	17.0	5,701	175	47	160	20.9	5,701
800	105	28	95	12.1	6,461	140	38	127	16.0	6,461	175	47	159	19.7	6,461
850	105	28	95	11.4	7,118	140	38	126	15.1	7,118	175	47	158	18.6	7,118
900	105	28	94	10.8	7,964	140	38	126	14.3	7,964	175	47	157	17.6	7,964
950	105	28	94	10.3	8,692	140	38	125	13.6	8,692	175	47	156	16.8	8,692
1000	105	28	93	9.8	9,625	140	38	125	13.0	9,625	175	47	156	16.0	9,625
1050	105	28	93	9.3	10,423	140	38	124	12.4	10,423	175	47	155	15.2	10,423
1100	105	28	93	8.9	11,461	140	38	123	11.8	11,461	175	47	154	14.6	11,461
1150	105	28	92	8.5	12,311	140	38	123	11.3	12,311	175	47	154	14.0	12,311
1200	105	28	92	8.2	13,417	140	38	123	10.9	13,417	175	47	153	13.4	13,417
1250	105	28	92	7.8	14,356	140	38	122	10.4	14,356	175	47	153	12.9	14,356
1300	105	28	91	7.5	15,548	140	38	122	10.0	15,548	175	47	152	12.4	15,548
1350	105	28	91	7.3	16,559	140	38	121	9.7	16,559	175	47	152	12.0	16,559
1400	105	28	91	7.0	17,837	140	38	121	9.3	17,837	175	47	151	11.5	17,837
1450	105	28	90	6.8	18,918	140	38	120	9.0	18,918	175	47	151	11.2	18,918
1500	105	28	90	6.5	20,283	140	38	120	8.7	20,283	175	47	150	10.8	20,283
1600	105	28	90	6.1	22,885	140	38	119	8.2	22,885	175	47	149	10.1	22,885
1650	105	28	89	6.0	24,108	140	38	119	7.9	24,108	175	47	149	9.8	24,108
1700	105	28	89	5.8	25,645	140	38	119	7.7	25,645	175	47	148	9.5	25,645
1800	105	28	89	5.5	28,592	140	38	118	7.3	28,592	175	47	148	9.0	28,592
1900	105	28	88	5.2	31,636	140	38	117	6.9	31,636	175	47	147	8.6	31,636
1950	105	28	88	5.0	33,071	140	38	117	6.7	33,071	175	47	147	8.3	33,071
2000	105	28	88	4.9	34,867	140	38	117	6.6	34,867	175	47	146	8.1	34,867
2100	105	28	87	4.7	38,256	140	38	116	6.3	38,256	175	47	146	7.8	38,256
2200	105	28	87	4.5	41,801	140	38	116	6.0	41,801	175	47	145	7.4	41,801
2250	105	28	87	4.4	43,447	140	38	116	5.8	43,447	175	47	145	7.2	43,447
2300	105	28	87	4.3	45,503	140	38	115	5.7	45,503	175	47	144	7.1	45,503
2400	105	28	86	4.1	49,363	140	38	115	5.5	49,363	175	47	144	6.8	49,363
2500	105	28	86	3.9	53,379	140	38	115	5.3	53,379	175	47	143	6.5	53,379
2550	105	28	86	3.9	55,238	140	38	114	5.2	55,238	175	47	143	6.4	55,238
2600	105	28	86	3.8	57,553	140	38	114	5.1	57,553	175	47	143	6.3	57,553
2700	105	28	85	3.6	61,883	140	38	114	4.9	61,883	175	47	142	6.0	61,883
2800	105	28	85	3.5	66,371	140	38	113	4.7	66,371	175	47	142	5.8	66,371
2850	105	28	85	3.5	68,442	140	38	113	4.6	68,442	175	47	142	5.7	68,442
2900	105	28	85	3.4	71,016	140	38	113	4.5	71,016	175	47	141	5.6	71,016
3000	105	28	85	3.3	75,818	140	38	113	4.4	75,818	175	47	141	5.4	75,818
3100	105	28	84	3.2	80,777	140	38	112	4.2	80,777	175	47	140	5.3	80,777
3150	105	28	84	3.1	83,060	140	38	112	4.2	83,060	175	47	140	5.2	83,060
3200	105	28	84	3.1	85,893	140	38	112	4.1	85,893	175	47	140	5.1	85,893
3300	105	28	84	3.0	91,166	140	38	112	4.0	91,166	175	47	140	5.0	91,166
3400	105	28	84	2.9	96,597	140	38	111	3.9	96,597	175	47	139	4.8	96,597
3450	105	28	83	2.9	99,091	140	38	111	3.8	99,091	175	47	139	4.7	99,091
3600	105	28	83	2.7	107,928	140	38	111	3.7	107,928	175	47	139	4.5	107,928
3800	105	28	83	2.6	119,888	140	38	110	3.5	119,888	175	47	138	4.3	119,888
4000	105	28	82	2.5	132,477	140	38	110	3.3	132,477	175	47	137	4.1	132,477

Reduction of movement for expansion joints with PTFE lining: axial compression: -0 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %.
Angular movement only possible with guided external support ring.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29). Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN6. In case of deviating flange dimensions, please contact us.

Customised products available

High flexible FPM rubber bellow for a tumbler screening machine

Universal expansion joint, type U142A
with PTFE lining for a sulphuric acid reclamation plant
Ø 2,800 mm, -0.15 bar, 80°C

U300A-konz U300A-exz ⌀ 80 - 1,600 mm


Type key > page 22

U3 0 0 A
- Tie rod variant
- Support ring variants
- Number of arches
- Type

Concentric or eccentric reducing expansion joint

Design: Concentric or eccentric reducing rubber bellows with full faced rubber flanges, designed to compensate all-directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single- or multi-part backing flanges. At high pressure, large diameters and extreme reductions with self-sealing rubber bulge and single-part swivel backing flange at the large diameter. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 80 to 1,600 mm, custom diameters possible

Length: Standard L_E = 150 to 2,150 mm (> page 128–129)
Custom length on request

Pressure: Up to 10 bar depending on diameter and length

Movement: For small axial and lateral movements
(> page 128–129)

Application:
Plant construction, desulphurisation plants, sand/gravel extraction industry, dredgers, food processing e.g. in gypsum suspension conveyance lines, on pumps, vessels, as vacuum/pressure hoses

PED 2014/68/EU KTW WRAS FDA <10⁵ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single- or multi-part round backing flanges with clearance holes
For high pressure, large diameters and extreme reductions, single-part round swivel backing flange with clearance holes and a groove to accept a rubber bulge at the large diameter

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

End fitting

Full faced flanges

Swivel flanged with rubber bulge

Swivel flanged with metal core

Full faced / swivel flanged combination

Accessories

Tie rods:

Type U300**E**: Tie rods mounted outside in spherical bearings and ball disks to take up the thrust forces from pressure

Type U300**M**: Tie rods mounted outside and inside in spherical bearings and ball disks to take up the thrust forces from pressure and vacuum

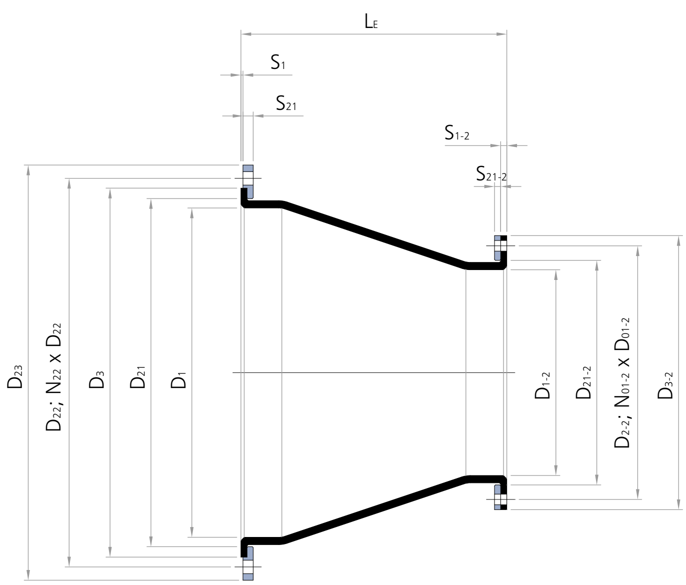
Protective covers:

Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

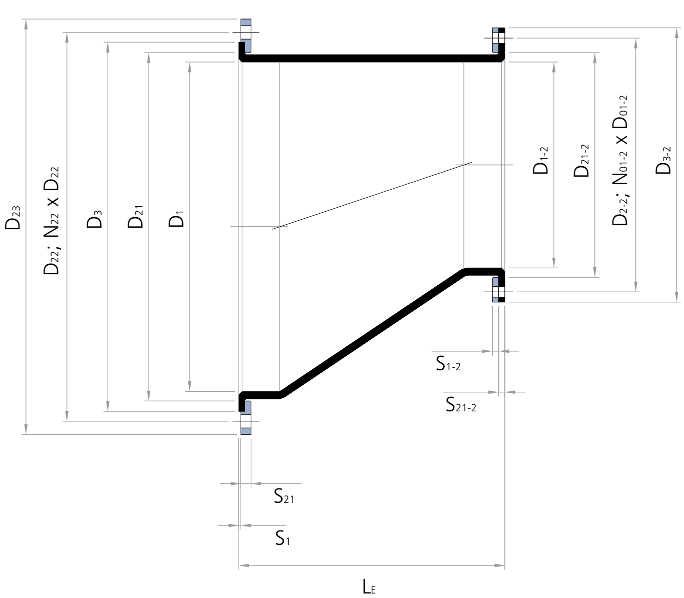
Flow liners:

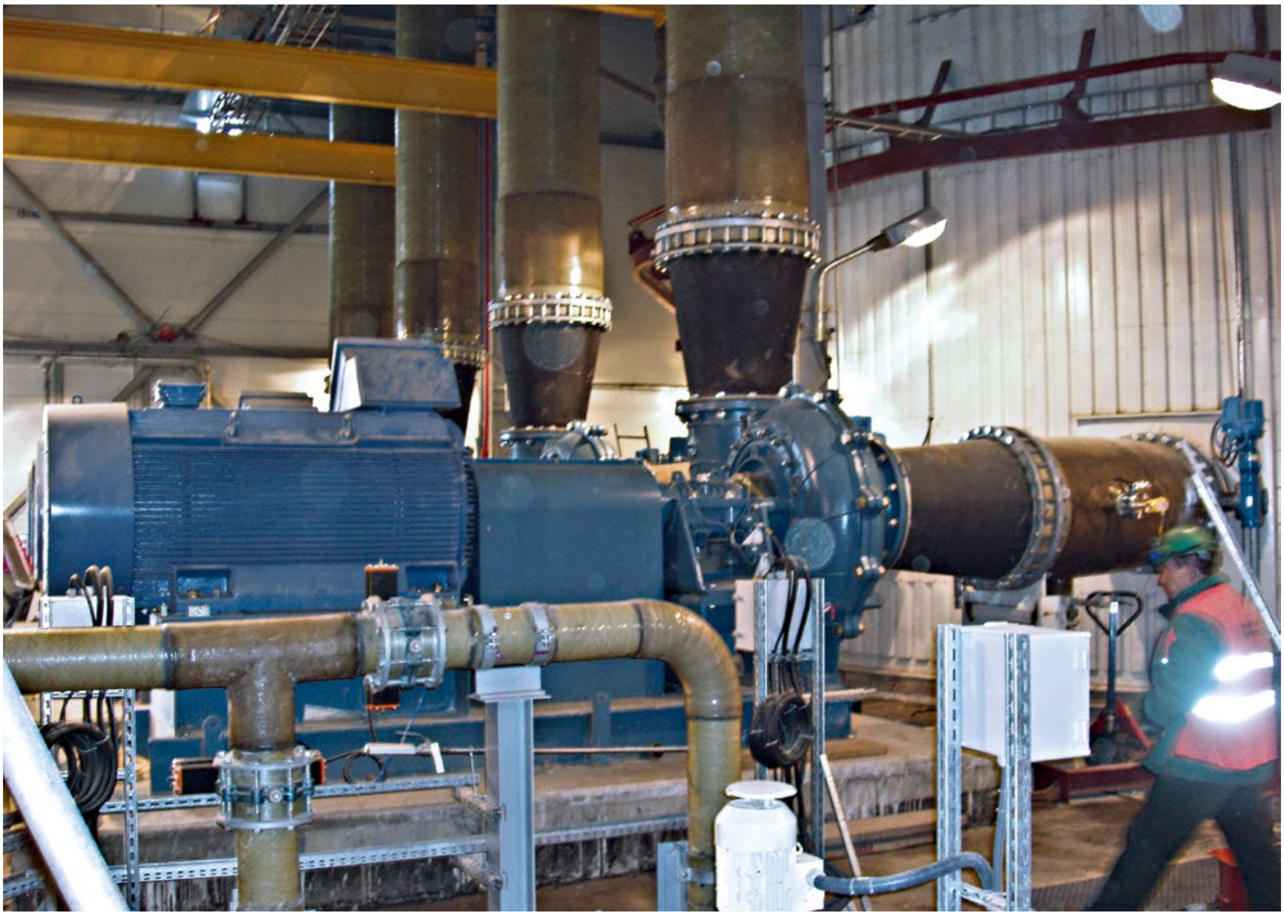
Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Cross section U300A-konz

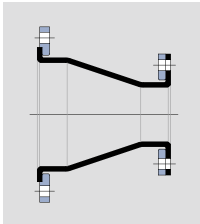


Cross section U300A-exz





Conical expansion joints, type U300A
on the suction and discharge side of a gypsum slurry pump
in a desulphurization unit of a power plant



U300A-konz

> concentric

Installation length (L_E) at design pressure

Potential combination			up to 6 bar higher pressures on request Movement		
Ø D_1 mm	Ø D_{1-2} mm	Length mm	mm	mm	±mm
100	**80**	160	2	2	5
125	**80**	235	3	2	7
	100	175	2	2	5
150	**80**	310	4	3	9
	100	250	3	3	7
	125	175	2	2	5
200	**80**	460	7	5	12
	100	400	6	4	11
	125	325	5	3	9
	150	250	3	3	7
250	**80**	660	10	7	17
	100	600	9	6	15
	125	525	8	5	13
	150	450	7	5	11
	200	300	4	3	8
300	**80**	810	12	8	19
	100	750	12	8	18
	125	675	10	7	16
	150	600	9	6	14
	200	450	7	5	11
	250	350	5	4	8
350	**80**	960	15	10	22
	100	900	14	9	21
	125	825	13	8	19
	150	750	12	8	17
	200	600	10	6	14
	250	500	7	5	12
	300	350	5	4	8
400	**100**	1050	17	11	23
	125	975	16	10	22
	150	900	15	9	20
	200	750	12	8	17
	250	650	10	7	15
	300	500	8	5	11
	350	350	5	4	8
500	**150**	1250	21	13	26
	200	1100	19	11	23
	250	1000	17	10	21
	300	850	14	9	18
	350	700	11	7	15
	400	550	9	6	12
	450	400	6	4	8
600	**200**	1400	25	14	28
	250	1300	23	13	26
	300	1150	21	12	23
	350	1000	18	10	20
	400	850	15	9	17
	450	700	12	7	14
	500	550	9	6	11
700	**250**	1600	30	16	31
	300	1450	27	15	28
	350	1300	24	13	25
	400	1150	21	12	22
	450	1000	18	10	19
	500	850	15	9	17
	600	550	9	6	11
800	**300**	1800	35	18	34
	350	1650	32	17	31
	400	1500	29	15	28
	450	1350	26	14	25
	500	1200	23	12	23
	600	900	16	9	17
	700	600	10	6	11

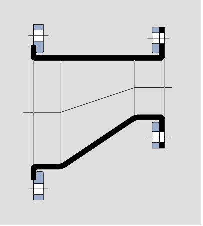
Installation length (L_E) at design pressure

Potential combination			up to 6 bar higher pressures on request Movement		
Ø D_1 mm	Ø D_{1-2} mm	Length mm	mm	mm	±mm
900	**350**	1950	39	20	36
	400	1800	36	18	33
	450	1650	33	17	30
	500	1500	30	15	27
	600	1200	24	12	22
	700	900	17	9	16
	800	600	10	6	11
1000	**400**	2100	43	21	37
	450	1950	40	20	35
	500	1800	37	18	32
	600	1500	31	15	27
	700	1200	24	12	21
	800	900	17	9	16
	900	600	10	6	11
1100	**450**	2300	49	23	40
	500	2150	46	22	37
	600	1850	39	19	32
	700	1550	32	16	27
	800	1250	26	13	22
	900	950	18	10	16
	1000	650	11	7	11
1200	**500**	2450	53	25	42
	600	2150	47	22	37
	700	1850	40	19	31
	800	1550	33	16	26
	900	1250	26	13	21
	1000	950	19	10	16
	1100	650	11	7	11
1300	**600**	2450	55	25	41
	700	2150	48	22	36
	800	1850	41	19	31
	900	1550	34	16	26
	1000	1250	27	13	21
	1100	950	19	10	16
	1200	650	12	7	11
1400	**700**	2500	57	25	41
	800	2200	50	22	36
	900	1900	43	19	31
	1000	1600	36	16	26
	1100	1300	28	13	21
	1200	1000	20	10	16
	1300	700	12	7	11
1500	**800**	2500	59	25	40
	900	2200	51	22	35
	1000	1900	44	19	31
	1100	1600	36	16	26
	1200	1300	29	13	21
	1300	1000	21	10	16
	1400	700	12	7	11
1600	**900**	2500	60	25	40
	1000	2200	53	22	35
	1100	1900	45	19	30
	1200	1600	37	16	25
	1300	1300	29	13	21
	1400	1000	21	10	16
	1500	700	13	7	11

The specified movements may vary depending on the design pressure.
Also available with restraints type "E" or type "M".
Intermediate sizes or other diameter combinations as well as other length on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN6. In case of deviating flange dimensions, please contact us.

Customised products available



U300A-exz

> eccentric

Installation length (L_E) at design pressure

Potential combination			Movement (up to 6 bar, higher pressures on request)		
Ø D_1 mm	Ø D_{1-2} mm	Length mm	mm	mm	±mm
100	**80**	160	2	2	5
125	**80**	235	3	2	7
	100	175	2	2	5
150	**80**	310	4	3	9
	100	250	3	3	7
	125	175	2	2	5
200	**80**	460	7	5	12
	100	400	6	4	11
	125	325	5	3	9
	150	250	3	3	7
250	**80**	660	10	7	17
	100	600	9	6	15
	125	525	8	5	13
	150	450	7	5	11
	200	300	4	3	8
300	**80**	810	12	8	19
	100	750	12	8	18
	125	675	10	7	16
	150	600	9	6	14
	200	450	7	5	11
	250	350	5	4	8
350	**80**	960	15	10	22
	100	900	14	9	21
	125	825	13	8	19
	150	750	12	8	17
	200	600	10	6	14
	250	500	7	5	12
	300	350	5	4	8
400	**100**	1050	17	11	23
	125	975	16	10	22
	150	900	15	9	20
	200	750	12	8	17
	250	650	10	7	15
	300	500	8	5	11
	350	350	5	4	8
500	**150**	1250	21	13	26
	200	1100	19	11	23
	250	1000	17	10	21
	300	850	14	9	18
	350	700	11	7	15
	400	550	9	6	12
	450	400	6	4	8
600	**200**	1400	25	14	28
	250	1300	23	13	26
	300	1150	21	12	23
	350	1000	18	10	20
	400	850	15	9	17
	450	700	12	7	14
	500	550	9	6	11
700	**250**	1600	30	16	31
	300	1450	27	15	28
	350	1300	24	13	25
	400	1150	21	12	22
	450	1000	18	10	19
	500	850	15	9	17
	600	550	9	6	11
800	**300**	1800	35	18	34
	350	1650	32	17	31
	400	1500	29	15	28
	450	1350	26	14	25
	500	1200	23	12	23
	600	900	16	9	17
	700	600	10	6	11

Installation length (L_E) at design pressure

Potential combination			Movement (up to 6 bar, higher pressures on request)		
Ø D_1 mm	Ø D_{1-2} mm	Length mm	mm	mm	±mm
900	**350**	1950	39	20	36
	400	1800	36	18	33
	450	1650	33	17	30
	500	1500	30	15	27
	600	1200	24	12	22
	700	900	17	9	16
	800	600	10	6	11
1000	**400**	2100	43	21	37
	450	1950	40	20	35
	500	1800	37	18	32
	600	1500	31	15	27
	700	1200	24	12	21
	800	900	17	9	16
	900	600	10	6	11
1100	**450**	2300	49	23	40
	500	2150	46	22	37
	600	1850	39	19	32
	700	1550	32	16	27
	800	1250	26	13	22
	900	950	18	10	16
	1000	650	11	7	11
1200	**500**	2450	53	25	42
	600	2150	47	22	37
	700	1850	40	19	31
	800	1550	33	16	26
	900	1250	26	13	21
	1000	950	19	10	16
	1100	650	11	7	11
1300	**600**	2450	55	25	41
	700	2150	48	22	36
	800	1850	41	19	31
	900	1550	34	16	26
	1000	1250	27	13	21
	1100	950	19	10	16
	1200	650	12	7	11
1400	**700**	2500	57	25	41
	800	2200	50	22	36
	900	1900	43	19	31
	1000	1600	36	16	26
	1100	1300	28	13	21
	1200	1000	20	10	16
	1300	700	12	7	11
1500	**800**	2500	59	25	40
	900	2200	51	22	35
	1000	1900	44	19	31
	1100	1600	36	16	26
	1200	1300	29	13	21
	1300	1000	21	10	16
	1400	700	12	7	11
1600	**900**	2500	60	25	40
	1000	2200	53	22	35
	1100	1900	45	19	30
	1200	1600	37	16	25
	1300	1300	29	13	21
	1400	1000	21	10	16
	1500	700	13	7	11

The specified movements may vary depending on the design pressure. Also available with restraints type "E" or type "M". Intermediate sizes or other diameter combinations as well as other length on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN6. In case of deviating flange dimensions, please contact us.

Customised products available

U400A

⌀ 300 - 4,000 mm
◻ up to 4,000 x 4,000 mm
◻ up to 6,000 x 3,000 mm

> **Type U400A**
> without support ring

> **Type U403A**
> with support ring

Type key > page 22
U4 0 0 A
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Vacuum donut with one arch facing inward

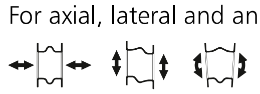
Design: High elastic, facing inwards single wide arch rubber bellows with full faced rubber flanges, designed to compensate all-directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single- or multi-part backing flanges. For pressure external support ring optional. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87. Note: The arch reduces the pipe cross-section (ask for mating flange dimensions).

Dimensions: ⌀ 300 to 4,000 mm
◻ up to 4,000 x 4,000 mm or ◻ up to 6,000 x 3,000 mm
Custom diameters / rectangular cross-sections possible

Length: Standard L_E = 100 to 500 mm (> page 134–135)
Custom length on request

Pressure: For permanent vacuum operations
Over-pressure only allowed with external support ring

Movement: For axial, lateral and angular movements

 (> page 134–135)

Application:
Cooling water systems, plant construction, petrochemical and refinery technology e. g. in vacuum lines, acid lines and on vessels

PED 2014/68/EU KTW WRAS FDA <10⁶ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single- or multi-part, round backing flanges with clearance holes

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

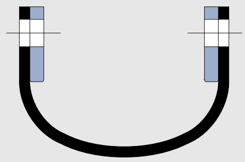
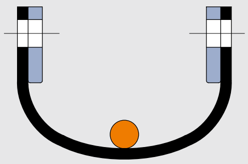
Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

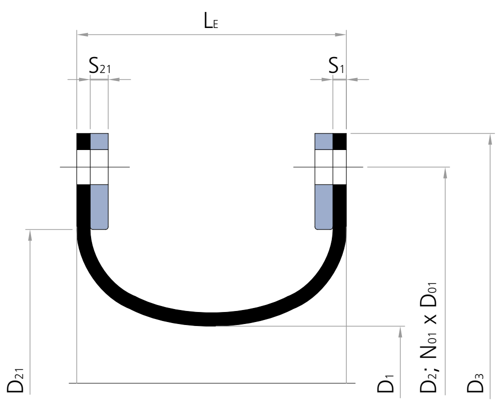
Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Support rings

TYPE	Support rings	Support ring	Pressure	Movement
U400A		None	For vacuum up to 0.05 bar absolute Over-pressure not allowed	> page 134
U403A		External in the arch	Depending on the diameter up to 6 bar, for vacuum up to 0.05 bar absolute	> page 135

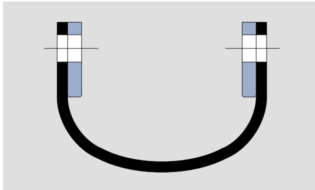
Materials	
Carbon steel, hot-dip galvanised	Stainless steel

Cross section U400A



Example: Type U403A

U400A for permanent vacuum operation,
size ∅ 800 mm



U400A

> without support ring

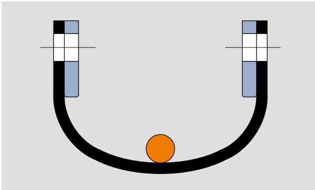
Installation length (L_E) at design pressure												
	up to 6 bar L_E = 250 mm				up to 6 bar L_E = 300 mm				up to 6 bar L_E = 350 mm			
	higher pressures on request											
Ø	Movement			A	Movement			A	Movement			A
mm	mm	mm	±mm	cm²	mm	mm	±mm	cm²	mm	mm	±mm	cm²
300	30	15	18	707	40	20	25	707	50	25	31	707
350	30	15	18	962	40	20	24	962	50	25	30	962
400	30	15	18	1,257	40	20	24	1,257	50	25	30	1,257
450	30	15	17	1,590	40	20	23	1,590	50	25	29	1,590
500	30	15	17	1,964	40	20	23	1,964	50	25	29	1,964
550	30	15	17	2,376	40	20	23	2,376	50	25	28	2,376
600	30	15	17	2,827	40	20	22	2,827	50	25	28	2,827
650	30	15	17	3,318	40	20	22	3,318	50	25	28	3,318
700	30	15	17	3,849	40	20	22	3,849	50	25	28	3,849
750	30	15	16	4,418	40	20	22	4,418	50	25	27	4,418
800	30	15	16	5,027	40	20	22	5,027	50	25	27	5,027
850	30	15	16	5,675	40	20	22	5,675	50	25	27	5,675
900	30	15	16	6,362	40	20	21	6,362	50	25	27	6,362
950	30	15	16	7,088	40	20	21	7,088	50	25	27	7,088
1000	30	15	16	7,854	40	20	21	7,854	50	25	26	7,854
1050	30	15	16	8,659	40	20	21	8,659	50	25	26	8,659
1100	30	15	16	9,503	40	20	21	9,503	50	25	26	9,503
1150	30	15	16	10,387	40	20	21	10,387	50	25	26	10,387
1200	30	15	15	11,310	40	20	21	11,310	50	25	26	11,310
1250	30	15	15	12,272	40	20	21	12,272	50	25	26	12,272
1300	30	15	15	13,273	40	20	20	13,273	50	25	26	13,273
1350	30	15	15	14,314	40	20	20	14,314	50	25	25	14,314
1400	30	15	15	15,394	40	20	20	15,394	50	25	25	15,394
1450	30	15	15	16,513	40	20	20	16,513	50	25	25	16,513
1500	30	15	15	17,672	40	20	20	17,672	50	25	25	17,672
1600	30	15	15	20,106	40	20	20	20,106	50	25	25	20,106
1650	30	15	15	21,383	40	20	20	21,383	50	25	25	21,383
1700	30	15	15	22,698	40	20	20	22,698	50	25	25	22,698
1800	30	15	15	25,447	40	20	20	25,447	50	25	24	25,447
1900	30	15	15	28,353	40	20	19	28,353	50	25	24	28,353
1950	30	15	15	29,865	40	20	19	29,865	50	25	24	29,865
2000	30	15	15	31,416	40	20	19	31,416	50	25	24	31,416
2100	30	15	14	34,636	40	20	19	34,636	50	25	24	34,636
2200	30	15	14	38,013	40	20	19	38,013	50	25	24	38,013
2250	30	15	14	39,761	40	20	19	39,761	50	25	24	39,761
2300	30	15	14	41,548	40	20	19	41,548	50	25	24	41,548
2400	30	15	14	45,239	40	20	19	45,239	50	25	24	45,239
2500	30	15	14	49,087	40	20	19	49,087	50	25	24	49,087
2550	30	15	14	51,071	40	20	19	51,071	50	25	23	51,071
2600	30	15	14	53,093	40	20	19	53,093	50	25	23	53,093
2700	30	15	14	57,256	40	20	19	57,256	50	25	23	57,256
2800	30	15	14	61,575	40	20	19	61,575	50	25	23	61,575
2850	30	15	14	63,794	40	20	18	63,794	50	25	23	63,794
2900	30	15	14	66,052	40	20	18	66,052	50	25	23	66,052
3000	30	15	14	70,686	40	20	18	70,686	50	25	23	70,686
3100	30	15	14	75,477	40	20	18	75,477	50	25	23	75,477
3150	30	15	14	77,931	40	20	18	77,931	50	25	23	77,931
3200	30	15	14	80,425	40	20	18	80,425	50	25	23	80,425
3300	30	15	14	85,530	40	20	18	85,530	50	25	23	85,530
3400	30	15	14	90,792	40	20	18	90,792	50	25	23	90,792
3450	30	15	14	93,482	40	20	18	93,482	50	25	23	93,482
3600	30	15	13	101,788	40	20	18	101,788	50	25	22	101,788
3800	30	15	13	113,412	40	20	18	113,412	50	25	22	113,412
4000	30	15	13	125,664	40	20	18	125,664	50	25	22	125,664

Recommended sizes
Further possible sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN6. In case of deviating flange dimensions, please contact us.

Customised products available



U403A

> with support ring

MEMBER OF THE ELAFLEX GROUP

Installation length (L_E) at design pressure

Ø	up to 6 bar L_E = 250 mm				up to 6 bar L_E = 300 mm				up to 6 bar L_E = 350 mm			
	higher pressures on request											
	Movement			A	Movement			A	Movement			A
mm	mm	mm	±mm	cm²	mm	mm	±mm	cm²	mm	mm	±mm	cm²
300	30	15	18	707	40	20	25	707	50	25	31	707
350	30	15	18	962	40	20	24	962	50	25	30	962
400	30	15	18	1,257	40	20	24	1,257	50	25	30	1,257
450	30	15	17	1,590	40	20	23	1,590	50	25	29	1,590
500	30	15	17	1,964	40	20	23	1,964	50	25	29	1,964
550	30	15	17	2,376	40	20	23	2,376	50	25	28	2,376
600	30	15	17	2,827	40	20	22	2,827	50	25	28	2,827
650	30	15	17	3,318	40	20	22	3,318	50	25	28	3,318
700	30	15	17	3,849	40	20	22	3,849	50	25	28	3,849
750	30	15	16	4,418	40	20	22	4,418	50	25	27	4,418
800	30	15	16	5,027	40	20	22	5,027	50	25	27	5,027
850	30	15	16	5,675	40	20	22	5,675	50	25	27	5,675
900	30	15	16	6,362	40	20	21	6,362	50	25	27	6,362
950	30	15	16	7,088	40	20	21	7,088	50	25	27	7,088
1000	30	15	16	7,854	40	20	21	7,854	50	25	26	7,854
1050	30	15	16	8,659	40	20	21	8,659	50	25	26	8,659
1100	30	15	16	9,503	40	20	21	9,503	50	25	26	9,503
1150	30	15	16	10,387	40	20	21	10,387	50	25	26	10,387
1200	30	15	15	11,310	40	20	21	11,310	50	25	26	11,310
1250	30	15	15	12,272	40	20	21	12,272	50	25	26	12,272
1300	30	15	15	13,273	40	20	20	13,273	50	25	26	13,273
1350	30	15	15	14,314	40	20	20	14,314	50	25	25	14,314
1400	30	15	15	15,394	40	20	20	15,394	50	25	25	15,394
1450	30	15	15	16,513	40	20	20	16,513	50	25	25	16,513
1500	30	15	15	17,672	40	20	20	17,672	50	25	25	17,672
1600	30	15	15	20,106	40	20	20	20,106	50	25	25	20,106
1650	30	15	15	21,383	40	20	20	21,383	50	25	25	21,383
1700	30	15	15	22,698	40	20	20	22,698	50	25	25	22,698
1800	30	15	15	25,447	40	20	20	25,447	50	25	24	25,447
1900	30	15	15	28,353	40	20	19	28,353	50	25	24	28,353
1950	30	15	15	29,865	40	20	19	29,865	50	25	24	29,865
2000	30	15	15	31,416	40	20	19	31,416	50	25	24	31,416
2100	30	15	14	34,636	40	20	19	34,636	50	25	24	34,636
2200	30	15	14	38,013	40	20	19	38,013	50	25	24	38,013
2250	30	15	14	39,761	40	20	19	39,761	50	25	24	39,761
2300	30	15	14	41,548	40	20	19	41,548	50	25	24	41,548
2400	30	15	14	45,239	40	20	19	45,239	50	25	24	45,239
2500	30	15	14	49,087	40	20	19	49,087	50	25	24	49,087
2550	30	15	14	51,071	40	20	19	51,071	50	25	23	51,071
2600	30	15	14	53,093	40	20	19	53,093	50	25	23	53,093
2700	30	15	14	57,256	40	20	19	57,256	50	25	23	57,256
2800	30	15	14	61,575	40	20	19	61,575	50	25	23	61,575
2850	30	15	14	63,794	40	20	18	63,794	50	25	23	63,794
2900	30	15	14	66,052	40	20	18	66,052	50	25	23	66,052
3000	30	15	14	70,686	40	20	18	70,686	50	25	23	70,686
3100	30	15	14	75,477	40	20	18	75,477	50	25	23	75,477
3150	30	15	14	77,931	40	20	18	77,931	50	25	23	77,931
3200	30	15	14	80,425	40	20	18	80,425	50	25	23	80,425
3300	30	15	14	85,530	40	20	18	85,530	50	25	23	85,530
3400	30	15	14	90,792	40	20	18	90,792	50	25	23	90,792
3450	30	15	14	93,482	40	20	18	93,482	50	25	23	93,482
3600	30	15	13	101,788	40	20	18	101,788	50	25	22	101,788
3800	30	15	13	113,412	40	20	18	113,412	50	25	22	113,412
4000	30	15	13	125,664	40	20	18	125,664	50	25	22	125,664

Recommended sizes
Further possible sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN6. In case of deviating flange dimensions, please contact us.

Customised products available

U500A

∅ 300 - 4,000mm
⧄ up to 4,000 x 4,000 mm
⧄ up to 6,000 x 3,000 mm

> **Type U500A**
> without vacuum ring

> **Type U501A**
> with vacuum ring

Type key > page 22
U5 0 0 A
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Pressure donut with one arch facing outward

Design: High elastic rubber bellows with wide arch facing outwards with full faced rubber flanges, designed to compensate all-directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single- or multi-part backing flanges. Optional for vacuum, internal support ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87. Note: Bolts must be leak-tight welded to the mating flange.*

Dimensions: ∅ 300 to 4,000 mm
⧄ up to 4,000 x 4,000 mm or ⧄ up to 6,000 x 3,000 mm
custom diameters / rectangular cross-sections possible

Length: Standard L_E = 100 to 500 mm (> page 140–141)
Custom length on request

Pressure: Up to 6 bar depending on diameter and length
Vacuum only allowed with vacuum ring

Movement: For axial, lateral and angular movements
(> page 140–141)

Application:
Cooling water systems, plant construction, petrochemical and refinery technology, cooling water systems, plant construction, petrochemical and refinery technology e. g. in vacuum lines, acid lines and on vessels

PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Multi-part, round backing flanges with clearance holes

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel or aluminium

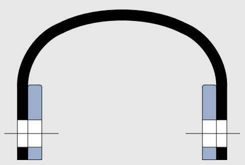
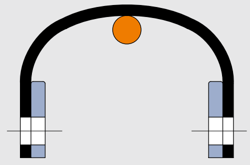
Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

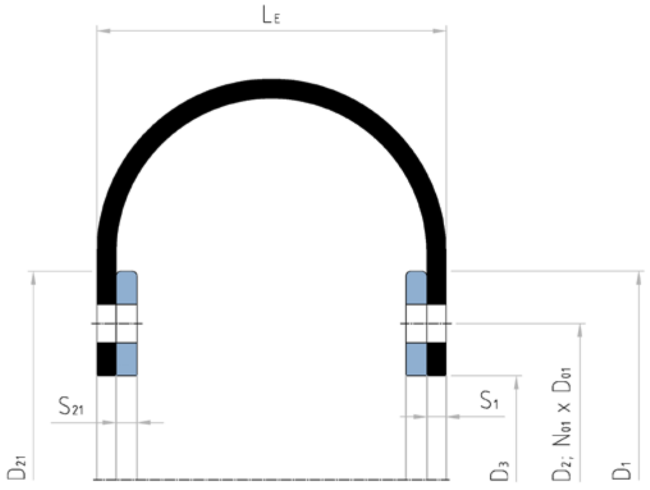
Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Support rings

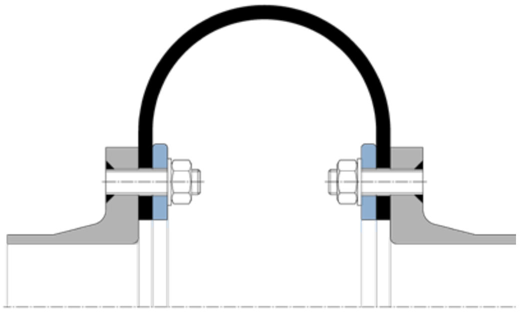
TYPE	Support rings	Vaccum ring	Pressure	Movement
U500A		None	Depending on diameter and length up to 6 bar Vacuum not allowed	> page 140
U501A		Internal in the arch	Depending on diameter and length up to 6 bar, for vacuum up to 0,05 bar absolute	> page 141

Materials	
Stainless steel	Carbon steel, rubberised

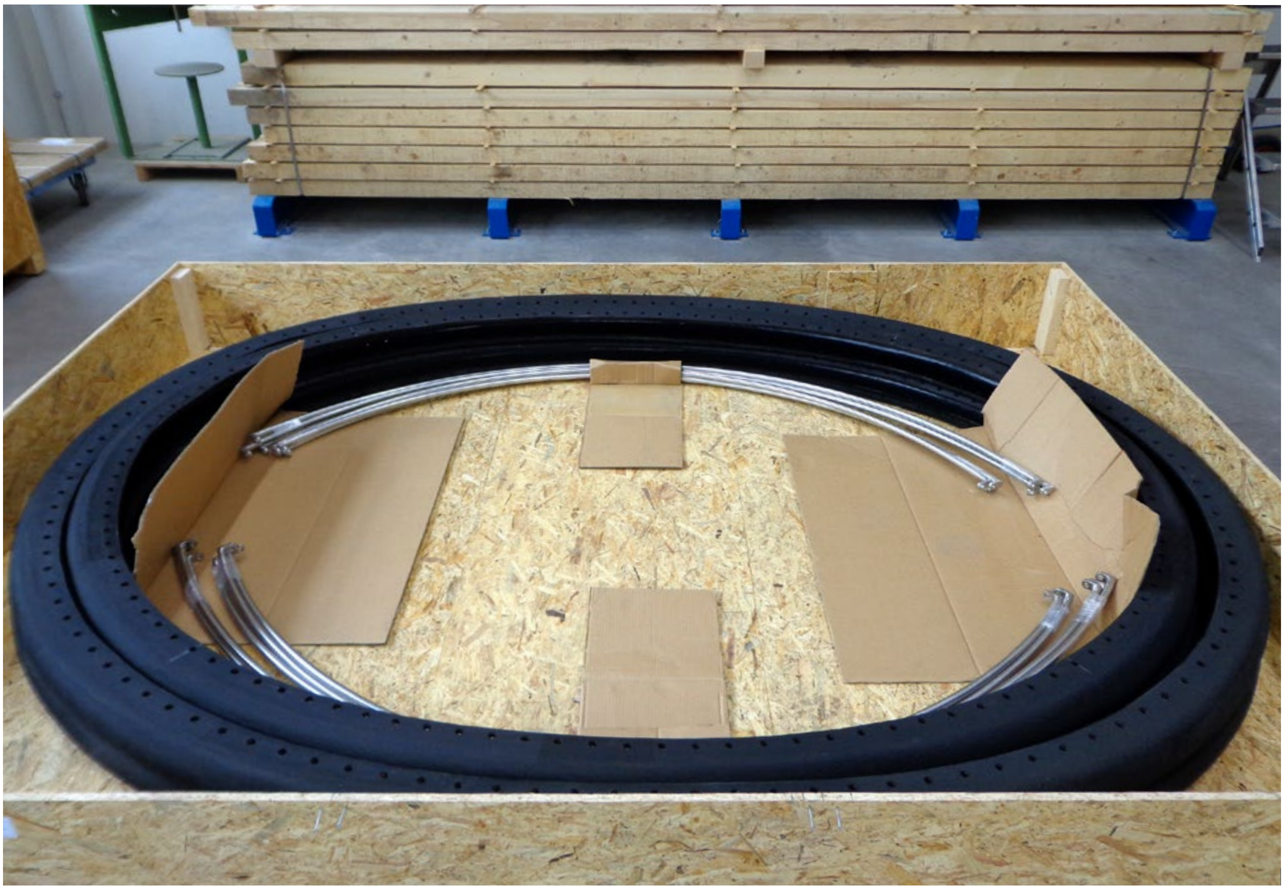
Cross section U500A



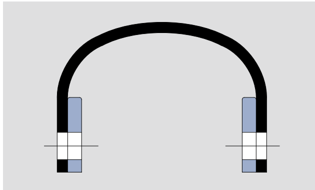
* **Note:**



Bolts leak-tight welded



Type U501A pressure donuts of size ∅ 2,800 mm
installed on the jet thruster of a vessel



U500A

> without vacuum ring

Installation length (L_E) at design pressure												
	up to 6 bar L_E = 250 mm				up to 6 bar L_E = 300 mm				up to 6 bar L_E = 350 mm			
	higher pressures on request											
Ø	Movement			A	Movement			A	Movement			A
mm	mm	mm	±mm	cm²	mm	mm	±mm	cm²	mm	mm	±mm	cm²
300	30	15	18	707	40	20	25	707	50	25	31	707
350	30	15	18	962	40	20	24	962	50	25	30	962
400	30	15	18	1,257	40	20	24	1,257	50	25	30	1,257
450	30	15	17	1,590	40	20	23	1,590	50	25	29	1,590
500	30	15	17	1,964	40	20	23	1,964	50	25	29	1,964
550	30	15	17	2,376	40	20	23	2,376	50	25	28	2,376
600	30	15	17	2,827	40	20	22	2,827	50	25	28	2,827
650	30	15	17	3,318	40	20	22	3,318	50	25	28	3,318
700	30	15	17	3,849	40	20	22	3,849	50	25	28	3,849
750	30	15	16	4,418	40	20	22	4,418	50	25	27	4,418
800	30	15	16	5,027	40	20	22	5,027	50	25	27	5,027
850	30	15	16	5,675	40	20	22	5,675	50	25	27	5,675
900	30	15	16	6,362	40	20	21	6,362	50	25	27	6,362
950	30	15	16	7,088	40	20	21	7,088	50	25	27	7,088
1000	30	15	16	7,854	40	20	21	7,854	50	25	26	7,854
1050	30	15	16	8,659	40	20	21	8,659	50	25	26	8,659
1100	30	15	16	9,503	40	20	21	9,503	50	25	26	9,503
1150	30	15	16	10,387	40	20	21	10,387	50	25	26	10,387
1200	30	15	15	11,310	40	20	21	11,310	50	25	26	11,310
1250	30	15	15	12,272	40	20	21	12,272	50	25	26	12,272
1300	30	15	15	13,273	40	20	20	13,273	50	25	26	13,273
1350	30	15	15	14,314	40	20	20	14,314	50	25	25	14,314
1400	30	15	15	15,394	40	20	20	15,394	50	25	25	15,394
1450	30	15	15	16,513	40	20	20	16,513	50	25	25	16,513
1500	30	15	15	17,672	40	20	20	17,672	50	25	25	17,672
1600	30	15	15	20,106	40	20	20	20,106	50	25	25	20,106
1650	30	15	15	21,383	40	20	20	21,383	50	25	25	21,383
1700	30	15	15	22,698	40	20	20	22,698	50	25	25	22,698
1800	30	15	15	25,447	40	20	20	25,447	50	25	24	25,447
1900	30	15	15	28,353	40	20	19	28,353	50	25	24	28,353
1950	30	15	15	29,865	40	20	19	29,865	50	25	24	29,865
2000	30	15	15	31,416	40	20	19	31,416	50	25	24	31,416
2100	30	15	14	34,636	40	20	19	34,636	50	25	24	34,636
2200	30	15	14	38,013	40	20	19	38,013	50	25	24	38,013
2250	30	15	14	39,761	40	20	19	39,761	50	25	24	39,761
2300	30	15	14	41,548	40	20	19	41,548	50	25	24	41,548
2400	30	15	14	45,239	40	20	19	45,239	50	25	24	45,239
2500	30	15	14	49,087	40	20	19	49,087	50	25	24	49,087
2550	30	15	14	51,071	40	20	19	51,071	50	25	23	51,071
2600	30	15	14	53,093	40	20	19	53,093	50	25	23	53,093
2700	30	15	14	57,256	40	20	19	57,256	50	25	23	57,256
2800	30	15	14	61,575	40	20	19	61,575	50	25	23	61,575
2850	30	15	14	63,794	40	20	18	63,794	50	25	23	63,794
2900	30	15	14	66,052	40	20	18	66,052	50	25	23	66,052
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3100	30	15	14	75,477	40	20	18	75,477	50	25	23	75,477
3150	30	15	14	77,931	40	20	18	77,931	50	25	23	77,931
3200	30	15	14	80,425	40	20	18	80,425	50	25	23	80,425
3300	30	15	14	85,530	40	20	18	85,530	50	25	23	85,530
3400	30	15	14	90,792	40	20	18	90,792	50	25	23	90,792
3450	30	15	14	93,482	40	20	18	93,482	50	25	23	93,482
3600	30	15	13	101,788	40	20	18	101,788	50	25	22	101,788
3800	30	15	13	113,412	40	20	18	113,412	50	25	22	113,412
4000	30	15	13	125,664	40	20	18	125,664	50	25	22	125,664

Recommended sizes
Further possible sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
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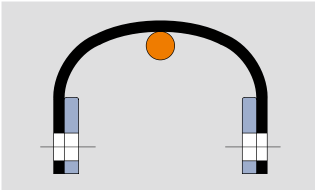
Customised products available



U501A

> with vacuum ring

MEMBER OF THE ELAFLEX GROUP

Installation length (L_E) at design pressure

Ø	up to 6 bar L_E = 250 mm				up to 6 bar L_E = 300 mm				up to 6 bar L_E = 350 mm			
	higher pressures on request											
	Movement			A	Movement			A	Movement			A
mm	mm	mm	±mm	cm²	mm	mm	±mm	cm²	mm	mm	±mm	cm²
300	30	15	18	707	40	20	25	707	50	25	31	707
350	30	15	18	962	40	20	24	962	50	25	30	962
400	30	15	18	1,257	40	20	24	1,257	50	25	30	1,257
450	30	15	17	1,590	40	20	23	1,590	50	25	29	1,590
500	30	15	17	1,964	40	20	23	1,964	50	25	29	1,964
550	30	15	17	2,376	40	20	23	2,376	50	25	28	2,376
600	30	15	17	2,827	40	20	22	2,827	50	25	28	2,827
650	30	15	17	3,318	40	20	22	3,318	50	25	28	3,318
700	30	15	17	3,849	40	20	22	3,849	50	25	28	3,849
750	30	15	16	4,418	40	20	22	4,418	50	25	27	4,418
800	30	15	16	5,027	40	20	22	5,027	50	25	27	5,027
850	30	15	16	5,675	40	20	22	5,675	50	25	27	5,675
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950	30	15	16	7,088	40	20	21	7,088	50	25	27	7,088
1000	30	15	16	7,854	40	20	21	7,854	50	25	26	7,854
1050	30	15	16	8,659	40	20	21	8,659	50	25	26	8,659
1100	30	15	16	9,503	40	20	21	9,503	50	25	26	9,503
1150	30	15	16	10,387	40	20	21	10,387	50	25	26	10,387
1200	30	15	15	11,310	40	20	21	11,310	50	25	26	11,310
1250	30	15	15	12,272	40	20	21	12,272	50	25	26	12,272
1300	30	15	15	13,273	40	20	20	13,273	50	25	26	13,273
1350	30	15	15	14,314	40	20	20	14,314	50	25	25	14,314
1400	30	15	15	15,394	40	20	20	15,394	50	25	25	15,394
1450	30	15	15	16,513	40	20	20	16,513	50	25	25	16,513
1500	30	15	15	17,672	40	20	20	17,672	50	25	25	17,672
1600	30	15	15	20,106	40	20	20	20,106	50	25	25	20,106
1650	30	15	15	21,383	40	20	20	21,383	50	25	25	21,383
1700	30	15	15	22,698	40	20	20	22,698	50	25	25	22,698
1800	30	15	15	25,447	40	20	20	25,447	50	25	24	25,447
1900	30	15	15	28,353	40	20	19	28,353	50	25	24	28,353
1950	30	15	15	29,865	40	20	19	29,865	50	25	24	29,865
2000	30	15	15	31,416	40	20	19	31,416	50	25	24	31,416
2100	30	15	14	34,636	40	20	19	34,636	50	25	24	34,636
2200	30	15	14	38,013	40	20	19	38,013	50	25	24	38,013
2250	30	15	14	39,761	40	20	19	39,761	50	25	24	39,761
2300	30	15	14	41,548	40	20	19	41,548	50	25	24	41,548
2400	30	15	14	45,239	40	20	19	45,239	50	25	24	45,239
2500	30	15	14	49,087	40	20	19	49,087	50	25	24	49,087
2550	30	15	14	51,071	40	20	19	51,071	50	25	23	51,071
2600	30	15	14	53,093	40	20	19	53,093	50	25	23	53,093
2700	30	15	14	57,256	40	20	19	57,256	50	25	23	57,256
2800	30	15	14	61,575	40	20	19	61,575	50	25	23	61,575
2850	30	15	14	63,794	40	20	18	63,794	50	25	23	63,794
2900	30	15	14	66,052	40	20	18	66,052	50	25	23	66,052
3000	30	15	14	70,686	40	20	18	70,686	50	25	23	70,686
3100	30	15	14	75,477	40	20	18	75,477	50	25	23	75,477
3150	30	15	14	77,931	40	20	18	77,931	50	25	23	77,931
3200	30	15	14	80,425	40	20	18	80,425	50	25	23	80,425
3300	30	15	14	85,530	40	20	18	85,530	50	25	23	85,530
3400	30	15	14	90,792	40	20	18	90,792	50	25	23	90,792
3450	30	15	14	93,482	40	20	18	93,482	50	25	23	93,482
3600	30	15	13	101,788	40	20	18	101,788	50	25	22	101,788
3800	30	15	13	113,412	40	20	18	113,412	50	25	22	113,412
4000	30	15	13	125,664	40	20	18	125,664	50	25	22	125,664

Recommended sizes
Further possible sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN6. In case of deviating flange dimensions, please contact us.

Customised products available

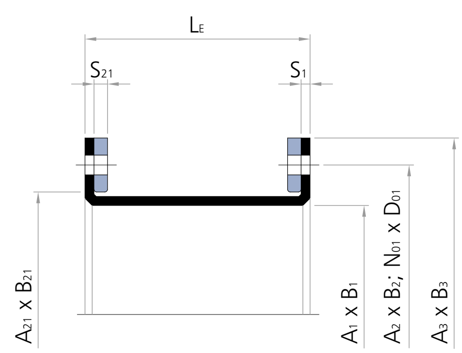
U900A Custom length x width

> Type U900A

Type key > page 22

U9 0 0 A
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section U900A



Rectangular universal expansion joint without arch

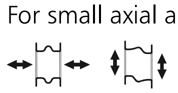
Design: Streamlined, cylindrical rubber bellows with full faced rubber flanges, designed to compensate all-directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single- or multi-part backing flanges. Reducers, offset and oval styles, or rounded corners available. In compliance with FSA Technical Handbook and ASTM F1123 - 87.

Dimensions: Individual length x width

Length: Custom length

Pressure: Up to 2,5 bar depending on dimensions and length
Vacuum stability on request

Movement: For small axial and lateral movements



Application:
Power plants, plant construction, food processing, wastewater treatment plants, industrial plants, paper industry e. g. to disconnect apparatus, for compressors

KTW WRAS | FDA | <10⁹ Ohm | EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology
PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows.				

Backing flanges

Design: Single- or multi-part backing flanges with clearance holes

Flange norms: According to customer specification

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

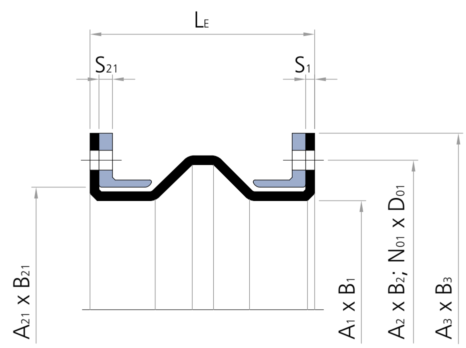
U910A ⌀ up to 4,000 x 4,000 mm
⌀ up to 6,000 x 3,000 mm

> Type U910A

Type key > page 22

U9 1 0 A
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section U910A



Rectangular universal expansion joint with one or more arches

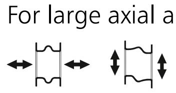
Design: Streamlined, single or multiple arch rubber bellows with full faced rubber flanges, designed to compensate all-directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single-part backing flanges with support collar. Reducers, offset and oval styles, or rounded corners available. In compliance with FSA Technical Handbook and ASTM F1123 - 87.

Dimensions: Custom length x width
⌀ up to 4,000 x 4,000 mm or 6,000 x 3,000 mm

Length: Custom length

Pressure: Up to 10 bar depending on dimensions and length
Vacuum stability on request

Movement: For large axial and lateral movements



Application:
Power plants, plant construction, food processing, wastewater treatment plants, industrial plants, paper industry e. g. to disconnect apparatus, for compressors

KTW WRAS FDA <10³ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology
PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows.				

Backing flanges

Design: Single- or multi-part backing flanges with support collar and clearance holes

Flange norms: According to customer specification

Materials: Carbon steel, stainless steel or aluminium

Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

(> page 42)

EPDM rubber bellow with angular offset for a coal mill
work shop test pressure 15 bar to simulate explosion

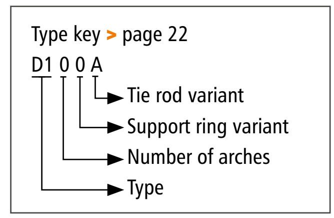
Radiation resistant Silicone single arch rubber bellow with internal vacuum ring prepared for hydraulic testing
installation on a high-pressure fan inside of a nuclear power plant

Triple arch FPM rubber bellow for decanter centrifuges

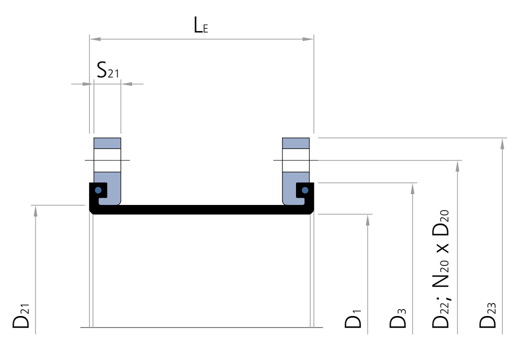
Universal expansion joints with swivel flange

D100A ∅ 40 - 1,200 mm

> Type D100A



Cross section D100A



Universal expansion joint without arch

Design: Streamlined, cylindrical rubber bellows with self-sealing rubber bulges, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and swivel backing flanges. Optional with embedded support rings. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ∅ 40 to 1,200 mm, custom diameters possible

Length: Standard L_E = 150 to 400 mm (> page 152)
Custom length on request

Pressure: Up to 10 bar depending on diameter and length
Vacuum stability on request

Movement: For small axial and lateral movements
(> page 152)

Application:
Plant construction, sand/gravel extraction industry, dredgers, food processing e.g. as suction/pressure hoses, in conveying lines, on pumps and vessels

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single-part, swivel, round backing flanges with clearance holes and groove to accept the rubber bulges

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

D100A

> without arch

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 150 mm					up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
40	8	5	12	0	10	10	6	16	0	10	13	8	20	0	10
50	8	5	11	0	16	10	6	15	0	16	13	8	19	0	16
65	8	5	11	0	28	10	6	14	0	28	13	8	18	0	28
80	8	5	10	0	43	10	6	14	0	43	13	8	17	0	43
100	8	5	10	0	69	10	6	13	0	69	13	8	17	0	69
125	8	5	10	0	115	10	6	13	0	115	13	8	16	0	115
150	8	5	9	0	170	10	6	12	0	170	13	8	15	0	170
200	8	5	9	0	278	10	6	12	0	278	13	8	14	0	278
250	8	5	8	0	449	10	6	11	0	449	13	8	14	0	449
300	8	5	8	0	656	10	6	11	0	656	13	8	13	0	656
350	8	5	8	0	855	10	6	10	0	855	13	8	13	0	855
400	8	5	8	0	1,195	10	6	10	0	1,195	13	8	13	0	1,195
450	8	5	7	0	1,514	10	6	10	0	1,514	13	8	12	0	1,514
500	8	5	7	0	1,886	10	6	10	0	1,886	13	8	12	0	1,886
600	8	5	7	0	2,706	10	6	9	0	2,706	13	8	12	0	2,706
700	8	5	7	0	3,750	10	6	9	0	3,750	13	8	11	0	3,750
800	8	5	7	0	4,914	10	6	9	0	4,914	13	8	11	0	4,914
900	8	5	6	0	6,193	10	6	9	0	6,193	13	8	11	0	6,193
1000	8	5	6	0	7,667	10	6	8	0	7,667	13	8	10	0	7,667
1100	8	5	6	0	9,297	10	6	8	0	9,297	13	8	10	0	9,297
1200	8	5	6	0	11,085	10	6	8	0	11,085	13	8	10	0	11,085

Installation length (L_E) at design pressure

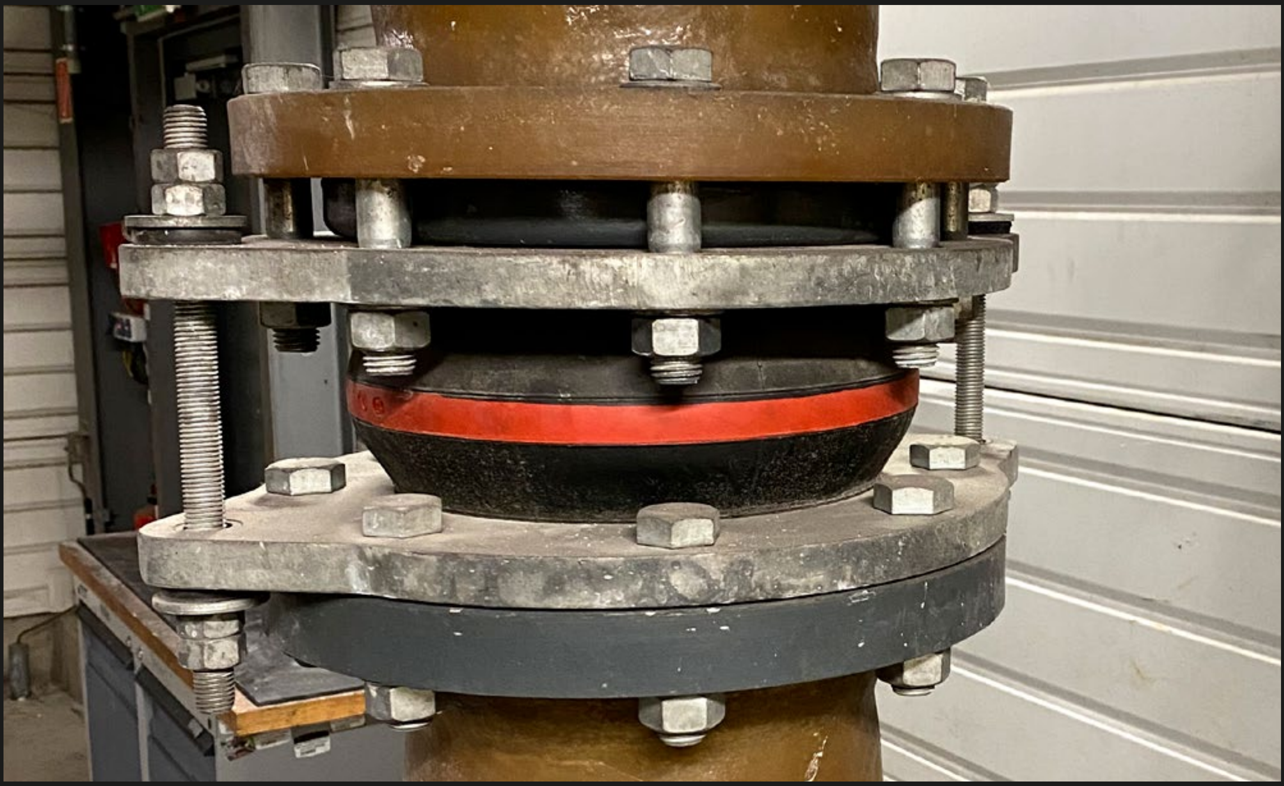
Ø	up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
40	15	9	24	0	10	18	11	28	0	10	20	12	32	0	10
50	15	9	23	0	16	18	11	27	0	16	20	12	30	0	16
65	15	9	22	0	28	18	11	25	0	28	20	12	29	0	28
80	15	9	21	0	43	18	11	24	0	43	20	12	28	0	43
100	15	9	20	0	69	18	11	23	0	69	20	12	27	0	69
125	15	9	19	0	115	18	11	22	0	115	20	12	25	0	115
150	15	9	18	0	170	18	11	21	0	170	20	12	24	0	170
200	15	9	17	0	278	18	11	20	0	278	20	12	23	0	278
250	15	9	17	0	449	18	11	19	0	449	20	12	22	0	449
300	15	9	16	0	656	18	11	19	0	656	20	12	21	0	656
350	15	9	15	0	855	18	11	18	0	855	20	12	21	0	855
400	15	9	15	0	1,195	18	11	18	0	1,195	20	12	20	0	1,195
450	15	9	15	0	1,514	18	11	17	0	1,514	20	12	20	0	1,514
500	15	9	14	0	1,886	18	11	17	0	1,886	20	12	19	0	1,886
600	15	9	14	0	2,706	18	11	16	0	2,706	20	12	19	0	2,706
700	15	9	13	0	3,750	18	11	16	0	3,750	20	12	18	0	3,750
800	15	9	13	0	4,914	18	11	15	0	4,914	20	12	18	0	4,914
900	15	9	13	0	6,193	18	11	15	0	6,193	20	12	17	0	6,193
1000	15	9	13	0	7,667	18	11	15	0	7,667	20	12	17	0	7,667
1100	15	9	12	0	9,297	18	11	14	0	9,297	20	12	16	0	9,297
1200	15	9	12	0	11,085	18	11	14	0	11,085	20	12	16	0	11,085

For larger movements see type D110A.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available

Universal expansion joint, type D110A
on the suction side of quenching water pumps in a waste incineration plant
∅ 150 mm, 16 bar



Single arch swivel flange EPDM rubber expansion joint
to compensate lateral movements of a GRP pipeline

D110A ⌀ 20 - 1,200 mm

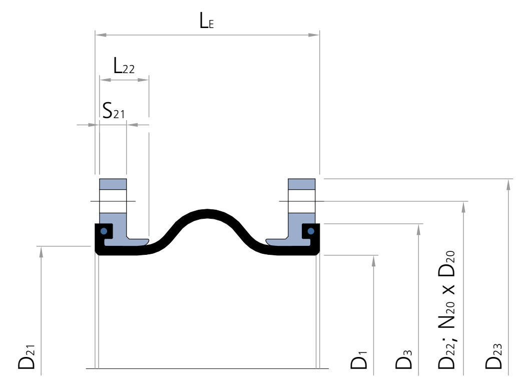
> **Type D110A**
> without vacuum ring

> **Type D111A**
> with internal vacuum ring

> **Type D112A**
> with embedded vacuum ring

Type key > page 22
D1 1 0 A
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section D110A



Universal expansion joint with one arch

Design: Streamlined, single wide arch rubber bellows with seal-sealing rubber bulges, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and swivel backing flanges. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 20 to 1,200 mm, custom diameters possible

Length: Standard L_E = 130 to 350 mm (> page 157–159)
Custom length on request

Pressure: Up to 25 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For axial, lateral and angular movements (> page 157–159)

Spring rate: Axial and lateral spring rates (> page 296)

Application:
Cooling water systems, desalination plants, drinking water supply, plant construction, e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX · TÜV DIN 4809 (Standard sizes) · Shipbuilding certification (Standard sizes)

Request assembly instructions at:
www.ditec-adam.de/en/contact

Standard rubber bellows

Elastomer	Fabric	Marking	°C	Application
EPDM / EPDM	PEEK		-40 | +130	Heating systems, cooling, hot air
IIR / EPDM	Polyamid		-40 | +100	Drinking water, seawater, weak acids and alkalis
EPDM/EPDM	Polyamid		-30 | +90	Seawater, weak acids and alkalis
NBR / CR	Polyamid		-20 | +90	Oils, fuels, gases
NBRweiß / CR	Polyamid		-20 | +90	Fat containing food, weather resistant
CSM / CSM	Polyamid		-20 | +100	Chemicals, aggresive chemical wastewater, weather resistant
NBR / CR	Polyamid		-20 | +90	Oils, fuels, gases, LPG, blast furnace gas, lubricants
IIR / EPDM	Polyamid		-40 | +90	Seawater, weak acids and alkalis
CR / CR	Polyamid	–	-25 | +90	Cold- and hot water, seawater, wastewater with oleaginous corrosion protection
NBR / CR	Stahl		-20 | +90	Oils, fuels, gases, fuel ethanol blends
NBR-LT / CR	Polyamid	LT	-40 | +90	Oils, fuels, gases, LPG, for tanker and filling stations
HNBR / CR	Stahl		-35 | +100	Oils, fuels, gases, LPG, high Temperature
BR	Polyamid		-50 | +70	Sludge, dust or powder, liquids with solids, emulsions

Non-standard rubber bellows

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single-part, swivel, round backing flanges with support collar, clearance holes and groove to accept the rubber bulges

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

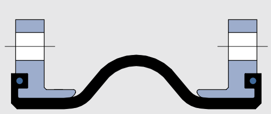
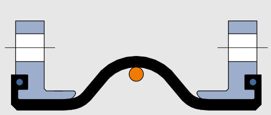
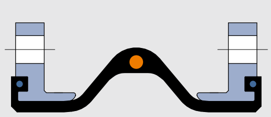
Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

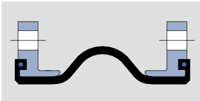
Filled arch:

(> page 42)

Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
D110A		None	Depending on the diameter up to 25 bar, vacuum stability on request	> page 157
D111A		Vacuum spirals up to ∅ 250 mm, vacuum ring starting at ∅ 300 mm Medium contact, inside the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 158
D112A		No medium contact, embedded in the arch starting at ∅ 100 mm	Depending on the diameter up to 16 bar, for vacuum up to 0.05 bar absolute	> page 159

Materials	
Stainless steel	Carbon steel, embedded



D110A

> without vacuum ring

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Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 130 mm					up to 10 bar L_E = 150 mm					up to 10 bar L_E = 175 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
20	30	30	30	30.0	17										
25	30	30	30	30.0	17										
32	30	30	30	30.0	17										
40	30	30	30	35.0	18										
50	30	30	30	30.0	32										
65	30	30	30	30.0	53										
80	30	30	30	30.0	85	30	30	30	30.0	85					
100	30	30	30	20.0	128	30	30	30	20.0	128					
125	30	30	30	20.0	187	30	30	30	20.0	187					
150	30	30	30	20.0	259	30	30	30	20.0	259					
200	30	30	30	12.0	410						30	30	30	12.0	410
250	30	30	30	12.0	596						30	30	30	12.0	596
300	30	30	30	12.0	822						31	10	17	3.8	903
350											31	10	17	3.3	1,134
400											31	10	17	2.9	1,521
450											31	10	17	2.5	1,878
500											31	10	17	2.3	2,290
600											31	10	16	1.9	3,187
700											31	10	16	1.6	4,312
800											31	10	16	1.4	5,555
900											31	10	16	1.3	6,910
1000											31	10	16	1.1	8,462
1100											31	10	15	1.0	10,171
1200											31	10	15	1.0	12,037

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm					up to 10 bar L_E = 275 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	40	20	26	11.3	564	44	20	29	11.3	573	44	20	29	11.3	573
250	40	20	26	9.1	799	44	20	28	9.1	809	44	20	28	9.1	809
300	30	30	30	12.0	822	44	20	27	7.6	1,081	44	20	27	7.6	1,081
350	50	30	30	8.0	1,176	44	20	27	6.5	1,333	44	20	27	6.5	1,333
400	50	30	30	8.0	1,547	44	20	27	5.7	1,750	44	20	27	5.7	1,750
450	50	30	30	8.0	2,042	50	30	30	8.0	2,042	44	20	26	5.1	2,132
500	50	30	30	8.0	2,279	40	20	30	6.0	2,279	44	20	26	4.6	2,570
600	50	30	30	8.0	3,115	40	20	30	6.0	3,115	44	20	26	3.8	3,515
700	40	20	24	3.3	4,669	50	30	30	8.0	4,342	50	30	30	8.0	4,342
800	40	20	23	2.9	5,958	50	30	30	6.0	5,274	44	20	25	2.9	5,986
900	40	20	23	2.5	7,359	44	20	25	2.5	7,390	44	20	25	2.5	7,390
1000	40	20	23	2.3	8,958	44	20	25	2.3	8,992	44	20	25	2.3	8,992
1100	40	20	23	2.1	10,715	44	20	24	2.1	10,751	44	20	24	2.1	10,751
1200	40	20	22	1.9	12,628	44	20	24	1.9	12,668	44	20	24	1.9	12,668

Installation length (L_E) at design pressure

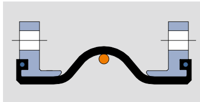
Ø	up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm				
	higher pressures on request									
	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	53	31	37	17.2	707	69	43	49	23.3	897
250	53	31	36	19.0	968	69	43	48	19.0	1,188
300	53	31	36	16.0	1,263	69	43	48	16.0	1,514
350	53	31	35	13.8	1,534	69	43	47	13.8	1,810
400	53	31	35	12.1	1,979	69	43	46	12.1	2,290
450	53	31	34	10.8	2,384	69	43	46	10.8	2,725
500	53	31	34	9.8	2,846	69	43	45	9.8	3,217
600	53	31	33	8.2	3,837	69	43	45	8.2	4,266
700	53	31	33	7.0	5,064	69	43	44	7.0	5,555
800	53	31	33	6.1	6,404	69	43	43	6.1	6,955
900	50	30	30	5.0	7,379	69	43	43	5.5	8,462
1000	50	30	30	5.0	8,894	69	43	43	4.9	10,171
1100	53	31	32	4.5	11,310	69	43	42	4.5	12,037
1200	53	31	31	4.1	13,273	69	43	42	4.1	14,061

Standard sizes
Non-standard sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For larger movements see type D120A and D123A.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



D111A

> with internal vacuum ring

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 130 mm					up to 10 bar L_E = 150 mm					up to 10 bar L_E = 175 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
20	30	10	30	30.0	17										
25	30	10	30	30.0	17										
32	30	10	30	30.0	17										
40	30	10	30	35.0	18										
50	30	10	30	30.0	32										
65	30	10	30	30.0	53										
80	30	10	30	30.0	85	30	10	30	30.0	85					
100	30	10	30	20.0	128	30	10	30	20.0	128					
125	30	10	30	20.0	187	30	10	30	20.0	187					
150	30	10	30	20.0	259	30	10	30	20.0	259					
200	30	10	30	12.0	410						30	10	30	12	410
250	30	10	30	12.0	596						30	10	30	12	596
300	30	10	30	12.0	822						31	3	17	3.8	903
350											31	3	17	3.3	1,134
400											31	3	17	2.9	1,521
450											31	3	17	2.5	1,878
500											31	3	17	2.3	2,290
600											31	3	16	1.9	3,187
700											31	3	16	1.6	4,312
800											31	3	16	1.4	5,555
900											31	3	16	1.3	6,910
1000											31	3	16	1.1	8,462
1100											31	3	15	1	10,171
1200											31	3	15	1	12,037

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm					up to 10 bar L_E = 275 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	40	7	26	11.3	564	44	7	29	11.3	573	44	7	29	11.3	573
250	40	7	26	9.1	799	44	7	28	9.1	809	44	7	28	9.1	809
300	30	10	30	12	822	44	7	27	7.6	1,081	44	7	27	7.6	1,081
350	50	10	30	8	1,176	44	7	27	6.5	1,333	44	7	27	6.5	1,333
400	50	10	30	8	1,547	44	7	27	5.7	1,750	44	7	27	5.7	1,750
450	50	30	30	8	2,042	50	10	30	8	2,042	44	7	26	5.1	2,132
500	50	10	30	8	2,279	40	7	30	6	2,279	44	7	26	4.6	2,570
600	50	10	30	8	3,115	40	7	30	6	3,115	44	7	26	3.8	3,515
700	40	7	24	3.3	4,669	50	10	30	8	4,342	50	10	30	8	4,342
800	40	7	23	2.9	5,958	50	10	30	6	5,274	44	7	25	2.9	5,986
900	40	7	23	2.5	7,359	44	7	25	2.5	7,390	44	7	25	2.5	7,390
1000	40	7	23	2.3	8,958	44	7	25	2.3	8,992	44	7	25	2.3	8,992
1100	40	7	23	2.1	10,715	44	7	24	2.1	10,751	44	7	24	2.1	10,751
1200	40	7	22	1.9	12,628	44	7	24	1.9	12,668	44	7	24	1.9	12,668

Installation length (L_E) at design pressure

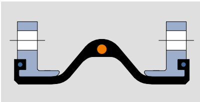
Ø	up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm				
	higher pressures on request									
	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	53	10	37	17.2	707	69	14	49	23.3	897
250	53	10	36	13.9	968	69	14	48	19	1,188
300	53	10	36	11.7	1,263	69	14	48	16	1,514
350	53	10	35	10	1,534	69	14	47	13.8	1,810
400	53	10	35	8.8	1,979	69	14	46	12.1	2,290
450	53	10	34	7.8	2,384	69	14	46	10.8	2,725
500	53	10	34	7.1	2,846	69	14	45	9.8	3,217
600	53	10	33	5.9	3,837	69	14	45	8.2	4,266
700	53	10	33	5.1	5,064	69	14	44	7	5,555
800	53	10	33	4.4	6,404	69	14	43	6.1	6,955
900	50	10	30	5	7,379	69	14	43	5.5	8,462
1000	50	10	30	5	8,894	69	14	43	4.9	10,171
1100	53	10	32	3.2	11,310	69	14	42	4.5	12,037
1200	53	10	31	3	13,273	69	14	42	4.1	14,061

Standard sizes
Non-standard sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29). For larger movements see type D121A or D124A.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



D112A

> with embedded vacuum ring

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Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 130 mm					up to 10 bar L_E = 150 mm					up to 10 bar L_E = 175 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
20															
25															
32															
40															
50															
65															
80															
100															
125															
150															
200											20	2	17	4	401
250											20	2	16	3.2	603
300											20	2	16	2.7	840
350											20	2	16	2.3	1,064
400											20	2	16	2	1,439
450											20	2	16	1.8	1,787
500											20	2	15	1.6	2,190
600											20	2	15	1.3	3,068
700											20	2	15	1.1	4,174
800											20	2	15	1	5,398
900											20	2	15	0.9	6,735
1000											20	2	15	0.8	8,268
1100											20	2	14	0.7	9,958
1200											20	2	14	0.7	11,805

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm					up to 10 bar L_E = 275 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	26	6	25	10.2	515	29	6	28	10.2	531	29	6	28	10.2	531
250	26	6	25	8.2	740	29	6	27	8.2	760	29	6	27	8.2	760
300	26	6	24	6.8	1,001	29	6	27	6.8	1,024	29	6	27	6.8	1,024
350	26	6	24	5.9	1,244	29	6	26	5.9	1,269	29	6	26	5.9	1,269
400	26	6	24	5.1	1,647	29	6	26	5.1	1,676	29	6	26	5.1	1,676
450	26	6	23	4.6	2,019	29	6	26	4.6	2,051	29	6	26	4.6	2,051
500	26	6	23	4.1	2,445	29	6	25	4.1	2,481	29	6	25	4.1	2,481
600	26	6	23	3.4	3,370	29	6	25	3.4	3,411	29	6	25	3.4	3,411
700	26	6	23	2.9	4,525	29	6	25	2.9	4,572	29	6	25	2.9	4,572
800	26	6	22	2.6	5,795	29	6	24	2.6	5,849	29	6	24	2.6	5,849
900	26	6	22	2.3	7,178	29	6	24	2.3	7,238	29	6	24	2.3	7,238
1000	26	6	22	2.1	8,758	29	6	24	2.1	8,825	29	6	24	2.1	8,825
1100	26	6	22	1.9	10,496	29	6	24	1.9	10,568	29	6	24	1.9	10,568
1200	26	6	21	1.7	12,390	29	6	23	1.7	12,469	29	6	23	1.7	12,469

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm				
	higher pressures on request									
	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	35	9	36	16.2	661	46	13	48	21.3	804
250	35	9	35	13.1	913	46	13	47	17.3	1,081
300	35	9	35	10.9	1,201	46	13	46	14.6	1,392
350	35	9	34	9.4	1,466	46	13	45	12.6	1,676
400	35	9	34	8.3	1,901	46	13	45	11	2,140
450	35	9	33	7.3	2,299	46	13	44	9.8	2,561
500	35	9	33	6.6	2,753	46	13	44	8.9	3,039
600	35	9	33	5.5	3,728	46	13	43	7.4	4,060
700	35	9	32	4.7	4,939	46	13	43	6.4	5,320
800	35	9	32	4.1	6,263	46	13	42	5.6	6,691
900	35	9	31	3.7	7,698	46	13	42	5	8,171
1000	35	9	31	3.3	9,331	46	13	41	4.5	9,852
1100	35	9	31	3	11,122	46	13	41	4.1	11,690
1200	35	9	31	2.8	13,070	46	13	41	3.7	13,685

Standard sizes
Non-standard sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For larger movements see type D122A or D125A.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available

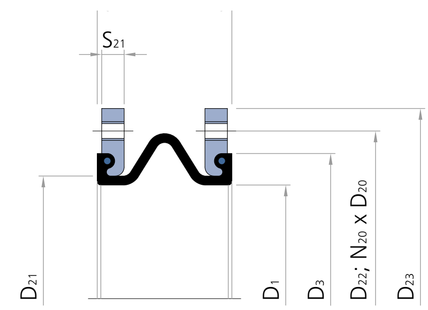
D210A Ø 32 - 500 mm

> **Type D210A**
> without vacuum ring

> **Type D211A**
> with internal vacuum ring

Type key > page 22
D2 1 0 A
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section D210A



Universal expansion joint with one arch

Design: Streamlined, single arch rubber bellows with self-sealing rubber bulges, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and swivel backing flanges with threaded holes. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: Ø 32 to 500 mm

Length: L_E = 100 or 110 mm (> page 162–163)

Pressure: Up to 25 bar depending on diameter
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For large axial, lateral and angular movements
(> page 162–163)

Application:
Cooling water systems, desalination plants, drinking water supply, plant construction, e.g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

CE PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX · TÜV DIN 4809 (Standard sizes) · Shipbuilding certification (Standard sizes)

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM / EPDM	PEEK		-40 | +130	Heating systems acc. 4809, warm- and hot water
IIR / EPDM	Polyamid		-40 | +100	Drinking water, seawater, acids, dilute chlorine compounds
NBR / CR	Polyamid		-20 | +90	Oil, gases, lubricants, natural gas
NBRweiß / CR	Polyamid		-20 | +90	Oily and fatty food (in complinance with KTW and FDA)
CSM / CSM	Polyamid		-20 | +100	Chemicals, corrosive chemical waste, air compressors with oil content
IIR / EPDM	Polyamid		-40 | +90	Cold-and warm water, sea water, cooling water, weak acids, alcohol

Backing flanges

Design: Single-part, swivel, round backing flanges with threaded holes and groove to accept the rubber bulges

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

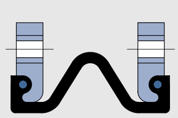
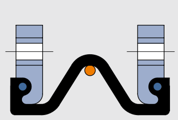
Coating: Galvanised, yellow neutralised

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
D210A		None	Depending on the diameter up to 25 bar, vacuum stability on request	> page 162
D211A		Vacuum spiral / ring, medium contact, inside the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 163

Materials
Stainless steel

D210A

> without vacuum support ring

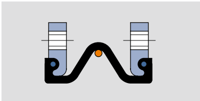
Installation length (L_E) at design pressure										
	up to 10 bar L_E = 100 mm					up to 10 bar L_E = 110 mm				
	higher pressures on request									
Ø	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
32	30	20	30	7.0	18					
40	30	20	30	7.0	18					
50	30	20	30	7.0	35					
65	30	20	30	7.0	56					
80	30	20	30	7.0	87					
100	30	20	30	7.0	130					
125	30	20	30	7.0	190					
150	30	20	30	7.0	263					
200	30	20	30	7.0	416					
250	30	20	30	7.0	607					
300	30	20	30	7.0	830					
350	30	20	30	7.0	1,100					
400						30	20	30	7.0	1,385
500						30	20	30	7.0	2,091

Standard sizes

In the event of axial extension and simultaneous lateral displacement (due to installation gap tolerance) the above movements are reduced (> page 29).

Angular movement only possible for 10 mm reduced installation length (90 / 100).

Universal expansion joint, type D110A
in a plastic pipe of a paper plant
Ø 150 mm, design pressure 6 bar



D211A

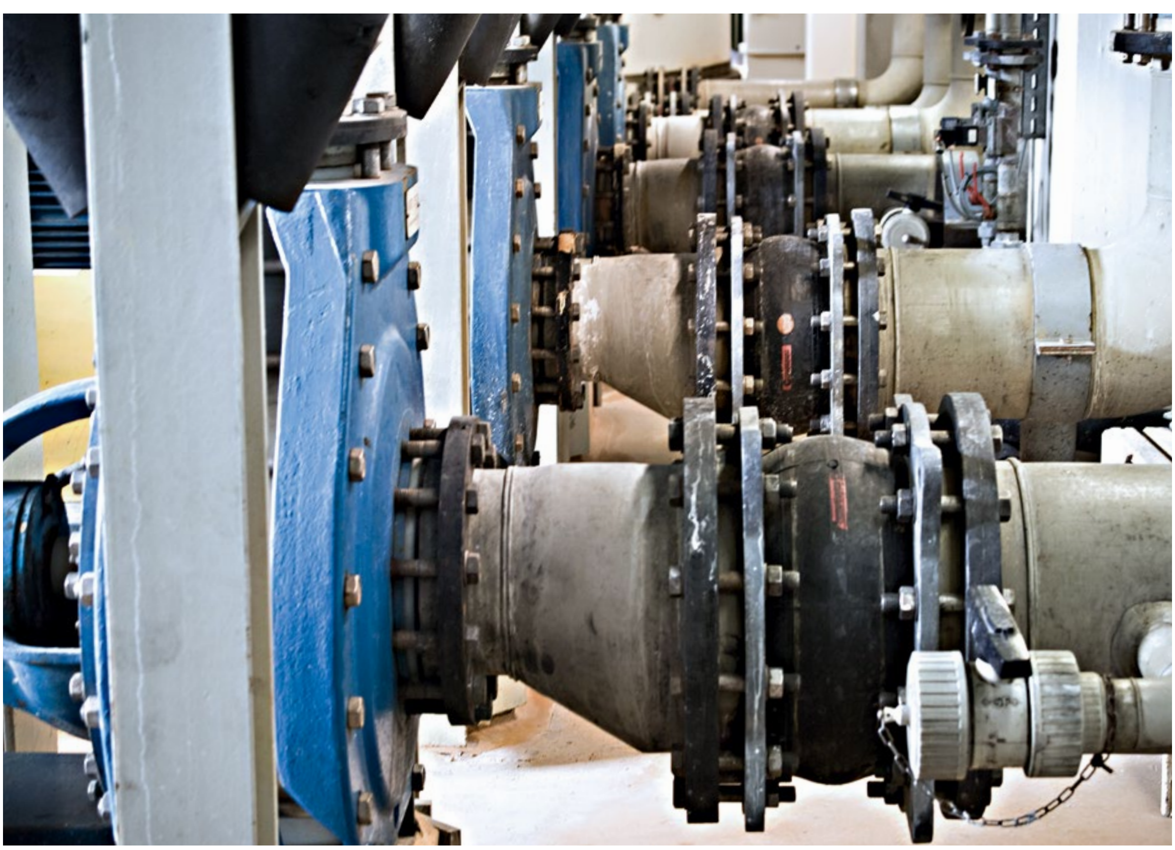
> with internal vacuum ring

Installation length (L_E) at design pressure										
	up to 10 bar **L_E = 100 mm**					up to 10 bar **L_E = 110 mm**				
	higher pressures on request									
Ø	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
32	30	5	20	4.0	18					
40	30	5	20	4.0	18					
50	30	5	20	4.0	35					
65	30	5	20	4.0	56					
80	30	5	20	4.0	87					
100	30	5	20	4.0	130					
125	30	5	20	4.0	190					
150	30	5	20	4.0	263					
200	30	5	20	4.0	416					
250	30	5	20	4.0	607					
300	30	5	20	4.0	830					
350	30	5	20	4.0	1,100					
400						30	5	20	4.0	1,385
500						30	5	20	4.0	2,091

Standard sizes

In the event of axial extension and simultaneous lateral displacement (due to installation gap tolerance) the above movements are reduced (> page 29).

Angular movement only possible for 10 mm reduced installation length (90 / 100).



Expansion joints with swivel flanges, type D110A
pumping header installation
Ø 300 mm, operating pressure 10 bar

D120A ⌀ 100 - 1,200 mm

- > **Type D120A**
  without vacuum rings
- > **Type D121A**
  with internal vacuum rings
- > **Type D122A**
  with embedded vacuum rings
- > **Type D123A**
  without vacuum rings,
  with external support ring
- > **Type D124A**
  with internal vacuum rings,
  with external support ring
- > **Type D125A**
  with embedded vacuum rings,
  with external support ring

Type key > page 22
D1 2 3 A
- A → Tie rod variant
- 3 → Support ring variant
- 2 → Number of arches
- D1 → Type

Universal expansion joint with two arches

Design: Streamlined, double wide arch rubber bellows with self-sealing rubber bulges, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and swivel backing flanges. Optional with vacuum rings and/or external support ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 100 to 1,200 mm, custom diameters possible

Length: Standard L_E = 350 to 600 mm (> page 167–169)
Custom length on request

Pressure: Up to 10 bar depending on diameter and length
Vacuum not allowed without vacuum rings, with vacuum rings up to 0.05 bar absolute

Movement: For very large axial, lateral and angular movements
(> page 167–169)

Spring rate: To calculate the axial and lateral spring rate for double arch joints, divide our single arch values of type D110A by the number of arches (> page 296)

Application:
Cooling water systems, desalination plants, drinking water supply, plant construction, e. g. in pipelines, on pumps, as dismantling joints,on condensers and vessels

PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single-part, swivel, round backing flanges with support collar, clearance holes and groove to accept the rubber bulges

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

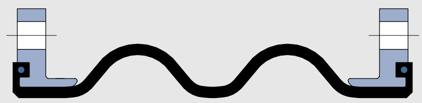
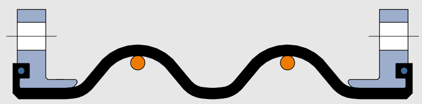
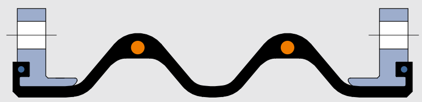
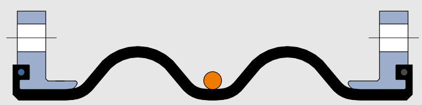
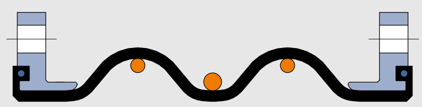
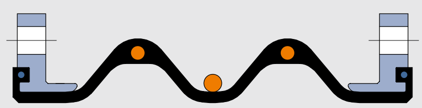
Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

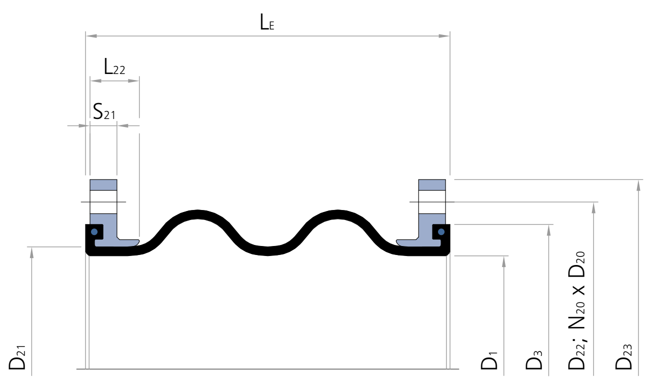
(> page 42)

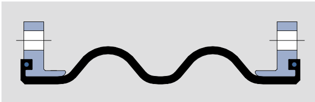
Support rings

TYPE	Support rings	Vacuum ring	Support ring	Pressure	Movement
D120A		None	None	Low pressure, vacuum stability on request	> page 167
D121A		Medium contact, inside the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 168
D122A		No medium contact, embedded in the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 169
D123A		None	External between the arches	Depending on the diameter up to 10 bar, slight vacuum	> page 167
D124A		Medium contact, inside the arches	External between the arches	Depending on the diameter up to 10 bar, for vacuum up to 0.05 bar absolute	> page 168
D125A		No medium contact, embedded in the arches	External between the arches	Depending on the diameter up to 10 bar, for vacuum up to 0.05 bar absolute	> page 169

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

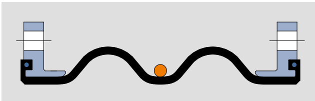
Cross section D120A





D120A

> without vacuum rings



D123A

> without vacuum rings, with external support ring

Installation length (L_E) at design pressure

	up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					up to 10 bar L_E = 450 mm				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	62	20	36	11.3	445	80	40	53	21.8	564	88	41	57	22.3	573
250	62	20	35	9.1	656	80	40	52	17.7	799	88	41	56	18.2	809
300	62	20	35	7.6	903	80	40	51	14.9	1,069	88	41	55	15.3	1,081
350	62	20	34	6.5	1,134	80	40	50	12.9	1,320	88	41	54	13.2	1,333
400	62	20	34	5.7	1,521	80	40	50	11.3	1,735	88	41	54	11.6	1,750
450	62	20	33	5.1	1,878	80	40	49	10.1	2,116	88	41	53	10.3	2,132
500	62	20	33	4.6	2,290	80	40	49	9.1	2,552	88	41	52	9.3	2,570
600	62	20	33	3.8	3,187	80	40	48	7.6	3,494	88	41	52	7.8	3,515
700	62	20	32	3.3	4,312	80	40	47	6.5	4,669	88	41	51	6.7	4,693
800	62	20	32	2.9	5,555	80	40	47	5.7	5,958	88	41	50	5.9	5,986
900	62	20	31	2.5	6,910	80	40	46	5.1	7,359	88	41	50	5.2	7,390
1000	62	20	31	2.3	8,462	80	40	46	4.6	8,958	88	41	49	4.7	8,992
1100	62	20	31	2.1	10,171	80	40	45	4.2	10,715	88	41	49	4.3	10,751
1200	62	20	31	1.9	12,037	80	40	45	3.8	12,628	88	41	48	3.9	12,668

Installation length (L_E) at design pressure

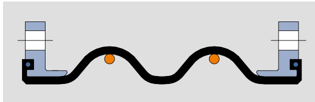
	up to 10 bar L_E = 500 mm					up to 10 bar L_E = 550 mm					up to 10 bar L_E = 600 mm				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	106	61	74	31.4	707	124	82	91	39.4	855	138	85	99	40.4	897
250	106	61	72	26.0	968	124	82	89	33.3	1,140	138	85	97	34.2	1,188
300	106	61	71	22.1	1,263	124	82	88	28.7	1,459	138	85	95	29.5	1,514
350	106	61	70	19.2	1,534	124	82	86	25.1	1,750	138	85	94	25.9	1,810
400	106	61	69	17.0	1,979	124	82	85	22.3	2,223	138	85	93	23.0	2,290
450	106	61	69	15.2	2,384	124	82	84	20.0	2,651	138	85	92	20.7	2,725
500	106	61	68	13.7	2,846	124	82	84	18.2	3,137	138	85	91	18.8	3,217
600	106	61	67	11.5	3,837	124	82	82	15.3	4,174	138	85	89	15.8	4,266
700	106	61	66	9.9	5,064	124	82	81	13.2	5,450	138	85	88	13.7	5,555
800	106	61	65	8.7	6,404	124	82	80	11.6	6,837	138	85	87	12.0	6,955
900	106	61	64	7.7	7,854	124	82	79	10.3	8,332	138	85	86	10.7	8,462
1000	106	61	64	7.0	9,503	124	82	79	9.3	10,029	138	85	85	9.6	10,171
1100	106	61	63	6.3	11,310	124	82	78	8.5	11,882	138	85	84	8.8	12,037
1200	106	61	63	5.8	13,273	124	82	77	7.8	13,893	138	85	84	8.1	14,061

Recommended sizes
Further possible sizes

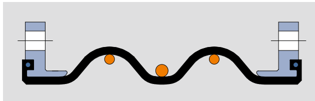
Angular movement only possible with guided external support ring.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



D121A
> with internal vacuum rings



D124A
> with internal vacuum rings, with external support ring

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					up to 10 bar L_E = 450 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	62	7	36	11.3	445	80	13	53	21.8	564	88	13	57	22.3	573
250	62	7	35	9.1	656	80	13	52	17.7	799	88	13	56	18.2	809
300	62	7	35	7.6	903	80	13	51	14.9	1,069	88	13	55	15.3	1,081
350	62	7	34	6.5	1,134	80	13	50	12.9	1,320	88	13	54	13.2	1,333
400	62	7	34	5.7	1,521	80	13	50	11.3	1,735	88	13	54	11.6	1,750
450	62	7	33	5.1	1,878	80	13	49	10.1	2,116	88	13	53	10.3	2,132
500	62	7	33	4.6	2,290	80	13	49	9.1	2,552	88	13	52	9.3	2,570
600	62	7	33	3.8	3,187	80	13	48	7.6	3,494	88	13	52	7.8	3,515
700	62	7	32	3.3	4,312	80	13	47	6.5	4,669	88	13	51	6.7	4,693
800	62	7	32	2.9	5,555	80	13	47	5.7	5,958	88	13	50	5.9	5,986
900	62	7	31	2.5	6,910	80	13	46	5.1	7,359	88	13	50	5.2	7,390
1000	62	7	31	2.3	8,462	80	13	46	4.6	8,958	88	13	49	4.7	8,992
1100	62	7	31	2.1	10,171	80	13	45	4.2	10,715	88	13	49	4.3	10,751
1200	62	7	31	1.9	12,037	80	13	45	3.8	12,628	88	13	48	3.9	12,668

Installation length (L_E) at design pressure

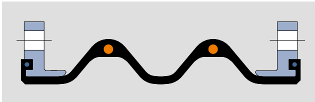
Ø	up to 10 bar L_E = 500 mm					up to 10 bar L_E = 550 mm					up to 10 bar L_E = 600 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	106	20	74	31.4	707	124	27	91	39.4	855	138	28	99	40.4	897
250	106	20	72	26.0	968	124	27	89	33.3	1,140	138	28	97	34.2	1,188
300	106	20	71	22.1	1,263	124	27	88	28.7	1,459	138	28	95	29.5	1,514
350	106	20	70	19.2	1,534	124	27	86	25.1	1,750	138	28	94	25.9	1,810
400	106	20	69	17.0	1,979	124	27	85	22.3	2,223	138	28	93	23.0	2,290
450	106	20	69	15.2	2,384	124	27	84	20.0	2,651	138	28	92	20.7	2,725
500	106	20	68	13.7	2,846	124	27	84	18.2	3,137	138	28	91	18.8	3,217
600	106	20	67	11.5	3,837	124	27	82	15.3	4,174	138	28	89	15.8	4,266
700	106	20	66	9.9	5,064	124	27	81	13.2	5,450	138	28	88	13.7	5,555
800	106	20	65	8.7	6,404	124	27	80	11.6	6,837	138	28	87	12.0	6,955
900	106	20	64	7.7	7,854	124	27	79	10.3	8,332	138	28	86	10.7	8,462
1000	106	20	64	7.0	9,503	124	27	79	9.3	10,029	138	28	85	9.6	10,171
1100	106	20	63	6.3	11,310	124	27	78	8.5	11,882	138	28	84	8.8	12,037
1200	106	20	63	5.8	13,273	124	27	77	7.8	13,893	138	28	84	8.1	14,061

Recommended sizes
Further possible sizes

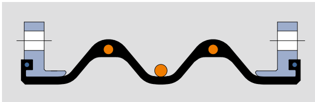
Angular movement only possible with guided external support ring.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



D122A
> with embedded vacuum rings



D125A
> with embedded vacuum rings, with external support ring

MEMBER OF THE ELAFLEX GROUP

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					up to 10 bar L_E = 450 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	41	5	34	8.0	401	52	12	51	19.3	515	58	12	55	20.3	531
250	41	5	33	6.4	603	52	12	50	15.6	740	58	12	54	16.5	760
300	41	5	32	5.3	840	52	12	49	13.1	1,001	58	12	53	13.9	1,024
350	41	5	32	4.6	1,064	52	12	48	11.3	1,244	58	12	52	11.9	1,269
400	41	5	32	4.0	1,439	52	12	48	9.9	1,647	58	12	52	10.5	1,676
450	41	5	31	3.6	1,787	52	12	47	8.8	2,019	58	12	51	9.3	2,051
500	41	5	31	3.2	2,190	52	12	47	8.0	2,445	58	12	51	8.4	2,481
600	41	5	30	2.7	3,068	52	12	46	6.7	3,370	58	12	50	7.0	3,411
700	41	5	30	2.3	4,174	52	12	45	5.7	4,525	58	12	49	6.0	4,572
800	41	5	30	2.0	5,398	52	12	45	5.0	5,795	58	12	49	5.3	5,849
900	41	5	29	1.8	6,735	52	12	44	4.4	7,178	58	12	48	4.7	7,238
1000	41	5	29	1.6	8,268	52	12	44	4.0	8,758	58	12	48	4.2	8,825
1100	41	5	29	1.5	9,958	52	12	43	3.6	10,496	58	12	47	3.8	10,568
1200	41	5	29	1.3	11,805	52	12	43	3.3	12,390	58	12	47	3.5	12,469

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 500 mm					up to 10 bar L_E = 550 mm					up to 10 bar L_E = 600 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	70	19	72	29.7	661	82	26	89	38.0	804	91	26	95	38.0	804
250	70	19	71	24.5	913	82	26	87	32.0	1,081	91	26	94	32.0	1,081
300	70	19	69	20.8	1,201	82	26	86	27.5	1,392	91	26	92	27.5	1,392
350	70	19	69	18.0	1,466	82	26	85	24.0	1,676	91	26	91	24.0	1,676
400	70	19	68	15.9	1,901	82	26	84	21.3	2,140	91	26	90	21.3	2,140
450	70	19	67	14.2	2,299	82	26	83	19.1	2,561	91	26	89	19.1	2,561
500	70	19	66	12.8	2,753	82	26	82	17.3	3,039	91	26	88	17.3	3,039
600	70	19	65	10.8	3,728	82	26	81	14.6	4,060	91	26	86	14.6	4,060
700	70	19	64	9.2	4,939	82	26	79	12.6	5,320	91	26	85	12.6	5,320
800	70	19	64	8.1	6,263	82	26	78	11.0	6,691	91	26	84	11.0	6,691
900	70	19	63	7.2	7,698	82	26	78	9.8	8,171	91	26	83	9.8	8,171
1000	70	19	62	6.5	9,331	82	26	77	8.9	9,852	91	26	82	8.9	9,852
1100	70	19	62	5.9	11,122	82	26	76	8.1	11,690	91	26	82	8.1	11,690
1200	70	19	61	5.4	13,070	82	26	76	7.4	13,685	91	26	81	7.4	13,685

Recommended sizes
Further possible sizes

Angular movement only possible with guided external support ring.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available


T3.1

Universal expansion joints for clamped fixing

B100 ⌀ 50 - 5,000 mm

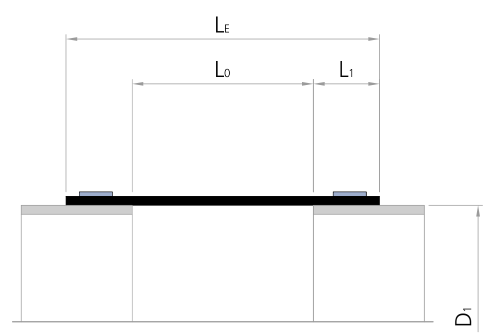
> Type B100

Type key > page 22

B1 0 0

- Support ring variant
- Number of arches
- Type

Cross section B100



Universal expansion joint without arch

Design: Streamlined, cylindrical slip-on sleeve type rubber bellows, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and fixing clamps. Optional with embedded support rings. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87. Available in split-wrap or custom offset arrangements.

Diameters: ⌀ 50 to 5,000 mm, custom diameters possible

Length: = Installation gap + 2 x fixing width
L_0 = 125 to 250 mm (standard installation gaps) (> page 174)
Custom length on request

Fixing width: At least 40 mm
Depends on pressure, diameter and clamp type

Pressure: Up to 6 bar depending on diameter and length
Vacuum stability on request

Movement: For low axial and lateral movements
For axial extension or vacuum, the expansion joint can slip of the pipeline (groove as needed at the pipeline end)
(> page 174)

Application:
Power plants, plant construction, food processing, wastewater treatment plants, industrial facilities, e.g. to disconnect pipelines, on oscillating conveyor systems, on sieving machines

CE PED 2014/68/EU · KTW WRAS · FDA · <10⁵ Ohm · EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows, available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 174)

Clamps

Design: Depending on pressure and diameter, endless clamp belt, screw thread belt, small clamps or hinge bolt clamps. At higher pressures, 2 parallel clamps per side

Width:

Endless clamp belt:	¾"
Screw thread belt:	½"
Small clamp:	depending on Ø: 9–12 mm
Hinge bolt clamp:	depending on Ø: 18–30 mm

Materials:

Endless clamp belt with screw lugs (tongs):	1.7300
Screw thread belt with threaded screw lugs:	1.4310
Small clamp, belt and housing:	1.4016 (Screw steel galvanised)
Hinge bolt clamp, belt and housing:	1.4016 (Screw steel galvanised)

B100

> without arch

Installation gap

Ø	L₀ = 125 mm					L₀ = 150 mm					L₀ = 175 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	6	0	10	0	29	8	0	11	0	29	9	0	13	0	29
65	6	0	9	0	45	8	0	11	0	45	9	0	13	0	45
80	6	0	9	0	62	8	0	10	0	62	9	0	12	0	62
100	6	0	8	0	103	8	0	10	0	103	9	0	12	0	103
125	6	0	8	0	153	8	0	10	0	153	9	0	11	0	153
150	6	0	8	0	222	8	0	9	0	222	9	0	11	0	222
175	6	0	7	0	295	8	0	9	0	295	9	0	10	0	295
200	6	0	7	0	377	8	0	9	0	377	9	0	10	0	377
250	6	0	7	0	585	8	0	8	0	585	9	0	10	0	585
300	6	0	7	0	824	8	0	8	0	824	9	0	9	0	824
350	6	0	6	0	993	8	0	8	0	993	9	0	9	0	993
400	6	0	6	0	1,297	8	0	8	0	1,297	9	0	9	0	1,297
450	6	0	6	0	1,642	8	0	7	0	1,642	9	0	9	0	1,642
500	6	0	6	0	2,027	8	0	7	0	2,027	9	0	8	0	2,027
550	6	0	6	0	2,452	8	0	7	0	2,452	9	0	8	0	2,452
600	6	0	6	0	2,919	8	0	7	0	2,919	9	0	8	0	2,919
650	6	0	6	0	3,425	8	0	7	0	3,425	9	0	8	0	3,425
700	6	0	6	0	3,973	8	0	7	0	3,973	9	0	8	0	3,973
750	6	0	6	0	4,560	8	0	7	0	4,560	9	0	8	0	4,560
800	6	0	5	0	5,189	8	0	7	0	5,189	9	0	8	0	5,189
850	6	0	5	0	5,858	8	0	6	0	5,858	9	0	8	0	5,858
900	6	0	5	0	6,567	8	0	6	0	6,567	9	0	7	0	6,567
1000	6	0	5	0	8,107	8	0	6	0	8,107	9	0	7	0	8,107
1100	6	0	5	0	9,607	8	0	6	0	9,607	9	0	7	0	9,607
1200	6	0	5	0	11,404	8	0	6	0	11,404	9	0	7	0	11,404
1300	6	0	5	0	13,376	8	0	6	0	13,376	9	0	7	0	13,376
1400	6	0	5	0	15,504	8	0	6	0	15,504	9	0	7	0	15,504
1500	6	0	5	0	17,789	8	0	6	0	17,789	9	0	7	0	17,789

Installation gap

L₀ = 200 mm					L₀ = 225 mm					L₀ = 250 mm					Ø
Movement				A	Movement				A	Movement				A	
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
10	0	15	0	29	11	0	17	0	29	13	0	19	0	29	50
10	0	14	0	45	11	0	16	0	45	13	0	18	0	45	65
10	0	14	0	62	11	0	16	0	62	13	0	17	0	62	80
10	0	13	0	103	11	0	15	0	103	13	0	17	0	103	100
10	0	13	0	153	11	0	14	0	153	13	0	16	0	153	125
10	0	12	0	222	11	0	14	0	222	13	0	15	0	222	150
10	0	12	0	295	11	0	13	0	295	13	0	15	0	295	175
10	0	12	0	377	11	0	13	0	377	13	0	14	0	377	200
10	0	11	0	585	11	0	12	0	585	13	0	14	0	585	250
10	0	11	0	824	11	0	12	0	824	13	0	13	0	824	300
10	0	10	0	993	11	0	12	0	993	13	0	13	0	993	350
10	0	10	0	1,297	11	0	11	0	1,297	13	0	13	0	1,297	400
10	0	10	0	1,642	11	0	11	0	1,642	13	0	12	0	1,642	450
10	0	10	0	2,027	11	0	11	0	2,027	13	0	12	0	2,027	500
10	0	9	0	2,452	11	0	11	0	2,452	13	0	12	0	2,452	550
10	0	9	0	2,919	11	0	10	0	2,919	13	0	12	0	2,919	600
10	0	9	0	3,425	11	0	10	0	3,425	13	0	11	0	3,425	650
10	0	9	0	3,973	11	0	10	0	3,973	13	0	11	0	3,973	700
10	0	9	0	4,560	11	0	10	0	4,560	13	0	11	0	4,560	750
10	0	9	0	5,189	11	0	10	0	5,189	13	0	11	0	5,189	800
10	0	9	0	5,858	11	0	10	0	5,858	13	0	11	0	5,858	850
10	0	9	0	6,567	11	0	10	0	6,567	13	0	11	0	6,567	900
10	0	8	0	8,107	11	0	9	0	8,107	13	0	10	0	8,107	1000
10	0	8	0	9,607	11	0	9	0	9,607	13	0	10	0	9,607	1100
10	0	8	0	11,404	11	0	9	0	11,404	13	0	10	0	11,404	1200
10	0	8	0	13,376	11	0	9	0	13,376	13	0	10	0	13,376	1300
10	0	8	0	15,504	11	0	9	0	15,504	13	0	10	0	15,504	1400
10	0	8	0	17,789	11	0	9	0	17,789	13	0	10	0	17,789	1500

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; lateral displacement: -50 %.
Larger movements see type B110.

Customised products available

Pipe penetration seal and clamped EPDM rubber expansion joint
penetration seal made from silicone rubber with open seam
for afterwards closing on site

B110

⌀ 50 - 5,000 mm
⌀ 6,000 x 3,000 mm

> **Type B110**
> without vacuum ring

> **Type B111**
> with internal vacuum ring

> **Type B112**
> with embedded vacuum ring

Type key > page 22

B1 1 0
- 0 → Support ring variant
- 1 → Number of arches
- B1 → Type

Universal expansion joint with one arch

Design: Streamlined, single wide arch slip-on sleeve type rubber bellows, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and fixing clamps. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87. Available in split-wrap or custom offset arrangements.

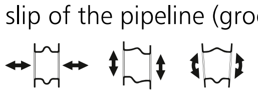
Diameters: ⌀ 50 to 5,000 mm, custom diameters possible

Length: = Installation gap + 2 x fixing width
L_0 = 125 to 250 mm (standard installation gaps) (> page 179–181)
Custom length on request

Fixing width: At least 40 mm
Depends on pressure, diameter and clamp type

Pressure: Up to 6 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For axial, lateral and angular movements
For axial extension or vacuum, the expansion joint can slip of the pipeline (groove as needed at the pipeline end)

 (> page 179–181)

Application:
Power plants, plant construction, food processing, wastewater treatment plants, industrial facilities, e. g. to disconnect pipelines, on oscillating conveyor systems, on sieving machines

PED 2014/68/EU · KTW WRAS · FDA · <10⁵ Ohm · EX

Request assembly instructions at:
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Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows, available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 179–181)

Clamps

Design: Depending on pressure and diameters, endless clamp belt, screw thread belt, small clamps or hinge bolt clamps. At higher pressures, 2 parallel clamps per side

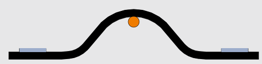
Width:

Endless clamp belt:	¾"
Screw thread belt:	½"
Small clamp:	depending on Ø: 9–12 mm
Hinge bolt clamp:	depending on Ø: 18–30 mm

Materials:

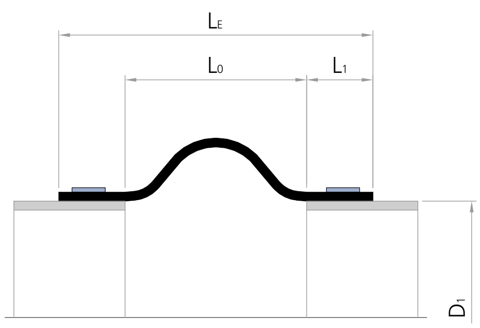
Endless clamp belt with screw lugs (tongs):	1.7300
Screw thread belt with threaded screw lugs:	1.4310
Small clamp, belt and housing:	1.4016 (Screw steel galvanised)
Hinge bolt clamp, belt and housing:	1.4016 (Screw steel galvanised)

Support rings

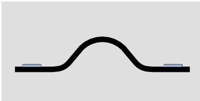
TYPE	Support rings	Vacuum ring	Pressure	Movement
B110		None	Depending on the diameter up to 6 bar, vacuum stability on request	> page 179
B111		Medium contact, inside the arch	Depending on the diameter up to 6 bar, for vacuum up to 0.05 bar absolute	> page 180
B112		No medium contact, embedded in the arches	Depending on the diameter up to 6 bar, for vacuum up to 0.05 bar absolute	> page 181

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

Cross section B110



Example: Type B112



B110

> without vacuum ring

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Installation gap

∅	L_0 = 125 mm					L_0 = 150 mm					L_0 = 175 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	31	10	20	21.8	96	40	20	30	38.7	155	44	20	32	38.7	159
65	31	10	20	17.1	125	40	20	29	31.6	191	44	20	32	31.6	196
80	31	10	20	14.0	152	40	20	29	26.6	224	44	20	31	26.6	229
100	31	10	19	11.3	212	40	20	28	21.8	297	44	20	30	21.8	303
125	31	10	19	9.1	283	40	20	28	17.7	379	44	20	30	17.7	386
150	31	10	18	7.6	374	40	20	27	14.9	484	44	20	29	14.9	492
175	31	10	18	6.5	466	40	20	27	12.9	588	44	20	29	12.9	597
200	31	10	18	5.7	569	40	20	26	11.3	703	44	20	29	11.3	712
250	31	10	18	4.6	819	40	20	26	9.1	979	44	20	28	9.1	990
300	31	10	17	3.8	1,098	40	20	26	7.6	1,281	44	20	27	7.6	1,294
350	31	10	17	3.3	1,292	40	20	25	6.5	1,490	44	20	27	6.5	1,504
400	31	10	17	2.9	1,636	40	20	25	5.7	1,858	44	20	27	5.7	1,873
450	31	10	17	2.5	2,020	40	20	25	5.1	2,267	44	20	26	5.1	2,283
500	31	10	17	2.3	2,445	40	20	24	4.6	2,715	44	20	26	4.6	2,734
550	31	10	16	2.1	2,911	40	20	24	4.2	3,205	44	20	26	4.2	3,225
600	31	10	16	1.9	3,417	40	20	24	3.8	3,735	44	20	26	3.8	3,757
650	31	10	16	1.8	3,964	40	20	24	3.5	4,305	44	20	26	3.5	4,329
700	31	10	16	1.6	4,551	40	20	24	3.3	4,917	44	20	25	3.3	4,941
750	31	10	16	1.5	5,178	40	20	23	3.1	5,568	44	20	25	3.1	5,595
800	31	10	16	1.4	5,847	40	20	23	2.9	6,260	44	20	25	2.9	6,288
850	31	10	16	1.3	6,555	40	20	23	2.7	6,993	44	20	25	2.7	7,023
900	31	10	16	1.3	7,305	40	20	23	2.5	7,766	44	20	25	2.5	7,798
1000	31	10	16	1.1	8,925	40	20	23	2.3	9,434	44	20	25	2.3	9,469
1100	31	10	15	1.0	10,496	40	20	23	2.1	11,047	44	20	24	2.1	11,085
1200	31	10	15	1.0	12,370	40	20	22	1.9	12,969	44	20	24	1.9	13,009
1300	31	10	15	0.9	14,420	40	20	22	1.8	15,066	44	20	24	1.8	15,109
1400	31	10	15	0.8	16,627	40	20	22	1.6	17,320	44	20	24	1.6	17,366
1500	31	10	15	0.8	18,991	40	20	22	1.5	19,731	44	20	24	1.5	19,781

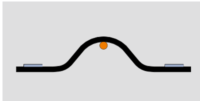
Installation gap

∅	L_0 = 200 mm					L_0 = 225 mm					L_0 = 250 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	53	31	42	51.1	233	60	32	46	52.0	255	69	43	56	59.8	347
65	53	31	41	43.6	278	60	32	45	44.6	302	69	43	55	52.9	402
80	53	31	40	37.8	317	60	32	44	38.7	343	69	43	54	47.1	448
100	53	31	39	31.8	402	60	32	44	32.6	431	69	43	53	40.7	549
125	53	31	39	26.4	498	60	32	43	27.1	530	69	43	51	34.5	659
150	53	31	38	22.5	617	60	32	42	23.1	653	69	43	51	29.8	796
175	53	31	37	19.5	734	60	32	41	20.1	773	69	43	50	26.2	928
200	53	31	37	17.2	861	60	32	41	17.7	903	69	43	49	23.3	1,070
250	53	31	36	13.9	1,164	60	32	40	14.4	1,213	69	43	48	19.0	1,405
300	53	31	36	11.7	1,492	60	32	39	12.0	1,548	69	43	48	16.0	1,764
350	53	31	35	10.0	1,717	60	32	39	10.4	1,777	69	43	47	13.8	2,008
400	53	31	35	8.8	2,111	60	32	38	9.1	2,176	69	43	46	12.1	2,431
450	53	31	34	7.8	2,545	60	32	38	8.1	2,617	69	43	46	10.8	2,896
500	53	31	34	7.1	3,019	60	32	38	7.3	3,097	69	43	45	9.8	3,400
550	53	31	34	6.4	3,534	60	32	37	6.6	3,619	69	43	45	8.9	3,946
600	53	31	33	5.9	4,090	60	32	37	6.1	4,181	69	43	45	8.2	4,532
650	53	31	33	5.4	4,686	60	32	37	5.6	4,783	69	43	44	7.5	5,158
700	53	31	33	5.1	5,322	60	32	36	5.2	5,426	69	43	44	7.0	5,825
750	53	31	33	4.7	5,999	60	32	36	4.9	6,110	69	43	44	6.5	6,533
800	53	31	33	4.4	6,717	60	32	36	4.6	6,834	69	43	43	6.1	7,281
850	53	31	32	4.2	7,475	60	32	36	4.3	7,598	69	43	43	5.8	8,069
900	53	31	32	3.9	8,274	60	32	36	4.1	8,404	69	43	43	5.5	8,898
1000	53	31	32	3.5	9,993	60	32	35	3.7	10,136	69	43	43	4.9	10,678
1100	53	31	32	3.2	11,652	60	32	35	3.3	11,805	69	43	42	4.5	12,390
1200	53	31	31	3.0	13,623	60	32	35	3.1	13,789	69	43	42	4.1	14,420
1300	53	31	31	2.7	15,770	60	32	34	2.8	15,948	69	43	42	3.8	16,627
1400	53	31	31	2.5	18,074	60	32	34	2.6	18,265	69	43	41	3.5	18,991
1500	53	31	31	2.4	20,536	60	32	34	2.4	20,739	69	43	41	3.3	21,512

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %; angular movement: -66 %.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For larger movements see type B120 or B123.

Customised products available



B111

> with internal vacuum ring

Installation gap

Ø	L₀ = 125 mm					L₀ = 150 mm					L₀ = 175 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	31	3	20	21.8	96	40	7	30	38.7	155	44	7	32	38.7	159
65	31	3	20	17.1	125	40	7	29	31.6	191	44	7	32	31.6	196
80	31	3	20	14.0	152	40	7	29	26.6	224	44	7	31	26.6	229
100	31	3	19	11.3	212	40	7	28	21.8	297	44	7	30	21.8	303
125	31	3	19	9.1	283	40	7	28	17.7	379	44	7	30	17.7	386
150	31	3	18	7.6	374	40	7	27	14.9	484	44	7	29	14.9	492
175	31	3	18	6.5	466	40	7	27	12.9	588	44	7	29	12.9	597
200	31	3	18	5.7	569	40	7	26	11.3	703	44	7	29	11.3	712
250	31	3	18	4.6	819	40	7	26	9.1	979	44	7	28	9.1	990
300	31	3	17	3.8	1,098	40	7	26	7.6	1,281	44	7	27	7.6	1,294
350	31	3	17	3.3	1,292	40	7	25	6.5	1,490	44	7	27	6.5	1,504
400	31	3	17	2.9	1,636	40	7	25	5.7	1,858	44	7	27	5.7	1,873
450	31	3	17	2.5	2,020	40	7	25	5.1	2,267	44	7	26	5.1	2,283
500	31	3	17	2.3	2,445	40	7	24	4.6	2,715	44	7	26	4.6	2,734
550	31	3	16	2.1	2,911	40	7	24	4.2	3,205	44	7	26	4.2	3,225
600	31	3	16	1.9	3,417	40	7	24	3.8	3,735	44	7	26	3.8	3,757
650	31	3	16	1.8	3,964	40	7	24	3.5	4,305	44	7	26	3.5	4,329
700	31	3	16	1.6	4,551	40	7	24	3.3	4,917	44	7	25	3.3	4,941
750	31	3	16	1.5	5,178	40	7	23	3.1	5,568	44	7	25	3.1	5,595
800	31	3	16	1.4	5,847	40	7	23	2.9	6,260	44	7	25	2.9	6,288
850	31	3	16	1.3	6,555	40	7	23	2.7	6,993	44	7	25	2.7	7,023
900	31	3	16	1.3	7,305	40	7	23	2.5	7,766	44	7	25	2.5	7,798
1000	31	3	16	1.1	8,925	40	7	23	2.3	9,434	44	7	25	2.3	9,469
1100	31	3	15	1.0	10,496	40	7	23	2.1	11,047	44	7	24	2.1	11,085
1200	31	3	15	1.0	12,370	40	7	22	1.9	12,969	44	7	24	1.9	13,009
1300	31	3	15	0.9	14,420	40	7	22	1.8	15,066	44	7	24	1.8	15,109
1400	31	3	15	0.8	16,627	40	7	22	1.6	17,320	44	7	24	1.6	17,366
1500	31	3	15	0.8	18,991	40	7	22	1.5	19,731	44	7	24	1.5	19,781

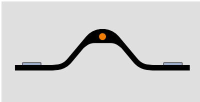
Installation gap

Ø	L₀ = 200 mm					L₀ = 225 mm					L₀ = 250 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	53	10	42	51	233	60	11	46	52	255	69	14	56	60	347
65	53	10	41	43.6	278	60	11	45	44.6	302	69	14	55	52.9	402
80	53	10	40	37.8	317	60	11	44	38.7	343	69	14	54	47.1	448
100	53	10	39	31.8	402	60	11	44	32.6	431	69	14	53	40.7	549
125	53	10	39	26.4	498	60	11	43	27.1	530	69	14	51	34.5	659
150	53	10	38	22.5	617	60	11	42	23.1	653	69	14	51	29.8	796
175	53	10	37	19.5	734	60	11	41	20.1	773	69	14	50	26.2	928
200	53	10	37	17.2	861	60	11	41	17.7	903	69	14	49	23.3	1,070
250	53	10	36	13.9	1,164	60	11	40	14.4	1,213	69	14	48	19	1,405
300	53	10	36	11.7	1,492	60	11	39	12	1,548	69	14	48	16	1,764
350	53	10	35	10	1,717	60	11	39	10.4	1,777	69	14	47	13.8	2,008
400	53	10	35	8.8	2,111	60	11	38	9.1	2,176	69	14	46	12.1	2,431
450	53	10	34	7.8	2,545	60	11	38	8.1	2,617	69	14	46	10.8	2,896
500	53	10	34	7.1	3,019	60	11	38	7.3	3,097	69	14	45	9.8	3,400
550	53	10	34	6.4	3,534	60	11	37	6.6	3,619	69	14	45	8.9	3,946
600	53	10	33	5.9	4,090	60	11	37	6.1	4,181	69	14	45	8.2	4,532
650	53	10	33	5.4	4,686	60	11	37	5.6	4,783	69	14	44	7.5	5,158
700	53	10	33	5.1	5,322	60	11	36	5.2	5,426	69	14	44	7	5,825
750	53	10	33	4.7	5,999	60	11	36	4.9	6,110	69	14	44	6.5	6,533
800	53	10	33	4.4	6,717	60	11	36	4.6	6,834	69	14	43	6.1	7,281
850	53	10	32	4.2	7,475	60	11	36	4.3	7,598	69	14	43	5.8	8,069
900	53	10	32	3.9	8,274	60	11	36	4.1	8,404	69	14	43	5.5	8,898
1000	53	10	32	3.5	9,993	60	11	35	3.7	10,136	69	14	43	4.9	10,678
1100	53	10	32	3.2	11,652	60	11	35	3.3	11,805	69	14	42	4.5	12,390
1200	53	10	31	3	13,623	60	11	35	3.1	13,789	69	14	42	4.1	14,420
1300	53	10	31	2.7	15,770	60	11	34	2.8	15,948	69	14	42	3.8	16,627
1400	53	10	31	2.5	18,074	60	11	34	2.6	18,265	69	14	41	3.5	18,991
1500	53	10	31	2.4	20,536	60	11	34	2.4	20,739	69	14	41	3.3	21,512

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For larger movements see type B121 or B124.

Customised products available



B112

> with embedded vacuum ring

MEMBER OF THE ELAFLEX GROUP

Installation gap

Ø	L_0 = 125 mm					L_0 = 150 mm					L_0 = 175 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	20	2	19	15.6	76	26	6	29	35.8	129	29	6	31	35.8	137
65	20	2	19	12.2	102	26	6	28	29.0	163	29	6	31	29.0	172
80	20	2	18	9.9	126	26	6	27	24.2	193	29	6	30	24.2	203
100	20	2	18	8.0	182	26	6	27	19.8	261	29	6	29	19.8	273
125	20	2	18	6.4	248	26	6	26	16.1	339	29	6	29	16.1	352
150	20	2	17	5.3	334	26	6	26	13.5	439	29	6	28	13.5	454
175	20	2	17	4.6	422	26	6	26	11.6	538	29	6	28	11.6	554
200	20	2	17	4.0	519	26	6	25	10.2	647	29	6	28	10.2	666
250	20	2	16	3.2	760	26	6	25	8.2	913	29	6	27	8.2	935
300	20	2	16	2.7	1,029	26	6	24	6.8	1,206	29	6	27	6.8	1,231
350	20	2	16	2.3	1,217	26	6	24	5.9	1,409	29	6	26	5.9	1,436
400	20	2	16	2.0	1,551	26	6	24	5.1	1,768	29	6	26	5.1	1,798
450	20	2	16	1.8	1,926	26	6	23	4.6	2,166	29	6	26	4.6	2,200
500	20	2	15	1.6	2,341	26	6	23	4.1	2,606	29	6	25	4.1	2,642
550	20	2	15	1.5	2,797	26	6	23	3.7	3,086	29	6	25	3.7	3,125
600	20	2	15	1.3	3,294	26	6	23	3.4	3,606	29	6	25	3.4	3,649
650	20	2	15	1.2	3,831	26	6	23	3.2	4,167	29	6	25	3.2	4,213
700	20	2	15	1.1	4,408	26	6	23	2.9	4,769	29	6	25	2.9	4,818
750	20	2	15	1.1	5,027	26	6	22	2.7	5,411	29	6	24	2.7	5,463
800	20	2	15	1.0	5,685	26	6	22	2.6	6,093	29	6	24	2.6	6,149
850	20	2	15	0.9	6,384	26	6	22	2.4	6,816	29	6	24	2.4	6,875
900	20	2	15	0.9	7,124	26	6	22	2.3	7,580	29	6	24	2.3	7,642
1000	20	2	15	0.8	8,725	26	6	22	2.1	9,229	29	6	24	2.1	9,297
1100	20	2	14	0.7	10,279	26	6	22	1.9	10,825	29	6	24	1.9	10,899
1200	20	2	14	0.7	12,135	26	6	21	1.7	12,728	29	6	23	1.7	12,808
1300	20	2	14	0.6	14,166	26	6	21	1.6	14,806	29	6	23	1.6	14,892
1400	20	2	14	0.6	16,354	26	6	21	1.5	17,041	29	6	23	1.5	17,134
1500	20	2	14	0.5	18,699	26	6	21	1.4	19,433	29	6	23	1.4	19,532

Installation gap

Ø	L_0 = 200 mm					L_0 = 225 mm					L_0 = 250 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	35	9	41	49	207	40	9	45	49	207	46	13	54	57	290
65	35	9	40	41.7	249	40	9	43	41.7	249	46	13	53	50.2	340
80	35	9	39	35.9	286	40	9	43	35.9	286	46	13	52	44.3	383
100	35	9	38	30.1	367	40	9	42	30.1	367	46	13	51	38	476
125	35	9	38	24.9	459	40	9	41	24.9	459	46	13	50	32	580
150	35	9	37	21.1	574	40	9	40	21.1	574	46	13	49	27.5	708
175	35	9	36	18.3	687	40	9	40	18.3	687	46	13	48	24	833
200	35	9	36	16.2	810	40	9	39	16.2	810	46	13	48	21.3	968
250	35	9	35	13.1	1,104	40	9	38	13.1	1,104	46	13	47	17.3	1,288
300	35	9	35	10.9	1,425	40	9	38	10.9	1,425	46	13	46	14.6	1,632
350	35	9	34	9.4	1,645	40	9	37	9.4	1,645	46	13	45	12.6	1,867
400	35	9	34	8.3	2,030	40	9	37	8.3	2,030	46	13	45	11	2,277
450	35	9	33	7.3	2,456	40	9	36	7.3	2,456	46	13	44	9.8	2,727
500	35	9	33	6.6	2,922	40	9	36	6.6	2,922	46	13	44	8.9	3,217
550	35	9	33	6	3,429	40	9	36	6	3,429	46	13	44	8.1	3,748
600	35	9	33	5.5	3,977	40	9	36	5.5	3,977	46	13	43	7.4	4,319
650	35	9	32	5.1	4,565	40	9	35	5.1	4,565	46	13	43	6.8	4,931
700	35	9	32	4.7	5,194	40	9	35	4.7	5,194	46	13	43	6.4	5,584
750	35	9	32	4.4	5,863	40	9	35	4.4	5,863	46	13	42	5.9	6,277
800	35	9	32	4.1	6,573	40	9	35	4.1	6,573	46	13	42	5.6	7,011
850	35	9	32	3.9	7,323	40	9	34	3.9	7,323	46	13	42	5.2	7,785
900	35	9	31	3.7	8,114	40	9	34	3.7	8,114	46	13	42	5	8,600
1000	35	9	31	3.3	9,817	40	9	34	3.3	9,817	46	13	41	4.5	10,351
1100	35	9	31	3	11,461	40	9	34	3	11,461	46	13	41	4.1	12,037
1200	35	9	31	2.8	13,417	40	9	33	2.8	13,417	46	13	41	3.7	14,040
1300	35	9	30	2.6	15,548	40	9	33	2.6	15,548	46	13	40	3.4	16,218
1400	35	9	30	2.4	17,837	40	9	33	2.4	17,837	46	13	40	3.2	18,554
1500	35	9	30	2.2	20,283	40	9	33	2.2	20,283	46	13	40	3	21,047

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -0 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For larger movements see type B122 or B125.

Customised products available

B120

⌀ 50 - 5,000 mm
⌀ 6,000 x 3,000 mm

- **Type B120**
  without vacuum rings
- **Type B121**
  with internal vacuum rings
- **Type B122**
  with embedded vacuum rings
- **Type B123**
  without vacuum rings,
  with external support ring
- **Type B124**
  with internal vacuum rings,
  with external support ring
- **Type B125**
  with embedded vacuum rings,
  with external support ring

Type key > page 22
B1 2 3
→ Support ring variant
→ Number of arches
→ Type

Universal expansion joint with two arches

Design: Streamlined, double wide arch slip-on sleeve type rubber bellows, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and fixing clamps. Optional with vacuum rings and/or external support ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87. Available in split-wrap or custom offset arrangements.

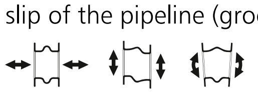
Diameters: ⌀ 50 to 5,000 mm, custom diameters possible

Length: = Installation gap + 2 x fixing width
L_0 = 250 to 500 mm (standard installation gaps) (> page 185–187)
Custom length on request

Fixing width: At least 40 mm
Depends on pressure, diameter and clamp type

Pressure: Up to 6 bar depending on diameter and length
Vacuum not allowed without vacuum rings, with vacuum rings up to 0.05 bar absolute

Movement: For axial, lateral and angular movements
For axial extension or vacuum, the expansion joint can slip of the pipeline (groove as needed at the pipeline end)



(> page 185–187)

Application:
Power plants, plant construction, food processing, wastewater treatment plants, industrial facilities, e. g. to disconnect pipelines, on oscillating conveyor systems, on sieving machines

PED 2014/68/EU · KTW WRAS · FDA · <10⁵ Ohm · EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology
PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows, available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 185–187)				

Clamps

Design: Depending on pressure and the diameter, endless clamp belt, screw thread belt, small clamps or hinge bolt clamps. At higher pressures, 2 parallel clamps per side

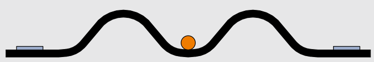
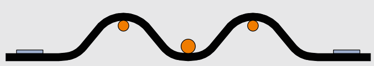
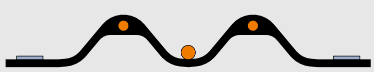
Width:

Endless clamp belt:	¾″
Screw thread belt:	½″
Small clamp:	depending on Ø: 9–12 mm
Hinge bolt clamp:	depending on Ø: 18–30 mm

Materials:

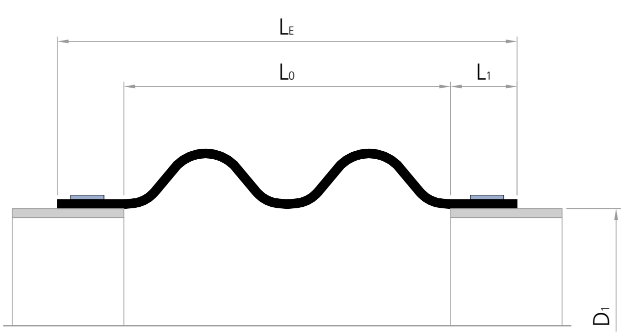
Endless clamp belt with screw lugs (tongs):	1.7300
Screw thread belt with threaded screw lugs:	1.4310
Small clamp, belt and housing:	1.4016 (Screw steel galvanised)
Hinge bolt clamp, belt and housing:	1.4016 (Screw steel galvanised)

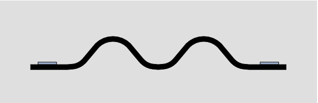
Support rings

TYPE	Support rings	Vacuum ring	Support ring	Pressure	Movement
B120		None	None	Low pressure, vacuum stability on request	> page 185
B121		Medium contact, inside the arch	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 186
B122		No medium contact, embedded in the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 187
B123		None	External between the arches	Depending on the diameter up to 6 bar, slight vacuum	> page 185
B124		Medium contact, inside the arch	External between the arches	Depending on the diameter up to 6 bar, for vacuum up to 0.05 bar absolute	> page 186
B125		No medium contact, embedded in the arches	External between the arches	Depending on the diameter up to 6 bar, for vacuum up to 0.05 bar absolute	> page 187

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

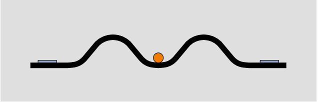
Cross section B120





B120

> without vacuum rings



B123

> without vacuum rings, with external support ring

Installation gap

Ø	L_0 = 250 mm					L_0 = 300 mm					L_0 = 350 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	62	20	41	38.7	96	80	40	60	58.0	155	88	41	65	58.6	159
65	62	20	40	31.6	125	80	40	59	50.9	191	88	41	63	51.6	196
80	62	20	39	26.6	152	80	40	58	45.0	224	88	41	62	45.7	229
100	62	20	38	21.8	212	80	40	56	38.7	297	88	41	61	39.4	303
125	62	20	38	17.7	283	80	40	55	32.6	379	88	41	60	33.3	386
150	62	20	37	14.9	374	80	40	54	28.1	484	88	41	59	28.7	492
175	62	20	36	12.9	466	80	40	54	24.6	588	88	41	58	25.1	597
200	62	20	36	11.3	569	80	40	53	21.8	703	88	41	57	22.3	712
250	62	20	35	9.1	819	80	40	52	17.7	979	88	41	56	18.2	990
300	62	20	35	7.6	1,098	80	40	51	14.9	1,281	88	41	55	15.3	1,294
350	62	20	34	6.5	1,292	80	40	50	12.9	1,490	88	41	54	13.2	1,504
400	62	20	34	5.7	1,636	80	40	50	11.3	1,858	88	41	54	11.6	1,873
450	62	20	33	5.1	2,020	80	40	49	10.1	2,267	88	41	53	10.3	2,283
500	62	20	33	4.6	2,445	80	40	49	9.1	2,715	88	41	52	9.3	2,734
550	62	20	33	4.2	2,911	80	40	48	8.3	3,205	88	41	52	8.5	3,225
600	62	20	33	3.8	3,417	80	40	48	7.6	3,735	88	41	52	7.8	3,757
650	62	20	32	3.5	3,964	80	40	48	7.0	4,305	88	41	51	7.2	4,329
700	62	20	32	3.3	4,551	80	40	47	6.5	4,917	88	41	51	6.7	4,941
750	62	20	32	3.1	5,178	80	40	47	6.1	5,568	88	41	51	6.2	5,595
800	62	20	32	2.9	5,847	80	40	47	5.7	6,260	88	41	50	5.9	6,288
850	62	20	32	2.7	6,555	80	40	46	5.4	6,993	88	41	50	5.5	7,023
900	62	20	31	2.5	7,305	80	40	46	5.1	7,766	88	41	50	5.2	7,798
1000	62	20	31	2.3	8,925	80	40	46	4.6	9,434	88	41	49	4.7	9,469
1100	62	20	31	2.1	10,496	80	40	45	4.2	11,047	88	41	49	4.3	11,085
1200	62	20	31	1.9	12,370	80	40	45	3.8	12,969	88	41	48	3.9	13,009
1300	62	20	30	1.8	14,420	80	40	45	3.5	15,066	88	41	48	3.6	15,109
1400	62	20	30	1.6	16,627	80	40	44	3.3	17,320	88	41	48	3.4	17,366
1500	62	20	30	1.5	18,991	80	40	44	3.1	19,731	88	41	47	3.1	19,781

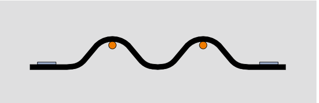
Installation gap

Ø	L_0 = 400 mm					L_0 = 450 mm					L_0 = 500 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	106	61	84	67.7	233	121	65	93	69	255	138	85	112	73.6	347
65	106	61	82	62	278	121	65	91	63.4	302	138	85	109	69.1	402
80	106	61	80	56.7	317	121	65	89	58.4	343	138	85	107	64.8	448
100	106	61	79	50.7	402	121	65	87	52.4	431	138	85	105	59.5	549
125	106	61	77	44.3	498	121	65	85	46.1	530	138	85	103	53.7	659
150	106	61	76	39.1	617	121	65	84	40.9	653	138	85	101	48.6	796
175	106	61	75	34.9	734	121	65	83	36.6	773	138	85	100	44.2	928
200	106	61	74	31.4	861	121	65	82	33	903	138	85	99	40.4	1,070
250	106	61	72	26	1,164	121	65	80	27.5	1,213	138	85	97	34.2	1,405
300	106	61	71	22.1	1,492	121	65	79	23.4	1,548	138	85	95	29.5	1,764
350	106	61	70	19.2	1,717	121	65	78	20.4	1,777	138	85	94	25.9	2,008
400	106	61	69	17	2,111	121	65	77	18	2,176	138	85	93	23	2,431
450	106	61	69	15.2	2,545	121	65	76	16.1	2,617	138	85	92	20.7	2,896
500	106	61	68	13.7	3,019	121	65	75	14.6	3,097	138	85	91	18.8	3,400
550	106	61	67	12.5	3,534	121	65	75	13.3	3,619	138	85	90	17.2	3,946
600	106	61	67	11.5	4,090	121	65	74	12.2	4,181	138	85	89	15.8	4,532
650	106	61	66	10.6	4,686	121	65	73	11.3	4,783	138	85	89	14.7	5,158
700	106	61	66	9.9	5,322	121	65	73	10.5	5,426	138	85	88	13.7	5,825
750	106	61	66	9.2	5,999	121	65	72	9.8	6,110	138	85	87	12.8	6,533
800	106	61	65	8.7	6,717	121	65	72	9.2	6,834	138	85	87	12	7,281
850	106	61	65	8.2	7,475	121	65	72	8.7	7,598	138	85	86	11.3	8,069
900	106	61	64	7.7	8,274	121	65	71	8.2	8,404	138	85	86	10.7	8,898
1000	106	61	64	7	9,993	121	65	71	7.4	10,136	138	85	85	9.6	10,678
1100	106	61	63	6.3	11,652	121	65	70	6.7	11,805	138	85	84	8.8	12,390
1200	106	61	63	5.8	13,623	121	65	69	6.2	13,789	138	85	84	8.1	14,420
1300	106	61	62	5.4	15,770	121	65	69	5.7	15,948	138	85	83	7.5	16,627
1400	106	61	62	5	18,074	121	65	68	5.3	18,265	138	85	83	6.9	18,991
1500	106	61	62	4.6	20,536	121	65	68	5	20,739	138	85	82	6.5	21,512

Recommended sizes
Further possible sizes

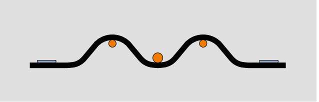
Reduction of movement for expansion joints with PTFE lining: axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %; angular movement: -66 %. In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29). Angular movement only possible with guided external support ring. For larger movements see type B130 or B133.

Customised products available



B121

> with internal vacuum rings



B124

> with internal vacuum rings, with external support ring

Installation gap

Ø	L_0 = 125 mm					L_0 = 150 mm					L_0 = 175 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	62	7	41	38.7	96	80	13	60	58.0	155	88	13	65	58.6	159
65	62	7	40	31.6	125	80	13	59	50.9	191	88	13	63	51.6	196
80	62	7	39	26.6	152	80	13	58	45.0	224	88	13	62	45.7	229
100	62	7	38	21.8	212	80	13	56	38.7	297	88	13	61	39.4	303
125	62	7	38	17.7	283	80	13	55	32.6	379	88	13	60	33.3	386
150	62	7	37	14.9	374	80	13	54	28.1	484	88	13	59	28.7	492
175	62	7	36	12.9	466	80	13	54	24.6	588	88	13	58	25.1	597
200	62	7	36	11.3	569	80	13	53	21.8	703	88	13	57	22.3	712
250	62	7	35	9.1	819	80	13	52	17.7	979	88	13	56	18.2	990
300	62	7	35	7.6	1,098	80	13	51	14.9	1,281	88	13	55	15.3	1,294
350	62	7	34	6.5	1,292	80	13	50	12.9	1,490	88	13	54	13.2	1,504
400	62	7	34	5.7	1,636	80	13	50	11.3	1,858	88	13	54	11.6	1,873
450	62	7	33	5.1	2,020	80	13	49	10.1	2,267	88	13	53	10.3	2,283
500	62	7	33	4.6	2,445	80	13	49	9.1	2,715	88	13	52	9.3	2,734
550	62	7	33	4.2	2,911	80	13	48	8.3	3,205	88	13	52	8.5	3,225
600	62	7	33	3.8	3,417	80	13	48	7.6	3,735	88	13	52	7.8	3,757
650	62	7	32	3.5	3,964	80	13	48	7.0	4,305	88	13	51	7.2	4,329
700	62	7	32	3.3	4,551	80	13	47	6.5	4,917	88	13	51	6.7	4,941
750	62	7	32	3.1	5,178	80	13	47	6.1	5,568	88	13	51	6.2	5,595
800	62	7	32	2.9	5,847	80	13	47	5.7	6,260	88	13	50	5.9	6,288
850	62	7	32	2.7	6,555	80	13	46	5.4	6,993	88	13	50	5.5	7,023
900	62	7	31	2.5	7,305	80	13	46	5.1	7,766	88	13	50	5.2	7,798
1000	62	7	31	2.3	8,925	80	13	46	4.6	9,434	88	13	49	4.7	9,469
1100	62	7	31	2.1	10,496	80	13	45	4.2	11,047	88	13	49	4.3	11,085
1200	62	7	31	1.9	12,370	80	13	45	3.8	12,969	88	13	48	3.9	13,009
1300	62	7	30	1.8	14,420	80	13	45	3.5	15,066	88	13	48	3.6	15,109
1400	62	7	30	1.6	16,627	80	13	44	3.3	17,320	88	13	48	3.4	17,366
1500	62	7	30	1.5	18,991	80	13	44	3.1	19,731	88	13	47	3.1	19,781

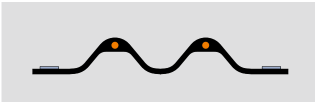
Installation gap

Ø	L_0 = 200 mm					L_0 = 225 mm					L_0 = 250 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	106	20	84	68	233	121	21	93	69	255	138	28	112	74	347
65	106	20	82	62	278	121	21	91	63.4	302	138	28	109	69.1	402
80	106	20	80	56.7	317	121	21	89	58.4	343	138	28	107	64.8	448
100	106	20	79	50.7	402	121	21	87	52.4	431	138	28	105	59.5	549
125	106	20	77	44.3	498	121	21	85	46.1	530	138	28	103	53.7	659
150	106	20	76	39.1	617	121	21	84	40.9	653	138	28	101	48.6	796
175	106	20	75	34.9	734	121	21	83	36.6	773	138	28	100	44.2	928
200	106	20	74	31.4	861	121	21	82	33	903	138	28	99	40.4	1,070
250	106	20	72	26	1,164	121	21	80	27.5	1,213	138	28	97	34.2	1,405
300	106	20	71	22.1	1,492	121	21	79	23.4	1,548	138	28	95	29.5	1,764
350	106	20	70	19.2	1,717	121	21	78	20.4	1,777	138	28	94	25.9	2,008
400	106	20	69	17	2,111	121	21	77	18	2,176	138	28	93	23	2,431
450	106	20	69	15.2	2,545	121	21	76	16.1	2,617	138	28	92	20.7	2,896
500	106	20	68	13.7	3,019	121	21	75	14.6	3,097	138	28	91	18.8	3,400
550	106	20	67	12.5	3,534	121	21	75	13.3	3,619	138	28	90	17.2	3,946
600	106	20	67	11.5	4,090	121	21	74	12.2	4,181	138	28	89	15.8	4,532
650	106	20	66	10.6	4,686	121	21	73	11.3	4,783	138	28	89	14.7	5,158
700	106	20	66	9.9	5,322	121	21	73	10.5	5,426	138	28	88	13.7	5,825
750	106	20	66	9.2	5,999	121	21	72	9.8	6,110	138	28	87	12.8	6,533
800	106	20	65	8.7	6,717	121	21	72	9.2	6,834	138	28	87	12	7,281
850	106	20	65	8.2	7,475	121	21	72	8.7	7,598	138	28	86	11.3	8,069
900	106	20	64	7.7	8,274	121	21	71	8.2	8,404	138	28	86	10.7	8,898
1000	106	20	64	7	9,993	121	21	71	7.4	10,136	138	28	85	9.6	10,678
1100	106	20	63	6.3	11,652	121	21	70	6.7	11,805	138	28	84	8.8	12,390
1200	106	20	63	5.8	13,623	121	21	69	6.2	13,789	138	28	84	8.1	14,420
1300	106	20	62	5.4	15,770	121	21	69	5.7	15,948	138	28	83	7.5	16,627
1400	106	20	62	5	18,074	121	21	68	5.3	18,265	138	28	83	6.9	18,991
1500	106	20	62	4.6	20,536	121	21	68	5	20,739	138	28	82	6.5	21,512

Recommended sizes
Further possible sizes

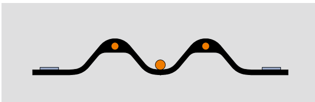
Reduction of movement for expansion joints with PTFE lining: axial compression: -33 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %. In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29). Angular movement only possible with guided external support ring. For larger movements see type B131 or B134.

Customised products available



B122

> with embedded vacuum rings



B125

> with embedded vacuum rings, with external support ring

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Installation gap

	L_0 = 125 mm					L_0 = 150 mm					L_0 = 175 mm				
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	41	5	38	29.2	76	52	12	57	54.5	129	58	12	63	56.0	137
65	41	5	37	23.3	102	52	12	56	47.1	163	58	12	61	48.7	172
80	41	5	37	19.3	126	52	12	55	41.2	193	58	12	60	42.8	203
100	41	5	36	15.6	182	52	12	54	35.0	261	58	12	59	36.5	273
125	41	5	35	12.6	248	52	12	53	29.2	339	58	12	58	30.6	352
150	41	5	35	10.6	334	52	12	52	25.0	439	58	12	57	26.3	454
175	41	5	34	9.1	422	52	12	51	21.8	538	58	12	56	22.9	554
200	41	5	34	8.0	519	52	12	51	19.3	647	58	12	55	20.3	666
250	41	5	33	6.4	760	52	12	50	15.6	913	58	12	54	16.5	935
300	41	5	32	5.3	1,029	52	12	49	13.1	1,206	58	12	53	13.9	1,231
350	41	5	32	4.6	1,217	52	12	48	11.3	1,409	58	12	52	11.9	1,436
400	41	5	32	4.0	1,551	52	12	48	9.9	1,768	58	12	52	10.5	1,798
450	41	5	31	3.6	1,926	52	12	47	8.8	2,166	58	12	51	9.3	2,200
500	41	5	31	3.2	2,341	52	12	47	8.0	2,606	58	12	51	8.4	2,642
550	41	5	31	2.9	2,797	52	12	46	7.3	3,086	58	12	50	7.7	3,125
600	41	5	30	2.7	3,294	52	12	46	6.7	3,606	58	12	50	7.0	3,649
650	41	5	30	2.5	3,831	52	12	45	6.1	4,167	58	12	50	6.5	4,213
700	41	5	30	2.3	4,408	52	12	45	5.7	4,769	58	12	49	6.0	4,818
750	41	5	30	2.1	5,027	52	12	45	5.3	5,411	58	12	49	5.6	5,463
800	41	5	30	2.0	5,685	52	12	45	5.0	6,093	58	12	49	5.3	6,149
850	41	5	30	1.9	6,384	52	12	44	4.7	6,816	58	12	48	5.0	6,875
900	41	5	29	1.8	7,124	52	12	44	4.4	7,580	58	12	48	4.7	7,642
1000	41	5	29	1.6	8,725	52	12	44	4.0	9,229	58	12	48	4.2	9,297
1100	41	5	29	1.5	10,279	52	12	43	3.6	10,825	58	12	47	3.8	10,899
1200	41	5	29	1.3	12,135	52	12	43	3.3	12,728	58	12	47	3.5	12,808
1300	41	5	28	1.2	14,166	52	12	43	3.1	14,806	58	12	47	3.3	14,892
1400	41	5	28	1.1	16,354	52	12	42	2.9	17,041	58	12	46	3.0	17,134
1500	41	5	28	1.1	18,699	52	12	42	2.7	19,433	58	12	46	2.8	19,532

Installation gap

	L_0 = 200 mm					L_0 = 225 mm					L_0 = 250 mm				
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	70	19	82	66	207	80	19	89	66	207	91	26	108	72	290
65	70	19	80	60.3	249	80	19	87	60.3	249	91	26	106	67.4	340
80	70	19	78	54.9	286	80	19	85	54.9	286	91	26	104	62.9	383
100	70	19	77	48.7	367	80	19	84	48.7	367	91	26	102	57.3	476
125	70	19	75	42.4	459	80	19	82	42.4	459	91	26	100	51.3	580
150	70	19	74	37.2	574	80	19	81	37.2	574	91	26	98	46.1	708
175	70	19	73	33.1	687	80	19	79	33.1	687	91	26	97	41.7	833
200	70	19	72	29.7	810	80	19	79	29.7	810	91	26	95	38	968
250	70	19	71	24.5	1,104	80	19	77	24.5	1,104	91	26	94	32	1,288
300	70	19	69	20.8	1,425	80	19	76	20.8	1,425	91	26	92	27.5	1,632
350	70	19	69	18	1,645	80	19	75	18	1,645	91	26	91	24	1,867
400	70	19	68	15.9	2,030	80	19	74	15.9	2,030	91	26	90	21.3	2,277
450	70	19	67	14.2	2,456	80	19	73	14.2	2,456	91	26	89	19.1	2,727
500	70	19	66	12.8	2,922	80	19	72	12.8	2,922	91	26	88	17.3	3,217
550	70	19	66	11.7	3,429	80	19	72	11.7	3,429	91	26	87	15.8	3,748
600	70	19	65	10.8	3,977	80	19	71	10.8	3,977	91	26	86	14.6	4,319
650	70	19	65	9.9	4,565	80	19	71	9.9	4,565	91	26	86	13.5	4,931
700	70	19	64	9.2	5,194	80	19	70	9.2	5,194	91	26	85	12.6	5,584
750	70	19	64	8.6	5,863	80	19	70	8.6	5,863	91	26	85	11.7	6,277
800	70	19	64	8.1	6,573	80	19	69	8.1	6,573	91	26	84	11	7,011
850	70	19	63	7.6	7,323	80	19	69	7.6	7,323	91	26	84	10.4	7,785
900	70	19	63	7.2	8,114	80	19	68	7.2	8,114	91	26	83	9.8	8,600
1000	70	19	62	6.5	9,817	80	19	68	6.5	9,817	91	26	82	8.9	10,351
1100	70	19	62	5.9	11,461	80	19	67	5.9	11,461	91	26	82	8.1	12,037
1200	70	19	61	5.4	13,417	80	19	67	5.4	13,417	91	26	81	7.4	14,040
1300	70	19	61	5	15,548	80	19	66	5	15,548	91	26	81	6.8	16,218
1400	70	19	60	4.7	17,837	80	19	66	4.7	17,837	91	26	80	6.4	18,554
1500	70	19	60	4.3	20,283	80	19	65	4.3	20,283	91	26	79	5.9	21,047

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining: axial compression: -0 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %. In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29). Angular movement only possible with guided external support ring. For larger movements see type B132 or B135.

Customised products available

B130 B140 B150

Ø 50 - 5,000 mm

⌀ 6,000 x 3,000 mm

- **Type B130 B140 B150**
  without vacuum rings
- **Type B131 B141 B151**
  with internal vacuum rings
- **Type B132 B142 B152**
  with embedded vacuum rings
- **Type B133 B143 B153**
  without vacuum rings,
  with external support rings
- **Type B134 B144 B154**
  with internal vacuum rings,
  with external support rings
- **Type B135 B145 B155**
  with embedded vacuum rings,
  with external support rings

Type key > page 22
B1 3 3
Support ring variant
Number of arches
Type

Universal expansion joint with three or more arches

Design: Streamlined, triple or multiple wide arch slip-on sleeve type rubber bellows, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and fixing clamps. Optional with vacuum rings and/or external support rings. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87. Available in split-wrap or custom offset arrangements.

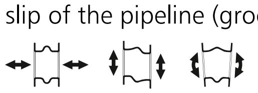
Diameters: Ø 50 to 5,000 mm, custom diameters possible

Length: = Installation gap + 2 x fixing width
Installation gaps L_0 = 600 mm with 3 arches, type B130
Installation gaps L_0 = 800 mm with 4 arches, type B140
Installation gaps L_0 = 1,000 mm with 5 arches, type B150
(> page 191–193)
Custom length on request

Fixing width: At least 40 mm
Depends on pressure, diameter and clamp type

Pressure: Up to 6 bar depending on diameter and length
Vacuum not allowed without vacuum rings, with vacuum rings up to 0.05 bar absolute

Movement: For very large axial, lateral and angular movements
For axial extension or vacuum, the expansion joint can slip of the pipeline (groove as needed at the pipeline end)


(> page 191–193)

Application:
Power plants, plant construction, food processing, wastewater treatment plants, industrial facilities, e. g. to disconnect pipelines, on oscillating conveyor systems, on sieving machines

PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

ditec MEMBER OF THE ELAFLEX GROUP

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 191–193)

Clamps

Design: Depending on pressure and the diameter, endless clamp belt, screw thread belt, small clamps or hinge bolt clamps. At higher pressures, 2 parallel clamps per side

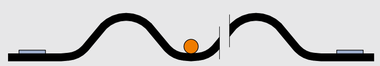
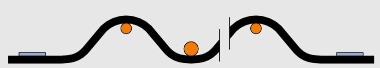
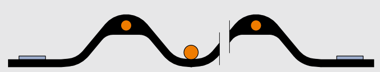
Width:

Endless clamp belt:	¾"
Screw thread belt:	½"
Small clamp:	depending on Ø: 9–12 mm
Hinge bolt clamp:	depending on Ø: 18–30 mm

Materials:

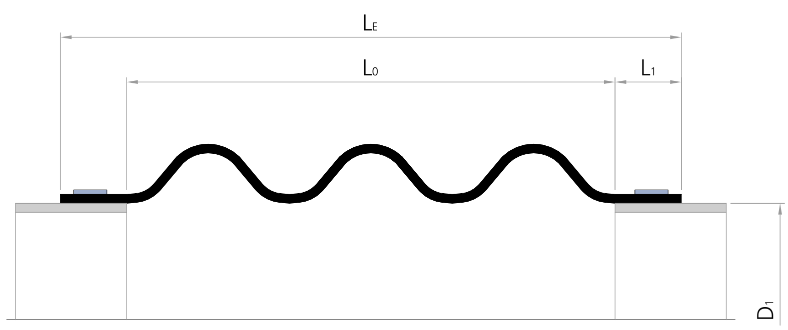
Endless clamp belt with screw lugs (tongs):	1.7300
Screw thread belt with threaded screw lugs:	1.4310
Small clamp, belt and housing:	1.4016 (Screw steel galvanised)
Hinge bolt clamp, belt and housing:	1.4016 (Screw steel galvanised)

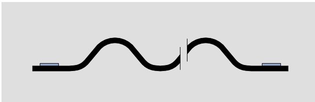
Support rings

TYPE	Support rings	Vacuum ring	Support ring	Pressure	Movement
B130 B140 B150		None	None	Low pressure, vacuum stability on request	> page 191
B131 B141 B151		Medium contact, inside the arch	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 192
B132 B142 B152		No medium contact, embedded in the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 193
B133 B143 B153		None	External between the arches	Depending on the diameter up to 6 bar, slight vacuum	> page 191
B134 B144 B154		Medium contact, inside the arch	External between the arches	Depending on the diameter up to 6 bar, for vacuum up to 0.05 bar absolute	> page 192
B135 B145 B155		No medium contact, embedded in the arches	External between the arches	Depending on the diameter up to 6 bar, for vacuum up to 0.05 bar absolute	> page 193

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

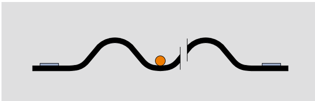
Cross section B130





B130 B140 B150

> without vacuum rings



B133 B143 B153

> without vacuum rings, with external support rings

Installation gap

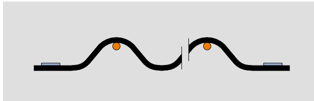
Ø	L_0 = 600 mm – B130 B133					L_0 = 800 mm – B140 B143					L_0 = 1000 mm – B150 B153				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm^2	mm	mm	±mm	±°	cm^2	mm	mm	±mm	±°	cm^2
50	159	92	126	74.8	233	212	123	168	78.5	233	265	154	210	80.8	233
65	159	92	123	70.5	278	212	123	164	75.2	278	265	154	205	78.1	278
80	159	92	121	66.5	317	212	123	161	72.0	317	265	154	201	75.4	317
100	159	92	118	61.5	402	212	123	158	67.9	402	265	154	197	72.0	402
125	159	92	116	55.8	498	212	123	154	63.1	498	265	154	193	67.9	498
150	159	92	114	50.8	617	212	123	152	58.6	617	265	154	190	64.0	617
175	159	92	112	46.4	734	212	123	150	54.6	734	265	154	187	60.4	734
200	159	92	111	42.6	861	212	123	148	50.9	861	265	154	185	57.0	861
250	159	92	109	36.4	1,164	212	123	145	44.5	1,164	265	154	181	50.9	1,164
300	159	92	107	31.5	1,492	212	123	143	39.4	1,492	265	154	178	45.8	1,492
350	159	92	105	27.7	1,717	212	123	141	35.1	1,717	265	154	176	41.3	1,717
400	159	92	104	24.7	2,111	212	123	139	31.6	2,111	265	154	174	37.6	2,111
450	159	92	103	22.2	2,545	212	123	137	28.7	2,545	265	154	172	34.4	2,545
500	159	92	102	20.2	3,019	212	123	136	26.2	3,019	265	154	170	31.6	3,019
550	159	92	101	18.5	3,534	212	123	135	24.1	3,534	265	154	169	29.2	3,534
600	159	92	100	17.0	4,090	212	123	134	22.3	4,090	265	154	167	27.2	4,090
650	159	92	100	15.8	4,686	212	123	133	20.7	4,686	265	154	166	25.4	4,686
700	159	92	99	14.7	5,322	212	123	132	19.4	5,322	265	154	165	23.7	5,322
750	159	92	98	13.8	5,999	212	123	131	18.2	5,999	265	154	164	22.3	5,999
800	159	92	98	13.0	6,717	212	123	130	17.1	6,717	265	154	163	21.1	6,717
850	159	92	97	12.2	7,475	212	123	130	16.1	7,475	265	154	162	19.9	7,475
900	159	92	97	11.6	8,274	212	123	129	15.3	8,274	265	154	161	18.9	8,274
1000	159	92	96	10.4	9,993	212	123	128	13.8	9,993	265	154	160	17.1	9,993
1100	159	92	95	9.5	11,652	212	123	127	12.6	11,652	265	154	158	15.6	11,652
1200	159	92	94	8.7	13,623	212	123	126	11.6	13,623	265	154	157	14.4	13,623
1300	159	92	94	8.1	15,770	212	123	125	10.7	15,770	265	154	156	13.3	15,770
1400	159	92	93	7.5	18,074	212	123	124	10.0	18,074	265	154	155	12.4	18,074
1500	159	92	92	7.0	20,536	212	123	123	9.3	20,536	265	154	154	11.6	20,536

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %; angular movement: -66 %.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Angular movement only possible with guided external support ring.
Larger movements on request.

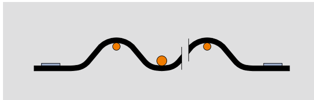
Customised products available

Multi-arch clamped rubber sleeve,
external support rings with lugs for guidance



B131 B141 B151

> with internal vacuum rings



B134 B144 B154

> with internal vacuum rings, with external support rings

Installation gap

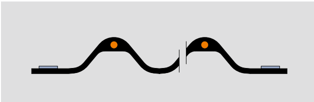
	L_0 = 600 mm – B131 B134					L_0 = 800 mm – B141 B144					L_0 = 1000 mm – B151 B154				
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	159	30	126	74.8	233	212	41	168	78.5	233	265	51	210	80.8	233
65	159	30	123	70.5	278	212	41	164	75.2	278	265	51	205	78.1	278
80	159	30	121	66.5	317	212	41	161	72.0	317	265	51	201	75.4	317
100	159	30	118	61.5	402	212	41	158	67.9	402	265	51	197	72.0	402
125	159	30	116	55.8	498	212	41	154	63.1	498	265	51	193	67.9	498
150	159	30	114	50.8	617	212	41	152	58.6	617	265	51	190	64.0	617
175	159	30	112	46.4	734	212	41	150	54.6	734	265	51	187	60.4	734
200	159	30	111	42.6	861	212	41	148	50.9	861	265	51	185	57.0	861
250	159	30	109	36.4	1,164	212	41	145	44.5	1,164	265	51	181	50.9	1,164
300	159	30	107	31.5	1,492	212	41	143	39.4	1,492	265	51	178	45.8	1,492
350	159	30	105	27.7	1,717	212	41	141	35.1	1,717	265	51	176	41.3	1,717
400	159	30	104	24.7	2,111	212	41	139	31.6	2,111	265	51	174	37.6	2,111
450	159	30	103	22.2	2,545	212	41	137	28.7	2,545	265	51	172	34.4	2,545
500	159	30	102	20.2	3,019	212	41	136	26.2	3,019	265	51	170	31.6	3,019
550	159	30	101	18.5	3,534	212	41	135	24.1	3,534	265	51	169	29.2	3,534
600	159	30	100	17.0	4,090	212	41	134	22.3	4,090	265	51	167	27.2	4,090
650	159	30	100	15.8	4,686	212	41	133	20.7	4,686	265	51	166	25.4	4,686
700	159	30	99	14.7	5,322	212	41	132	19.4	5,322	265	51	165	23.7	5,322
750	159	30	98	13.8	5,999	212	41	131	18.2	5,999	265	51	164	22.3	5,999
800	159	30	98	13.0	6,717	212	41	130	17.1	6,717	265	51	163	21.1	6,717
850	159	30	97	12.2	7,475	212	41	130	16.1	7,475	265	51	162	19.9	7,475
900	159	30	97	11.6	8,274	212	41	129	15.3	8,274	265	51	161	18.9	8,274
1000	159	30	96	10.4	9,993	212	41	128	13.8	9,993	265	51	160	17.1	9,993
1100	159	30	95	9.5	11,652	212	41	127	12.6	11,652	265	51	158	15.6	11,652
1200	159	30	94	8.7	13,623	212	41	126	11.6	13,623	265	51	157	14.4	13,623
1300	159	30	94	8.1	15,770	212	41	125	10.7	15,770	265	51	156	13.3	15,770
1400	159	30	93	7.5	18,074	212	41	124	10.0	18,074	265	51	155	12.4	18,074
1500	159	30	92	7.0	20,536	212	41	123	9.3	20,536	265	51	154	11.6	20,536

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Angular movement only possible with guided external support ring.
Larger movements on request.

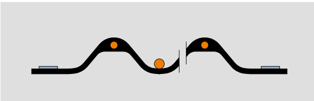
Customised products available

Sleeve type rubber bellow with built in off-set



B132 B142 B152

> with embedded vacuum rings



B135 B145 B155

> with embedded vacuum rings, with external support rings

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Installation gap

∅	L_0 = 600 mm – B132 B135					L_0 = 800 mm – B142 B145					L_0 = 1000 mm – B152 B155				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
50	105	28	123	73.8	207	140	38	164	77.7	207	175	47	204	80.1	207
65	105	28	120	69.3	249	140	38	160	74.2	249	175	47	200	77.2	249
80	105	28	118	65.1	286	140	38	157	70.8	286	175	47	196	74.4	286
100	105	28	115	59.8	367	140	38	154	66.5	367	175	47	192	70.7	367
125	105	28	113	54.0	459	140	38	150	61.5	459	175	47	188	66.4	459
150	105	28	111	48.9	574	140	38	148	56.9	574	175	47	185	62.3	574
175	105	28	109	44.5	687	140	38	146	52.7	687	175	47	182	58.5	687
200	105	28	108	40.7	810	140	38	144	49.0	810	175	47	180	55.0	810
250	105	28	106	34.5	1,104	140	38	141	42.6	1,104	175	47	177	48.8	1,104
300	105	28	104	29.8	1,425	140	38	139	37.5	1,425	175	47	174	43.6	1,425
350	105	28	103	26.2	1,645	140	38	137	33.3	1,645	175	47	171	39.3	1,645
400	105	28	102	23.3	2,030	140	38	135	29.9	2,030	175	47	169	35.6	2,030
450	105	28	100	20.9	2,456	140	38	134	27.1	2,456	175	47	167	32.4	2,456
500	105	28	99	19.0	2,922	140	38	133	24.7	2,922	175	47	166	29.8	2,922
550	105	28	99	17.4	3,429	140	38	132	22.7	3,429	175	47	164	27.5	3,429
600	105	28	98	16.0	3,977	140	38	130	21.0	3,977	175	47	163	25.5	3,977
650	105	28	97	14.8	4,565	140	38	130	19.5	4,565	175	47	162	23.7	4,565
700	105	28	96	13.8	5,194	140	38	129	18.2	5,194	175	47	161	22.2	5,194
750	105	28	96	12.9	5,863	140	38	128	17.0	5,863	175	47	160	20.9	5,863
800	105	28	95	12.1	6,573	140	38	127	16.0	6,573	175	47	159	19.7	6,573
850	105	28	95	11.4	7,323	140	38	126	15.1	7,323	175	47	158	18.6	7,323
900	105	28	94	10.8	8,114	140	38	126	14.3	8,114	175	47	157	17.6	8,114
1000	105	28	93	9.8	9,817	140	38	125	13.0	9,817	175	47	156	16.0	9,817
1100	105	28	93	8.9	11,461	140	38	123	11.8	11,461	175	47	154	14.6	11,461
1200	105	28	92	8.2	13,417	140	38	123	10.9	13,417	175	47	153	13.4	13,417
1300	105	28	91	7.5	15,548	140	38	122	10.0	15,548	175	47	152	12.4	15,548
1400	105	28	91	7.0	17,837	140	38	121	9.3	17,837	175	47	151	11.5	17,837
1500	105	28	90	6.5	20,283	140	38	120	8.7	20,283	175	47	150	10.8	20,283

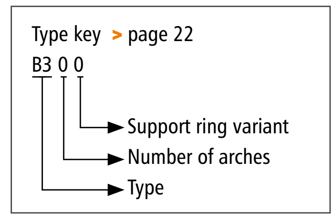
Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -0 %; axial extension: -0 %; lateral displacement: -50 %; angular movement: -0 %.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Angular movement only possible with guided external support ring.
Larger movements on request.

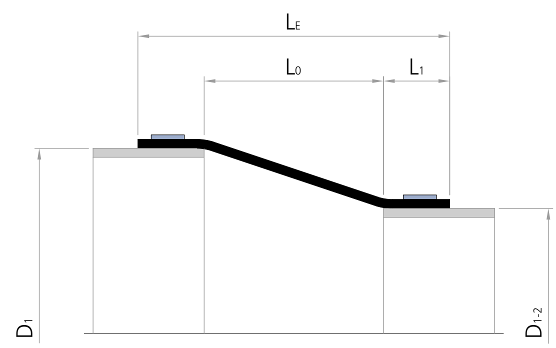
Customised products available

B300 ∅ 50 - 5,000 mm

> Type B300



Cross section B300



Concentric or eccentric reducing expansion joint

Design: Streamlined, concentric or eccentric reducer slip-on sleeve type rubber bellows, designed to compensate all directional movements, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and fixing clamps. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87. Available in split-wrap or custom offset arrangements.

Diameters: ∅ 50 to 5,000 mm, custom diameters and combinations possible

Length: = Installation gap + 2 x fixing width
L_0 = 75 to 2,100 mm (standard installation gaps) (> page 196)
Custom length on request

Fixing width: At least 40 mm
Depends on pressure, diameter and clamp type

Pressure: Up to 1 bar depending on diameter and length
Vacuum stability on request

Movement: For low axial compression and lateral movements
For vacuums, the expansion joint can slip of the pipeline (groove as needed at the pipeline end)
(> page 196)

Application:
Power plants, plant construction, food processing, wastewater treatment plants, industrial facilities, e. g. to disconnect pipelines, on oscillating conveyor systems, on sieving machines

PED 2014/68/EU KTW WRAS FDA <10⁹ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Clamps

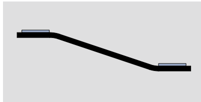
Design: Depending on pressure and diameters, endless clamp belt, screw thread belt, small clamps or hinge bolt clamps. At higher pressures, 2 parallel clamps per side

Width:

Endless clamp belt:	¾″
Screw thread belt:	½″
Small clamp:	depending on Ø: 9–12 mm
Hinge bolt clamp:	depending on Ø: 18–30 mm

Materials:

Endless clamp belt with screw lugs (tongs):	1.7300
Screw thread belt with threaded screw lugs:	1.4310
Small clamp, belt and housing:	1.4016 (Screw steel galvanised)
Hinge bolt clamp, belt and housing:	1.4016 (Screw steel galvanised)



B300

> concentric

Potential combination			Movement		
Ø D1 mm	Ø D1-2	Gap mm	mm	mm	±mm
100	80	60	1	0	2
125	80	135	2	0	4
	100	75	1	0	2
150	80	210	3	0	6
	100	150	2	0	4
	125	75	1	0	2
200	80	360	6	0	10
	100	300	5	0	8
	125	225	4	0	6
	150	150	2	0	4
250	80	510	8	0	13
	100	450	7	0	11
	125	375	6	0	9
	150	300	5	0	8
	200	150	3	0	4
300	80	660	11	0	16
	100	600	10	0	14
	125	525	9	0	13
	150	450	8	0	11
	200	300	5	0	7
	250	150	3	0	4
350	80	810	14	0	19
	100	750	13	0	17
	125	675	12	0	16
	150	600	10	0	14
	200	450	8	0	10
	250	300	5	0	7
	300	150	3	0	3
400	100	900	16	0	20
	125	825	15	0	18
	150	750	13	0	17
	200	600	11	0	13
	250	450	8	0	10
	300	300	6	0	7
	350	150	3	0	3
500	150	1050	19	0	22
	200	900	17	0	19
	250	750	14	0	16
	300	600	12	0	13
	350	450	9	0	10
	400	300	6	0	6
	450	150	3	0	3
600	200	1200	23	0	24
	250	1050	21	0	21
	300	900	18	0	18
	350	750	15	0	15
	400	600	12	0	12
	450	450	9	0	9
	500	300	6	0	6
700	250	1350	27	0	26
	300	1200	25	0	23
	350	1050	22	0	20
	400	900	19	0	17
	450	750	16	0	15
	500	600	13	0	12
	600	300	7	0	6
800	300	1500	32	0	28
	350	1350	29	0	25
	400	1200	26	0	23
	450	1050	23	0	20
	500	900	20	0	17
	600	600	13	0	11
	700	300	7	0	6

Potential combination			Movement		
Ø D1 mm	Ø D1-2	Gap mm	mm	mm	±mm
900	350	1650	36	0	30
	400	1500	33	0	27
	450	1350	30	0	25
	500	1200	27	0	22
	600	900	21	0	16
	700	600	14	0	11
	800	300	7	0	5
1000	400	1800	40	0	32
	450	1650	37	0	29
	500	1500	34	0	27
	600	1200	28	0	21
	700	900	21	0	16
	800	600	14	0	11
	900	300	7	0	5
1100	450	1950	45	0	34
	500	1800	42	0	31
	600	1500	36	0	26
	700	1200	29	0	21
	800	900	22	0	16
	900	600	15	0	10
	1000	300	8	0	5
1200	500	2100	50	0	36
	600	1800	43	0	31
	700	1500	37	0	25
	800	1200	30	0	20
	900	900	23	0	15
	1000	600	15	0	10
	1100	300	8	0	5
1300	600	2100	52	0	35
	700	1800	45	0	30
	800	1500	38	0	25
	900	1200	31	0	20
	1000	900	23	0	15
	1100	600	16	0	10
	1200	300	8	0	5
1400	700	2100	53	0	34
	800	1800	46	0	29
	900	1500	39	0	25
	1000	1200	32	0	20
	1100	900	24	0	15
	1200	600	16	0	10
	1300	300	8	0	5
1500	800	2100	55	0	34
	900	1800	47	0	29
	1000	1500	40	0	24
	1100	1200	32	0	19
	1200	900	25	0	14
	1300	600	17	0	10
	1400	300	8	0	5
1600	900	2100	56	0	33
	1000	1800	49	0	28
	1100	1500	41	0	24
	1200	1200	33	0	19
	1300	900	25	0	14
	1400	600	17	0	9
	1500	300	9	0	5

The specified movements may vary depending on the design pressure.

Customised products available

Concentric reducing expansion joint with zipper for maintenance service

Flexible silicone rubber reducer for large axial and lateral displacements

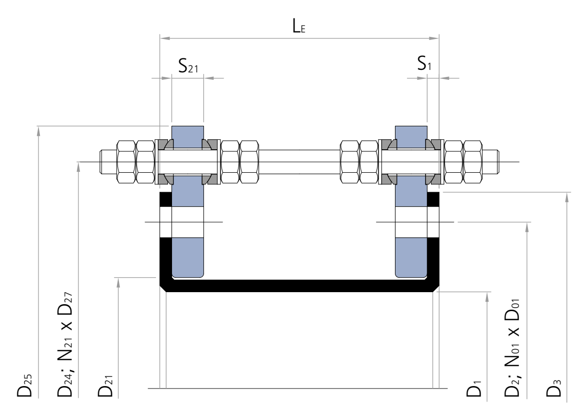
Lateral expansion joints with full faced rubber flange

U100... (Tie rod B/E/C/M/R/K/L) ø 80 - 4,000 mm

> Type U100M

Type key > page 22
U1 0 0 M
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section U100M



Lateral expansion joint without arch

Design: Streamlined, cylindrical rubber bellows with full faced rubber flanges, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single- or multi-part backing flanges with tie-rods borne in spherical washers. Optional with embedded support rings. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ∅ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 150 to 400 mm (> page 204–205)
Custom length on request

Pressure: Up to 16 bar depending on diameter and length
Vacuum stability on request

Movement: For low lateral movements*
(> page 204–205)

*Installation gap tolerances according to axial movement capability of the expansion joint

Application:
Plant construction, sand/gravel extraction industry, dredgers, food processing e. g. as suction/pressure hoses, in conveying lines, on pumps and vessels

PED 2014/68/EU KTW WRAS FDA <10⁶ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 204–205)

Backing flanges

Design: Single- or multi-part integral backing flanges with clearance holes and tie rod holders (tie rod type B, E, C, M)

Single- or multi-part backing flanges with clearance holes and tie rod gusset plates (tie rod type R, K, L)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

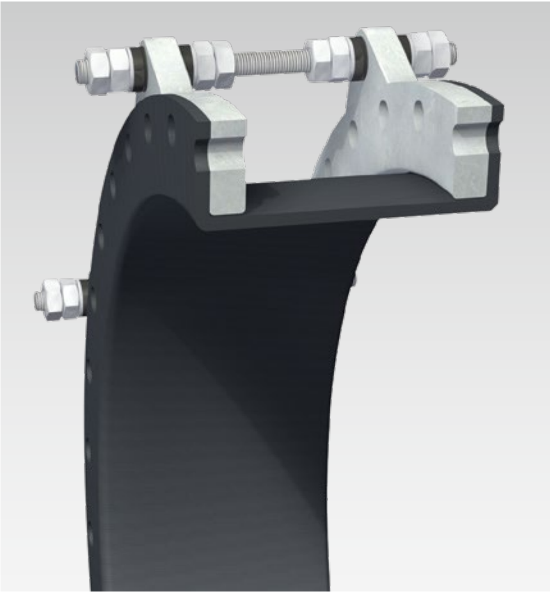
Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Tie rods

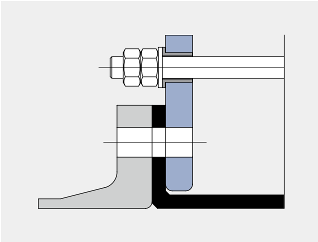


Example: Type U100M

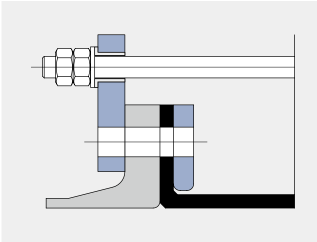
Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

Materials: Carbon steel
Stainless steel

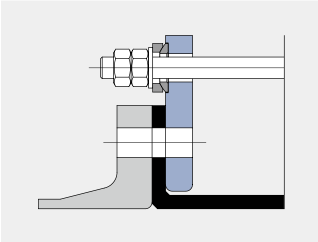
Coating: Spherical washers/ball disks: PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated



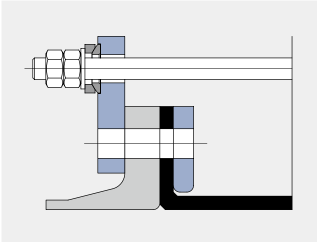
Type U100B
Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



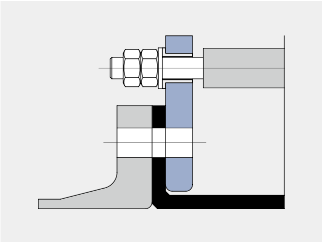
Type U100R
Gusset plates: Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



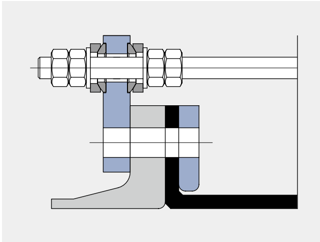
Type U100E
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



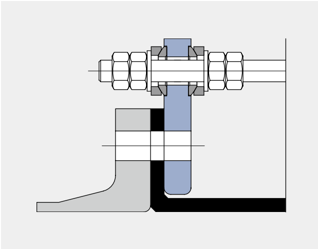
Type U100K
Gusset plates: Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



Type U100C
Tie rods mounted outside in rubber bushing and inside with compression sleeve to accommodate pressure thrust forces

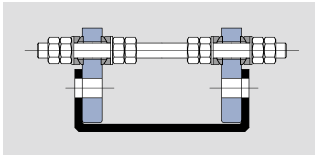


Type U100L
Gusset plates: Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces



Type U100M
Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces

Large bore lateral rubber expansion joint, type U110M
GRP pipe ∅ 3,600 mm of a utility plant
work-shop hydraulic test at 13 bar



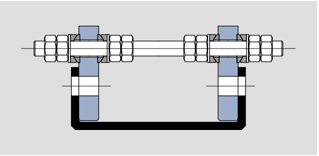
U100... (Tie rod B/E/C/M/R/K/L)

> without arch

Installation length (L_E) at design pressure															
	up to 10 bar L_E = 150 mm					up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	8	5	10	0	79	10	6	13	0	79	13	8	17	0	79
125	8	5	10	0	123	10	6	13	0	123	13	8	16	0	123
150	8	5	9	0	177	10	6	12	0	177	13	8	15	0	177
175	8	5	9	0	254	10	6	12	0	254	13	8	15	0	254
200	8	5	9	0	314	10	6	12	0	314	13	8	14	0	314
250	8	5	8	0	491	10	6	11	0	491	13	8	14	0	491
300	8	5	8	0	716	10	6	11	0	716	13	8	13	0	716
350	8	5	8	0	990	10	6	10	0	990	13	8	13	0	990
400	8	5	8	0	1,269	10	6	10	0	1,269	13	8	13	0	1,269
450	8	5	7	0	1,612	10	6	10	0	1,612	13	8	12	0	1,612
500	8	5	7	0	1,987	10	6	10	0	1,987	13	8	12	0	1,987
550	8	5	7	0	2,376	10	6	9	0	2,376	13	8	12	0	2,376
600	8	5	7	0	2,856	10	6	9	0	2,856	13	8	12	0	2,856
650	8	5	7	0	3,318	10	6	9	0	3,318	13	8	11	0	3,318
700	8	5	7	0	3,893	10	6	9	0	3,893	13	8	11	0	3,893
750	8	5	7	0	4,418	10	6	9	0	4,418	13	8	11	0	4,418
800	8	5	7	0	5,090	10	6	9	0	5,090	13	8	11	0	5,090
850	8	5	6	0	5,675	10	6	9	0	5,675	13	8	11	0	5,675
900	8	5	6	0	6,433	10	6	9	0	6,433	13	8	11	0	6,433
950	8	5	6	0	7,088	10	6	8	0	7,088	13	8	11	0	7,088
1000	8	5	6	0	7,933	10	6	8	0	7,933	13	8	10	0	7,933
1050	8	5	6	0	8,659	10	6	8	0	8,659	13	8	10	0	8,659
1100	8	5	6	0	9,607	10	6	8	0	9,607	13	8	10	0	9,607
1150	8	5	6	0	10,387	10	6	8	0	10,387	13	8	10	0	10,387
1200	8	5	6	0	11,404	10	6	8	0	11,404	13	8	10	0	11,404
1250	8	5	6	0	12,272	10	6	8	0	12,272	13	8	10	0	12,272
1300	8	5	6	0	13,376	10	6	8	0	13,376	13	8	10	0	13,376
1350	8	5	6	0	14,314	10	6	8	0	14,314	13	8	10	0	14,314
1400	8	5	6	0	15,504	10	6	8	0	15,504	13	8	10	0	15,504
1450	8	5	6	0	16,513	10	6	8	0	16,513	13	8	10	0	16,513
1500	8	5	6	0	17,789	10	6	8	0	17,789	13	8	10	0	17,789
1600	8	5	6	0	20,232	10	6	8	0	20,232	13	8	10	0	20,232
1650	8	5	6	0	21,382	10	6	8	0	21,382	13	8	9	0	21,382
1700	8	5	6	0	22,832	10	6	8	0	22,832	13	8	9	0	22,832
1800	8	5	6	0	25,617	10	6	7	0	25,617	13	8	9	0	25,617
1900	8	5	6	0	28,502	10	6	7	0	28,502	13	8	9	0	28,502
1950	8	5	5	0	29,865	10	6	7	0	29,865	13	8	9	0	29,865
2000	8	5	5	0	31,573	10	6	7	0	31,573	13	8	9	0	31,573
2100	8	5	5	0	34,801	10	6	7	0	34,801	13	8	9	0	34,801
2200	8	5	5	0	38,186	10	6	7	0	38,186	13	8	9	0	38,186
2250	8	5	5	0	39,761	10	6	7	0	39,761	13	8	9	0	39,761
2300	8	5	5	0	41,728	10	6	7	0	41,728	13	8	9	0	41,728
2400	8	5	5	0	45,428	10	6	7	0	45,428	13	8	9	0	45,428
2500	8	5	5	0	49,284	10	6	7	0	49,284	13	8	9	0	49,284
2550	8	5	5	0	51,071	10	6	7	0	51,071	13	8	9	0	51,071
2600	8	5	5	0	53,297	10	6	7	0	53,297	13	8	9	0	53,297
2700	8	5	5	0	57,468	10	6	7	0	57,468	13	8	9	0	57,468
2800	8	5	5	0	61,795	10	6	7	0	61,795	13	8	9	0	61,795
2850	8	5	5	0	63,794	10	6	7	0	63,794	13	8	8	0	63,794
2900	8	5	5	0	66,280	10	6	7	0	66,280	13	8	8	0	66,280
3000	8	5	5	0	70,922	10	6	7	0	70,922	13	8	8	0	70,922
3100	8	5	5	0	75,720	10	6	7	0	75,720	13	8	8	0	75,720
3150	8	5	5	0	77,931	10	6	7	0	77,931	13	8	8	0	77,931
3200	8	5	5	0	80,676	10	6	7	0	80,676	13	8	8	0	80,676
3300	8	5	5	0	85,789	10	6	7	0	85,789	13	8	8	0	85,789
3400	8	5	5	0	91,059	10	6	7	0	91,059	13	8	8	0	91,059
3450	8	5	5	0	93,482	10	6	7	0	93,482	13	8	8	0	93,482
3600	8	5	5	0	102,071	10	6	6	0	102,071	13	8	8	0	102,071
3800	8	5	5	0	113,710	10	6	6	0	113,710	13	8	8	0	113,710
4000	8	5	5	0	125,978	10	6	6	0	125,978	13	8	8	0	125,978

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %.
Larger movements see type U110x.



U100... (Tie rod B/E/C/M/R/K/L)

> without arch

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Installation length (L_E) at design pressure															
up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm^2	mm	mm	±mm	±°	cm^2	mm	mm	±mm	±°	cm^2	mm
15	9	20	0	79	18	11	23	0	79	20	12	27	0	79	**100**
15	9	19	0	123	18	11	22	0	123	20	12	25	0	123	**125**
15	9	18	0	177	18	11	21	0	177	20	12	24	0	177	**150**
15	9	18	0	254	18	11	21	0	254	20	12	24	0	254	**175**
15	9	17	0	314	18	11	20	0	314	20	12	23	0	314	**200**
15	9	17	0	491	18	11	19	0	491	20	12	22	0	491	**250**
15	9	16	0	716	18	11	19	0	716	20	12	21	0	716	**300**
15	9	15	0	990	18	11	18	0	990	20	12	21	0	990	**350**
15	9	15	0	1,269	18	11	18	0	1,269	20	12	20	0	1,269	**400**
15	9	15	0	1,612	18	11	17	0	1,612	20	12	20	0	1,612	**450**
15	9	14	0	1,987	18	11	17	0	1,987	20	12	19	0	1,987	**500**
15	9	14	0	2,376	18	11	17	0	2,376	20	12	19	0	2,376	**550**
15	9	14	0	2,856	18	11	16	0	2,856	20	12	19	0	2,856	**600**
15	9	14	0	3,318	18	11	16	0	3,318	20	12	18	0	3,318	**650**
15	9	13	0	3,893	18	11	16	0	3,893	20	12	18	0	3,893	**700**
15	9	13	0	4,418	18	11	16	0	4,418	20	12	18	0	4,418	**750**
15	9	13	0	5,090	18	11	15	0	5,090	20	12	18	0	5,090	**800**
15	9	13	0	5,675	18	11	15	0	5,675	20	12	17	0	5,675	**850**
15	9	13	0	6,433	18	11	15	0	6,433	20	12	17	0	6,433	**900**
15	9	13	0	7,088	18	11	15	0	7,088	20	12	17	0	7,088	**950**
15	9	13	0	7,933	18	11	15	0	7,933	20	12	17	0	7,933	**1000**
15	9	12	0	8,659	18	11	15	0	8,659	20	12	17	0	8,659	**1050**
15	9	12	0	9,607	18	11	14	0	9,607	20	12	16	0	9,607	**1100**
15	9	12	0	10,387	18	11	14	0	10,387	20	12	16	0	10,387	**1150**
15	9	12	0	11,404	18	11	14	0	11,404	20	12	16	0	11,404	**1200**
15	9	12	0	12,272	18	11	14	0	12,272	20	12	16	0	12,272	**1250**
15	9	12	0	13,376	18	11	14	0	13,376	20	12	16	0	13,376	**1300**
15	9	12	0	14,314	18	11	14	0	14,314	20	12	16	0	14,314	**1350**
15	9	12	0	15,504	18	11	14	0	15,504	20	12	16	0	15,504	**1400**
15	9	12	0	16,513	18	11	14	0	16,513	20	12	16	0	16,513	**1450**
15	9	12	0	17,789	18	11	14	0	17,789	20	12	15	0	17,789	**1500**
15	9	11	0	20,232	18	11	13	0	20,232	20	12	15	0	20,232	**1600**
15	9	11	0	21,382	18	11	13	0	21,382	20	12	15	0	21,382	**1650**
15	9	11	0	22,832	18	11	13	0	22,832	20	12	15	0	22,832	**1700**
15	9	11	0	25,617	18	11	13	0	25,617	20	12	15	0	25,617	**1800**
15	9	11	0	28,502	18	11	13	0	28,502	20	12	15	0	28,502	**1900**
15	9	11	0	29,865	18	11	13	0	29,865	20	12	15	0	29,865	**1950**
15	9	11	0	31,573	18	11	13	0	31,573	20	12	15	0	31,573	**2000**
15	9	11	0	34,801	18	11	13	0	34,801	20	12	14	0	34,801	**2100**
15	9	11	0	38,186	18	11	13	0	38,186	20	12	14	0	38,186	**2200**
15	9	11	0	39,761	18	11	12	0	39,761	20	12	14	0	39,761	**2250**
15	9	11	0	41,728	18	11	12	0	41,728	20	12	14	0	41,728	**2300**
15	9	11	0	45,428	18	11	12	0	45,428	20	12	14	0	45,428	**2400**
15	9	10	0	49,284	18	11	12	0	49,284	20	12	14	0	49,284	**2500**
15	9	10	0	51,071	18	11	12	0	51,071	20	12	14	0	51,071	**2550**
15	9	10	0	53,297	18	11	12	0	53,297	20	12	14	0	53,297	**2600**
15	9	10	0	57,468	18	11	12	0	57,468	20	12	14	0	57,468	**2700**
15	9	10	0	61,795	18	11	12	0	61,795	20	12	14	0	61,795	**2800**
15	9	10	0	63,794	18	11	12	0	63,794	20	12	14	0	63,794	**2850**
15	9	10	0	66,280	18	11	12	0	66,280	20	12	14	0	66,280	**2900**
15	9	10	0	70,922	18	11	12	0	70,922	20	12	13	0	70,922	**3000**
15	9	10	0	75,720	18	11	12	0	75,720	20	12	13	0	75,720	**3100**
15	9	10	0	77,931	18	11	12	0	77,931	20	12	13	0	77,931	**3150**
15	9	10	0	80,676	18	11	12	0	80,676	20	12	13	0	80,676	**3200**
15	9	10	0	85,789	18	11	12	0	85,789	20	12	13	0	85,789	**3300**
15	9	10	0	91,059	18	11	11	0	91,059	20	12	13	0	91,059	**3400**
15	9	10	0	93,482	18	11	11	0	93,482	20	12	13	0	93,482	**3450**
15	9	10	0	102,071	18	11	11	0	102,071	20	12	13	0	102,071	**3600**
15	9	10	0	113,710	18	11	11	0	113,710	20	12	13	0	113,710	**3800**
15	9	10	0	125,978	18	11	11	0	125,978	20	12	13	0	125,978	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available

U110... (Tie rod B/E/C/M/R/K/L) ø 80 - 4,000 mm

> **Type U110...** (Tie rod B/E/C/M/R/K/L) without vacuum ring

> **Type U111...** (Tie rod B/E/C/M/R/K/L) with internal vacuum ring

> **Type U112...** (Tie rod B/E/C/M/R/K/L) with embedded vacuum ring

Type key > page 22
U1 1 0 M
- Tie rod variant
- Support ring variants
- Number of arches
- Type

Lateral expansion joint with one arch

Design: Streamlined, single wide arch rubber bellows with full faced rubber flanges, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single- or multi-part backing flanges with tie-rods borne in spherical washers. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ∅ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 200 to 500 mm (> page 212–217)
Custom length on request

Pressure: Up to 100 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For lateral and angular (2 tie rod design) movements*
(> page 212–217)

Spring rate: Lateral spring rates (> page 296)

*Installation gap tolerances according to axial movement capability of the expansion joint

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

PED 2014/68/EU KTW WRAS FDA <10⁹ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows, available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 212–217)

Backing flanges

Design: Single- or multi-part integral backing flanges with support collar, clearance holes and tie rod holders (tie rod type B, E, C, M)

Single- or multi-part backing flanges with support collar, clearance holes and tie rod gusset plates (tie rod type R, K, L)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

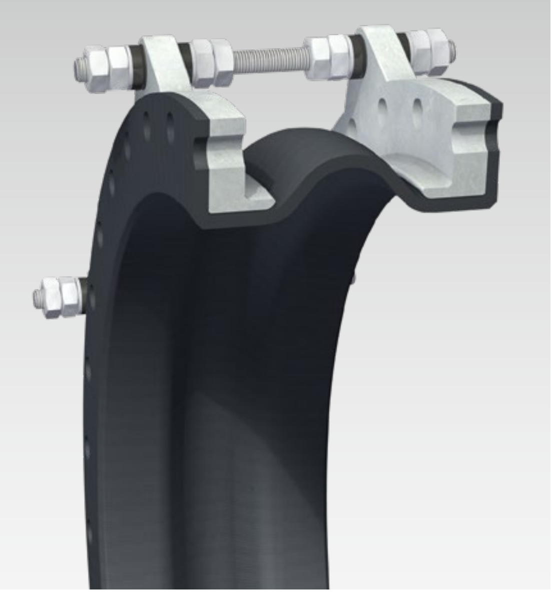
Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

> page 42)

Tie rods

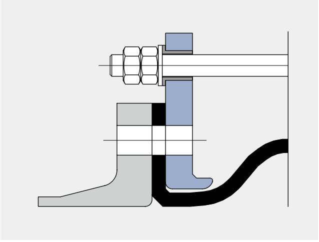


Example: Type U110M

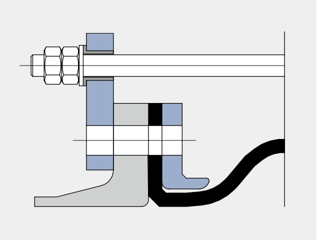
Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

Materials: Carbon steel
Stainless steel

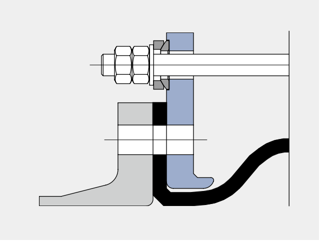
Coating: Spherical washers/ball disks: PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated



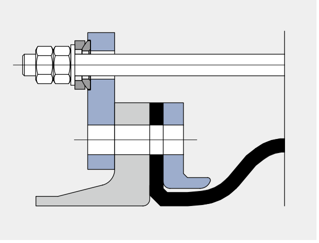
Type U110B
Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



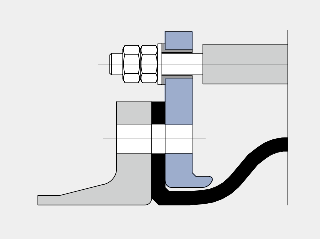
Type U110R
Gusset plates: Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



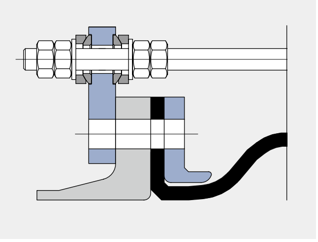
Type U110E
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



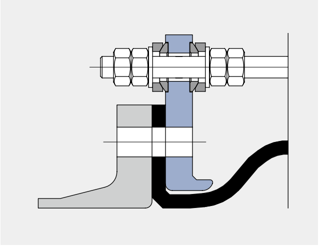
Type U110K
Gusset plates: Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



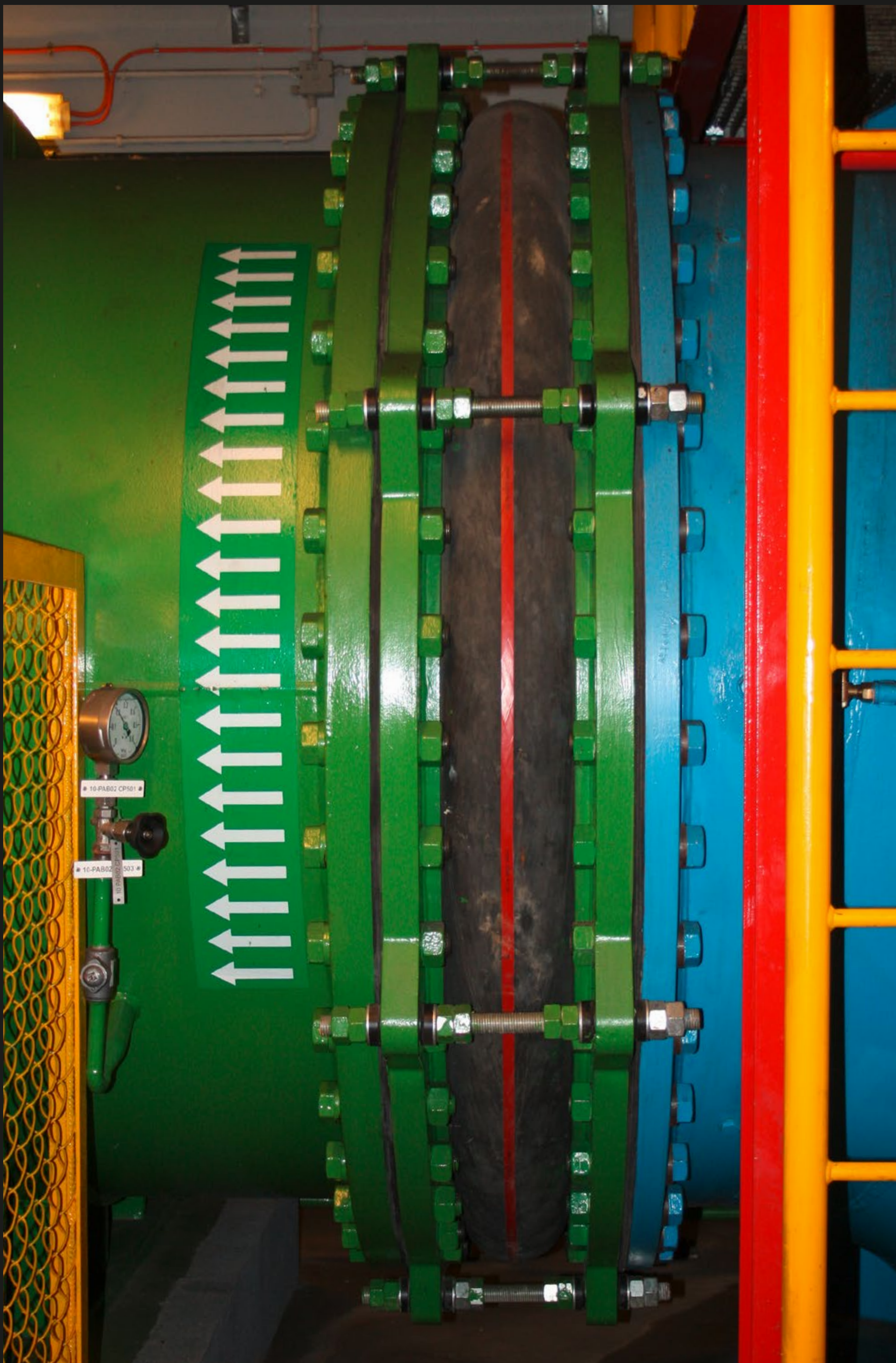
Type U110C
Tie rods mounted outside in rubber bushing and inside with compression sleeve to accommodate pressure/vacuum thrust forces



Type U110L
Gusset plates: Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces



Type U110M
Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces


10-PAB02 CP501

Sea water intake cooling water line ∅ 2,600 mm,
operating pressure 2.5 bar,
lateral tied rubber expansion joints of type U111M

EPDM rubber expansion joint ∅ 900 mm PN 16
designed according PED 2014/68/EU with aramid cord reinforcements,
design temperature 120° C

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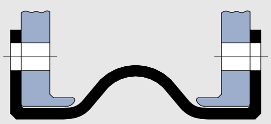
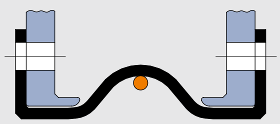
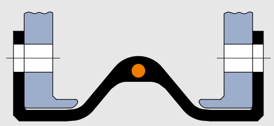
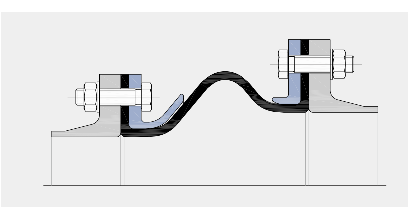
Support rings

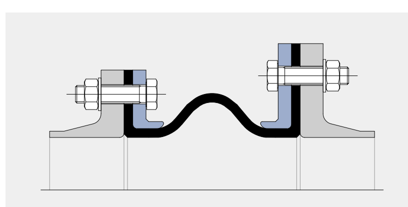
TYPE	Support rings	Vacuum ring	Pressure	Movement
U110...		None	Depending on the diameter up to 100 bar, vacuum stability on request	> page 212–213
U111...		Medium contact, inside the arch	Depending on the diameter up to 100 bar, for vacuum up to 0.05 bar absolute	> page 214–215
U112...		No medium contact, embedded in the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 216–217

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

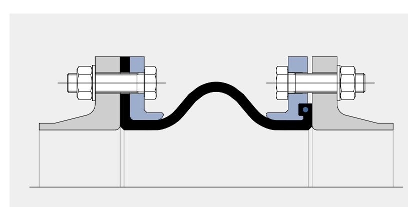
Specials



Customized reducer style

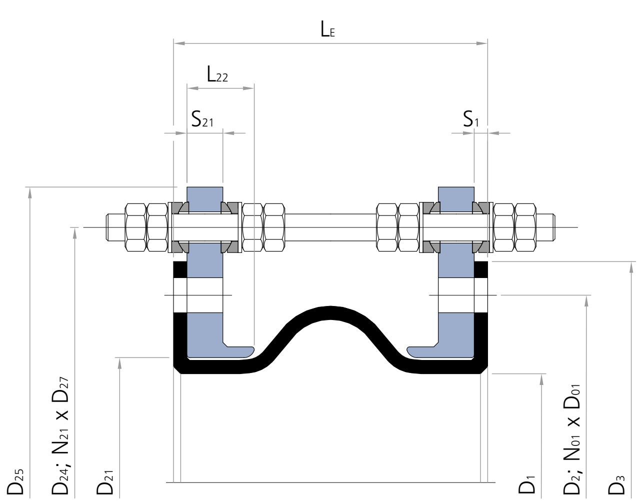


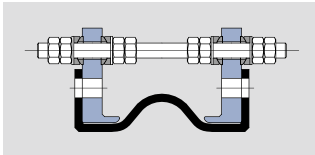
Different flange dimensions



Different end fitting

Cross section U110M





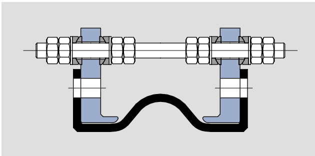
U110... (Tie rod B/E/C/M/R/K/L)

> without vacuum ring

Installation length (L_E) at design pressure															
	up to 4 bar L_E = 200 mm up to 6 bar L_E = 200 mm up to 10 bar L_E = 250 mm					up to 4 bar L_E = 200 mm up to 6 bar L_E = 250 mm up to 10 bar L_E = 300 mm					up to 4 bar L_E = 250 mm up to 6 bar L_E = 300 mm up to 10 bar L_E = 350 mm				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	26	11	18	0	177	31	10	19	0	177	40	20	28	0	254
125	26	11	17	0	241	31	10	19	0	241	40	20	28	0	330
150	26	11	17	0	314	31	10	18	0	314	40	20	27	0	415
175	26	11	17	0	415	31	10	18	0	415	40	20	27	0	531
200	26	11	17	0	491	31	10	18	0	491	40	20	26	0	616
250	26	11	16	0	707	31	10	18	0	707	40	20	26	0	855
300	26	11	16	0	973	31	10	17	0	973	40	20	26	0	1,146
350	26	11	16	0	1,288	31	10	17	0	1,288	40	20	25	0	1,486
400	26	11	16	0	1,605	31	10	17	0	1,605	40	20	25	0	1,825
450	26	11	15	0	1,987	31	10	17	0	1,987	40	20	25	0	2,231
500	26	11	15	0	2,402	31	10	17	0	2,402	40	20	24	0	2,669
550						31	10	16	0	2,827	40	20	24	0	3,117
600						31	10	16	0	3,349	40	20	24	0	3,664
650						31	10	16	0	3,848	40	20	24	0	4,185
700						31	10	16	0	4,465	40	20	24	0	4,827
750						31	10	16	0	5,027	40	20	23	0	5,411
800						31	10	16	0	5,741	40	20	23	0	6,151
850						31	10	16	0	6,362	40	20	23	0	6,793
900						31	10	16	0	7,163	40	20	23	0	7,620
950						31	10	16	0	7,854	40	20	23	0	8,332
1000						31	10	16	0	8,742	40	20	23	0	9,246
1050											40	20	23	0	10,029
1100											40	20	23	0	11,047
1150											40	20	23	0	11,882
1200											40	20	22	0	12,969
1250											40	20	22	0	13,893
1300											40	20	22	0	15,066
1350											40	20	22	0	16,061
1400											40	20	22	0	17,320
1450											40	20	22	0	18,385
1500											40	20	22	0	19,731
1600											40	20	22	0	22,299
1650											40	20	22	0	23,506
1700											40	20	22	0	25,025
1800											40	20	22	0	27,937
1900											40	20	22	0	30,946
1950											40	20	22	0	32,365
2000											40	20	21	0	34,143
2100															
2200															
2250															
2300															
2400															
2500															
2550															
2600															
2700															
2800															
2850															
2900															
3000															
3100															
3150															
3200															
3300															
3400															
3450															
3600															
3800															
4000															

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %.
In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29). For larger movements see type U120x.



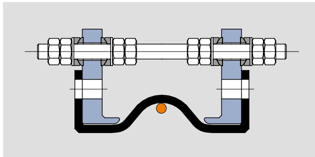
U110... (Tie rod B/E/C/M/R/K/L)

> without vacuum ring

Installation length (L_E) at design pressure															
up to 4 bar **L_E = 300 mm** up to 6 bar **L_E = 350 mm** up to 10 bar **L_E = 400 mm**					up to 4 bar **L_E = 350 mm** up to 6 bar **L_E = 400 mm** up to 10 bar **L_E = 450 mm**					up to 4 bar **L_E = 400 mm** up to 6 bar **L_E = 450 mm** up to 10 bar **L_E = 500 mm**					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
44	20	30	0	260	53	31	39	0	353	69	43	53	0	491	**100**
44	20	30	0	337	53	31	39	0	441	69	43	51	0	594	**125**
44	20	29	0	423	53	31	38	0	539	69	43	51	0	707	**150**
44	20	29	0	539	53	31	37	0	670	69	43	50	0	855	**175**
44	20	29	0	625	53	31	37	0	765	69	43	49	0	962	**200**
44	20	28	0	866	53	31	36	0	1,029	69	43	48	0	1,257	**250**
44	20	27	0	1,158	53	31	36	0	1,346	69	43	48	0	1,605	**300**
44	20	27	0	1,500	53	31	35	0	1,713	69	43	47	0	2,003	**350**
44	20	27	0	1,840	53	31	35	0	2,075	69	43	46	0	2,393	**400**
44	20	26	0	2,248	53	31	34	0	2,507	69	43	46	0	2,856	**450**
44	20	26	0	2,688	53	31	34	0	2,971	69	43	45	0	3,349	**500**
44	20	26	0	3,137	53	31	34	0	3,442	69	43	45	0	3,848	**550**
44	20	26	0	3,685	53	31	33	0	4,015	69	43	45	0	4,453	**600**
44	20	26	0	4,208	53	31	33	0	4,560	69	43	44	0	5,027	**650**
44	20	25	0	4,852	53	31	33	0	5,230	69	43	44	0	5,728	**700**
44	20	25	0	5,437	53	31	33	0	5,836	69	43	44	0	6,362	**750**
44	20	25	0	6,179	53	31	33	0	6,604	69	43	43	0	7,163	**800**
44	20	25	0	6,822	53	31	32	0	7,268	69	43	43	0	7,854	**850**
44	20	25	0	7,651	53	31	32	0	8,123	69	43	43	0	8,742	**900**
44	20	25	0	8,365	53	31	32	0	8,858	69	43	43	0	9,503	**950**
44	20	25	0	9,280	53	31	32	0	9,799	69	43	43	0	10,477	**1000**
44	20	25	0	10,064	53	31	32	0	10,605	69	43	42	0	11,310	**1050**
44	20	24	0	11,085	53	31	32	0	11,652	69	43	42	0	12,390	**1100**
44	20	24	0	11,921	53	31	32	0	12,509	69	43	42	0	13,273	**1150**
44	20	24	0	13,009	53	31	31	0	13,623	69	43	42	0	14,420	**1200**
44	20	24	0	13,935	53	31	31	0	14,569	69	43	42	0	15,394	**1250**
44	20	24	0	15,109	53	31	31	0	15,770	69	43	42	0	16,627	**1300**
44	20	24	0	16,106	53	31	31	0	16,787	69	43	41	0	17,671	**1350**
44	20	24	0	17,366	53	31	31	0	18,074	69	43	41	0	18,991	**1400**
44	20	24	0	18,433	53	31	31	0	19,162	69	43	41	0	20,106	**1450**
44	20	24	0	19,781	53	31	31	0	20,536	69	43	41	0	21,512	**1500**
44	20	24	0	22,352	53	31	31	0	23,154	69	43	41	0	24,190	**1600**
44	20	24	0	23,561	53	31	31	0	24,384	69	43	41	0	25,447	**1650**
44	20	23	0	25,081	53	31	30	0	25,930	69	43	41	0	27,026	**1700**
44	20	23	0	27,996	53	31	30	0	28,893	69	43	40	0	30,049	**1800**
44	20	23	0	31,009	53	31	30	0	31,952	69	43	40	0	33,168	**1900**
44	20	23	0	32,429	53	31	30	0	33,394	69	43	40	0	34,636	**1950**
44	20	23	0	34,209	53	31	30	0	35,199	69	43	40	0	36,474	**2000**
44	20	23	0	37,565	53	31	30	0	38,603	69	43	40	0	39,938	**2100**
44	20	23	0	41,079	53	31	30	0	42,164	69	43	40	0	43,558	**2200**
44	20	23	0	42,712	53	31	30	0	43,818	69	43	40	0	45,239	**2250**
44	20	23	0	44,750	53	31	30	0	45,882	69	43	40	0	47,336	**2300**
44	20	23	0	48,578	53	31	29	0	49,757	69	43	39	0	51,271	**2400**
44	20	23	0	52,563	53	31	29	0	53,789	69	43	39	0	55,363	**2500**
44	20	23	0	54,408	53	31	29	0	55,655	69	43	39	0	57,256	**2550**
44	20	23	0	56,706	53	31	29	0	57,979	69	43	39	0	59,612	**2600**
44	20	23	0	61,005	53	31	29	0	62,325	69	43	39	0	64,018	**2700**
44	20	22	0	65,461	53	31	29	0	66,829	69	43	39	0	68,581	**2800**
44	20	22	0	67,518	53	31	29	0	68,906	69	43	39	0	70,686	**2850**
44	20	22	0	70,075	53	31	29	0	71,489	69	43	39	0	73,301	**2900**
44	20	22	0	74,845	53	31	29	0	76,307	69	43	39	0	78,179	**3000**
44	20	22	0	79,773	53	31	29	0	81,282	69	43	38	0	83,213	**3100**
44	20	22	0	82,041	53	31	29	0	83,571	69	43	38	0	85,530	**3150**
44	20	22	0	84,857	53	31	29	0	86,413	69	43	38	0	88,405	**3200**
44	20	22	0	90,099	53	31	29	0	91,702	69	43	38	0	93,753	**3300**
44	20	22	0	95,498	53	31	29	0	97,148	69	43	38	0	99,259	**3400**
44	20	22	0	97,979	53	31	29	0	99,650	69	43	38	0	101,788	**3450**
44	20	22	0	106,767	53	31	28	0	108,511	69	43	38	0	110,741	**3600**
44	20	22	0	118,664	53	31	28	0	120,503	69	43	38	0	122,852	**3800**
44	20	22	0	131,190	53	31	28	0	133,123	69	43	38	0	135,591	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



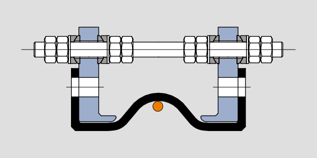
U111... (Tie rod B/E/C/M/R/K/L)

> with internal vacuum ring

Installation length (L_E) at design pressure															
	up to 4 bar **L_E = 200 mm** up to 6 bar **L_E = 200 mm** up to 10 bar **L_E = 250 mm**					up to 4 bar **L_E = 200 mm** up to 6 bar **L_E = 250 mm** up to 10 bar **L_E = 300 mm**					up to 4 bar **L_E = 250 mm** up to 6 bar **L_E = 300 mm** up to 10 bar **L_E = 350 mm**				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	26	4	18	0	177	31	3	19	0	177	40	7	28	0	254
125	26	4	17	0	241	31	3	19	0	241	40	7	28	0	330
150	26	4	17	0	314	31	3	18	0	314	40	7	27	0	415
175	26	4	17	0	415	31	3	18	0	415	40	7	27	0	531
200	26	4	17	0	491	31	3	18	0	491	40	7	26	0	616
250	26	4	16	0	707	31	3	18	0	707	40	7	26	0	855
300	26	4	16	0	973	31	3	17	0	973	40	7	26	0	1,146
350	26	4	16	0	1,288	31	3	17	0	1,288	40	7	25	0	1,486
400	26	4	16	0	1,605	31	3	17	0	1,605	40	7	25	0	1,825
450	26	4	15	0	1,987	31	3	17	0	1,987	40	7	25	0	2,231
500	26	4	15	0	2,402	31	3	17	0	2,402	40	7	24	0	2,669
550						31	3	16	0	2,827	40	7	24	0	3,117
600						31	3	16	0	3,349	40	7	24	0	3,664
650						31	3	16	0	3,848	40	7	24	0	4,185
700						31	3	16	0	4,465	40	7	24	0	4,827
750						31	3	16	0	5,027	40	7	23	0	5,411
800						31	3	16	0	5,741	40	7	23	0	6,151
850						31	3	16	0	6,362	40	7	23	0	6,793
900						31	3	16	0	7,163	40	7	23	0	7,620
950						31	3	16	0	7,854	40	7	23	0	8,332
1000						31	3	16	0	8,742	40	7	23	0	9,246
1050											40	7	23	0	10,029
1100											40	7	23	0	11,047
1150											40	7	23	0	11,882
1200											40	7	22	0	12,969
1250											40	7	22	0	13,893
1300											40	7	22	0	15,066
1350											40	7	22	0	16,061
1400											40	7	22	0	17,320
1450											40	7	22	0	18,385
1500											40	7	22	0	19,731
1600											40	7	22	0	22,299
1650											40	7	22	0	23,506
1700											40	7	22	0	25,025
1800											40	7	22	0	27,937
1900											40	7	22	0	30,946
1950											40	7	22	0	32,365
2000											40	7	21	0	34,143
2100															
2200															
2250															
2300															
2400															
2500															
2550															
2600															
2700															
2800															
2850															
2900															
3000															
3100															
3150															
3200															
3300															
3400															
3450															
3600															
3800															
4000															

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -0 %; lateral displacement: -50 %.
In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29). For larger movements see type U121x.



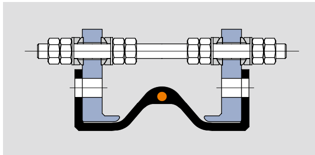
U111... (Tie rod B/E/C/M/R/K/L)

> with internal vacuum ring

Installation length (L_E) at design pressure															
up to 4 bar L_E = **300 mm** up to 6 bar L_E = **350 mm** up to 10 bar L_E = **400 mm**					up to 4 bar L_E = **350 mm** up to 6 bar L_E = **400 mm** up to 10 bar L_E = **450 mm**					up to 4 bar L_E = **400 mm** up to 6 bar L_E = **450 mm** up to 10 bar L_E = **500 mm**					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
44	7	30	0	260	53	10	39	0	353	69	14	53	0	491	**100**
44	7	30	0	337	53	10	39	0	441	69	14	51	0	594	**125**
44	7	29	0	423	53	10	38	0	539	69	14	51	0	707	**150**
44	7	29	0	539	53	10	37	0	670	69	14	50	0	855	**175**
44	7	29	0	625	53	10	37	0	765	69	14	49	0	962	**200**
44	7	28	0	866	53	10	36	0	1,029	69	14	48	0	1,257	**250**
44	7	27	0	1,158	53	10	36	0	1,346	69	14	48	0	1,605	**300**
44	7	27	0	1,500	53	10	35	0	1,713	69	14	47	0	2,003	**350**
44	7	27	0	1,840	53	10	35	0	2,075	69	14	46	0	2,393	**400**
44	7	26	0	2,248	53	10	34	0	2,507	69	14	46	0	2,856	**450**
44	7	26	0	2,688	53	10	34	0	2,971	69	14	45	0	3,349	**500**
44	7	26	0	3,137	53	10	34	0	3,442	69	14	45	0	3,848	**550**
44	7	26	0	3,685	53	10	33	0	4,015	69	14	45	0	4,453	**600**
44	7	26	0	4,208	53	10	33	0	4,560	69	14	44	0	5,027	**650**
44	7	25	0	4,852	53	10	33	0	5,230	69	14	44	0	5,728	**700**
44	7	25	0	5,437	53	10	33	0	5,836	69	14	44	0	6,362	**750**
44	7	25	0	6,179	53	10	33	0	6,604	69	14	43	0	7,163	**800**
44	7	25	0	6,822	53	10	32	0	7,268	69	14	43	0	7,854	**850**
44	7	25	0	7,651	53	10	32	0	8,123	69	14	43	0	8,742	**900**
44	7	25	0	8,365	53	10	32	0	8,858	69	14	43	0	9,503	**950**
44	7	25	0	9,280	53	10	32	0	9,799	69	14	43	0	10,477	**1000**
44	7	25	0	10,064	53	10	32	0	10,605	69	14	42	0	11,310	**1050**
44	7	24	0	11,085	53	10	32	0	11,652	69	14	42	0	12,390	**1100**
44	7	24	0	11,921	53	10	32	0	12,509	69	14	42	0	13,273	**1150**
44	7	24	0	13,009	53	10	31	0	13,623	69	14	42	0	14,420	**1200**
44	7	24	0	13,935	53	10	31	0	14,569	69	14	42	0	15,394	**1250**
44	7	24	0	15,109	53	10	31	0	15,770	69	14	42	0	16,627	**1300**
44	7	24	0	16,106	53	10	31	0	16,787	69	14	41	0	17,671	**1350**
44	7	24	0	17,366	53	10	31	0	18,074	69	14	41	0	18,991	**1400**
44	7	24	0	18,433	53	10	31	0	19,162	69	14	41	0	20,106	**1450**
44	7	24	0	19,781	53	10	31	0	20,536	69	14	41	0	21,512	**1500**
44	7	24	0	22,352	53	10	31	0	23,154	69	14	41	0	24,190	**1600**
44	7	24	0	23,561	53	10	31	0	24,384	69	14	41	0	25,447	**1650**
44	7	23	0	25,081	53	10	30	0	25,930	69	14	41	0	27,026	**1700**
44	7	23	0	27,996	53	10	30	0	28,893	69	14	40	0	30,049	**1800**
44	7	23	0	31,009	53	10	30	0	31,952	69	14	40	0	33,168	**1900**
44	7	23	0	32,429	53	10	30	0	33,394	69	14	40	0	34,636	**1950**
44	7	23	0	34,209	53	10	30	0	35,199	69	14	40	0	36,474	**2000**
44	7	23	0	37,565	53	10	30	0	38,603	69	14	40	0	39,938	**2100**
44	7	23	0	41,079	53	10	30	0	42,164	69	14	40	0	43,558	**2200**
44	7	23	0	42,712	53	10	30	0	43,818	69	14	40	0	45,239	**2250**
44	7	23	0	44,750	53	10	30	0	45,882	69	14	40	0	47,336	**2300**
44	7	23	0	48,578	53	10	29	0	49,757	69	14	39	0	51,271	**2400**
44	7	23	0	52,563	53	10	29	0	53,789	69	14	39	0	55,363	**2500**
44	7	23	0	54,408	53	10	29	0	55,655	69	14	39	0	57,256	**2550**
44	7	23	0	56,706	53	10	29	0	57,979	69	14	39	0	59,612	**2600**
44	7	23	0	61,005	53	10	29	0	62,325	69	14	39	0	64,018	**2700**
44	7	22	0	65,461	53	10	29	0	66,829	69	14	39	0	68,581	**2800**
44	7	22	0	67,518	53	10	29	0	68,906	69	14	39	0	70,686	**2850**
44	7	22	0	70,075	53	10	29	0	71,489	69	14	39	0	73,301	**2900**
44	7	22	0	74,845	53	10	29	0	76,307	69	14	39	0	78,179	**3000**
44	7	22	0	79,773	53	10	29	0	81,282	69	14	38	0	83,213	**3100**
44	7	22	0	82,041	53	10	29	0	83,571	69	14	38	0	85,530	**3150**
44	7	22	0	84,857	53	10	29	0	86,413	69	14	38	0	88,405	**3200**
44	7	22	0	90,099	53	10	29	0	91,702	69	14	38	0	93,753	**3300**
44	7	22	0	95,498	53	10	29	0	97,148	69	14	38	0	99,259	**3400**
44	7	22	0	97,979	53	10	29	0	99,650	69	14	38	0	101,788	**3450**
44	7	22	0	106,767	53	10	28	0	108,511	69	14	38	0	110,741	**3600**
44	7	22	0	118,664	53	10	28	0	120,503	69	14	38	0	122,852	**3800**
44	7	22	0	131,190	53	10	28	0	133,123	69	14	38	0	135,591	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



U112... (Tie rod B/E/C/M/R/K/L)

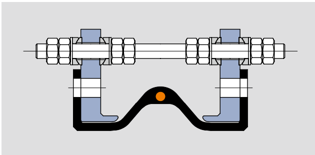
> with embedded vacuum ring

Installation length (L_E) at design pressure

	up to 4 bar L_E = 200 mm up to 6 bar L_E = 200 mm up to 10 bar L_E = 250 mm					up to 4 bar L_E = 200 mm up to 6 bar L_E = 250 mm up to 10 bar L_E = 300 mm					up to 4 bar L_E = 250 mm up to 6 bar L_E = 300 mm up to 10 bar L_E = 350 mm				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	17	4	18	0	177	20	2	18	0	150	26	6	27	0	222
125	17	4	17	0	241	20	2	18	0	209	26	6	26	0	293
150	17	4	17	0	314	20	2	17	0	278	26	6	26	0	373
175	17	4	17	0	415	20	2	17	0	373	26	6	26	0	483
200	17	4	17	0	491	20	2	17	0	445	26	6	25	0	564
250	17	4	16	0	707	20	2	16	0	651	26	6	25	0	794
300	17	4	16	0	973	20	2	16	0	908	26	6	24	0	1,075
350	17	4	16	0	1,288	20	2	16	0	1,213	26	6	24	0	1,405
400	17	4	16	0	1,605	20	2	16	0	1,521	26	6	24	0	1,735
450	17	4	15	0	1,987	20	2	16	0	1,893	26	6	23	0	2,132
500	17	4	15	0	2,402	20	2	15	0	2,299	26	6	23	0	2,561
550						20	2	15	0	2,715	26	6	23	0	3,000
600						20	2	15	0	3,227	26	6	23	0	3,536
650						20	2	15	0	3,718	26	6	23	0	4,049
700						20	2	15	0	4,324	26	6	23	0	4,681
750						20	2	15	0	4,877	26	6	22	0	5,255
800						20	2	15	0	5,581	26	6	22	0	5,986
850						20	2	15	0	6,193	26	6	22	0	6,619
900						20	2	15	0	6,984	26	6	22	0	7,436
950						20	2	15	0	7,667	26	6	22	0	8,139
1000						20	2	15	0	8,544	26	6	22	0	9,043
1050											26	6	22	0	9,817
1100											26	6	22	0	10,825
1150											26	6	22	0	11,652
1200											26	6	21	0	12,728
1250											26	6	21	0	13,643
1300											26	6	21	0	14,806
1350											26	6	21	0	15,792
1400											26	6	21	0	17,041
1450											26	6	21	0	18,098
1500											26	6	21	0	19,433
1600											26	6	21	0	21,983
1650											26	6	21	0	23,181
1700											26	6	21	0	24,689
1800											26	6	21	0	27,582
1900											26	6	21	0	30,573
1950											26	6	21	0	31,984
2000											26	6	21	0	33,751
2100															
2200															
2250															
2300															
2400															
2500															
2550															
2600															
2700															
2800															
2850															
2900															
3000															
3100															
3150															
3200															
3300															
3400															
3450															
3600															
3800															
4000															

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -0 %; axial extension: -0 %; lateral displacement: -50 %.
In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29). For larger movements see type U122x.



U112... (Tie rod B/E/C/M/R/K/L)

> with embedded vacuum ring

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Installation length (L_E) at design pressure															
up to 4 bar L_E = 300 mm up to 6 bar L_E = 350 mm up to 10 bar L_E = 400 mm					up to 4 bar L_E = 350 mm up to 6 bar L_E = 400 mm up to 10 bar L_E = 450 mm					up to 4 bar L_E = 400 mm up to 6 bar L_E = 450 mm up to 10 bar L_E = 500 mm					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
29	6	29	0	232	35	9	38	0	320	46	13	51	0	423	**100**
29	6	29	0	305	35	9	38	0	405	46	13	50	0	519	**125**
29	6	28	0	387	35	9	37	0	499	46	13	49	0	625	**150**
29	6	28	0	499	35	9	36	0	625	46	13	48	0	765	**175**
29	6	28	0	581	35	9	36	0	716	46	13	48	0	866	**200**
29	6	27	0	814	35	9	35	0	973	46	13	47	0	1,146	**250**
29	6	27	0	1,099	35	9	35	0	1,282	46	13	46	0	1,479	**300**
29	6	26	0	1,432	35	9	34	0	1,640	46	13	45	0	1,863	**350**
29	6	26	0	1,765	35	9	34	0	1,995	46	13	45	0	2,240	**400**
29	6	26	0	2,165	35	9	33	0	2,419	46	13	44	0	2,688	**450**
29	6	25	0	2,597	35	9	33	0	2,875	46	13	44	0	3,167	**500**
29	6	25	0	3,039	35	9	33	0	3,339	46	13	44	0	3,653	**550**
29	6	25	0	3,578	35	9	33	0	3,904	46	13	43	0	4,243	**600**
29	6	25	0	4,094	35	9	32	0	4,441	46	13	43	0	4,803	**650**
29	6	25	0	4,729	35	9	32	0	5,102	46	13	43	0	5,489	**700**
29	6	24	0	5,307	35	9	32	0	5,701	46	13	42	0	6,110	**750**
29	6	24	0	6,041	35	9	32	0	6,461	46	13	42	0	6,896	**800**
29	6	24	0	6,677	35	9	32	0	7,118	46	13	42	0	7,574	**850**
29	6	24	0	7,497	35	9	31	0	7,964	46	13	42	0	8,446	**900**
29	6	24	0	8,203	35	9	31	0	8,692	46	13	41	0	9,195	**950**
29	6	24	0	9,110	35	9	31	0	9,625	46	13	41	0	10,153	**1000**
29	6	24	0	9,887	35	9	31	0	10,423	46	13	41	0	10,973	**1050**
29	6	24	0	10,899	35	9	31	0	11,461	46	13	41	0	12,037	**1100**
29	6	24	0	11,728	35	9	31	0	12,311	46	13	41	0	12,908	**1150**
29	6	23	0	12,808	35	9	31	0	13,417	46	13	41	0	14,040	**1200**
29	6	23	0	13,726	35	9	31	0	14,356	46	13	40	0	15,001	**1250**
29	6	23	0	14,892	35	9	30	0	15,548	46	13	40	0	16,218	**1300**
29	6	23	0	15,881	35	9	30	0	16,559	46	13	40	0	17,250	**1350**
29	6	23	0	17,134	35	9	30	0	17,837	46	13	40	0	18,554	**1400**
29	6	23	0	18,194	35	9	30	0	18,918	46	13	40	0	19,656	**1450**
29	6	23	0	19,532	35	9	30	0	20,283	46	13	40	0	21,047	**1500**
29	6	23	0	22,088	35	9	30	0	22,885	46	13	40	0	23,697	**1600**
29	6	23	0	23,289	35	9	30	0	24,108	46	13	39	0	24,941	**1650**
29	6	23	0	24,801	35	9	30	0	25,645	46	13	39	0	26,504	**1700**
29	6	23	0	27,700	35	9	30	0	28,592	46	13	39	0	29,498	**1800**
29	6	22	0	30,698	35	9	29	0	31,636	46	13	39	0	32,589	**1900**
29	6	22	0	32,111	35	9	29	0	33,071	46	13	39	0	34,045	**1950**
29	6	22	0	33,882	35	9	29	0	34,867	46	13	39	0	35,867	**2000**
29	6	22	0	37,223	35	9	29	0	38,256	46	13	39	0	39,303	**2100**
29	6	22	0	40,721	35	9	29	0	41,801	46	13	38	0	42,895	**2200**
29	6	22	0	42,346	35	9	29	0	43,447	46	13	38	0	44,563	**2250**
29	6	22	0	44,376	35	9	29	0	45,503	46	13	38	0	46,645	**2300**
29	6	22	0	48,188	35	9	29	0	49,363	46	13	38	0	50,551	**2400**
29	6	22	0	52,158	35	9	29	0	53,379	46	13	38	0	54,615	**2500**
29	6	22	0	53,995	35	9	29	0	55,238	46	13	38	0	56,495	**2550**
29	6	22	0	56,284	35	9	29	0	57,553	46	13	38	0	58,836	**2600**
29	6	22	0	60,568	35	9	28	0	61,883	46	13	38	0	63,213	**2700**
29	6	22	0	65,008	35	9	28	0	66,371	46	13	38	0	67,748	**2800**
29	6	22	0	67,058	35	9	28	0	68,442	46	13	37	0	69,840	**2850**
29	6	22	0	69,606	35	9	28	0	71,016	46	13	37	0	72,440	**2900**
29	6	22	0	74,361	35	9	28	0	75,818	46	13	37	0	77,289	**3000**
29	6	21	0	79,273	35	9	28	0	80,777	46	13	37	0	82,295	**3100**
29	6	21	0	81,534	35	9	28	0	83,060	46	13	37	0	84,599	**3150**
29	6	21	0	84,342	35	9	28	0	85,893	46	13	37	0	87,459	**3200**
29	6	21	0	89,568	35	9	28	0	91,166	46	13	37	0	92,779	**3300**
29	6	21	0	94,951	35	9	28	0	96,597	46	13	37	0	98,256	**3400**
29	6	21	0	97,425	35	9	28	0	99,091	46	13	37	0	100,772	**3450**
29	6	21	0	106,188	35	9	28	0	107,928	46	13	37	0	109,682	**3600**
29	6	21	0	118,054	35	9	28	0	119,888	46	13	37	0	121,736	**3800**
29	6	21	0	130,548	35	9	27	0	132,477	46	13	36	0	134,419	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

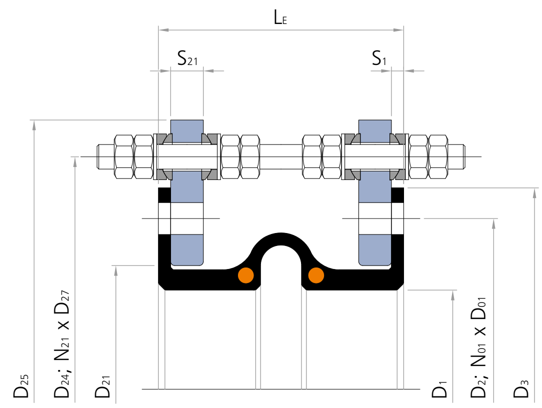
Customised products available

U216... (Tie rod B/E/C/M/R/K/L) ⌀ 100 - 4,000 mm

> Type U216M

Type key > page 22
U2 1 6 M
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section U216M



Lateral expansion joint with one arch

Design: Thick-walled, single arch rubber bellows with full faced rubber flanges, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, with support rings at the foot arch and split backing flanges with tie-rods borne in spherical washers. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ∅ 100 to 4,000 mm, custom diameters possible

Length: Standard L_E = 250 to 350 mm (> page 221)
Custom length on request

Pressure: Up to 25 bar depending on diameter and length
Vacuum-proof

Movement: For lateral and angular (2 tie rod design) movements*
(> page 221)

Spring rate: The embedded support rings and reinforcements generate large spring rates

Application:
Cooling water systems, desalination plants, drinking water supply, plant construction, e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

CE PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm

Request assembly instructions at:
www.ditec-adam.de/en/contact

*Installation gap tolerances according to axial movement capability of the expansion joint

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single- or multi-part integral backing flanges with clearance holes and tie rod holders (tie rod type B, E, C, M)

Single- or multi-part backing flanges with clearance holes and tie rod gusset plates (tie rod type R, K, L)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

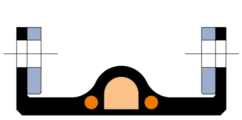
Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:



(> page 42)

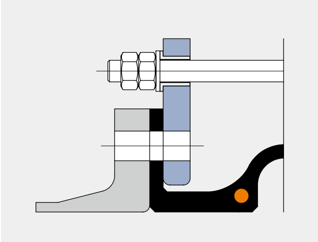
Tie rods

Example: Type U216M

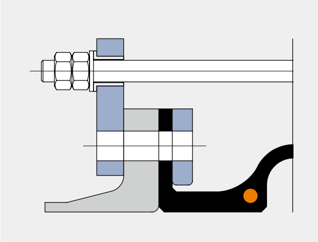
Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

Materials: Carbon steel
Stainless steel

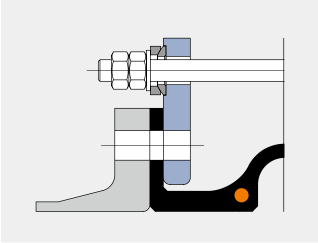
Coating: Spherical washers/ball disks: PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated



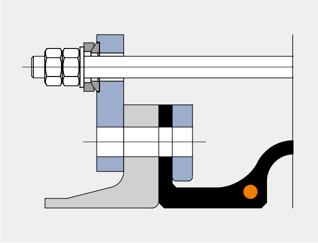
Type U216B
Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



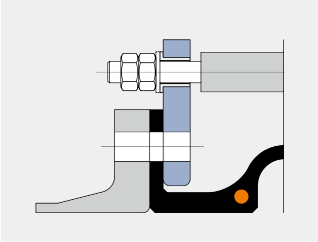
Type U216R
Gusset plate: Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



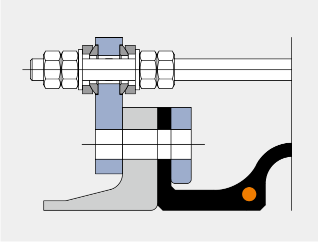
Type U216E
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



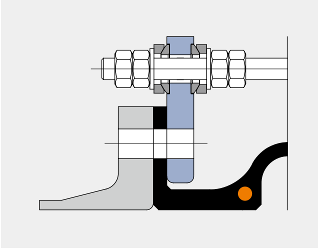
Type U216K
Gusset plate: Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



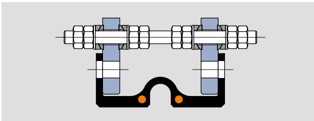
Type U216C
Tie rods mounted outside in rubber bushing and inside with compression sleeve to accommodate pressure/vacuum thrust forces



Type U216L
Gusset plate: Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/ vacuum thrust forces



Type U216M
Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/ vacuum thrust forces



U216... (Tie rod B/E/C/M/R/K/L)

> with one arch

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Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 250 mm					up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	35	15	27	0	346	41	21	35	0	460	47	24	40	0	573
125	35	15	25	0	434	41	21	34	0	560	47	24	39	0	683
150	35	15	25	0	531	41	21	33	0	670	47	24	37	0	804
175	35	15	24	0	661	41	21	32	0	814	47	24	36	0	962
200	35	15	23	0	755	41	21	31	0	919	47	24	35	0	1,075
250	35	15	22	0	1,018	41	21	30	0	1,207	47	24	34	0	1,385
300	35	15	22	0	1,333	41	21	29	0	1,548	47	24	33	0	1,750
350	35	15	21	0	1,698	41	21	28	0	1,940	47	24	32	0	2,165
400	35	15	21	0	2,059	41	21	27	0	2,324	47	24	31	0	2,570
450	35	15	20	0	2,489	41	21	27	0	2,781	47	24	31	0	3,048
500	35	15	20	0	2,951	41	21	26	0	3,267	47	24	30	0	3,557
550	35	15	19	0	3,421	41	21	26	0	3,761	47	24	29	0	4,072
600	35	15	19	0	3,993	41	21	25	0	4,359	47	24	29	0	4,693
650	35	15	19	0	4,536	41	21	25	0	4,927	47	24	29	0	5,281
700	35	15	19	0	5,204	41	21	25	0	5,621	47	24	28	0	5,999
750	35	15	18	0	5,809	41	21	24	0	6,249	47	24	28	0	6,648
800	35	15	18	0	6,576	41	21	24	0	7,044	47	24	28	0	7,466
850	35	15	18	0	7,238	41	21	24	0	7,729	47	24	27	0	8,171
900	35	15	18	0	8,091	41	21	24	0	8,610	47	24	27	0	9,076
950	35	15	18	0	8,825	41	21	23	0	9,366	47	24	27	0	9,852
1000	35	15	17	0	9,764	41	21	23	0	10,333	47	24	26	0	10,843
1050	35	15	17	0	10,568	41	21	23	0	11,159	47	24	26	0	11,690
1100	35	15	17	0	11,613	41	21	23	0	12,233	47	24	26	0	12,788
1150	35	15	17	0	12,469	41	21	23	0	13,110	47	24	26	0	13,685
1200	35	15	17	0	13,581	41	21	22	0	14,250	47	24	26	0	14,849
1250	35	15	17	0	14,527	41	21	22	0	15,218	47	24	25	0	15,837
1300	35	15	17	0	15,725	41	21	22	0	16,445	47	24	25	0	17,087
1350	35	15	17	0	16,742	41	21	22	0	17,483	47	24	25	0	18,146
1400	35	15	16	0	18,027	41	21	22	0	18,796	47	24	25	0	19,483
1450	35	15	16	0	19,113	41	21	22	0	19,906	47	24	25	0	20,612
1500	35	15	16	0	20,485	41	21	22	0	21,305	47	24	25	0	22,035
1600	35	15	16	0	23,100	41	21	21	0	23,970	47	24	24	0	24,745
1650	35	15	16	0	24,328	41	21	21	0	25,221	47	24	24	0	26,016
1700	35	15	16	0	25,873	41	21	21	0	26,793	47	24	24	0	27,612
1800	35	15	16	0	28,832	41	21	21	0	29,804	47	24	24	0	30,666
1900	35	15	16	0	31,889	41	21	21	0	32,910	47	24	24	0	33,816
1950	35	15	15	0	33,329	41	21	21	0	34,373	47	24	23	0	35,299
2000	35	15	15	0	35,133	41	21	20	0	36,204	47	24	23	0	37,154
2100	35	15	15	0	38,533	41	21	20	0	39,655	47	24	23	0	40,649
2200	35	15	15	0	42,091	41	21	20	0	43,263	47	24	23	0	44,301
2250	35	15	15	0	43,744	41	21	20	0	44,938	47	24	23	0	45,996
2300	35	15	15	0	45,806	41	21	20	0	47,028	47	24	23	0	48,111
2400	35	15	15	0	49,678	41	21	20	0	50,950	47	24	23	0	52,077
2500	35	15	15	0	53,707	41	21	20	0	55,030	47	24	22	0	56,200
2550	35	15	15	0	55,572	41	21	20	0	56,917	47	24	22	0	58,107
2600	35	15	15	0	57,893	41	21	19	0	59,266	47	24	22	0	60,481
2700	35	15	15	0	62,237	41	21	19	0	63,660	47	24	22	0	64,918
2800	35	15	14	0	66,737	41	21	19	0	68,210	47	24	22	0	69,513
2850	35	15	14	0	68,813	41	21	19	0	70,309	47	24	22	0	71,631
2900	35	15	14	0	71,394	41	21	19	0	72,918	47	24	22	0	74,264
3000	35	15	14	0	76,209	41	21	19	0	77,783	47	24	22	0	79,173
3100	35	15	14	0	81,181	41	21	19	0	82,805	47	24	22	0	84,239
3150	35	15	14	0	83,469	41	21	19	0	85,116	47	24	21	0	86,570
3200	35	15	14	0	86,309	41	21	19	0	87,984	47	24	21	0	89,462
3300	35	15	14	0	91,595	41	21	19	0	93,320	47	24	21	0	94,842
3400	35	15	14	0	97,038	41	21	19	0	98,813	47	24	21	0	100,379
3450	35	15	14	0	99,538	41	21	19	0	101,336	47	24	21	0	102,922
3600	35	15	14	0	108,395	41	21	18	0	110,270	47	24	21	0	111,924
3800	35	15	14	0	120,380	41	21	18	0	122,356	47	24	21	0	124,098
4000	35	15	14	0	132,993	41	21	18	0	135,070	47	24	21	0	136,900

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with filled arch:
axial compression: -50 %; axial extension: -75 %; lateral displacement: -50 %.
In the event of lateral displacement and simultaneous axial extension the above movements are reduced (> page 29).

Customised products available

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

U110... LDJ (Tie rod B/E/C/M/R/K/L) ø 80 - 4,000 mm

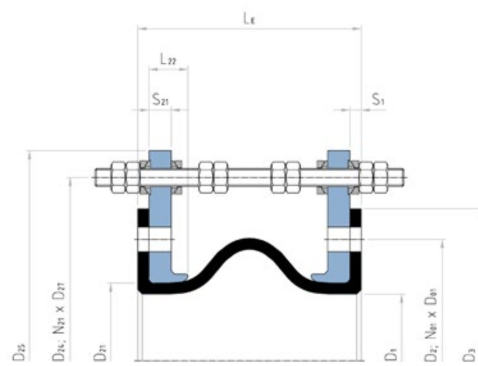
> **Type U110... LDJ** (Tie rod B/E/C/M/R/K/L) without vacuum ring

> **Type U111... LDJ** (Tie rod B/E/C/M/R/K/L) with internal vacuum ring

> **Type U112 ... LDJ** (Tie rod B/E/C/M/R/K/L) with embedded vacuum ring

Type key > page 22
U1 1 0 M LDJ
- Tie rod variant
- Support ring variants
- Number of arches
- Type

Cross section U110M LDJ



Lateral dismantling joint

Design: Rubber expansion joints as dismantling joints play a decisive role in the design and layout of pipelines and valves. They are an essential aid during the installation and removal of pipe sections and piping equipment. Without a dismantling joint offering axial, lateral, angular and some minor torsional adjustments, it is almost impossible to insert a valve exactly into a pipe section. Thanks to this all-directional adjustability, the valve can be fitted next to the dismantling joint, and the rubber expansion joint can compensate for installation tolerances prior to being securely connected to the mating flanges.

ditec`s dismantling rubber expansion joints are specifically designed for self-retraction to facilitate access to piping and equipment as well as for unmatched ease of installation and subsequent removal. Only the rubber bellow with its close to unlimited medium compatibility is in contact with the fluid so that the use of costly stainless steel materials or special coatings are unnecessary.

Dismantling rubber expansion joints are high elastic, streamlined, have depending from expected installation tolerances or movements single or multiple wide arches with full faced rubber flanges or swivel flanges with sealing bulge, have a cycle life in the tens of millions, are constructed with a high-grade leak-proof tube,

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e.g. in pipelines, on pumps, valves

PED 2014/68/EU KTW WRAS FDA <10⁶ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

multiple layers of high-strength cord, a seamless cover, and backing flanges with support collar. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

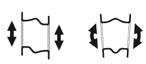
Lateral dismantling joints are installed in unanchored piping or isolated equipment. The primary function of the integrated tie rods is to continuously restrain expansion joints axially during normal operation. The tie rods will act as the primary restraint by continuously restraining the full pressure thrust loads. If the pipline is out of service the tie rods are used also to retract the expansion joint bellow to receive space for dismantling and installation purposes of nearby pipe sections or valves. Tie rod designs are based on the calculated thrust force of the rubber expansion joint at the specified pressure and are attached to the external or internal hardware of the expansion joint.

Diameters: ∅ 80 to 4,000 mm, custom diameters possible

Length: L_E = 200 to 500 mm (> page 212–217)
Custom length on request

Pressure: Up to 100 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For lateral and angular (2 tie rod design) movements*
For movement capabilities refer to type U110M (> page 212–217)



Spring rate: Lateral spring rates (> page 296)

*Installation gap tolerances according to axial movement capability of the expansion joint

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 212–217)

Backing flanges

Design: Single- or multi-part integral backing flanges with support collar, clearance holes and tie rod holders (tie rod type B, E, C, M)

Single- or multi-part backing flanges with support collar, clearance holes and tie rod gusset plates (tie rod type R, K, L)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

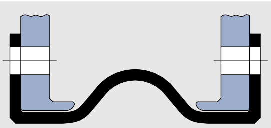
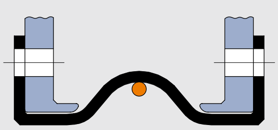
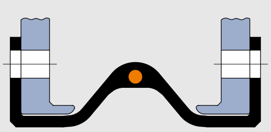
Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

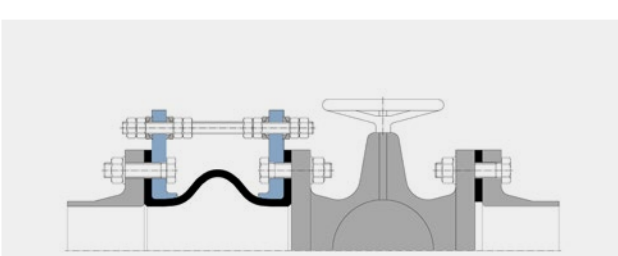
(> page 42)

Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
U110... LDJ		None	Depending on the diameter up to 100 bar, vacuum stability on request	> page 212–213
U111... LDJ		Medium contact, inside the arch	Depending on the diameter up to 100 bar, for vacuum up to 0.05 bar absolute	> page 214–215
U112... LDJ		No medium contact, embedded in the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 216–217

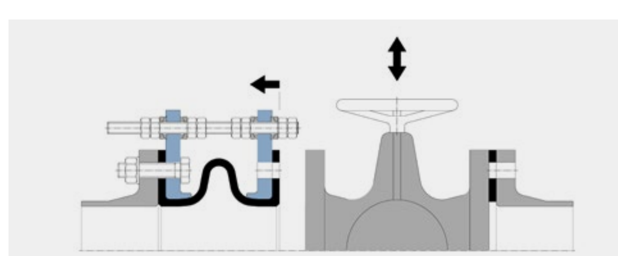
Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

Working principle of a dismantling joint



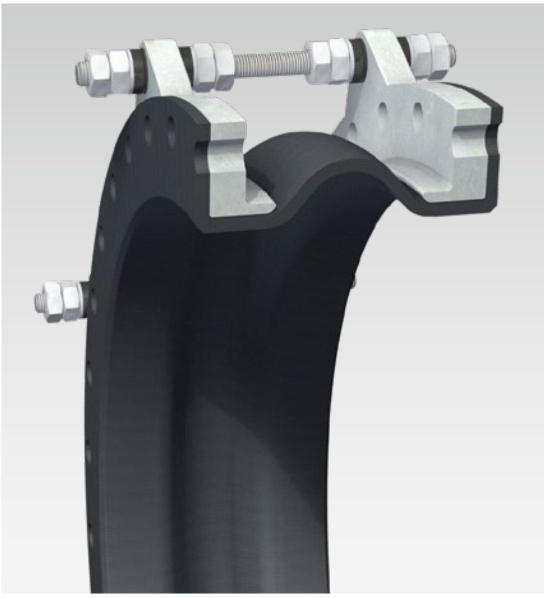
in operation

Note: check tie-rod clashing with valve or pump body



for maintenance

Tie rods

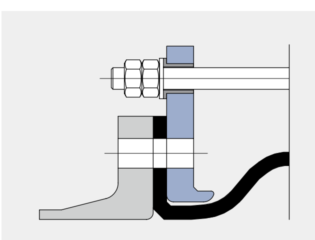


Example: Type U110M LDJ

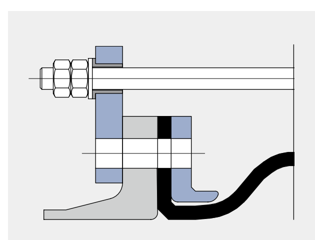
Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

Materials: Carbon steel
Stainless steel

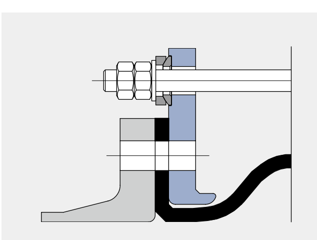
Coating: Spherical washers/ball disks: PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated



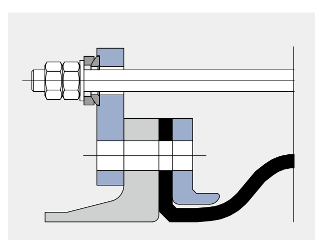
Type U110B
Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



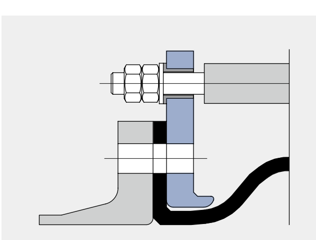
Type U110R
Gusset plates: Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



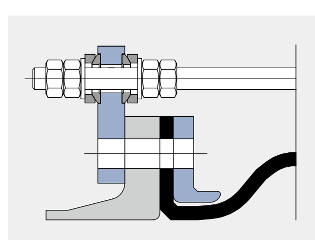
Type U110E
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



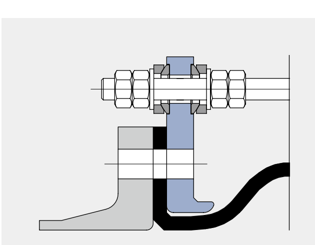
Type U110K
Gusset plates: Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



Type U110C
Tie rods mounted outside in rubber bushing and inside with compression sleeve to accommodate pressure/vacuum thrust forces

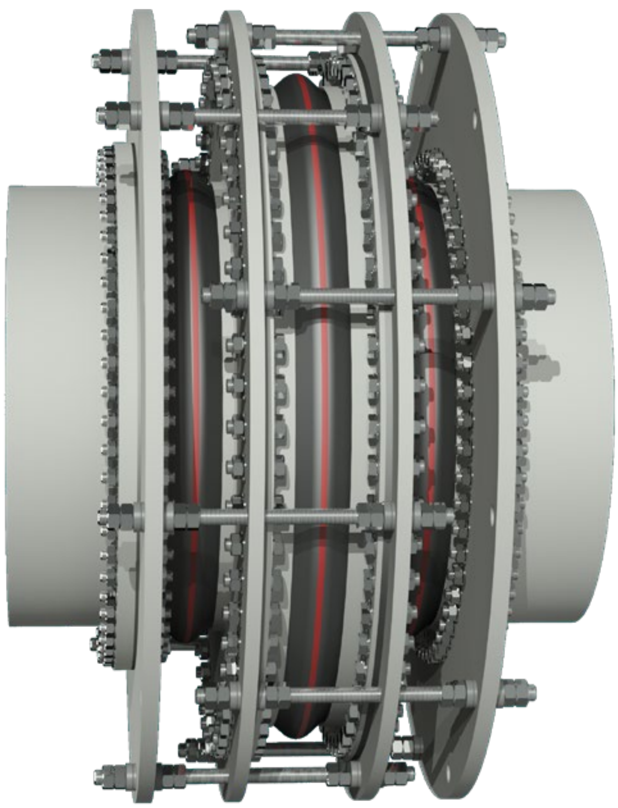


Type U110L
Gusset plates: Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces



Type U110M
Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces

U110M IPB ⌀ 80 - 4,000 mm



> **Type U110M IPB**
without vacuum rings

> **Type U111M IPB**
with internal vacuum rings

> **Type U112M IPB**
with embedded vacuum rings

Type key > page 22

U1 1 0 M IPB
- Tie rod variant
- Support ring variants
- Number of arches
- Type

In-line pressure balanced expansion joint

Design:

In-line pressure balanced expansion joints are designed to absorb movements from a pipe system. They can accommodate axial and lateral movements where anchoring of the pipe system is difficult or impractical due to structural or economic considerations. Pressure balanced expansion joints do not transfer the internal pressure thrust on to the fix points, adjacent equipment, or structures. In-line pressure balanced rubber expansion joints are the only effective solution for directly absorbing large axial movements while continuously self-restraining the pressure thrust forces. This arrangement consists of tie devices inter-connecting its main joint sections to its opposing balancing joint section.

Therefore, pressure balanced expansion joints can offer significant advantages, where pipe systems are connected with turbines, pumps, valves or other equipment, that are unable to withstand pressure thrust loads. Although pressure balanced expansion joints eliminate pressure thrust, it's important to note that the existing load on the surrounding equipment is the total sum of the spring rates of both the two main bellows and the balancing bellow. The balancing rubber expansion joint needs to be twice the effective area as the main rubber expansion joints. In operation the main bellows of the pressure balanced unit will contract from axial movement of the piping while the balancing bellow will expand.

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e. g. in pipelines, on pumps, on condensers and vessels

Request assembly instructions at:
www.ditec-adam.de/en/contact

In-line pressure balanced rubber expansion joints are high elastic, streamlined, have depending from the expected axial or lateral movements single or multiple wide arches with full faced rubber flanges, have a cycle life in the tens of millions, are constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and backing flanges with support collar. Optional with vacuum rings. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ∅ 80 to 4,000 mm, custom diameters possible

Length: Custom length on request

Pressure: Up to 40 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For axial and lateral movements
(> page 212–217)

Spring rate: The total axial spring rate is the axial spring rate of the balancing expansion joint plus once the axial spring rate of the main bellow
The total lateral spring rate is 1/3 of each bellows lateral spring rate plus the friction forces of the tie rods bearings

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows, available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 212–217)

Backing flanges

Design: Single-part integral backing flanges with support collar, clearance holes and tie rod holders (tie rod type M)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Tie rods

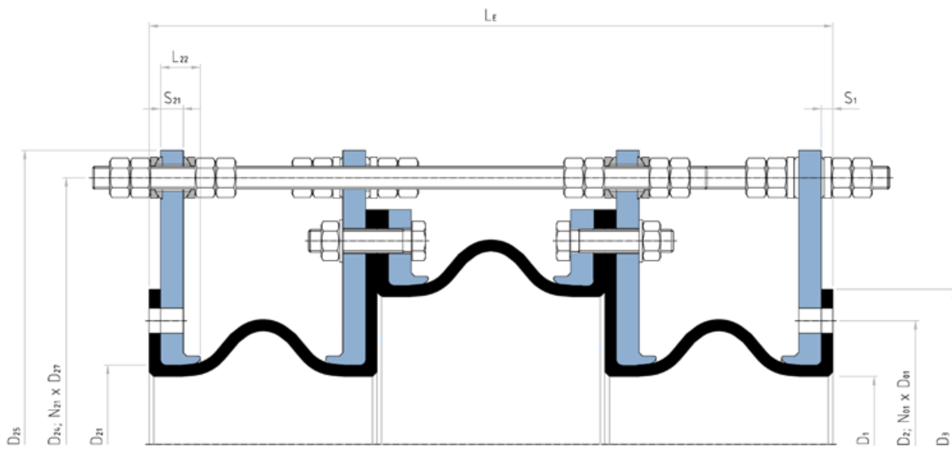
Example: Type U112M IPB

Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

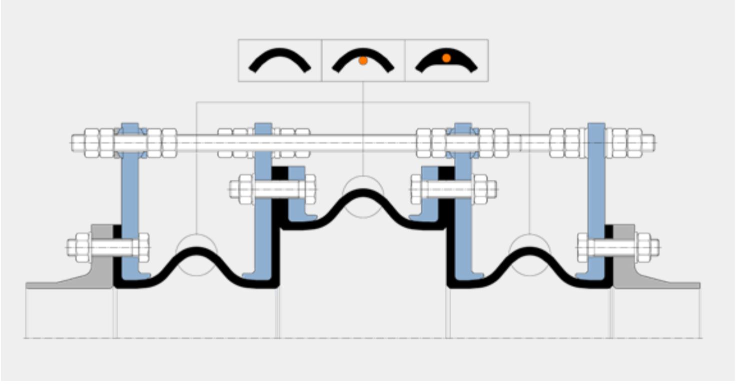
Materials: Carbon steel
Stainless steel

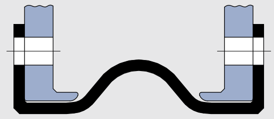
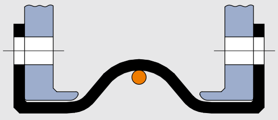
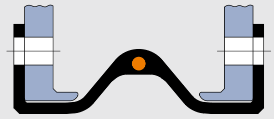
Coating: Spherical washers/ball disks: PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated

Cross section U110M IPB



Support rings



TYPE	Support rings	Vacuum ring	Pressure	Movement
U110M IPB		None	Depending on the diameter up to 40 bar, vacuum stability on request	> page 212–213
U111M IPB		Medium contact, inside the arch apex	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute	> page 214–215
U112M IPB		No medium contact, embedded in the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 216–217

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

In-line pressure balanced rubber expansion joint of size ∅ 800 mm

U110M EPB ⌀ 80 - 4,000 mm

> **Type U110M EPB**
> without vacuum rings

> **Type U111M EPB**
> with internal vacuum rings

> **Type U112M EPB**
> with embedded vacuum rings

Type key > page 22

U1 1 0 M EPB
- Tie rod variant
- Support ring variants
- Number of arches
- Type

Elbow pressure balanced expansion joint

Design: Elbow pressure balanced expansion joints or corner relief expansion joints are the types of pressure balanced expansion joints, which are used where pressure thrust forces on equipment or piping is unacceptable and the direction of the pipe system also changes.

By installing elbow pressure balanced expansion joints, the pressure thrust force is balanced internally within the expansion joint and only the spring rate force, which is needed to move the pipe expansion joint is transmitted to the pipe system. This arrangement consists of tie devices inter-connecting its main joint section to its opposing balancing joint section and reduces the load acting on the guides/fix points, which further reduces the need for supporting structures.

Elbow pressure balanced rubber expansion joints are high elastic, streamlined, have depending from the expected axial or lateral movements single or multiple wide archs with full faced rubber flanges, have a cycle life in the tens of millions, are constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and backing flanges with support collar. Optional with vacuum rings. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e. g. in pipelines, on pumps, valves

CE PED 2014/68/EU | KTW WRAS | FDA | <10⁶ Ohm | EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Diameters: ∅ 80 to 4,000 mm, custom diameters possible

Length: Custom length on request

Pressure: Up to 40 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For axial and lateral movements
(> page 212–217)

Spring rate: Axial and lateral spring rates (> page 296)

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows, available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 212–217)

Backing flanges

Design: Single-part integral backing flanges with support collar, clearance holes and tie rod holders (tie rod type M)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

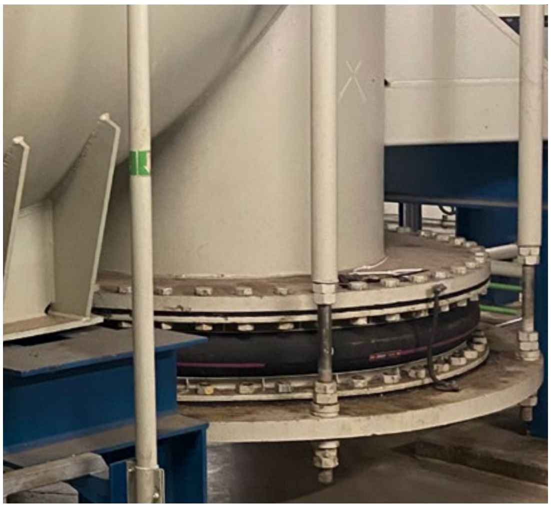
Tie rods

Example: Type U112M EPB

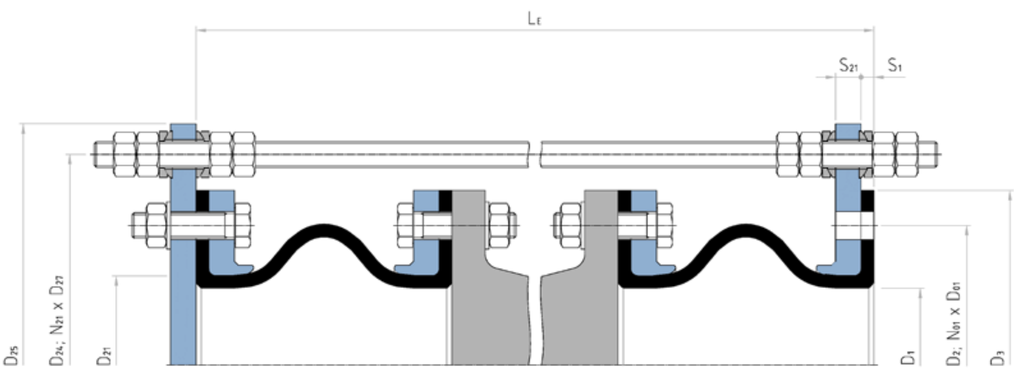
Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

Materials: Carbon steel
Stainless steel

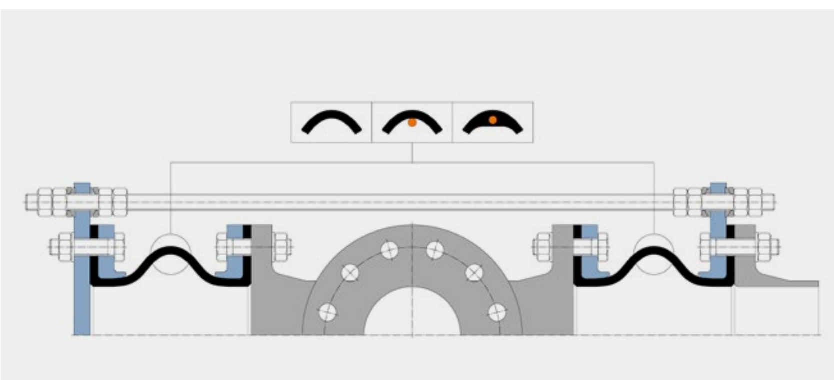
Coating: Spherical washers/ball disks:
PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated

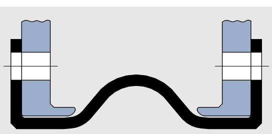
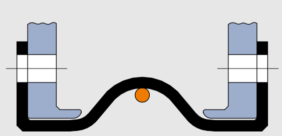
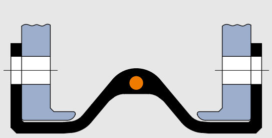


Cross section U110M EPB



Support rings



TYPE	Support rings	Vacuum ring	Pressure	Movement
U110M EPB		None	Depending on the diameter up to 40 bar, vacuum stability on request	> page 212–213
U111M EPB		Medium contact, inside the arch apex	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute	> page 214–215
U112M EPB		No medium contact, embed-ded in the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 216–217

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

U120M ⌀ 80 - 4,000 mm

> **Type U120M**
without vacuum rings

> **Type U121M**
with internal vacuum rings

> **Type U122M**
with embedded vacuum rings

> **Type U123M**
without vacuum rings,
with external support ring

> **Type U124M**
with internal vacuum rings,
with external support ring

> **Type U125M**
with embedded vacuum rings,
with external support ring

Type key > page 22
U1 2 3 M
- M → Tie rod variant
- 3 → Support ring variant
- 2 → Number of arches
- U1 → Type

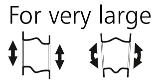
Lateral expansion joint with two arches

Design: Streamlined, double or multiple wide arch rubber bellows with full faced rubber flanges, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single- or multi-part backing flanges with tie-rods borne in spherical washers. Optional with vacuum rings and/or external support ring(s). In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 80 to 4,000 mm, custom diameters possible

Length: Standard L_E = 350 to 650 mm (> page 242–247)
Custom length on request

Pressure: Up to 100 bar depending on diameter and length
Vacuum not allowed without vacuum rings, with vacuum rings up to 0.05 bar absolute

Movement: For very large lateral and angular (2 tie rod design) movements*
 (> page 242–247)

Spring rate: To calculate the lateral spring rate for multiple arch joints, divide our single arch values of type U110A by the number of arches (> page 296)

Application:
Cooling water systems, desalination plants, drinking water supply, plant constructions e.g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

Request assembly instructions at:
www.ditec-adam.de/en/contact

*Installation gap tolerances according to axial movement capability of the expansion joint

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 242–247)

Backing flanges

Design: Single- or multi-part integral backing flanges with support collar, clearance holes and tie rod holders (tie rod type B, E, C, M)

Single- or multi-part backing flanges with support collar, clearance holes and tie rod gusset plates (tie rod type R, K, L)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective cover (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

(> page 42)

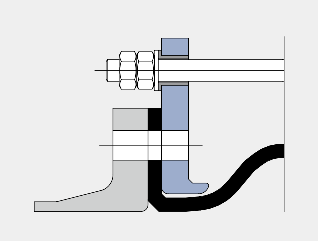
Tie rods

Example: Type U124M

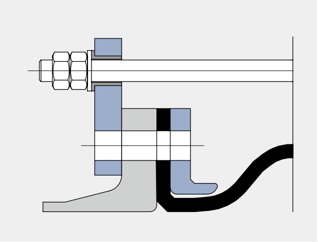
Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

Materials: Carbon steel
Stainless steel

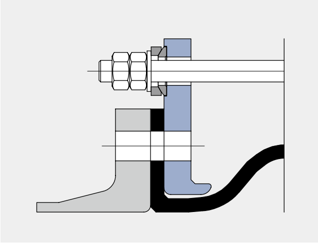
Coating: Spherical washers/ball disks: PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated



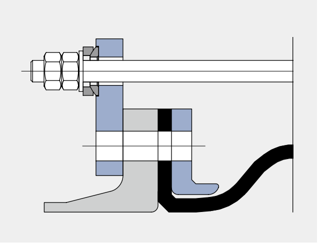
Type U120B
Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



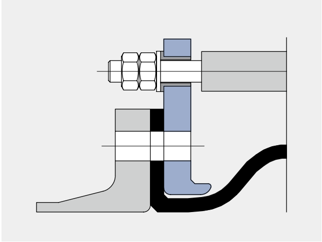
Type U120R
Gusset plate: Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



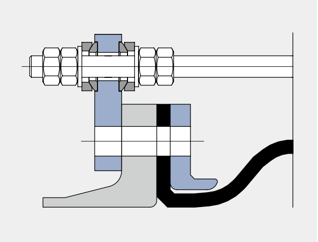
Type U120E
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



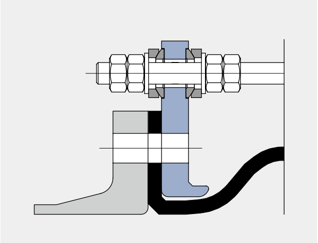
Type U120K
Gusset plate: Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



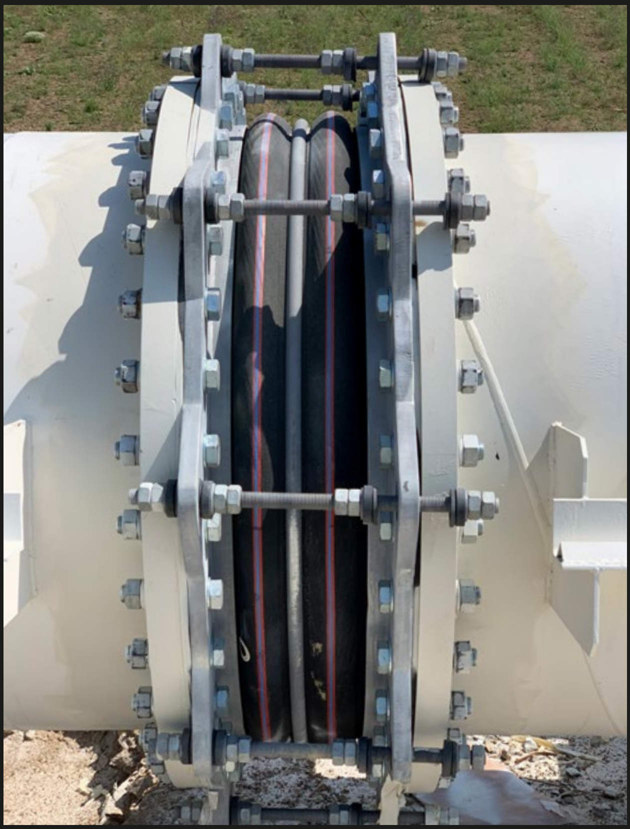
Type U120C
Tie rods mounted outside in rubber bushing and inside with compression sleeve to accommodate pressure/vacuum thrust forces



Type U120L
Gusset plate: Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces



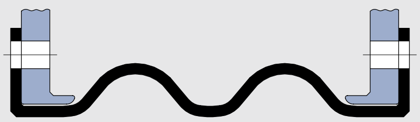
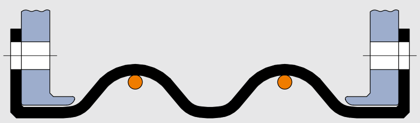
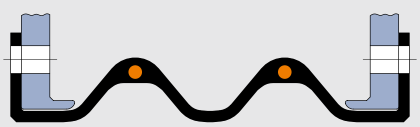
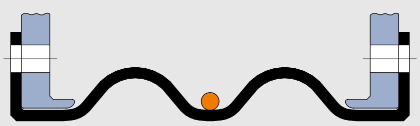
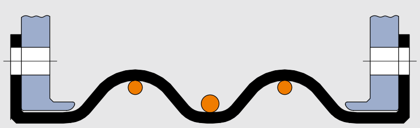
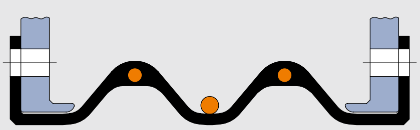
Type U120M
Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces



Installation of tied rubber expansion joints ∅ 1,400 mm
in a ring water line of a copper mine

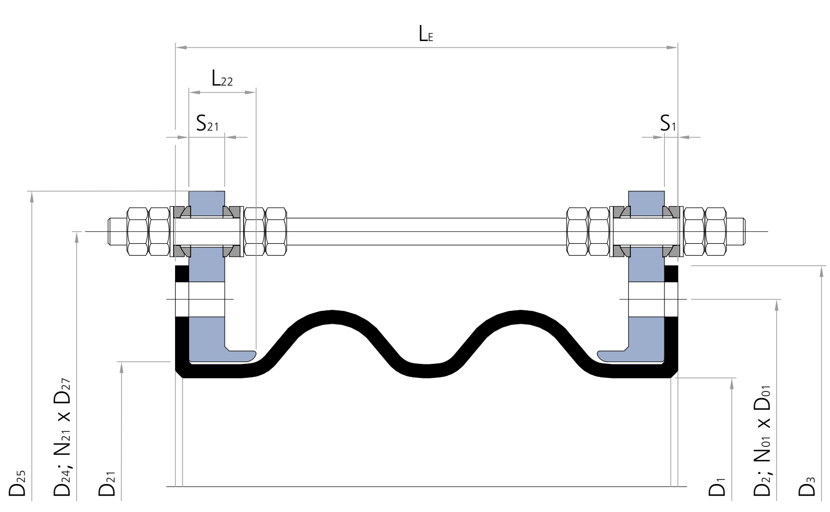
∅ 1,600 mm triple arch rubber expansion joints of type U135M installed in the feed lines of a waste water treatment plant

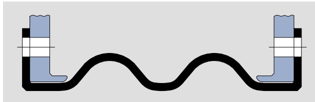
Support rings

TYPE	Support rings	Vacuum ring	Support ring	Pressure	Movement
U120M		None	None	Low pressure, vacuum stability on request	> page 242–243
U121M		Medium contact, inside the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 244–245
U122M		No medium contact, embedded in the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 246–247
U123M		None	External between the arches	Depending on the diameter up to 100 bar, slight vacuum	> page 242–243
U124M		Medium contact, inside the arches	External between the arches	Depending on the diameter up to 100 bar, for vacuum up to 0.05 bar absolute	> page 244–245
U125M		No medium contact, embedded in the arches	External between the arches	Depending on the diameter up to 40 bar, for vacuum up to 0.05 bar absolute	> page 246–247

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

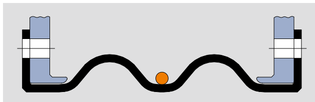
Cross section U120A





U120M

> without vacuum rings



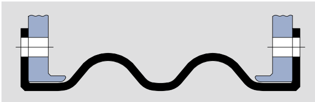
U123M

> without vacuum rings, with external support ring

	Installation length (L_E) at design pressure														
	up to 4 bar L_E = **350 mm** up to 6 bar L_E = **350 mm** up to 10 bar L_E = **400 mm**					up to 4 bar L_E = **350 mm** up to 6 bar L_E = **400 mm** up to 10 bar L_E = **450 mm**					up to 4 bar L_E = **400 mm** up to 6 bar L_E = **450 mm** up to 10 bar L_E = **500 mm**				
	higher pressures on request														
⌀	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	53	22	35	0	177	62	20	38	0	177	80	40	56	0	254
125	53	22	34	0	241	62	20	38	0	241	80	40	55	0	330
150	53	22	34	0	314	62	20	37	0	314	80	40	54	0	415
175	53	22	33	0	415	62	20	36	0	415	80	40	54	0	531
200	53	22	33	0	491	62	20	36	0	491	80	40	53	0	616
250	53	22	32	0	707	62	20	35	0	707	80	40	52	0	855
300	53	22	32	0	973	62	20	35	0	973	80	40	51	0	1,146
350	53	22	31	0	1,288	62	20	34	0	1,288	80	40	50	0	1,486
400	53	22	31	0	1,605	62	20	34	0	1,605	80	40	50	0	1,825
450	53	22	31	0	1,987	62	20	33	0	1,987	80	40	49	0	2,231
500	53	22	30	0	2,402	62	20	33	0	2,402	80	40	49	0	2,669
550						62	20	33	0	2,827	80	40	48	0	3,117
600						62	20	33	0	3,349	80	40	48	0	3,664
650						62	20	32	0	3,848	80	40	48	0	4,185
700						62	20	32	0	4,465	80	40	47	0	4,827
750						62	20	32	0	5,027	80	40	47	0	5,411
800						62	20	32	0	5,741	80	40	47	0	6,151
850						62	20	32	0	6,362	80	40	46	0	6,793
900						62	20	31	0	7,163	80	40	46	0	7,620
950						62	20	31	0	7,854	80	40	46	0	8,332
1000						62	20	31	0	8,742	80	40	46	0	9,246
1050											80	40	46	0	10,029
1100											80	40	45	0	11,047
1150											80	40	45	0	11,882
1200											80	40	45	0	12,969
1250											80	40	45	0	13,893
1300											80	40	45	0	15,066
1350											80	40	45	0	16,061
1400											80	40	44	0	17,320
1450											80	40	44	0	18,385
1500											80	40	44	0	19,731
1600											80	40	44	0	22,299
1650											80	40	44	0	23,506
1700											80	40	44	0	25,025
1800											80	40	43	0	27,937
1900											80	40	43	0	30,946
1950											80	40	43	0	32,365
2000											80	40	43	0	34,143
2100															
2200															
2250															
2300															
2400															
2500															
2550															
2600															
2700															
2800															
2850															
2900															
3000															
3100															
3150															
3200															
3300															
3400															
3450															
3600															
3800															
4000															

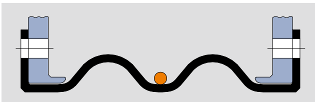
Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %.
In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29). Larger movements on request.



U120M

> without vacuum rings



U123M

> without vacuum rings, with external support ring

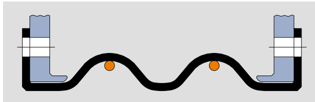
MEMBER OF THE ELAFLEX GROUP

Installation length (L_E) at design pressure

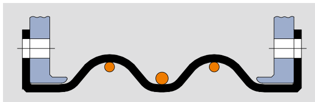
up to 4 bar **L_E = 450 mm** up to 6 bar **L_E = 500 mm** up to 10 bar **L_E = 550 mm**					up to 4 bar **L_E = 500 mm** up to 6 bar **L_E = 550 mm** up to 10 bar **L_E = 600 mm**					up to 4 bar **L_E = 550 mm** up to 6 bar **L_E = 600 mm** up to 10 bar **L_E = 650 mm**					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
88	41	61	0	260	106	61	79	0	353	124	82	97	0	460	**100**
88	41	60	0	337	106	61	77	0	441	124	82	95	0	560	**125**
88	41	59	0	423	106	61	76	0	539	124	82	93	0	670	**150**
88	41	58	0	539	106	61	75	0	670	124	82	92	0	814	**175**
88	41	57	0	625	106	61	74	0	765	124	82	91	0	919	**200**
88	41	56	0	866	106	61	72	0	1,029	124	82	89	0	1,207	**250**
88	41	55	0	1,158	106	61	71	0	1,346	124	82	88	0	1,548	**300**
88	41	54	0	1,500	106	61	70	0	1,713	124	82	86	0	1,940	**350**
88	41	54	0	1,840	106	61	69	0	2,075	124	82	85	0	2,324	**400**
88	41	53	0	2,248	106	61	69	0	2,507	124	82	84	0	2,781	**450**
88	41	52	0	2,688	106	61	68	0	2,971	124	82	84	0	3,267	**500**
88	41	52	0	3,137	106	61	67	0	3,442	124	82	83	0	3,761	**550**
88	41	52	0	3,685	106	61	67	0	4,015	124	82	82	0	4,359	**600**
88	41	51	0	4,208	106	61	66	0	4,560	124	82	82	0	4,927	**650**
88	41	51	0	4,852	106	61	66	0	5,230	124	82	81	0	5,621	**700**
88	41	51	0	5,437	106	61	66	0	5,836	124	82	81	0	6,249	**750**
88	41	50	0	6,179	106	61	65	0	6,604	124	82	80	0	7,044	**800**
88	41	50	0	6,822	106	61	65	0	7,268	124	82	80	0	7,729	**850**
88	41	50	0	7,651	106	61	64	0	8,123	124	82	79	0	8,610	**900**
88	41	49	0	8,365	106	61	64	0	8,858	124	82	79	0	9,366	**950**
88	41	49	0	9,280	106	61	64	0	9,799	124	82	79	0	10,333	**1000**
88	41	49	0	10,064	106	61	64	0	10,605	124	82	78	0	11,159	**1050**
88	41	49	0	11,085	106	61	63	0	11,652	124	82	78	0	12,233	**1100**
88	41	49	0	11,921	106	61	63	0	12,509	124	82	78	0	13,110	**1150**
88	41	48	0	13,009	106	61	63	0	13,623	124	82	77	0	14,250	**1200**
88	41	48	0	13,935	106	61	63	0	14,569	124	82	77	0	15,218	**1250**
88	41	48	0	15,109	106	61	62	0	15,770	124	82	77	0	16,445	**1300**
88	41	48	0	16,106	106	61	62	0	16,787	124	82	76	0	17,483	**1350**
88	41	48	0	17,366	106	61	62	0	18,074	124	82	76	0	18,796	**1400**
88	41	48	0	18,433	106	61	62	0	19,162	124	82	76	0	19,906	**1450**
88	41	47	0	19,781	106	61	62	0	20,536	124	82	76	0	21,305	**1500**
88	41	47	0	22,352	106	61	61	0	23,154	124	82	75	0	23,970	**1600**
88	41	47	0	23,561	106	61	61	0	24,384	124	82	75	0	25,221	**1650**
88	41	47	0	25,081	106	61	61	0	25,930	124	82	75	0	26,793	**1700**
88	41	47	0	27,996	106	61	61	0	28,893	124	82	74	0	29,804	**1800**
88	41	46	0	31,009	106	61	60	0	31,952	124	82	74	0	32,910	**1900**
88	41	46	0	32,429	106	61	60	0	33,394	124	82	74	0	34,373	**1950**
88	41	46	0	34,209	106	61	60	0	35,199	124	82	74	0	36,204	**2000**
88	41	46	0	37,565	106	61	60	0	38,603	124	82	73	0	39,655	**2100**
88	41	46	0	41,079	106	61	59	0	42,164	124	82	73	0	43,263	**2200**
88	41	46	0	42,712	106	61	59	0	43,818	124	82	73	0	44,938	**2250**
88	41	46	0	44,750	106	61	59	0	45,882	124	82	73	0	47,028	**2300**
88	41	45	0	48,578	106	61	59	0	49,757	124	82	72	0	50,950	**2400**
88	41	45	0	52,563	106	61	59	0	53,789	124	82	72	0	55,030	**2500**
88	41	45	0	54,408	106	61	59	0	55,655	124	82	72	0	56,917	**2550**
88	41	45	0	56,706	106	61	59	0	57,979	124	82	72	0	59,266	**2600**
88	41	45	0	61,005	106	61	58	0	62,325	124	82	72	0	63,660	**2700**
88	41	45	0	65,461	106	61	58	0	66,829	124	82	71	0	68,210	**2800**
88	41	45	0	67,518	106	61	58	0	68,906	124	82	71	0	70,309	**2850**
88	41	45	0	70,075	106	61	58	0	71,489	124	82	71	0	72,918	**2900**
88	41	45	0	74,845	106	61	58	0	76,307	124	82	71	0	77,783	**3000**
88	41	44	0	79,773	106	61	58	0	81,282	124	82	71	0	82,805	**3100**
88	41	44	0	82,041	106	61	58	0	83,571	124	82	71	0	85,116	**3150**
88	41	44	0	84,857	106	61	57	0	86,413	124	82	71	0	87,984	**3200**
88	41	44	0	90,099	106	61	57	0	91,702	124	82	70	0	93,320	**3300**
88	41	44	0	95,498	106	61	57	0	97,148	124	82	70	0	98,813	**3400**
88	41	44	0	97,979	106	61	57	0	99,650	124	82	70	0	101,336	**3450**
88	41	44	0	106,767	106	61	57	0	108,511	124	82	70	0	110,270	**3600**
88	41	44	0	118,664	106	61	57	0	120,503	124	82	70	0	122,356	**3800**
88	41	43	0	131,190	106	61	56	0	133,123	124	82	69	0	135,070	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



U121M
> with internal vacuum rings



U124M
> with internal vacuum rings, with external support ring

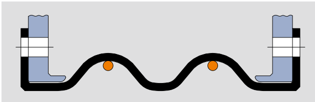
Installation length (L_E) at design pressure

higher pressures on request

Ø	up to 4 bar L_E = **350 mm**, up to 6 bar L_E = **350 mm**, up to 10 bar L_E = **400 mm** – Movement				A	up to 4 bar L_E = **350 mm**, up to 6 bar L_E = **400 mm**, up to 10 bar L_E = **450 mm** – Movement				A	up to 4 bar L_E = **400 mm**, up to 6 bar L_E = **450 mm**, up to 10 bar L_E = **500 mm** – Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	53	7	35	0	177	62	7	38	0	177	80	13	56	0	254
125	53	7	34	0	241	62	7	38	0	241	80	13	55	0	330
150	53	7	34	0	314	62	7	37	0	314	80	13	54	0	415
175	53	7	33	0	415	62	7	36	0	415	80	13	54	0	531
200	53	7	33	0	491	62	7	36	0	491	80	13	53	0	616
250	53	7	32	0	707	62	7	35	0	707	80	13	52	0	855
300	53	7	32	0	973	62	7	35	0	973	80	13	51	0	1,146
350	53	7	31	0	1,288	62	7	34	0	1,288	80	13	50	0	1,486
400	53	7	31	0	1,605	62	7	34	0	1,605	80	13	50	0	1,825
450	53	7	31	0	1,987	62	7	33	0	1,987	80	13	49	0	2,231
500	53	7	30	0	2,402	62	7	33	0	2,402	80	13	49	0	2,669
550						62	7	33	0	2,827	80	13	48	0	3,117
600						62	7	33	0	3,349	80	13	48	0	3,664
650						62	7	32	0	3,848	80	13	48	0	4,185
700						62	7	32	0	4,465	80	13	47	0	4,827
750						62	7	32	0	5,027	80	13	47	0	5,411
800						62	7	32	0	5,741	80	13	47	0	6,151
850						62	7	32	0	6,362	80	13	46	0	6,793
900						62	7	31	0	7,163	80	13	46	0	7,620
950						62	7	31	0	7,854	80	13	46	0	8,332
1000						62	7	31	0	8,742	80	13	46	0	9,246
1050											80	13	46	0	10,029
1100											80	13	45	0	11,047
1150											80	13	45	0	11,882
1200											80	13	45	0	12,969
1250											80	13	45	0	13,893
1300											80	13	45	0	15,066
1350											80	13	45	0	16,061
1400											80	13	44	0	17,320
1450											80	13	44	0	18,385
1500											80	13	44	0	19,731
1600											80	13	44	0	22,299
1650											80	13	44	0	23,506
1700											80	13	44	0	25,025
1800											80	13	43	0	27,937
1900											80	13	43	0	30,946
1950											80	13	43	0	32,365
2000											80	13	43	0	34,143
2100															
2200															
2250															
2300															
2400															
2500															
2550															
2600															
2700															
2800															
2850															
2900															
3000															
3100															
3150															
3200															
3300															
3400															
3450															
3600															
3800															
4000															

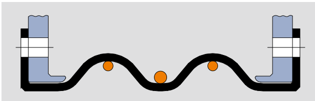
Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -33 %; axial extension: -0 %; lateral displacement: -50 %.
In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29). Larger movements on request.



U121M

> with internal vacuum rings



U124M

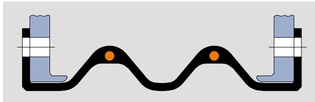
> with internal vacuum rings, with external support ring

MEMBER OF THE ELAFLEX GROUP

Installation length (L_E) at design pressure															
up to 4 bar **L_E = 450 mm** up to 6 bar **L_E = 500 mm** up to 10 bar **L_E = 550 mm**					up to 4 bar **L_E = 500 mm** up to 6 bar **L_E = 550 mm** up to 10 bar **L_E = 600 mm**					up to 4 bar **L_E = 550 mm** up to 6 bar **L_E = 600 mm** up to 10 bar **L_E = 650 mm**					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
88	13	61	0	260	106	20	79	0	353	124	27	97	0	460	**100**
88	13	60	0	337	106	20	77	0	441	124	27	95	0	560	**125**
88	13	59	0	423	106	20	76	0	539	124	27	93	0	670	**150**
88	13	58	0	539	106	20	75	0	670	124	27	92	0	814	**175**
88	13	57	0	625	106	20	74	0	765	124	27	91	0	919	**200**
88	13	56	0	866	106	20	72	0	1,029	124	27	89	0	1,207	**250**
88	13	55	0	1,158	106	20	71	0	1,346	124	27	88	0	1,548	**300**
88	13	54	0	1,500	106	20	70	0	1,713	124	27	86	0	1,940	**350**
88	13	54	0	1,840	106	20	69	0	2,075	124	27	85	0	2,324	**400**
88	13	53	0	2,248	106	20	69	0	2,507	124	27	84	0	2,781	**450**
88	13	52	0	2,688	106	20	68	0	2,971	124	27	84	0	3,267	**500**
88	13	52	0	3,137	106	20	67	0	3,442	124	27	83	0	3,761	**550**
88	13	52	0	3,685	106	20	67	0	4,015	124	27	82	0	4,359	**600**
88	13	51	0	4,208	106	20	66	0	4,560	124	27	82	0	4,927	**650**
88	13	51	0	4,852	106	20	66	0	5,230	124	27	81	0	5,621	**700**
88	13	51	0	5,437	106	20	66	0	5,836	124	27	81	0	6,249	**750**
88	13	50	0	6,179	106	20	65	0	6,604	124	27	80	0	7,044	**800**
88	13	50	0	6,822	106	20	65	0	7,268	124	27	80	0	7,729	**850**
88	13	50	0	7,651	106	20	64	0	8,123	124	27	79	0	8,610	**900**
88	13	49	0	8,365	106	20	64	0	8,858	124	27	79	0	9,366	**950**
88	13	49	0	9,280	106	20	64	0	9,799	124	27	79	0	10,333	**1000**
88	13	49	0	10,064	106	20	64	0	10,605	124	27	78	0	11,159	**1050**
88	13	49	0	11,085	106	20	63	0	11,652	124	27	78	0	12,233	**1100**
88	13	49	0	11,921	106	20	63	0	12,509	124	27	78	0	13,110	**1150**
88	13	48	0	13,009	106	20	63	0	13,623	124	27	77	0	14,250	**1200**
88	13	48	0	13,935	106	20	63	0	14,569	124	27	77	0	15,218	**1250**
88	13	48	0	15,109	106	20	62	0	15,770	124	27	77	0	16,445	**1300**
88	13	48	0	16,106	106	20	62	0	16,787	124	27	76	0	17,483	**1350**
88	13	48	0	17,366	106	20	62	0	18,074	124	27	76	0	18,796	**1400**
88	13	48	0	18,433	106	20	62	0	19,162	124	27	76	0	19,906	**1450**
88	13	47	0	19,781	106	20	62	0	20,536	124	27	76	0	21,305	**1500**
88	13	47	0	22,352	106	20	61	0	23,154	124	27	75	0	23,970	**1600**
88	13	47	0	23,561	106	20	61	0	24,384	124	27	75	0	25,221	**1650**
88	13	47	0	25,081	106	20	61	0	25,930	124	27	75	0	26,793	**1700**
88	13	47	0	27,996	106	20	61	0	28,893	124	27	74	0	29,804	**1800**
88	13	46	0	31,009	106	20	60	0	31,952	124	27	74	0	32,910	**1900**
88	13	46	0	32,429	106	20	60	0	33,394	124	27	74	0	34,373	**1950**
88	13	46	0	34,209	106	20	60	0	35,199	124	27	74	0	36,204	**2000**
88	13	46	0	37,565	106	20	60	0	38,603	124	27	73	0	39,655	**2100**
88	13	46	0	41,079	106	20	59	0	42,164	124	27	73	0	43,263	**2200**
88	13	46	0	42,712	106	20	59	0	43,818	124	27	73	0	44,938	**2250**
88	13	46	0	44,750	106	20	59	0	45,882	124	27	73	0	47,028	**2300**
88	13	45	0	48,578	106	20	59	0	49,757	124	27	72	0	50,950	**2400**
88	13	45	0	52,563	106	20	59	0	53,789	124	27	72	0	55,030	**2500**
88	13	45	0	54,408	106	20	59	0	55,655	124	27	72	0	56,917	**2550**
88	13	45	0	56,706	106	20	59	0	57,979	124	27	72	0	59,266	**2600**
88	13	45	0	61,005	106	20	58	0	62,325	124	27	72	0	63,660	**2700**
88	13	45	0	65,461	106	20	58	0	66,829	124	27	71	0	68,210	**2800**
88	13	45	0	67,518	106	20	58	0	68,906	124	27	71	0	70,309	**2850**
88	13	45	0	70,075	106	20	58	0	71,489	124	27	71	0	72,918	**2900**
88	13	45	0	74,845	106	20	58	0	76,307	124	27	71	0	77,783	**3000**
88	13	44	0	79,773	106	20	58	0	81,282	124	27	71	0	82,805	**3100**
88	13	44	0	82,041	106	20	58	0	83,571	124	27	71	0	85,116	**3150**
88	13	44	0	84,857	106	20	57	0	86,413	124	27	71	0	87,984	**3200**
88	13	44	0	90,099	106	20	57	0	91,702	124	27	70	0	93,320	**3300**
88	13	44	0	95,498	106	20	57	0	97,148	124	27	70	0	98,813	**3400**
88	13	44	0	97,979	106	20	57	0	99,650	124	27	70	0	101,336	**3450**
88	13	44	0	106,767	106	20	57	0	108,511	124	27	70	0	110,270	**3600**
88	13	44	0	118,664	106	20	57	0	120,503	124	27	70	0	122,356	**3800**
88	13	43	0	131,190	106	20	56	0	133,123	124	27	69	0	135,070	**4000**

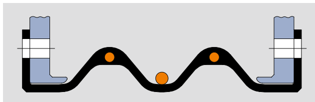
The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



U122M

> with embedded vacuum rings



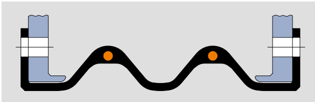
U125M

> with embedded vacuum rings, with external support ring

Installation length (L_E) at design pressure															
	up to 4 bar **L_E = 350 mm** up to 6 bar **L_E = 350 mm** up to 10 bar **L_E = 400 mm**					up to 4 bar **L_E = 350 mm** up to 6 bar **L_E = 400 mm** up to 10 bar **L_E = 450 mm**					up to 4 bar **L_E = 400 mm** up to 6 bar **L_E = 450 mm** up to 10 bar **L_E = 500 mm**				
	higher pressures on request														
Ø	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
100	35	7	35	0	177	41	5	36	0	150	52	12	54	0	222
125	35	7	34	0	241	41	5	35	0	209	52	12	53	0	293
150	35	7	34	0	314	41	5	35	0	278	52	12	52	0	373
175	35	7	33	0	415	41	5	34	0	373	52	12	51	0	483
200	35	7	33	0	491	41	5	34	0	445	52	12	51	0	564
250	35	7	32	0	707	41	5	33	0	651	52	12	50	0	794
300	35	7	32	0	973	41	5	32	0	908	52	12	49	0	1,075
350	35	7	31	0	1,288	41	5	32	0	1,213	52	12	48	0	1,405
400	35	7	31	0	1,605	41	5	32	0	1,521	52	12	48	0	1,735
450	35	7	31	0	1,987	41	5	31	0	1,893	52	12	47	0	2,132
500	35	7	30	0	2,402	41	5	31	0	2,299	52	12	47	0	2,561
550						41	5	31	0	2,715	52	12	46	0	3,000
600						41	5	30	0	3,227	52	12	46	0	3,536
650						41	5	30	0	3,718	52	12	45	0	4,049
700						41	5	30	0	4,324	52	12	45	0	4,681
750						41	5	30	0	4,877	52	12	45	0	5,255
800						41	5	30	0	5,581	52	12	45	0	5,986
850						41	5	30	0	6,193	52	12	44	0	6,619
900						41	5	29	0	6,984	52	12	44	0	7,436
950						41	5	29	0	7,667	52	12	44	0	8,139
1000						41	5	29	0	8,544	52	12	44	0	9,043
1050											52	12	44	0	9,817
1100											52	12	43	0	10,825
1150											52	12	43	0	11,652
1200											52	12	43	0	12,728
1250											52	12	43	0	13,643
1300											52	12	43	0	14,806
1350											52	12	43	0	15,792
1400											52	12	42	0	17,041
1450											52	12	42	0	18,098
1500											52	12	42	0	19,433
1600											52	12	42	0	21,983
1650											52	12	42	0	23,181
1700											52	12	42	0	24,689
1800											52	12	41	0	27,582
1900											52	12	41	0	30,573
1950											52	12	41	0	31,984
2000											52	12	41	0	33,751
2100															
2200															
2250															
2300															
2400															
2500															
2550															
2600															
2700															
2800															
2850															
2900															
3000															
3100															
3150															
3200															
3300															
3400															
3450															
3600															
3800															
4000															

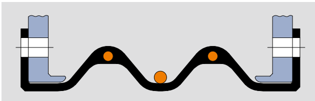
Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -0 %; axial extension: -0 %; lateral displacement: -0 %.
In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29). Larger movements on request.



U122M

> with embedded vacuum rings



U125M

> with embedded vacuum rings, with external support ring

Installation length (L_E) at design pressure

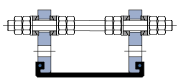
up to 4 bar L_E = **450 mm** up to 6 bar L_E = **500 mm** up to 10 bar L_E = **550 mm**					up to 4 bar L_E = **500 mm** up to 6 bar L_E = **550 mm** up to 10 bar L_E = **600 mm**					up to 4 bar L_E = **550 mm** up to 6 bar L_E = **600 mm** up to 10 bar L_E = **650 mm**					
higher pressures on request															
Movement				A	Movement				A	Movement				A	Ø
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
58	12	59	0	232	70	19	77	0	320	82	26	95	0	423	**100**
58	12	58	0	305	70	19	75	0	405	82	26	93	0	519	**125**
58	12	57	0	387	70	19	74	0	499	82	26	91	0	625	**150**
58	12	56	0	499	70	19	73	0	625	82	26	90	0	765	**175**
58	12	55	0	581	70	19	72	0	716	82	26	89	0	866	**200**
58	12	54	0	814	70	19	71	0	973	82	26	87	0	1,146	**250**
58	12	53	0	1,099	70	19	69	0	1,282	82	26	86	0	1,479	**300**
58	12	52	0	1,432	70	19	69	0	1,640	82	26	85	0	1,863	**350**
58	12	52	0	1,765	70	19	68	0	1,995	82	26	84	0	2,240	**400**
58	12	51	0	2,165	70	19	67	0	2,419	82	26	83	0	2,688	**450**
58	12	51	0	2,597	70	19	66	0	2,875	82	26	82	0	3,167	**500**
58	12	50	0	3,039	70	19	66	0	3,339	82	26	81	0	3,653	**550**
58	12	50	0	3,578	70	19	65	0	3,904	82	26	81	0	4,243	**600**
58	12	50	0	4,094	70	19	65	0	4,441	82	26	80	0	4,803	**650**
58	12	49	0	4,729	70	19	64	0	5,102	82	26	79	0	5,489	**700**
58	12	49	0	5,307	70	19	64	0	5,701	82	26	79	0	6,110	**750**
58	12	49	0	6,041	70	19	64	0	6,461	82	26	78	0	6,896	**800**
58	12	48	0	6,677	70	19	63	0	7,118	82	26	78	0	7,574	**850**
58	12	48	0	7,497	70	19	63	0	7,964	82	26	78	0	8,446	**900**
58	12	48	0	8,203	70	19	63	0	8,692	82	26	77	0	9,195	**950**
58	12	48	0	9,110	70	19	62	0	9,625	82	26	77	0	10,153	**1000**
58	12	47	0	9,887	70	19	62	0	10,423	82	26	77	0	10,973	**1050**
58	12	47	0	10,899	70	19	62	0	11,461	82	26	76	0	12,037	**1100**
58	12	47	0	11,728	70	19	61	0	12,311	82	26	76	0	12,908	**1150**
58	12	47	0	12,808	70	19	61	0	13,417	82	26	76	0	14,040	**1200**
58	12	47	0	13,726	70	19	61	0	14,356	82	26	75	0	15,001	**1250**
58	12	47	0	14,892	70	19	61	0	15,548	82	26	75	0	16,218	**1300**
58	12	46	0	15,881	70	19	61	0	16,559	82	26	75	0	17,250	**1350**
58	12	46	0	17,134	70	19	60	0	17,837	82	26	75	0	18,554	**1400**
58	12	46	0	18,194	70	19	60	0	18,918	82	26	74	0	19,656	**1450**
58	12	46	0	19,532	70	19	60	0	20,283	82	26	74	0	21,047	**1500**
58	12	46	0	22,088	70	19	60	0	22,885	82	26	74	0	23,697	**1600**
58	12	46	0	23,289	70	19	60	0	24,108	82	26	73	0	24,941	**1650**
58	12	45	0	24,801	70	19	59	0	25,645	82	26	73	0	26,504	**1700**
58	12	45	0	27,700	70	19	59	0	28,592	82	26	73	0	29,498	**1800**
58	12	45	0	30,698	70	19	59	0	31,636	82	26	73	0	32,589	**1900**
58	12	45	0	32,111	70	19	59	0	33,071	82	26	72	0	34,045	**1950**
58	12	45	0	33,882	70	19	58	0	34,867	82	26	72	0	35,867	**2000**
58	12	45	0	37,223	70	19	58	0	38,256	82	26	72	0	39,303	**2100**
58	12	44	0	40,721	70	19	58	0	41,801	82	26	72	0	42,895	**2200**
58	12	44	0	42,346	70	19	58	0	43,447	82	26	71	0	44,563	**2250**
58	12	44	0	44,376	70	19	58	0	45,503	82	26	71	0	46,645	**2300**
58	12	44	0	48,188	70	19	58	0	49,363	82	26	71	0	50,551	**2400**
58	12	44	0	52,158	70	19	57	0	53,379	82	26	71	0	54,615	**2500**
58	12	44	0	53,995	70	19	57	0	55,238	82	26	71	0	56,495	**2550**
58	12	44	0	56,284	70	19	57	0	57,553	82	26	71	0	58,836	**2600**
58	12	44	0	60,568	70	19	57	0	61,883	82	26	70	0	63,213	**2700**
58	12	43	0	65,008	70	19	57	0	66,371	82	26	70	0	67,748	**2800**
58	12	43	0	67,058	70	19	57	0	68,442	82	26	70	0	69,840	**2850**
58	12	43	0	69,606	70	19	57	0	71,016	82	26	70	0	72,440	**2900**
58	12	43	0	74,361	70	19	56	0	75,818	82	26	70	0	77,289	**3000**
58	12	43	0	79,273	70	19	56	0	80,777	82	26	69	0	82,295	**3100**
58	12	43	0	81,534	70	19	56	0	83,060	82	26	69	0	84,599	**3150**
58	12	43	0	84,342	70	19	56	0	85,893	82	26	69	0	87,459	**3200**
58	12	43	0	89,568	70	19	56	0	91,166	82	26	69	0	92,779	**3300**
58	12	43	0	94,951	70	19	56	0	96,597	82	26	69	0	98,256	**3400**
58	12	43	0	97,425	70	19	56	0	99,091	82	26	69	0	100,772	**3450**
58	12	42	0	106,188	70	19	55	0	107,928	82	26	68	0	109,682	**3600**
58	12	42	0	118,054	70	19	55	0	119,888	82	26	68	0	121,736	**3800**
58	12	42	0	130,548	70	19	55	0	132,477	82	26	68	0	134,419	**4000**

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

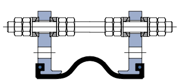
Customised products available

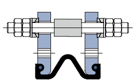
Lateral expansion joints with swivel flange

Cylindrical Expansion Joints without Arch

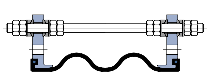


Single Arch Expansion Joints





Double Arch Expansion Joints



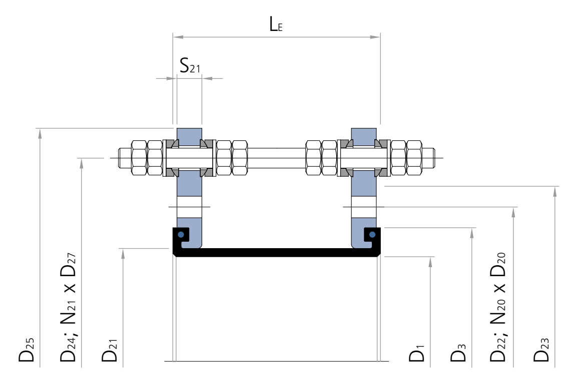
D100M ∅ 40 - 1,200 mm

> Type D100M

Type key > page 22

D1 0 0 M
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section D100M



Lateral expansion joint without arch

Design: Streamlined, cylindrical rubber bellows with self-sealing rubber bulges, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and swivel backing flanges with tie rods borne in spherical washers. Optional with embedded support rings. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ∅ 40 to 1,200 mm, custom diameters possible

Length: Standard L_E = 150 to 400 mm (> page 254)
Custom length on request

Pressure: Up to 10 bar depending on diameter and length
Vacuum stability on request

Movement: For low lateral movements*
(> page 254)

Application:
Plant construction, sand/gravel extraction industry, dredgers, food processing e. g. as suction/pressure hoses, in conveying lines, on pumps and vessels

PED 2014/68/EU · KTW WRAS · FDA · <10⁹ Ohm · EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

*Installation gap tolerances according to axial movement capability of the expansion joint

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single-part integral swivel backing flanges with clearance holes, groove to accommodate the rubber bulges and tie rod holders (tie rod type B, E, C, M)

Single-part swivel backing flanges with clearance holes, groove to accommodate the rubber bulges and tie rod gusset plates (tie rod type R, K, L)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

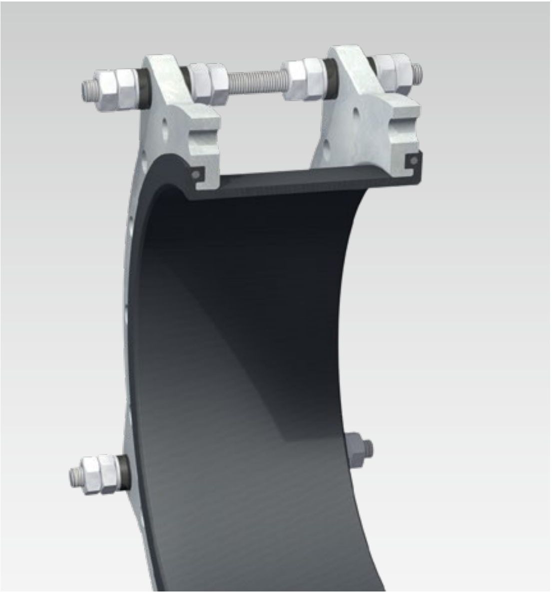
Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective shield (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Tie rods

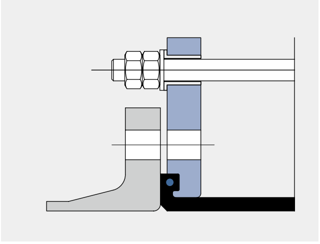


Example: Type D100M

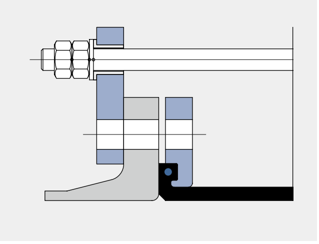
Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

Materials: Carbon steel
Stainless steel

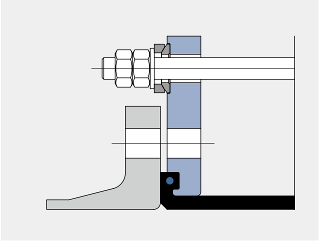
Coating: Spherical washers/ball disks:
PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated



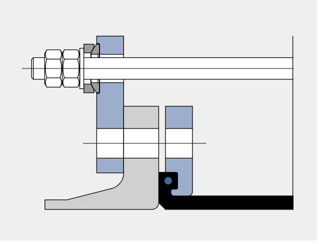
Type D100B
Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



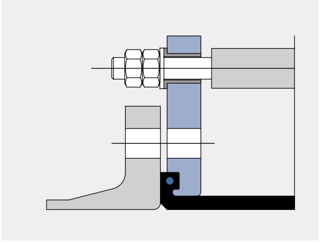
Type D100R
Gusset plates: Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



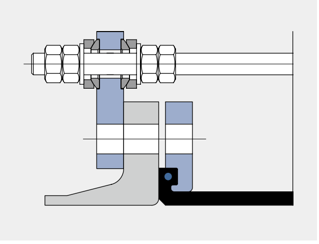
Type D100E
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



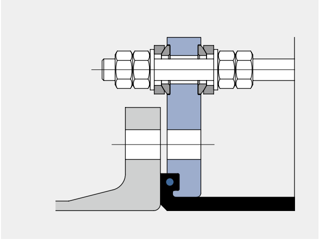
Type D100K
Gusset plates: Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



Type D100C
Tie rods mounted outside in rubber bushing and inside with compression sleeve to accommodate pressure/vacuum thrust forces

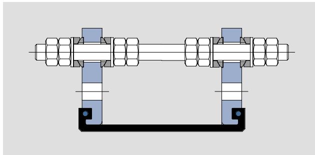


Type D100L
Gusset plates:Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces



Type D100M
Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/ vacuum thrust forces

Lateral expansion joint, type U110R
on the pump pressure side in a paper mill
∅ 50 mm, 10 bar



D100M

> without arch

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 150 mm					up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
40	8	5	12	0	10	10	6	16	0	10	13	8	20	0	10
50	8	5	11	0	16	10	6	15	0	16	13	8	19	0	16
65	8	5	11	0	28	10	6	14	0	28	13	8	18	0	28
80	8	5	10	0	43	10	6	14	0	43	13	8	17	0	43
100	8	5	10	0	69	10	6	13	0	69	13	8	17	0	69
125	8	5	10	0	115	10	6	13	0	115	13	8	16	0	115
150	8	5	9	0	170	10	6	12	0	170	13	8	15	0	170
200	8	5	9	0	278	10	6	12	0	278	13	8	14	0	278
250	8	5	8	0	449	10	6	11	0	449	13	8	14	0	449
300	8	5	8	0	656	10	6	11	0	656	13	8	13	0	656
350	8	5	8	0	855	10	6	10	0	855	13	8	13	0	855
400	8	5	8	0	1,195	10	6	10	0	1,195	13	8	13	0	1,195
450	8	5	7	0	1,514	10	6	10	0	1,514	13	8	12	0	1,514
500	8	5	7	0	1,886	10	6	10	0	1,886	13	8	12	0	1,886
600	8	5	7	0	2,706	10	6	9	0	2,706	13	8	12	0	2,706
700	8	5	7	0	3,750	10	6	9	0	3,750	13	8	11	0	3,750
800	8	5	7	0	4,914	10	6	9	0	4,914	13	8	11	0	4,914
900	8	5	6	0	6,193	10	6	9	0	6,193	13	8	11	0	6,193
1000	8	5	6	0	7,667	10	6	8	0	7,667	13	8	10	0	7,667
1100	8	5	6	0	9,297	10	6	8	0	9,297	13	8	10	0	9,297
1200	8	5	6	0	11,085	10	6	8	0	11,085	13	8	10	0	11,085

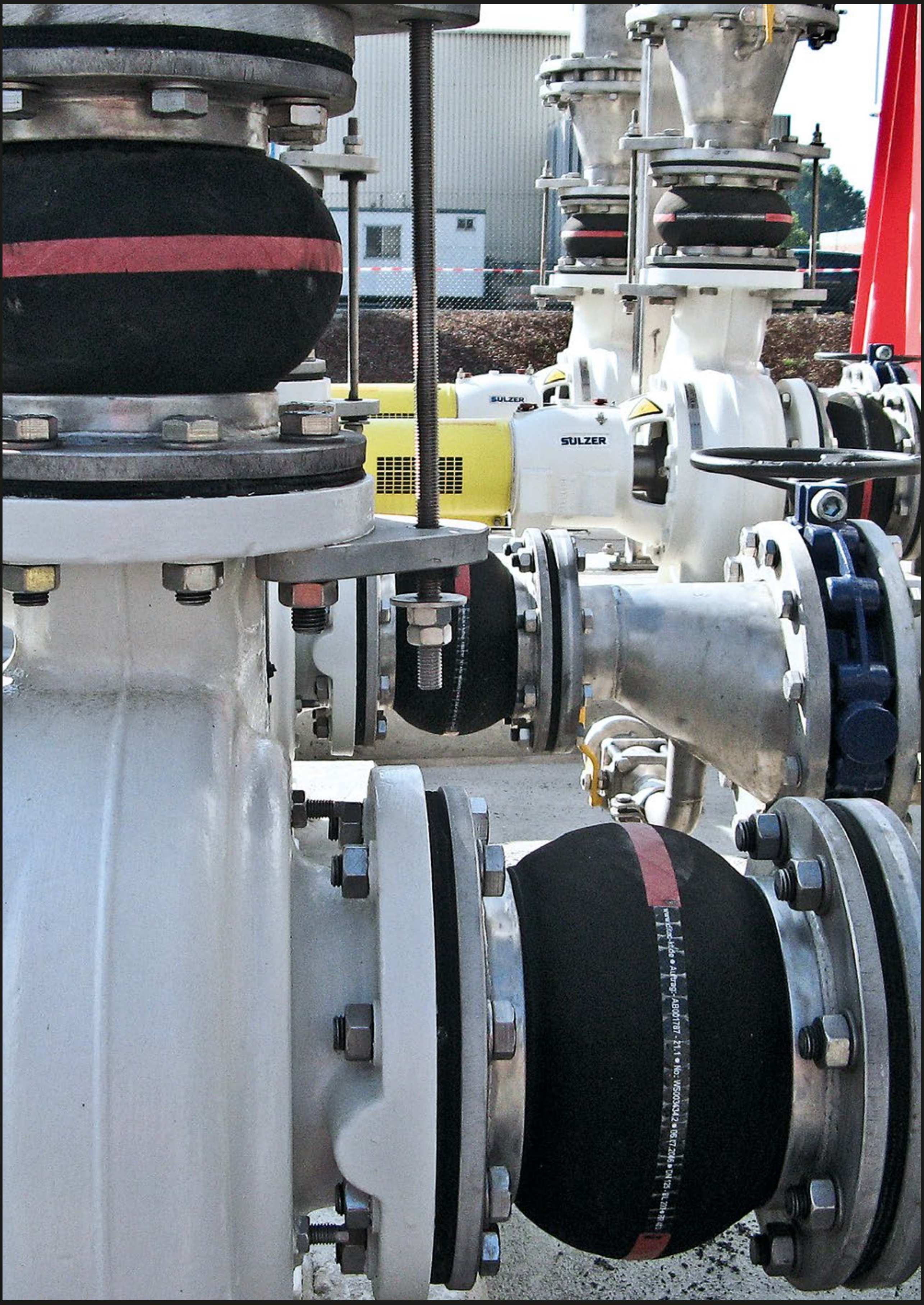
Installation length (L_E) at design pressure

up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					Ø
higher pressures on request															
Movement				A	Movement				A	Movement				A	
mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm
15	9	24	0	10	18	11	28	0	10	20	12	32	0	10	**40**
15	9	23	0	16	18	11	27	0	16	20	12	30	0	16	**50**
15	9	22	0	28	18	11	25	0	28	20	12	29	0	28	**65**
15	9	21	0	43	18	11	24	0	43	20	12	28	0	43	**80**
15	9	20	0	69	18	11	23	0	69	20	12	27	0	69	**100**
15	9	19	0	115	18	11	22	0	115	20	12	25	0	115	**125**
15	9	18	0	170	18	11	21	0	170	20	12	24	0	170	**150**
15	9	17	0	278	18	11	20	0	278	20	12	23	0	278	**200**
15	9	17	0	449	18	11	19	0	449	20	12	22	0	449	**250**
15	9	16	0	656	18	11	19	0	656	20	12	21	0	656	**300**
15	9	15	0	855	18	11	18	0	855	20	12	21	0	855	**350**
15	9	15	0	1,195	18	11	18	0	1,195	20	12	20	0	1,195	**400**
15	9	15	0	1,514	18	11	17	0	1,514	20	12	20	0	1,514	**450**
15	9	14	0	1,886	18	11	17	0	1,886	20	12	19	0	1,886	**500**
15	9	14	0	2,706	18	11	16	0	2,706	20	12	19	0	2,706	**600**
15	9	13	0	3,750	18	11	16	0	3,750	20	12	18	0	3,750	**700**
15	9	13	0	4,914	18	11	15	0	4,914	20	12	18	0	4,914	**800**
15	9	13	0	6,193	18	11	15	0	6,193	20	12	17	0	6,193	**900**
15	9	13	0	7,667	18	11	15	0	7,667	20	12	17	0	7,667	**1000**
15	9	12	0	9,297	18	11	14	0	9,297	20	12	16	0	9,297	**1100**
15	9	12	0	11,085	18	11	14	0	11,085	20	12	16	0	11,085	**1200**

Larger movements see type D110M.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



Universal and lateral expansion joint
on a lye pump suction and discharge side
∅ 125 mm, 5 bar

D110M ⌀ 20 - 1,200 mm

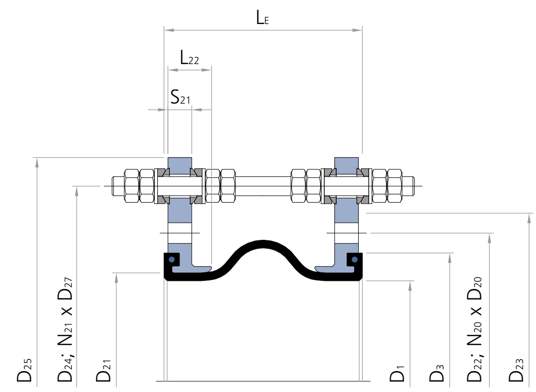
> **Type D110M**
without vacuum ring

> **Type D111M**
with internal vacuum ring

> **Type D112M**
with embedded vacuum ring

Type key > page 22
D1 1 0 M
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section D110M



Lateral expansion joint with one arch

Design: Streamlined, single wide arch rubber bellows with self-sealing rubber bulges, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and swivel backing flanges with tie rods borne in spherical washers. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 20 to 1,200 mm, custom diameters possible

Length: Standard L_E = 130 to 350 mm (> page 260–262)
Custom length on request

Pressure: Up to 25 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For lateral and angular (2 tie rod design) movements*
(> page 260–262)

Spring rate: Lateral spring rates (> page 296)

*Installation gap tolerances according to axial movement capability of the expansion joint

Application:
Cooling water systems, desalination plants, drinking water supply, plant construction, e.g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

PED 2014/68/EU
KTW WRAS
FDA
<10⁶ Ohm
EX
TÜV DIN 4809 (Standard sizes)
Shipbuilding certification (Standard sizes)

Request assembly instructions at:
www.ditec-adam.de/en/contact

Standard rubber bellows

Elastomer	Fabric	Marking	°C	Application
EPDM / EPDM	PEEK		-40 | +130	Heating systems, cooling, hot air
IIR / EPDM	Polyamid		-40 | +100	Drinking water, seawater, weak acids and alkalis
NBR / CR	Polyamid		-40 | +100	Oils, fuels, gases
NBRweiß / CR	Polyamid		-40 | +100	Fat containing food, weather resistant
CSM / CSM	Polyamid		-40 | +100	Chemicals, aggresive chemical wastewater, weather resistant
NBR / CR	Polyamid		-40 | +100	Oils, fuels, gases, LPG, blast furnace gas, lubricants
CR / CR	Polyamid	–	-40 | +100	Cold- and hot water, seawater, wastewater with oleaginous corrosion protection
NBR / CR	Stahl		-40 | +100	Oils, fuels, gases, fuel ethanol blends
NBR-LT / CR	Polyamid	LT	-40 | +100	Oils, fuels, gases, LPG, for tanker and filling stations
HNBR / CR	Stahl		-40 | +100	Oils, fuels, gases, LPG, for high Temperature
EPDM / EPDM	Polyamid		-40 | +100	Seawater, weak acids and alkalis
IIR / EPDM	Polyamid		-40 | +100	Seawater, weak acids and alkalis
BR	Polyamid		-40 | +100	Sludge, dust or powder, liquids with solids, emulsions

Non-standard rubber bellows

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single-part integral swivel backing flanges with support collar, clearance holes, groove to accommodate the rubber bulges and tie rod holders (tie rod type B, E, C, M)

Single-part swivel backing flanges with support collar, clearance holes, groove to accommodate the rubber bulges and tie rod gusset plates (tie rod type R, K, L)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

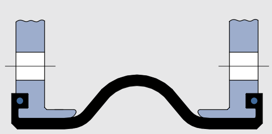
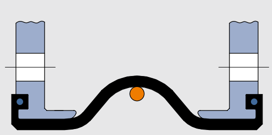
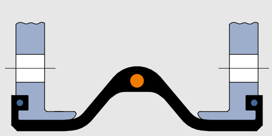
Protective covers: Ground protective shield
Protective shield or cover
Fire protective shield (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

(> page 42)

Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
D110M		None	Depending on the diameter up to 25 bar, vacuum stability on request	> page 260
D111M		Vacuum support ring spiral (1.4310) up to ∅ 250 mm, vacuum ring starting at ∅ 300 mm Medium contact, inside the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 261
D112M		No medium contact, embedded in the arch starting at ∅ 100 mm	Depending on the diameter up to 16 bar, for vacuum up to 0.05 bar absolute	> page 262

Materials	
Stainless steel	Carbon steel, embedded

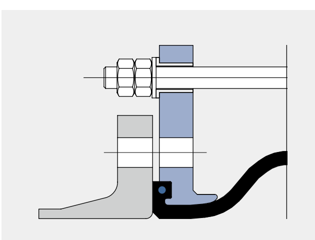
Tie rods

Example: Type D111M

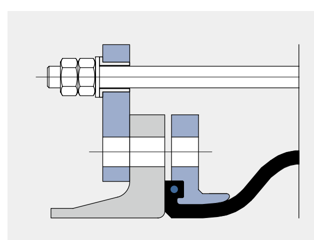
Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

Materials: Carbon steel
Stainless steel

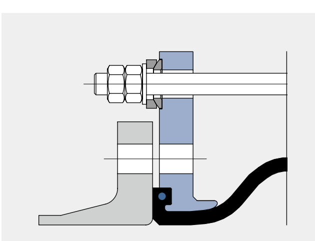
Coating: Spherical washers/ball disks:
PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated



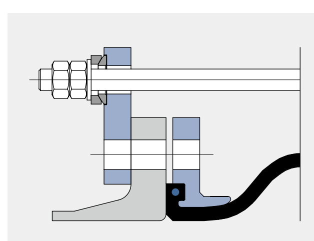
Type D110B
Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



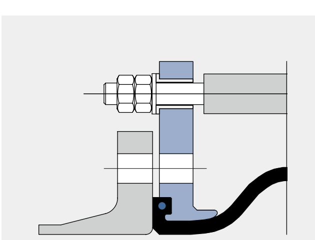
Type D110R
Gusset plates: Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



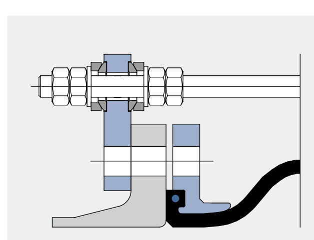
Type D110E
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



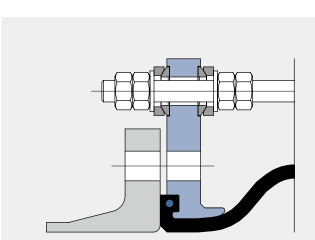
Type D110K
Gusset plates: Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



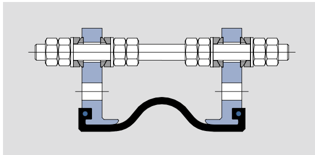
Type D110C
Tie rods mounted outside in rubber bushing and inside with compression sleeve to accommodate pressure/vacuum thrust forces



Type D110L
Gusset plates:Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces



Type D110M
Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces



D110M

> without vacuum ring

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 130 mm					up to 10 bar L_E = 150 mm					up to 10 bar L_E = 175 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
20	30	30	30	0	17										
25	30	30	30	0	17										
32	30	30	30	0	17										
40	30	30	30	0	18										
50	30	30	30	0	32										
65	30	30	30	0	53										
80	30	30	30	0	85	30	30	30	0	85					
100	30	30	30	0	128	30	30	30	0	128					
125	30	30	30	0	187	30	30	30	0	187					
150	30	30	30	0	259	30	30	30	0	259					
200	30	30	30	0	410						30	30	30	0	410
250	30	30	30	0	596						30	30	30	0	596
300	30	30	30	0	822						31	10	17	0	903
350											31	10	17	0	1,134
400											31	10	17	0	1,521
450											31	10	17	0	1,878
500											31	10	17	0	2,290
600											31	10	16	0	3,187
700											31	10	16	0	4,312
800											31	10	16	0	5,555
900											31	10	16	0	6,910
1000											31	10	16	0	8,462
1100											31	10	15	0	10,171
1200											31	10	15	0	12,037

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm					up to 10 bar L_E = 275 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	40	20	26	0	564	44	20	29	0	573	44	20	29	0	573
250	40	20	26	0	799	44	20	28	0	809	44	20	28	0	809
300	30	30	30	0	822	44	20	27	0	1,081	44	20	27	0	1,081
350	50	30	30	0	907	44	20	27	0	1,333	44	20	27	0	1,333
400	50	30	30	0	1,018	44	20	27	0	1,750	44	20	27	0	1,750
450	50	30	30	0	2,116	50	30	30	0	2,042	44	20	26	0	2,132
500	50	30	30	0	1,692	40	20	30	0	2,279	44	20	26	0	2,570
600	50	30	30	0	3,078	40	20	30	0	3,115	44	20	26	0	3,515
700	40	20	24	0	4,669	50	30	30	0	4,342	50	30	30	0	4,342
800	40	20	23	0	5,958	50	30	30	0	5,274	44	20	25	0	5,986
900	40	20	23	0	7,359	44	20	25	0	7,390	44	20	25	0	7,390
1000	40	20	23	0	8,958	44	20	25	0	8,992	44	20	25	0	8,992
1100	40	20	23	0	10,715	44	20	24	0	10,751	44	20	24	0	10,751
1200	40	20	22	0	12,628	44	20	24	0	12,668	44	20	24	0	12,668

Installation length (L_E) at design pressure

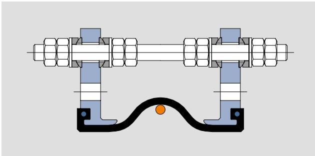
Ø	up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm				
	higher pressures on request									
	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	53	31	37	0	707	69	43	49	0	897
250	53	31	36	0	968	69	43	48	0	1,188
300	53	31	36	0	1,263	69	43	48	0	1,514
350	53	31	35	0	1,534	69	43	47	0	1,810
400	53	31	35	0	1,979	69	43	46	0	2,290
450	53	31	34	0	2,384	69	43	46	0	2,725
500	53	31	34	0	2,846	69	43	45	0	3,217
600	53	31	33	0	3,837	69	43	45	0	4,266
700	53	31	33	0	5,064	69	43	44	0	5,555
800	53	31	33	0	6,404	69	43	43	0	6,955
900	50	30	30	0	7,379	69	43	43	0	8,462
1000	50	30	30	0	8,894	69	43	43	0	10,171
1100	53	31	32	0	11,310	69	43	42	0	12,037
1200	53	31	31	0	13,273	69	43	42	0	14,061

Standard sizes
Non-standard sizes

In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29). For larger movements see type U120x.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



D111M

> with internal vacuum ring

MEMBER OF THE ELAFLEX GROUP

Installation length (L_E) at design pressure

higher pressures on request

Ø	up to 10 bar L_E = 130 mm					up to 10 bar L_E = 150 mm					up to 10 bar L_E = 175 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
20	30	10	30	30	17										
25	30	10	30	30	17										
32	30	10	30	30	17										
40	30	10	30	35	18										
50	30	10	30	30	32										
65	30	10	30	30	53										
80	30	10	30	30	85	30	10	30	30	85					
100	30	10	30	20	128	30	10	30	20	128					
125	30	10	30	20	187	30	10	30	20	187					
150	30	10	30	20	259	30	10	30	20	259					
200	30	10	30	12	410						30	10	30	12	410
250	30	10	30	12	596						30	10	30	12	596
300	30	10	30	12	822						31	3	17	4	903
350											31	3	17	3	1,134
400											31	3	17	3	1,521
450											31	3	17	3	1,878
500											31	3	17	2	2,290
600											31	3	16	2	3,187
700											31	3	16	2	4,312
800											31	3	16	1	5,555
900											31	3	16	1	6,910
1000											31	3	16	1	8,462
1100											31	3	15	1	10,171
1200											31	3	15	1	12,037

Installation length (L_E) at design pressure

higher pressures on request

Ø	up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm					up to 10 bar L_E = 275 mm				
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	40	7	26	11	564	44	7	29	11	573	44	7	29	11	573
250	40	7	26	9	799	44	7	28	9	809	44	7	28	9	809
300	30	10	30	12	822	44	7	27	8	1,081	44	7	27	8	1,081
350	50	10	30	8	907	44	7	27	7	1,333	44	7	27	7	1,333
400	50	10	30	8	1,018	44	7	27	6	1,750	44	7	27	6	1,750
450	50	30	30	5	2,116	50	30	30	6	2,042	44	7	26	5	2,132
500	50	10	30	8	1,692	40	7	30	5	2,279	44	7	26	5	2,570
600	50	10	30	8	3,078	40	7	30	4	3,115	44	7	26	4	3,515
700	40	7	24	3	4,669	50	30	30	8	4,342	50	10	30	8	4,342
800	40	7	23	3	5,958	50	30	30	8	5,274	44	7	25	3	5,986
900	40	7	23	3	7,359	44	7	25	3	7,390	44	7	25	3	7,390
1000	40	7	23	2	8,958	44	7	25	2	8,992	44	7	25	2	8,992
1100	40	7	23	2	10,715	44	7	24	2	10,751	44	7	24	2	10,751
1200	40	7	22	2	12,628	44	7	24	2	12,668	44	7	24	2	12,668

Installation length (L_E) at design pressure

higher pressures on request

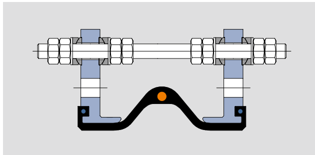
Ø	up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm				
	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	53	10	37	17	707	69	14	49	23	897
250	53	10	36	14	968	69	14	48	19	1,188
300	53	10	36	12	1,263	69	14	48	16	1,514
350	53	10	35	10	1,534	69	14	47	14	1,810
400	53	10	35	9	1,979	69	14	46	12	2,290
450	53	10	34	8	2,384	69	14	46	11	2,725
500	53	10	34	7	2,846	69	14	45	10	3,217
600	53	10	33	6	3,837	69	14	45	8	4,266
700	53	10	33	5	5,064	69	14	44	7	5,555
800	53	10	33	4	6,404	69	14	43	6	6,955
900	50	10	30	5	7,379	69	14	43	6	8,462
1000	50	10	30	5	8,894	69	14	43	5	10,171
1100	53	10	32	3	11,310	69	14	42	5	12,037
1200	53	10	31	3	13,273	69	14	42	4	14,061

Standard sizes
Non-standard sizes

In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29). For larger movements see type U121x.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



D112M

> with embedded vacuum ring

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 130 mm					up to 10 bar L_E = 150 mm					up to 10 bar L_E = 175 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
20															
25															
32															
40															
50															
65															
80															
100															
125															
150															
200											20	2	17	0	401
250											20	2	16	0	603
300											20	2	16	0	840
350											20	2	16	0	1.064
400											20	2	16	0	1.439
450											20	2	16	0	1.787
500											20	2	15	0	2.190
600											20	2	15	0	3.068
700											20	2	15	0	4.174
800											20	2	15	0	5.398
900											20	2	15	0	6.735
1000											20	2	15	0	8.268
1100											20	2	14	0	9.958
1200											20	2	14	0	11.805

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 200 mm					up to 10 bar L_E = 250 mm					up to 10 bar L_E = 275 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	26	6	25	0	515	29	6	28	0	531	29	6	28	0	531
250	26	6	25	0	740	29	6	27	0	760	29	6	27	0	760
300	26	6	24	0	1.001	29	6	27	0	1.024	29	6	27	0	1.024
350	26	6	24	0	1.244	29	6	26	0	1.269	29	6	26	0	1.269
400	26	6	24	0	1.647	29	6	26	0	1.676	29	6	26	0	1.676
450	26	6	23	0	2.019	29	6	26	0	2.051	29	6	26	0	2.051
500	26	6	23	0	2.445	29	6	25	0	2.481	29	6	25	0	2.481
600	26	6	23	0	3.370	29	6	25	0	3.411	29	6	25	0	3.411
700	26	6	23	0	4.525	29	6	25	0	4.572	29	6	25	0	4.572
800	26	6	22	0	5.795	29	6	24	0	5.849	29	6	24	0	5.849
900	26	6	22	0	7.178	29	6	24	0	7.238	29	6	24	0	7.238
1000	26	6	22	0	8.758	29	6	24	0	8.825	29	6	24	0	8.825
1100	26	6	22	0	10.496	29	6	24	0	10.568	29	6	24	0	10.568
1200	26	6	21	0	12.390	29	6	23	0	12.469	29	6	23	0	12.469

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 300 mm					up to 10 bar L_E = 350 mm				
	higher pressures on request									
	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	35	9	36	0	661	46	13	48	0	804
250	35	9	35	0	913	46	13	47	0	1.081
300	35	9	35	0	1.201	46	13	46	0	1.392
350	35	9	34	0	1.466	46	13	45	0	1.676
400	35	9	34	0	1.901	46	13	45	0	2.140
450	35	9	33	0	2.299	46	13	44	0	2.561
500	35	9	33	0	2.753	46	13	44	0	3.039
600	35	9	33	0	3.728	46	13	43	0	4.060
700	35	9	32	0	4.939	46	13	43	0	5.320
800	35	9	32	0	6.263	46	13	42	0	6.691
900	35	9	31	0	7.698	46	13	42	0	8.171
1000	35	9	31	0	9.331	46	13	41	0	9.852
1100	35	9	31	0	11.122	46	13	41	0	11.690
1200	35	9	31	0	13.070	46	13	41	0	13.685

Standard sizes
Non-standard sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
For larger movements see type D122x or D125x.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available

D112M lateral FPM rubber expansion joints of size ∅ 400 mm
with embedded vacuum ring and stainless backing flanges,
tie-rods and bearings

D210M ⌀ 32 - 500 mm

> **Type D210M**
> without vacuum ring

> **Type D211M**
> with internal vacuum ring

Type key > page 22

D2 1 0 M
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Lateral expansion joint with one arch

Design: Streamlined, single arch rubber bellows with self-sealing rubber bulges, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and swivel backing flanges with tie rods borne in spherical washers. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 32 to 500 mm

Length: L_E = 100 or 110 mm (> page 268–269)
Custom length on request

Pressure: Up to 25 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For lateral and angular (2 tie rod design) movements*
(> page 268–269)

Application:
Cooling water systems, desalination plants, drinking water supply, plant construction, e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

CE PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX · TÜV DIN 4809 (Standard sizes) · Shipbuilding certification (Standard sizes)

Request assembly instructions at:
www.ditec-adam.de/en/contact

*Installation gap tolerances according to axial movement capability of the expansion joint

Standard Rubber bellows

Elastomer	Fabric	Marking	°C	Application
EPDM / EPDM	PEEK		-40 | +130	Heating systems acc. 4809, warm- and hot water
IIR / EPDM	Polyamid		-40 | +100	Drinking water, seawater, weak acids and alkalis, weather-resistant
NBR / CR	Polyamid		-20 | +90	Oil, gases, lubricants, natural gas
NBR weiß / CR	Polyamid		-20 | +90	Oily and fatty food (in complinance with KTW and FDA)
CSM / CSM	Polyamid		-20 | +100	Chemicals, corrosive chemical waste, air compressors with oil content
IIR / EPDM	Polyamid		-40 | +90	Cold-and warm water, sea water, cooling water, weak acids, alcohol

Backing flanges

Design: Single-part integral swivel backing flanges with threaded holes, groove to accommodate the rubber bulges and tie rod holders (tie rod type B, E, C, S)

Single-part swivel backing flanges with threaded holes, groove to accommodate the rubber bulges and tie rod gusset plates (tie rod type R, K, L)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Galvanised, yellow-neutralized

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective shield (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

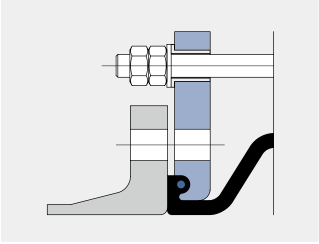
Tie rods

Example: Type D210C

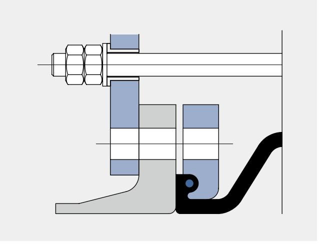
Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

Materials: Carbon steel
Stainless steel

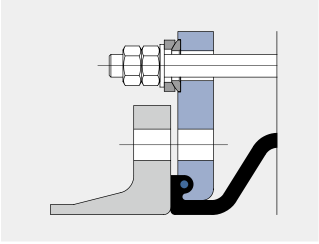
Coating: Spherical washers/ball disks: PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated



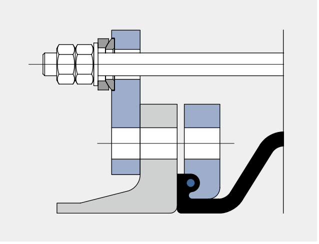
Type D210B
Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



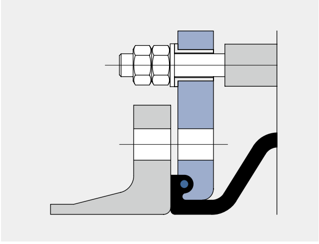
Type D210R
Gusset plates: Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



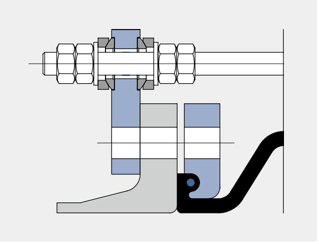
Type D210E
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



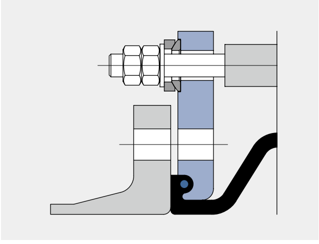
Type D210K
Gusset plates: Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



Type D210C
Tie rods mounted outside in rubber bushing and inside with compression sleeve to accommodate pressure/vacuum thrust forces

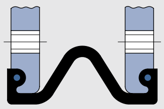
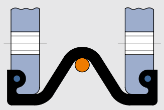


Type D210L
Gusset plates:Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces



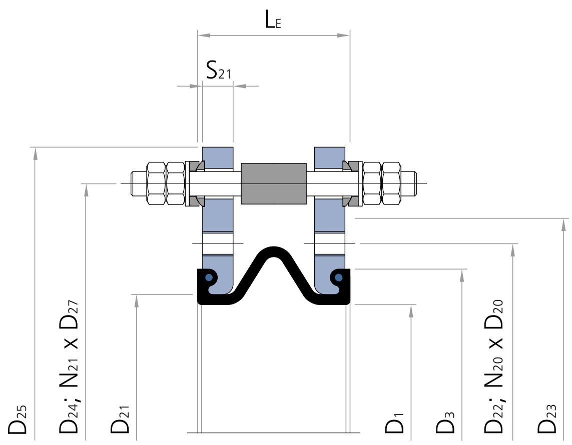
Type D210S
Tie rods mounted outside in spherical washers and ball disks and inside with compression sleeve to accommodate pressure/vacuum thrust forces

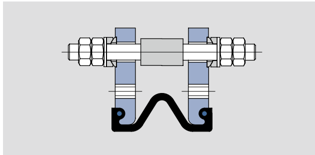
Support rings

TYPE	Support ring	Vacuum ring	Pressure	Movement
D210M		None	Depending on the diameter up to 25 bar, vacuum stability on request	> page 268
D211M		Vacuum spiral / ring, medium contact, inside the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 269

Materials
Stainless steel

Cross section D210S





D210M

> without vacuum ring

Installation length (L_E) at design pressure										
	up to 10 bar L_E = 100 mm					up to 10 bar L_E = 110 mm				
	higher pressures on request									
Ø	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
32	30	20	30	0	18					
40	30	20	30	0	18					
50	30	20	30	0	35					
65	30	20	30	0	56					
80	30	20	30	0	87					
100	30	20	30	0	130					
125	30	20	30	0	190					
150	30	20	30	0	263					
175	30	20	30	0	334					
200	30	20	30	0	416					
250	30	20	30	0	607					
300	30	20	30	0	830					
350	30	20	30	0	1,100					
400						30	20	30	0	1,385
500						30	20	30	0	2,091

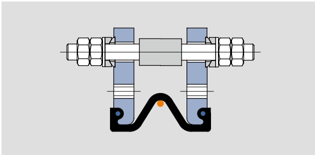
Standard sizes

In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29).

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available

Standard rubber expansion joint, D210A



D211M

> with internal vacuum ring

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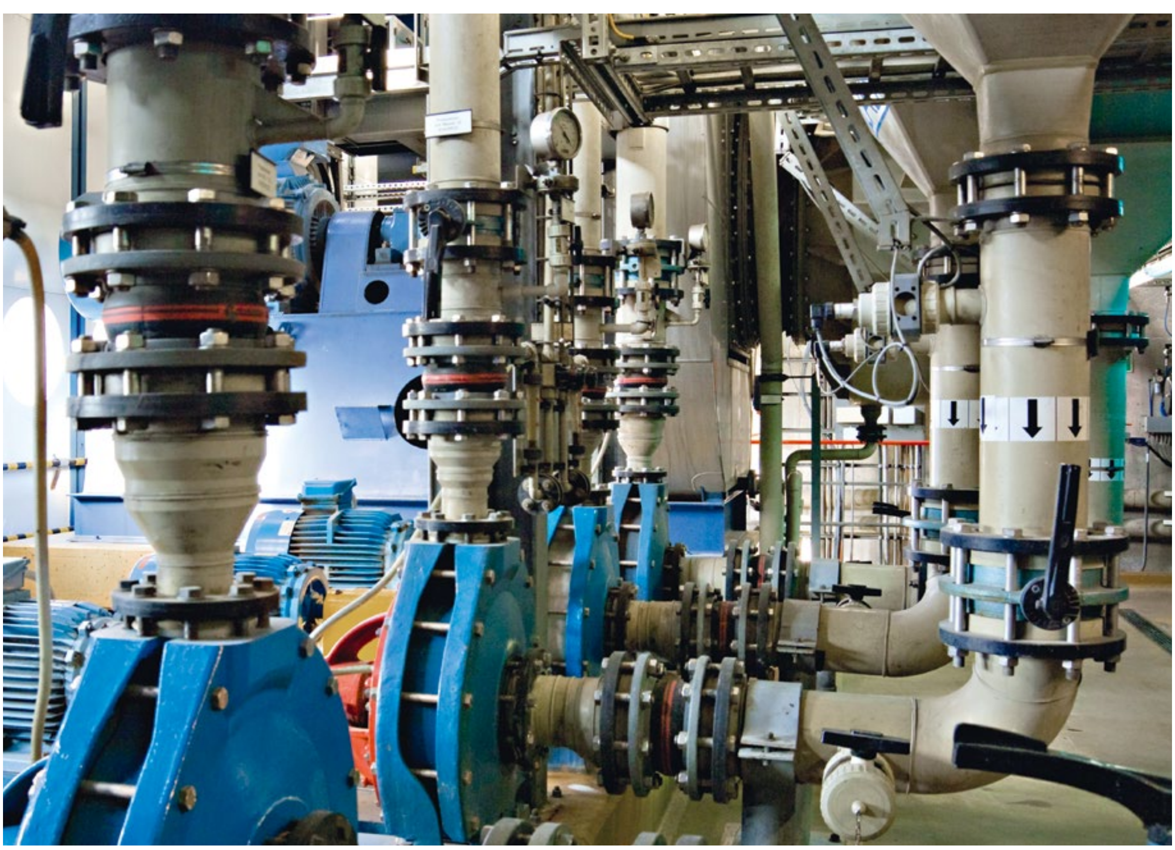
Installation length (L_E) at design pressure										
	up to 10 bar **L_E = 100 mm**					up to 10 bar **L_E = 110 mm**				
	higher pressures on request									
	Movement				A	Movement				A
Ø mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
32	30	5	20	0	18					
40	30	5	20	0	18					
50	30	5	20	0	35					
65	30	5	20	0	56					
80	30	5	20	0	87					
100	30	5	20	0	130					
125	30	5	20	0	190					
150	30	5	20	0	263					
175	30	5	20	0	334					
200	30	5	20	0	416					
250	30	5	20	0	607					
300	30	5	20	0	830					
350	30	5	20	0	1,100					
400						30	5	20	0	1,385
500						30	5	20	0	2,091

Standard sizes

In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29).

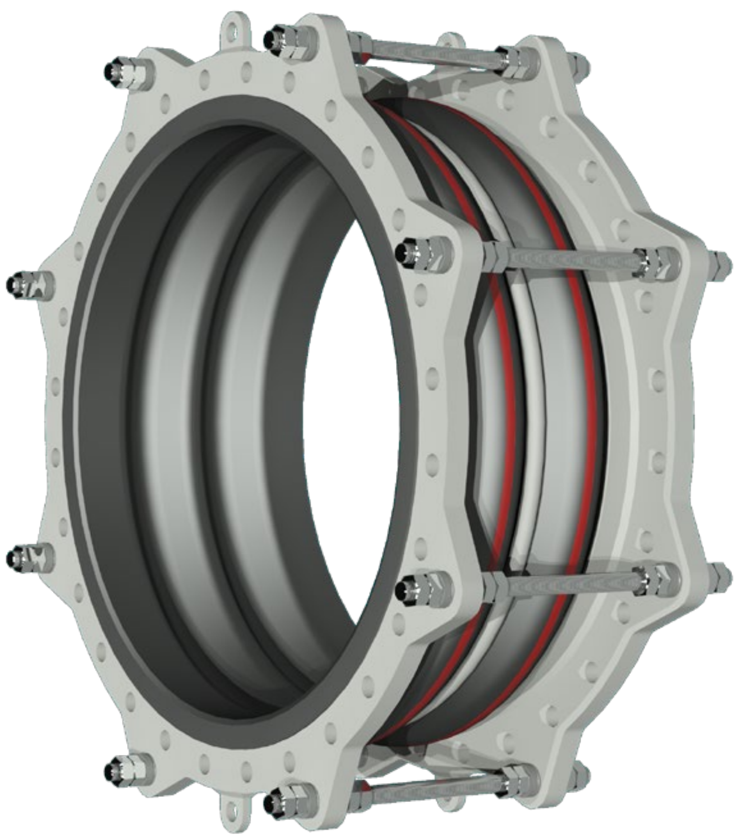
The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



Typical pump station arrangement
with expansion joints to decouple pump vibrations from pipeline

D120M ⌀ 100 - 1,200 mm



> Type D120M
without vacuum rings

> Type D121M
with internal vacuum rings

> Type D122M
with embedded vacuum rings

> Type D123M
without vacuum rings,
with external support ring

> Type D124M
with internal vacuum rings,
with external support ring

> Type D125M
with embedded vacuum rings,
with external support ring

Type key > page 22
D1 2 3 M
- M → Tie rod variant
- 3 → Support ring variant
- 2 → Number of arches
- D1 → Type

Lateral expansion joint with two arches

Design: Streamlined, double wide arch rubber bellows with self-sealing rubber bulges, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and swivel backing flanges with tie rods borne in spherical washers. Optional with vacuum rings and/or external support ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 100 to 1,200 mm, custom diameters possible

Length: Standard L_E = 350 to 650 mm (> page 274–276)
Custom length on request

Pressure: Up to 10 bar depending on diameter and length
Vacuum not allowed without vacuum rings, with vacuum rings up to 0.05 bar absolute

Movement: For very large lateral and angular (2 tie rod design) movements*
(> page 274–276)

Spring rate: To calculate the lateral spring rate for multiple arch joints, divide our single arch values of type D110A by the number of arches
(> page 296)

Application:
Cooling water systems, desalination plants, drinking water supply, plant construction, e.g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

CE PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

*Installation gap tolerances according to axial movement capability of the expansion joint

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single-part integral swivel backing flanges with support collar, clearance holes, groove to accommodate the rubber bulges and tie rod holders (tie rod type B, E, C, M)

Single-part swivel backing flanges with support collar, clearance holes, groove to accommodate the rubber bulges and tie rod gusset plates (tie rod type R, K, L)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

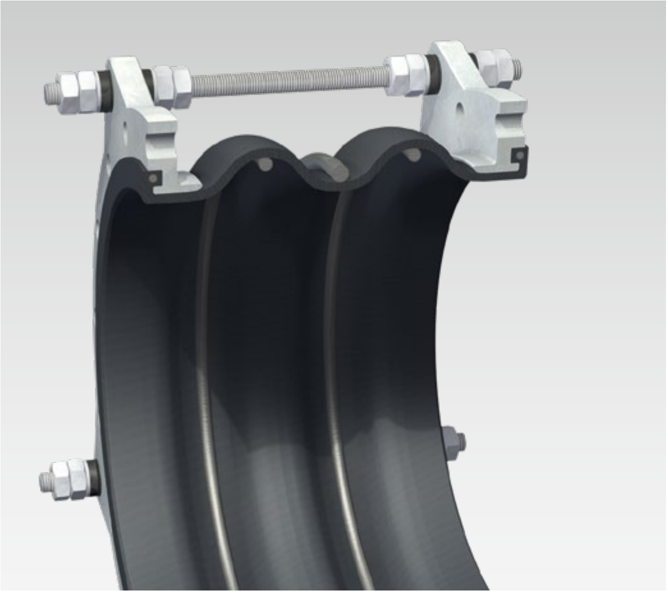
Protective covers: Ground protective shield
Protective shield or cover
Fire protective shield (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

(> page 42)

Tie rods

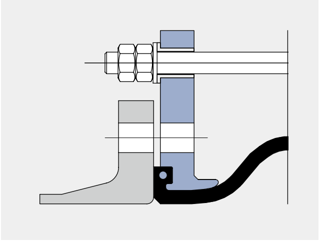


Example: Type D124M

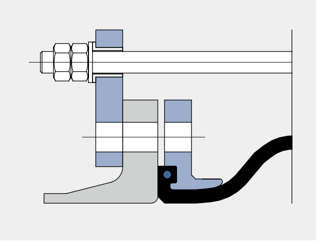
Design: Dimensioning according to design pressure (test pressure) based on the Pressure Equipment Directive

Materials: Carbon steel
Stainless steel

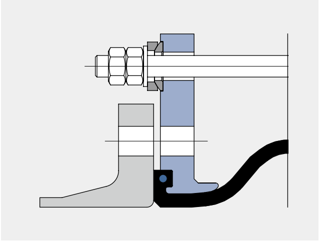
Coating: Spherical washers/ball disks:
PTFE coated
Tie rods: galvanised, hot-dip galvanised or PTFE-coated



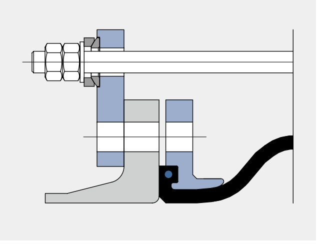
Type D120B
Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



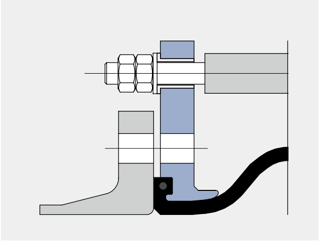
Type D120R
Gusset plates: Tie rods mounted outside in rubber bushing to accommodate pressure thrust forces



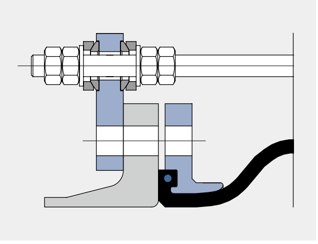
Type D120E
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



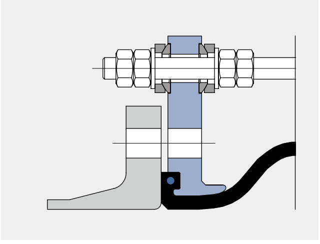
Type D120K
Gusset plates:
Tie rods mounted outside in spherical washers and ball disks to accommodate pressure thrust forces



Type D120C
Tie rods mounted outside in rubber bushing and inside with compression sleeve to accommodate pressure/vacuum thrust forces

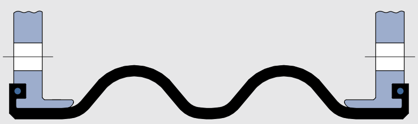
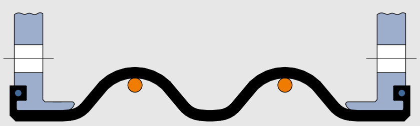
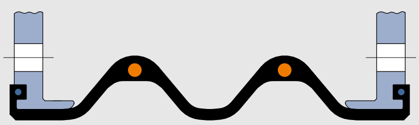
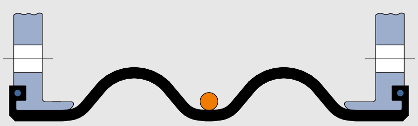
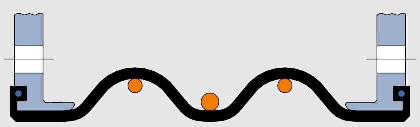
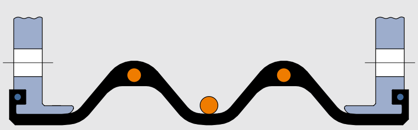


Type D120L
Gusset plates: Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces



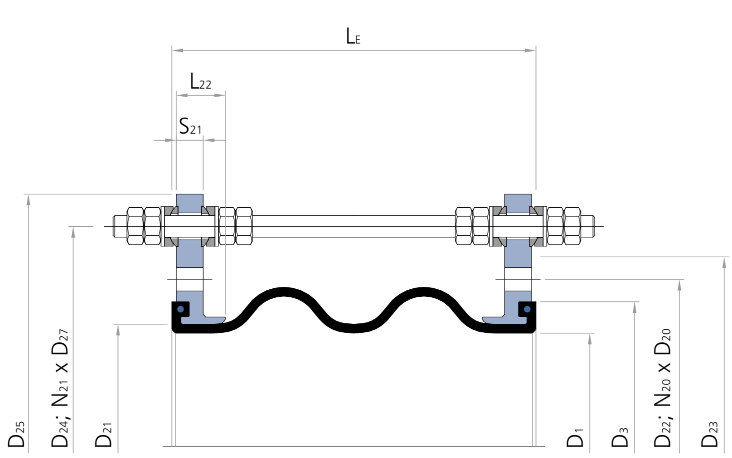
Type D120M
Tie rods mounted outside and inside in spherical washers and ball disks to accommodate pressure/vacuum thrust forces

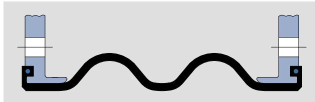
Support rings

TYPE	Support rings	Vacuum ring	Support ring	Pressure	Movement
D120M		None	None	Low pressure, vacuum stability on request	> page 274
D121M		Medium contact, inside the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 275
D122M		No medium contact, embedded in the arches	None	Low pressure, for vacuum up to 0.05 bar absolute	> page 276
D123M		None	External between the arches	Depending on the diameter up to 10 bar, slight vacuum	> page 274
D124M		Medium contact, inside the arches	External between the arches	Depending on the diameter up to 10 bar, for vacuum up to 0.05 bar absolute	> page 275
D125M		No medium contact, embedded in the arches	External between the arches	Depending on the diameter up to 10 bar, for vacuum up to 0.05 bar absolute	> page 276

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

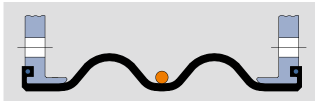
Cross section D120M





D120M

> without vacuum rings



D123M

> without vacuum rings, with external support ring

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					up to 10 bar L_E = 450 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	53	22	33	0	445	62	20	36	0	445	80	40	53	0	564
250	53	22	32	0	656	62	20	35	0	656	80	40	52	0	799
300	53	22	32	0	903	62	20	35	0	903	80	40	51	0	1,069
350	53	22	31	0	1,134	62	20	34	0	1,134	80	40	50	0	1,320
400	53	22	31	0	1,521	62	20	34	0	1,521	80	40	50	0	1,735
450	53	22	31	0	1,878	62	20	33	0	1,878	80	40	49	0	2,116
500	53	22	30	0	2,290	62	20	33	0	2,290	80	40	49	0	2,552
600	53	22	30	0	3,187	62	20	33	0	3,187	80	40	48	0	3,494
700	53	22	29	0	4,312	62	20	32	0	4,312	80	40	47	0	4,669
800	53	22	29	0	5,555	62	20	32	0	5,555	80	40	47	0	5,958
900	53	22	29	0	6,910	62	20	31	0	6,910	80	40	46	0	7,359
1000	53	22	29	0	8,462	62	20	31	0	8,462	80	40	46	0	8,958
1100	53	22	28	0	10,171	62	20	31	0	10,171	80	40	45	0	10,715
1200	53	22	28	0	12,037	62	20	31	0	12,037	80	40	45	0	12,628

Installation length (L_E) at design pressure

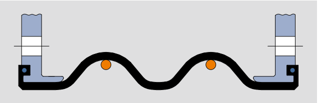
Ø	up to 10 bar L_E = 500 mm					up to 10 bar L_E = 550 mm					up to 10 bar L_E = 600 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	88	41	57	0	573	106	61	74	0	707	124	82	91	0	855
250	88	41	56	0	809	106	61	72	0	968	124	82	89	0	1,140
300	88	41	55	0	1,081	106	61	71	0	1,263	124	82	88	0	1,459
350	88	41	54	0	1,333	106	61	70	0	1,534	124	82	86	0	1,750
400	88	41	54	0	1,750	106	61	69	0	1,979	124	82	85	0	2,223
450	88	41	53	0	2,132	106	61	69	0	2,384	124	82	84	0	2,651
500	88	41	52	0	2,570	106	61	68	0	2,846	124	82	84	0	3,137
600	88	41	52	0	3,515	106	61	67	0	3,837	124	82	82	0	4,174
700	88	41	51	0	4,693	106	61	66	0	5,064	124	82	81	0	5,450
800	88	41	50	0	5,986	106	61	65	0	6,404	124	82	80	0	6,837
900	88	41	50	0	7,390	106	61	64	0	7,854	124	82	79	0	8,332
1000	88	41	49	0	8,992	106	61	64	0	9,503	124	82	79	0	10,029
1100	88	41	49	0	10,751	106	61	63	0	11,310	124	82	78	0	11,882
1200	88	41	48	0	12,668	106	61	63	0	13,273	124	82	77	0	13,893

Recommended sizes
Further possible sizes

In the event of lateral displacement and simultaneous axial extension the above movements are reduced (> page 29).
Larger movements on request.

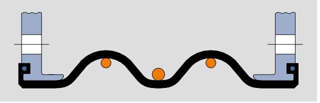
The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



D121M

> with internal vacuum rings



D124M

> with internal vacuum rings, with external support ring

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Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					up to 10 bar L_E = 450 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	53	7	33	0	445	62	7	36	0	445	80	13	53	0	564
250	53	7	32	0	656	62	7	35	0	656	80	13	52	0	799
300	53	7	32	0	903	62	7	35	0	903	80	13	51	0	1,069
350	53	7	31	0	1,134	62	7	34	0	1,134	80	13	50	0	1,320
400	53	7	31	0	1,521	62	7	34	0	1,521	80	13	50	0	1,735
450	53	7	31	0	1,878	62	7	33	0	1,878	80	13	49	0	2,116
500	53	7	30	0	2,290	62	7	33	0	2,290	80	13	49	0	2,552
600	53	7	30	0	3,187	62	7	33	0	3,187	80	13	48	0	3,494
700	53	7	29	0	4,312	62	7	32	0	4,312	80	13	47	0	4,669
800	53	7	29	0	5,555	62	7	32	0	5,555	80	13	47	0	5,958
900	53	7	29	0	6,910	62	7	31	0	6,910	80	13	46	0	7,359
1000	53	7	29	0	8,462	62	7	31	0	8,462	80	13	46	0	8,958
1100	53	7	28	0	10,171	62	7	31	0	10,171	80	13	45	0	10,715
1200	53	7	28	0	12,037	62	7	31	0	12,037	80	13	45	0	12,628

Installation length (L_E) at design pressure

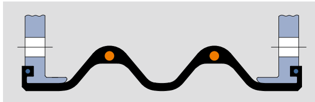
Ø	up to 10 bar L_E = 500 mm					up to 10 bar L_E = 550 mm					up to 10 bar L_E = 600 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	88	13	57	0	573	106	20	74	0	707	124	27	91	0	855
250	88	13	56	0	809	106	20	72	0	968	124	27	89	0	1,140
300	88	13	55	0	1,081	106	20	71	0	1,263	124	27	88	0	1,459
350	88	13	54	0	1,333	106	20	70	0	1,534	124	27	86	0	1,750
400	88	13	54	0	1,750	106	20	69	0	1,979	124	27	85	0	2,223
450	88	13	53	0	2,132	106	20	69	0	2,384	124	27	84	0	2,651
500	88	13	52	0	2,570	106	20	68	0	2,846	124	27	84	0	3,137
600	88	13	52	0	3,515	106	20	67	0	3,837	124	27	82	0	4,174
700	88	13	51	0	4,693	106	20	66	0	5,064	124	27	81	0	5,450
800	88	13	50	0	5,986	106	20	65	0	6,404	124	27	80	0	6,837
900	88	13	50	0	7,390	106	20	64	0	7,854	124	27	79	0	8,332
1000	88	13	49	0	8,992	106	20	64	0	9,503	124	27	79	0	10,029
1100	88	13	49	0	10,751	106	20	63	0	11,310	124	27	78	0	11,882
1200	88	13	48	0	12,668	106	20	63	0	13,273	124	27	77	0	13,893

Recommended sizes
Further possible sizes

In the event of lateral displacement and simultaneous axial extension the above movements are reduced (> page 29).
Larger movements on request.

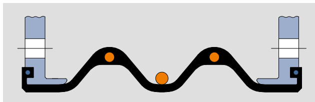
The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



D122M

> with embedded vacuum rings



D125M

> with embedded vacuum rings, with external support ring

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 350 mm					up to 10 bar L_E = 400 mm					up to 10 bar L_E = 450 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	35	7	33	0	445	41	5	34	0	401	52	12	51	0	515
250	35	7	32	0	656	41	5	33	0	603	52	12	50	0	740
300	35	7	32	0	903	41	5	32	0	840	52	12	49	0	1,001
350	35	7	31	0	1,134	41	5	32	0	1,064	52	12	48	0	1,244
400	35	7	31	0	1,521	41	5	32	0	1,439	52	12	48	0	1,647
450	35	7	31	0	1,878	41	5	31	0	1,787	52	12	47	0	2,019
500	35	7	30	0	2,290	41	5	31	0	2,190	52	12	47	0	2,445
600	35	7	30	0	3,187	41	5	30	0	3,068	52	12	46	0	3,370
700	35	7	29	0	4,312	41	5	30	0	4,174	52	12	45	0	4,525
800	35	7	29	0	5,555	41	5	30	0	5,398	52	12	45	0	5,795
900	35	7	29	0	6,910	41	5	29	0	6,735	52	12	44	0	7,178
1000	35	7	29	0	8,462	41	5	29	0	8,268	52	12	44	0	8,758
1100	35	7	28	0	10,171	41	5	29	0	9,958	52	12	43	0	10,496
1200	35	7	28	0	12,037	41	5	29	0	11,805	52	12	43	0	12,390

Installation length (L_E) at design pressure

Ø	up to 10 bar L_E = 500 mm					up to 10 bar L_E = 550 mm					up to 10 bar L_E = 600 mm				
	higher pressures on request														
	Movement				A	Movement				A	Movement				A
mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	58	12	55	0	531	70	19	72	0	661	82	26	89	0	804
250	58	12	54	0	760	70	19	71	0	913	82	26	87	0	1,081
300	58	12	53	0	1,024	70	19	69	0	1,201	82	26	86	0	1,392
350	58	12	52	0	1,269	70	19	69	0	1,466	82	26	85	0	1,676
400	58	12	52	0	1,676	70	19	68	0	1,901	82	26	84	0	2,140
450	58	12	51	0	2,051	70	19	67	0	2,299	82	26	83	0	2,561
500	58	12	51	0	2,481	70	19	66	0	2,753	82	26	82	0	3,039
600	58	12	50	0	3,411	70	19	65	0	3,728	82	26	81	0	4,060
700	58	12	49	0	4,572	70	19	64	0	4,939	82	26	79	0	5,320
800	58	12	49	0	5,849	70	19	64	0	6,263	82	26	78	0	6,691
900	58	12	48	0	7,238	70	19	63	0	7,698	82	26	78	0	8,171
1000	58	12	48	0	8,825	70	19	62	0	9,331	82	26	77	0	9,852
1100	58	12	47	0	10,568	70	19	62	0	11,122	82	26	76	0	11,690
1200	58	12	47	0	12,469	70	19	61	0	13,070	82	26	76	0	13,685

Recommended sizes
Further possible sizes

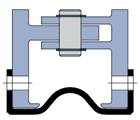
In the event of lateral displacement and simultaneous axial extension (due to installation gap tolerance) the above movements are reduced (> page 29).
Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available

Double arch EPDM rubber expansion joints ∅ 500 mm
with stainless steel swivel flanges,
for permanent vacuum operation in a paper mill

Angular expansion joints with full faced rubber flange



Single Arch Expansion Joints

U110F ⌀ 100 - 4,000 mm

> **Type U110F**
without vacuum ring

> **Type U111F**
with internal vacuum ring

> **Type U112F**
with embedded vacuum ring

Type key > page 22
U1 1 0 F
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Angular expansion joint with one arch

Design: Streamlined, single wide arch rubber bellows with full faced rubber flanges, designed to compensate angular movement in one plane only, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single-part backing flanges connected over a pair of hinge plates and pins. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 100 to 4,000 mm, custom diameters possible

Length: Standard L_E = 150 to 400 mm (> page 283–285)
Custom length on request

Pressure: Up to 25 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For angular movements
(> page 283–285)

Application:
Cooling water systems, desalination plants, drinking water supply, plant construction, e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

PED 2014/68/EU KTW WRAS FDA <10⁹ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows,
available starting at ∅ 300 mm. Take the restriction of the listed movement into account (> page 283–285)

Backing flanges

Design: Single-part, oval backing flanges with support collar, clearance holes, consisting of a pair of hinge plates connected with pins (type F)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective shield (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

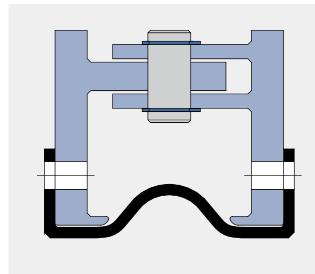
(> page 42)

Hinge

Design: Dimensions according to design pressure (test pressure)

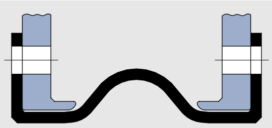
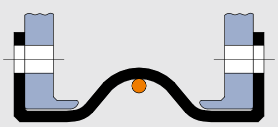
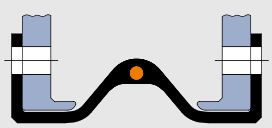
Materials: Carbon steel, stainless steel

Coating: Galvanised or hot-dip galvanised



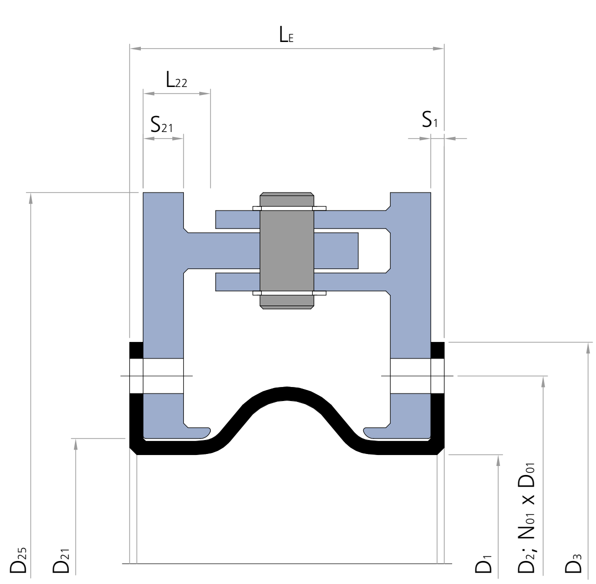
Type U110F
Hinge for angular movements on one plane with plates and pins to absorb the reaction forces from pressure and vacuum. Rotation axis in the center of the installation gap

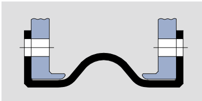
Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
U110F		None	Depending on the diameter up to 25 bar, vacuum stability on request	> page 283
U111F		Medium contact, inside the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 284
U112F		No medium contact, embedded in the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 285

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

Cross section U110F





U110F

> without vacuum ring

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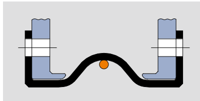
Installation length (L_E) depending on design pressure												
	up to 10 bar L_E = 150 mm		up to 10 bar L_E = 200 mm		up to 10 bar L_E = 250 mm		up to 10 bar L_E = 300 mm		up to 10 bar L_E = 350 mm		up to 10 bar L_E = 400 mm	
	pressures on request											
Ø mm	Movement ±°	A cm²	Movement ±°	A cm²	Movement ±°	A cm²	Movement ±°	A cm²	Movement ±°	A cm²	Movement ±°	A cm²
100	22.3	177	31.0	254	32.6	260	40	353	48.2	491	52.6	616
125	18.2	241	25.6	330	27.1	337	33.9	441	41.9	594	46.3	731
150	15.3	314	21.8	415	23.1	423	29.2	539	36.7	707	41.1	855
175	13.2	415	18.9	531	20.1	539	25.6	670	32.6	855	36.8	1,018
200	11.6	491	16.7	616	17.7	625	22.8	765	29.2	962	33.2	1,134
250	9.3	707	13.5	855	14.4	866	18.6	1,029	24.1	1,257	27.7	1,452
300	7.8	973	11.3	1,146	12	1,158	15.6	1,346	20.5	1,605	23.6	1,825
350	6.7	1,288	9.7	1,486	10.4	1,500	13.5	1,713	17.7	2,003	20.5	2,248
400	5.9	1,605	8.5	1,825	9.1	1,840	11.9	2,075	15.6	2,393	18.1	2,660
450	5.2	1,987	7.6	2,231	8.1	2,248	10.6	2,507	14	2,856	16.2	3,147
500	4.7	2,402	6.8	2,669	7.3	2,688	9.5	2,971	12.6	3,349	14.7	3,664
550	4.3	2,827	6.2	3,117	6.6	3,137	8.7	3,442	11.5	3,848	13.4	4,185
600	3.9	3,349	5.7	3,664	6.1	3,685	8	4,015	10.6	4,453	12.3	4,815
650	3.6	3,848	5.3	4,185	5.6	4,208	7.4	4,560	9.8	5,027	11.4	5,411
700	3.4	4,465	4.9	4,827	5.2	4,852	6.8	5,230	9.1	5,728	10.6	6,138
750	3.1	5,027	4.6	5,411	4.9	5,437	6.4	5,836	8.5	6,362	9.9	6,793
800	2.9	5,741	4.3	6,151	4.6	6,179	6	6,604	8	7,163	9.3	7,620
850	2.8	6,362	4.0	6,793	4.3	6,822	5.6	7,268	7.5	7,854	8.8	8,332
900	2.6	7,163	3.8	7,620	4.1	7,651	5.3	8,123	7.1	8,742	8.3	9,246
950	2.5	7,854	3.6	8,332	3.9	8,365	5.1	8,858	6.7	9,503	7.9	10,029
1000	2.3	8,742	3.4	9,246	3.7	9,280	4.8	9,799	6.4	10,477	7.5	11,029
1050	2.2	9,503	3.3	10,029	3.5	10,064	4.6	10,605	6.1	11,310	7.1	11,882
1100	2.1	10,496	3.1	11,047	3.3	11,085	4.4	11,652	5.8	12,390	6.8	12,989
1150	2.0	11,310	3.0	11,882	3.2	11,921	4.2	12,509	5.6	13,273	6.5	13,893
1200	2.0	12,370	2.9	12,969	3.1	13,009	4	13,623	5.3	14,420	6.2	15,066
1250	1.9	13,273	2.7	13,893	2.9	13,935	3.8	14,569	5.1	15,394	6	16,061
1300	1.8	14,420	2.6	15,066	2.8	15,109	3.7	15,770	4.9	16,627	5.8	17,320
1350	1.7	15,394	2.5	16,061	2.7	16,106	3.6	16,787	4.7	17,671	5.5	18,385
1400	1.7	16,627	2.5	17,320	2.6	17,366	3.4	18,074	4.6	18,991	5.3	19,731
1450	1.6	17,671	2.4	18,385	2.5	18,433	3.3	19,162	4.4	20,106	5.2	20,867
1500	1.6	18,991	2.3	19,731	2.4	19,781	3.2	20,536	4.3	21,512	5	22,299
1600	1.5	21,512	2.1	22,299	2.3	22,352	3	23,154	4	24,190	4.7	25,025
1650	1.4	22,698	2.1	23,506	2.2	23,561	2.9	24,384	3.9	25,447	4.5	26,302
1700	1.4	24,190	2.0	25,025	2.2	25,081	2.8	25,930	3.8	27,026	4.4	27,907
1800	1.3	27,055	1.9	27,937	2	27,996	2.7	28,893	3.6	30,049	4.2	30,978
1900	1.2	30,018	1.8	30,946	1.9	31,009	2.5	31,952	3.4	33,168	3.9	34,143
1950	1.2	31,416	1.8	32,365	1.9	32,429	2.5	33,394	3.3	34,636	3.8	35,633
2000	1.2	33,168	1.7	34,143	1.8	34,209	2.4	35,199	3.2	36,474	3.7	37,497
2100	1.1	36,474	1.6	37,497	1.7	37,565	2.3	38,603	3.1	39,938	3.6	41,007
2200	1.1	39,938	1.6	41,007	1.7	41,079	2.2	42,164	2.9	43,558	3.4	44,675
2250	1.0	41,548	1.5	42,638	1.6	42,712	2.1	43,818	2.8	45,239	3.3	46,377
2300	1.0	43,558	1.5	44,675	1.6	44,750	2.1	45,882	2.8	47,336	3.3	48,500
2400	1.0	47,336	1.4	48,500	1.5	48,578	2	49,757	2.7	51,271	3.1	52,482
2500	0.9	51,271	1.4	52,482	1.5	52,563	1.9	53,789	2.6	55,363	3	56,621
2550	0.9	53,093	1.3	54,325	1.4	54,408	1.9	55,655	2.5	57,256	2.9	58,535
2600	0.9	55,363	1.3	56,621	1.4	56,706	1.9	57,979	2.5	59,612	2.9	60,917
2700	0.9	59,612	1.3	60,917	1.4	61,005	1.8	62,325	2.4	64,018	2.8	65,370
2800	0.8	64,018	1.2	65,370	1.3	65,461	1.7	66,829	2.3	68,581	2.7	69,981
2850	0.8	66,052	1.2	67,426	1.3	67,518	1.7	68,906	2.3	70,686	2.6	72,107
2900	0.8	68,581	1.2	69,981	1.3	70,075	1.7	71,489	2.2	73,301	2.6	74,748
3000	0.8	73,301	1.1	74,748	1.2	74,845	1.6	76,307	2.1	78,179	2.5	79,673
3100	0.8	78,179	1.1	79,673	1.2	79,773	1.6	81,282	2.1	83,213	2.4	84,754
3150	0.7	80,425	1.1	81,940	1.2	82,041	1.5	83,571	2	85,530	2.4	87,092
3200	0.7	83,213	1.1	84,754	1.1	84,857	1.5	86,413	2	88,405	2.3	89,993
3300	0.7	88,405	1.0	89,993	1.1	90,099	1.5	91,702	1.9	93,753	2.3	95,388
3400	0.7	93,753	1.0	95,388	1.1	95,498	1.4	97,148	1.9	99,259	2.2	100,941
3450	0.7	96,211	1.0	97,868	1.1	97,979	1.4	99,650	1.9	101,788	2.2	103,491
3600	0.7	104,922	1.0	106,651	1	106,767	1.3	108,511	1.8	110,741	2.1	112,518
3800	0.6	116,718	0.9	118,542	1	118,664	1.3	120,503	1.7	122,852	2	124,723
4000	0.6	129,143	0.9	131,061	0.9	131,190	1.2	133,123	1.6	135,591	1.9	137,556

Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining: angular movement: -66 %.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



U111F

> with internal vacuum ring

	Installation length (L_E) depending on design pressure											
	up to 10 bar L_E = 150 mm		up to 10 bar L_E = 200 mm		up to 10 bar L_E = 250 mm		up to 10 bar L_E = 300 mm		up to 10 bar L_E = 350 mm		up to 10 bar L_E = 400 mm	
	pressures on request											
Ø	Movement	A	Movement	A	Movement	A	Movement	A	Movement	A	Movement	A
mm	±°	cm²	±°	cm²	±°	cm²	±°	cm²	±°	cm²	±°	cm²
100	18.8	177	25.2	254	27.0	260	32.2	353	39.7	491	43.5	616
125	15.2	241	20.6	330	22.2	337	26.7	441	33.6	594	37.2	731
150	12.8	314	17.4	415	18.8	423	22.8	539	29.0	707	32.3	855
175	11.0	415	15.0	531	16.2	539	19.8	670	25.4	855	28.5	1,018
200	9.6	491	13.2	616	14.3	625	17.5	765	22.5	962	25.4	1,134
250	7.7	707	10.6	855	11.5	866	14.1	1,029	18.4	1,257	20.8	1,452
300	6.5	973	8.9	1,146	9.6	1,158	11.9	1,346	15.5	1,605	17.6	1,825
350	5.5	1,288	7.6	1,486	8.3	1,500	10.2	1,713	13.3	2,003	15.2	2,248
400	4.9	1,605	6.7	1,825	7.3	1,840	9.0	2,075	11.7	2,393	13.4	2,660
450	4.3	1,987	6.0	2,231	6.5	2,248	8.0	2,507	10.5	2,856	11.9	3,147
500	3.9	2,402	5.4	2,669	5.8	2,688	7.2	2,971	9.4	3,349	10.8	3,664
550	3.5	2,827	4.9	3,117	5.3	3,137	6.5	3,442	8.6	3,848	9.8	4,185
600	3.2	3,349	4.5	3,664	4.9	3,685	6.0	4,015	7.9	4,453	9.0	4,815
650	3.0	3,848	4.1	4,185	4.5	4,208	5.5	4,560	7.3	5,027	8.3	5,411
700	2.8	4,465	3.8	4,827	4.2	4,852	5.1	5,230	6.8	5,728	7.7	6,138
750	2.6	5,027	3.6	5,411	3.9	5,437	4.8	5,836	6.3	6,362	7.2	6,793
800	2.4	5,741	3.4	6,151	3.6	6,179	4.5	6,604	5.9	7,163	6.8	7,620
850	2.3	6,362	3.2	6,793	3.4	6,822	4.2	7,268	5.6	7,854	6.4	8,332
900	2.2	7,163	3.0	7,620	3.2	7,651	4.0	8,123	5.3	8,742	6.0	9,246
950	2.0	7,854	2.8	8,332	3.1	8,365	3.8	8,858	5.0	9,503	5.7	10,029
1000	1.9	8,742	2.7	9,246	2.9	9,280	3.6	9,799	4.7	10,477	5.4	11,029
1050	1.9	9,503	2.6	10,029	2.8	10,064	3.4	10,605	4.5	11,310	5.2	11,882
1100	1.8	10,496	2.4	11,047	2.7	11,085	3.3	11,652	4.3	12,390	4.9	12,989
1150	1.7	11,310	2.3	11,882	2.5	11,921	3.1	12,509	4.1	13,273	4.7	13,893
1200	1.6	12,370	2.2	12,969	2.4	13,009	3.0	13,623	4.0	14,420	4.5	15,066
1250	1.6	13,273	2.2	13,893	2.3	13,935	2.9	14,569	3.8	15,394	4.3	16,061
1300	1.5	14,420	2.1	15,066	2.2	15,109	2.8	15,770	3.7	16,627	4.2	17,320
1350	1.4	15,394	2.0	16,061	2.2	16,106	2.7	16,787	3.5	17,671	4.0	18,385
1400	1.4	16,627	1.9	17,320	2.1	17,366	2.6	18,074	3.4	18,991	3.9	19,731
1450	1.3	17,671	1.9	18,385	2.0	18,433	2.5	19,162	3.3	20,106	3.7	20,867
1500	1.3	18,991	1.8	19,731	1.9	19,781	2.4	20,536	3.2	21,512	3.6	22,299
1600	1.2	21,512	1.7	22,299	1.8	22,352	2.3	23,154	3.0	24,190	3.4	25,025
1650	1.2	22,698	1.6	23,506	1.8	23,561	2.2	24,384	2.9	25,447	3.3	26,302
1700	1.1	24,190	1.6	25,025	1.7	25,081	2.1	25,930	2.8	27,026	3.2	27,907
1800	1.1	27,055	1.5	27,937	1.6	27,996	2.0	28,893	2.6	30,049	3.0	30,978
1900	1.0	30,018	1.4	30,946	1.5	31,009	1.9	31,952	2.5	33,168	2.9	34,143
1950	1.0	31,416	1.4	32,365	1.5	32,429	1.9	33,394	2.4	34,636	2.8	35,633
2000	1.0	33,168	1.3	34,143	1.5	34,209	1.8	35,199	2.4	36,474	2.7	37,497
2100	0.9	36,474	1.3	37,497	1.4	37,565	1.7	38,603	2.3	39,938	2.6	41,007
2200	0.9	39,938	1.2	41,007	1.3	41,079	1.6	42,164	2.2	43,558	2.5	44,675
2250	0.9	41,548	1.2	42,638	1.3	42,712	1.6	43,818	2.1	45,239	2.4	46,377
2300	0.8	43,558	1.2	44,675	1.3	44,750	1.6	45,882	2.1	47,336	2.4	48,500
2400	0.8	47,336	1.1	48,500	1.2	48,578	1.5	49,757	2.0	51,271	2.3	52,482
2500	0.8	51,271	1.1	52,482	1.2	52,563	1.4	53,789	1.9	55,363	2.2	56,621
2550	0.8	53,093	1.1	54,325	1.1	54,408	1.4	55,655	1.9	57,256	2.1	58,535
2600	0.7	55,363	1.0	56,621	1.1	56,706	1.4	57,979	1.8	59,612	2.1	60,917
2700	0.7	59,612	1.0	60,917	1.1	61,005	1.3	62,325	1.8	64,018	2.0	65,370
2800	0.7	64,018	1.0	65,370	1.0	65,461	1.3	66,829	1.7	68,581	1.9	69,981
2850	0.7	66,052	0.9	67,426	1.0	67,518	1.3	68,906	1.7	70,686	1.9	72,107
2900	0.7	68,581	0.9	69,981	1.0	70,075	1.2	71,489	1.6	73,301	1.9	74,748
3000	0.6	73,301	0.9	74,748	1.0	74,845	1.2	76,307	1.6	78,179	1.8	79,673
3100	0.6	78,179	0.9	79,673	0.9	79,773	1.2	81,282	1.5	83,213	1.8	84,754
3150	0.6	80,425	0.9	81,940	0.9	82,041	1.1	83,571	1.5	85,530	1.7	87,092
3200	0.6	83,213	0.8	84,754	0.9	84,857	1.1	86,413	1.5	88,405	1.7	89,993
3300	0.6	88,405	0.8	89,993	0.9	90,099	1.1	91,702	1.4	93,753	1.6	95,388
3400	0.6	93,753	0.8	95,388	0.9	95,498	1.1	97,148	1.4	99,259	1.6	100,941
3450	0.6	96,211	0.8	97,868	0.8	97,979	1.0	99,650	1.4	101,788	1.6	103,491
3600	0.5	104,922	0.7	106,651	0.8	106,767	1.0	108,511	1.3	110,741	1.5	112,518
3800	0.5	116,718	0.7	118,542	0.8	118,664	0.9	120,503	1.3	122,852	1.4	124,723
4000	0.5	129,143	0.7	131,061	0.7	131,190	0.9	133,123	1.2	135,591	1.4	137,556

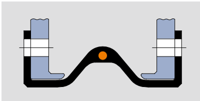
Recommended sizes

Further possible sizes

Reduction of movement for expansion joints with PTFE lining: angular movement: -0 %.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



U112F

> with embedded vacuum ring

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Installation length (L_E) depending on design pressure												
	up to 10 bar L_E = 150 mm		up to 10 bar L_E = 200 mm		up to 10 bar L_E = 250 mm		up to 10 bar L_E = 300 mm		up to 10 bar L_E = 350 mm		up to 10 bar L_E = 400 mm	
	pressures on request											
Ø mm	Movement ±°	A cm²	Movement ±°	A cm²	Movement ±°	A cm²	Movement ±°	A cm²	Movement ±°	A cm²	Movement ±°	A cm²
100	12.4	150	17.7	222	19.3	232	23.7	320	30.5	423	33.8	539
125	10.0	209	14.4	293	15.6	305	19.4	405	25.3	519	28.2	647
150	8.3	278	12.0	373	13.1	387	16.3	499	21.5	625	24.1	765
175	7.2	373	10.4	483	11.3	499	14.1	625	18.6	765	20.9	919
200	6.3	445	9.1	564	9.9	581	12.4	716	16.4	866	18.5	1,029
250	5.0	651	7.3	794	8	814	10	973	13.3	1,146	15	1,333
300	4.2	908	6.1	1,075	6.7	1,099	8.3	1,282	11.1	1,479	12.6	1,691
350	3.6	1,213	5.2	1,405	5.7	1,432	7.2	1,640	9.6	1,863	10.8	2,099
400	3.1	1,521	4.6	1,735	5	1,765	6.3	1,995	8.4	2,240	9.5	2,498
450	2.8	1,893	4.1	2,132	4.4	2,165	5.6	2,419	7.5	2,688	8.5	2,971
500	2.5	2,299	3.7	2,561	4	2,597	5	2,875	6.7	3,167	7.6	3,473
550	2.3	2,715	3.3	3,000	3.6	3,039	4.6	3,339	6.1	3,653	6.9	3,982
600	2.1	3,227	3.1	3,536	3.3	3,578	4.2	3,904	5.6	4,243	6.4	4,596
650	1.9	3,718	2.8	4,049	3.1	4,094	3.9	4,441	5.2	4,803	5.9	5,178
700	1.8	4,324	2.6	4,681	2.9	4,729	3.6	5,102	4.8	5,489	5.5	5,890
750	1.7	4,877	2.4	5,255	2.7	5,307	3.4	5,701	4.5	6,110	5.1	6,533
800	1.6	5,581	2.3	5,986	2.5	6,041	3.1	6,461	4.2	6,896	4.8	7,344
850	1.5	6,193	2.2	6,619	2.4	6,677	3	7,118	4	7,574	4.5	8,044
900	1.4	6,984	2.0	7,436	2.2	7,497	2.8	7,964	3.8	8,446	4.3	8,942
950	1.3	7,667	1.9	8,139	2.1	8,203	2.7	8,692	3.6	9,195	4	9,712
1000	1.3	8,544	1.8	9,043	2	9,110	2.5	9,625	3.4	10,153	3.8	10,696
1050	1.2	9,297	1.7	9,817	1.9	9,887	2.4	10,423	3.2	10,973	3.7	11,537
1100	1.1	10,279	1.7	10,825	1.8	10,899	2.3	11,461	3.1	12,037	3.5	12,628
1150	1.1	11,085	1.6	11,652	1.7	11,728	2.2	12,311	2.9	12,908	3.3	13,519
1200	1.1	12,135	1.5	12,728	1.7	12,808	2.1	13,417	2.8	14,040	3.2	14,677
1250	1.0	13,029	1.5	13,643	1.6	13,726	2	14,356	2.7	15,001	3.1	15,659
1300	1.0	14,166	1.4	14,806	1.5	14,892	1.9	15,548	2.6	16,218	3	16,902
1350	0.9	15,131	1.4	15,792	1.5	15,881	1.9	16,559	2.5	17,250	2.8	17,955
1400	0.9	16,354	1.3	17,041	1.4	17,134	1.8	17,837	2.4	18,554	2.7	19,285
1450	0.9	17,390	1.3	18,098	1.4	18,194	1.7	18,918	2.3	19,656	2.6	20,409
1500	0.8	18,699	1.2	19,433	1.3	19,532	1.7	20,283	2.3	21,047	2.6	21,825
1600	0.8	21,201	1.1	21,983	1.3	22,088	1.6	22,885	2.1	23,697	2.4	24,522
1650	0.8	22,379	1.1	23,181	1.2	23,289	1.5	24,108	2	24,941	2.3	25,787
1700	0.7	23,861	1.1	24,689	1.2	24,801	1.5	25,645	2	26,504	2.3	27,377
1800	0.7	26,706	1.0	27,582	1.1	27,700	1.4	28,592	1.9	29,498	2.1	30,419
1900	0.7	29,651	1.0	30,573	1.1	30,698	1.3	31,636	1.8	32,589	2	33,556
1950	0.6	31,040	0.9	31,984	1	32,111	1.3	33,071	1.7	34,045	2	35,033
2000	0.6	32,781	0.9	33,751	1	33,882	1.3	34,867	1.7	35,867	1.9	36,881
2100	0.6	36,069	0.9	37,086	1	37,223	1.2	38,256	1.6	39,303	1.8	40,364
2200	0.6	39,514	0.8	40,578	0.9	40,721	1.1	41,801	1.5	42,895	1.7	44,003
2250	0.6	41,115	0.8	42,200	0.9	42,346	1.1	43,447	1.5	44,563	1.7	45,692
2300	0.5	43,116	0.8	44,227	0.9	44,376	1.1	45,503	1.5	46,645	1.7	47,800
2400	0.5	46,875	0.8	48,033	0.8	48,188	1.1	49,363	1.4	50,551	1.6	51,754
2500	0.5	50,791	0.7	51,996	0.8	52,158	1	53,379	1.4	54,615	1.5	55,864
2550	0.5	52,604	0.7	53,831	0.8	53,995	1	55,238	1.3	56,495	1.5	57,766
2600	0.5	54,864	0.7	56,116	0.8	56,284	1	57,553	1.3	58,836	1.5	60,132
2700	0.5	59,094	0.7	60,393	0.7	60,568	0.9	61,883	1.3	63,213	1.4	64,557
2800	0.5	63,481	0.7	64,828	0.7	65,008	0.9	66,371	1.2	67,748	1.4	69,139
2850	0.4	65,506	0.6	66,874	0.7	67,058	0.9	68,442	1.2	69,840	1.3	71,252
2900	0.4	68,025	0.6	69,419	0.7	69,606	0.9	71,016	1.2	72,440	1.3	73,878
3000	0.4	72,727	0.6	74,168	0.7	74,361	0.8	75,818	1.1	77,289	1.3	78,775
3100	0.4	77,585	0.6	79,073	0.6	79,273	0.8	80,777	1.1	82,295	1.2	83,828
3150	0.4	79,823	0.6	81,332	0.6	81,534	0.8	83,060	1.1	84,599	1.2	86,153
3200	0.4	82,601	0.6	84,136	0.6	84,342	0.8	85,893	1.1	87,459	1.2	89,038
3300	0.4	87,773	0.6	89,356	0.6	89,568	0.8	91,166	1	92,779	1.2	94,406
3400	0.4	93,103	0.5	94,733	0.6	94,951	0.7	96,597	1	98,256	1.1	99,930
3450	0.4	95,553	0.5	97,203	0.6	97,425	0.7	99,091	1	100,772	1.1	102,467
3600	0.4	104,234	0.5	105,958	0.6	106,188	0.7	107,928	0.9	109,682	1.1	111,450
3800	0.3	115,993	0.5	117,811	0.5	118,054	0.7	119,888	0.9	121,736	1	123,599
4000	0.3	128,380	0.5	130,292	0.5	130,548	0.6	132,477	0.8	134,419	1	136,376

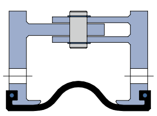
Recommended sizes
Further possible sizes

Reduction of movement for expansion joints with PTFE lining: angular movement: -0 %.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available

Angular expansion joints with swivel flange



Single Arch Expansion Joints

D110F ⌀ 20 - 1,200 mm

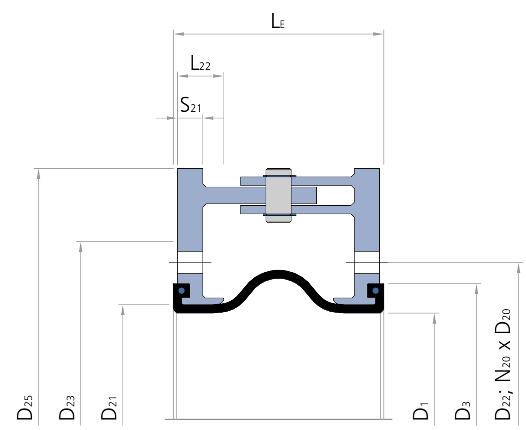
> Type D110F
without vacuum ring

> Type D111F
with internal vacuum ring

> Type D112F
with embedded vacuum ring

Type key > page 22
D1 1 0 F
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Cross section D110F



Angular expansion joint with one arch

Design: Streamlined, single wide arch rubber bellows with self-sealing rubber bulges, designed to compensate angular movement in one plane only, have a cycle life in the tens of millions, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and single-part backing flanges connected over a pair of hinge plates and pins. Optional with vacuum ring. In compliance with PED 2014/68/EU, FSA Technical Handbook and ASTM F1123 - 87.

Diameters: ⌀ 20 to 1,200 mm, custom diameters possible

Length: Standard L_E = 130 to 350 mm (> page 291–293)
Custom length on request

Pressure: Up to 25 bar depending on diameter and length
Vacuum stability on request, with vacuum ring up to 0.05 bar absolute

Movement: For angular movements
(> page 291–293)

Application:
Cooling water systems, desalination plants, drinking water supply, plant construction, e.g. in pipelines, on pumps, as dismantling joints, on condensers and vessels

PED 2014/68/EU · KTW WRAS · FDA · <10⁶ Ohm · EX · TÜV DIN 4809 (Standard sizes) · Shipbuilding certification (Standard sizes)

Request assembly instructions at:
www.ditec-adam.de/en/contact

Standard rubber bellows

Elastomer	Fabric	Marking	°C	Application
EPDM / EPDM	PEEK	red red	-40 | +130	Heating systems, cooling, hot air
IIR / EPDM	Polyamid	red	-40 | +100	Drinking water, seawater, weak acids and alkalis
NBR / CR	Polyamid	yellow	-40 | +100	Oils, fuels, gases
NBRweiß / CR	Polyamid	white	-40 | +100	Fat containing food, weather resistant
CSM / CSM	Polyamid	green	-40 | +100	Chemicals, aggresive chemical wastewater, weather resistant
NBR / CR	Polyamid	orange	-40 | +100	Oils, fuels, gases, LPG, blast furnace gas, lubricants
CR / CR	Polyamid	–	-40 | +100	Cold- and hot water, seawater, wastewater with oleaginous corrosion protection
NBR / CR	Stahl	yellow	-40 | +100	Oils, fuels, gases, fuel ethanol blends
NBR-LT / CR	Polyamid	yellow LT	-40 | +100	Oils, fuels, gases, LPG, for tanker and filling stations
HNBR / CR	Stahl	yellow blue yellow	-40 | +100	Oils, fuels, gases, LPG, for high Temperature
EPDM / EPDM	Polyamid	red	-40 | +100	Seawater, weak acids and alkalis
IIR / EPDM	Polyamid	red	-40 | +100	Seawater, weak acids and alkalis
BR	Polyamid	blue circle	-40 | +100	Sludge, dust or powder, liquids with solids, emulsions

Non-standard rubber bellows

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid	red	-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid	red/blue	-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid	orange/blue	-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid	light blue	-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid	light blue/blue	-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid	beige/red	-40 | +100	Foodstuffs
EPDMbeige	Aramid	beige/blue/red	-40 | +100	Foodstuffs
IIR	Polyamid	brown	-20 | +100	Hot water, acids, bases, gases
IIR	Aramid	brown/blue	-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid	green	-20 | +100	Strong acids, bases, chemicals
CSM	Aramid	green/blue	-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid	yellow	-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid	yellow/blue	-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid	beige/yellow	-30 | +100	Oil, fatty foods
NBRbeige	Aramid	beige/blue/yellow	-30 | +100	Oil, fatty foods
CR	Polyamid	grey	-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid	grey/blue	-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid	purple/blue	-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid	beige/blue/purple	-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single-part, oval backing flanges with support collar, clearance holes, groove to accommodate the rubber bulges and consisting of a pair of hinge plates connected with pins (type F)

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective shield (> page 58)

Flow liners: Cylindrical flow liner
Conical flow liner
Telescoping flow liner (> page 57)

Filled arch:

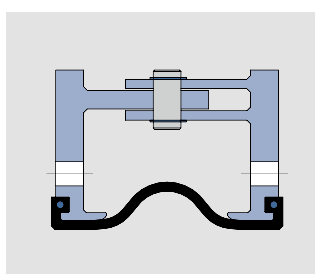
(> page 42)

Hinge

Design: Dimensions according to design pressure (test pressure)

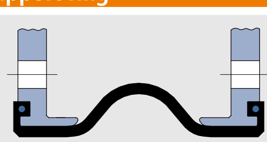
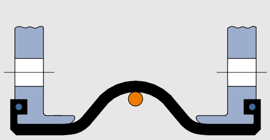
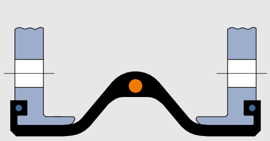
Materials: Carbon steel, stainless steel

Coating: Galvanised or hot-dip galvanised

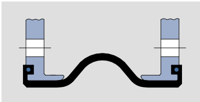


Type D110F
Hinge for angular movements on one plane with plates and pins to absorb the reaction forces from pressure and vacuum. Rotation axis in the center of the installation gap

Support rings

TYPE	Support ring	Vacuum ring	Pressure	Movement
D110F		None	Depending on the diameter up to 25 bar, vacuum stability on request	> page 291
D111F		Vacuum spiral up to ∅ 250 mm, vacuum ring starting from ∅ 300 mm Medium contact, inside the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 292
D112F		No medium contact, embedded in the arch starting from ∅ 100 mm	Depending on the diameter up to 16 bar, for vacuum up to 0.05 bar absolute	> page 293

Materials	
Stainless steel	Carbon steel, embedded



D110F

> without vacuum ring

Installation length (L_E) at design pressure

Ø mm	up to 10 bar L_E = 130 mm Movement ±°	A cm²	up to 10 bar L_E = 150 mm Movement ±°	A cm²	up to 10 bar L_E = 175 mm Movement ±°	A cm²	up to 10 bar L_E = 200 mm Movement ±°	A cm²
	higher pressures on request							
20	30.0	17						
25	30.0	17						
32	30.0	17						
40	35.0	18						
50	30.0	32						
65	30.0	53						
80	30.0	85	30.0	85				
100	20.0	128	20.0	128				
125	20.0	187	20.0	187				
150	20.0	259	20.0	259				
200	12.0	410			12.0	409	16.7	564
250	12.0	596			12.0	599	13.5	799
300	12.0	822			7.8	903	12.0	822
350					6.7	1,134	8.0	907
400					5.9	1,521	8.0	1,018
450					5.2	1,878	7.6	2,116
500					4.7	2,290	8.0	1,692
600					3.9	3,187	8.0	3,078
700					3.4	4,312	4.9	4,669
800					2.9	5,555	4.3	5,958
900					2.6	6,910	3.8	7,359
1000					2.3	8,462	3.4	8,958
1100					2.1	10,171	3.1	10,715
1200					2.0	12,037	2.9	12,628

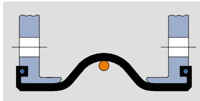
Installation length (L_E) at design pressure

Ø mm	up to 10 bar L_E = 250 mm Movement ±°	A cm²	up to 10 bar L_E = 275mm Movement ±°	A cm²	up to 10 bar L_E = 300 mm Movement ±°	A cm²	up to 10 bar L_E = 350 mm Movement ±°	A cm²
	higher pressures on request							
20								
25								
32								
40								
50								
65								
80								
100								
125								
150								
200	17.7	573	17.7	573	22.8	707	29.2	897
250	14.4	809	14.4	809	18.6	968	24.1	1,188
300	12.0	1,081	12.0	1,081	15.6	1,263	20.5	1,514
350	10.4	1,333	10.4	1,333	13.5	1,534	17.7	1,810
400	9.1	1,750	9.1	1,750	11.9	1,979	15.6	2,290
450	6.0	1,801	8.1	2,132	10.6	2,384	14.0	2,725
500	7.3	2,570	7.3	2,570	9.5	2,846	12.6	3,217
600	6.1	3,515	6.1	3,515	8	3,837	10.6	4,266
700	8.0	4,019	8.0	4,019	6.8	5,064	9.1	5,555
800	8.0	5,436	4.6	5,986	6	6,404	8.0	6,955
900	4.1	7,390	4.1	7,390	5	6,706	7.1	8,462
1000	3.7	8,992	3.7	8,992	5	8,231	6.4	10,171
1100	3.3	10,751	3.3	10,751	4.4	11,310	5.8	12,037
1200	3.1	12,668	3.1	12,668	4	13,273	5.3	14,061

Standard sizes
Non-standard sizes

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



D111F

> with internal vacuum ring

Installation length (L_E) at design pressure

∅ mm	up to 10 bar L_E = 130 mm Movement ±°	A cm²	up to 10 bar L_E = 150 mm Movement ±°	A cm²	up to 10 bar L_E = 175 mm Movement ±°	A cm²	up to 10 bar L_E = 200 mm Movement ±°	A cm²
	higher pressures on request							
20	30.0	17						
25	30.0	17						
32	30.0	17						
40	35.0	18						
50	30.0	32						
65	30.0	53						
80	30.0	85	30.0	85				
100	20.0	128	20.0	128				
125	20.0	187	20.0	187				
150	20.0	259	20.0	259				
200	12.0	410			12.0	409	13.2	564
250	12.0	596			12.0	599	10.6	799
300	12.0	822			6.5	903	12.0	822
350					5.5	1,134	8.0	907
400					4.9	1,521	8.0	1,018
450					4.3	1,878	6.0	2,116
500					3.9	2,290	8.0	1,692
600					3.2	3,187	8.0	3,078
700					2.8	4,312	3.8	4,669
800					2.4	5,555	3.4	5,958
900					2.2	6,910	3.0	7,359
1000					1.9	8,462	2.7	8,958
1100					1.8	10,171	2.4	10,715
1200					1.6	12,037	2.2	12,628

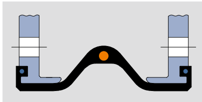
Installation length (L_E) at design pressure

∅ mm	up to 10 bar L_E = 250 mm Movement ±°	A cm²	up to 10 bar L_E = 275 mm Movement ±°	A cm²	up to 10 bar L_E = 300 mm Movement ±°	A cm²	up to 10 bar L_E = 350 mm Movement ±°	A cm²
	higher pressures on request							
20								
25								
32								
40								
50								
65								
80								
100								
125								
150								
200	14.3	573	14.3	573	17.5	707	22.5	897
250	11.5	809	11.5	809	14.1	968	18.4	1,188
300	9.6	1,081	9.6	1,081	11.9	1,263	15.5	1,514
350	8.3	1,333	8.3	1,333	10.2	1,534	13.3	1,810
400	7.3	1,750	7.3	1,750	9	1,979	11.7	2,290
450	6.0	1,801	6.5	2,132	8	2,384	10.5	2,725
500	5.8	2,570	5.8	2,570	7.2	2,846	9.4	3,217
600	4.9	3,515	4.9	3,515	6	3,837	7.9	4,266
700	8.0	4,019	8.0	4,019	5.1	5,064	6.8	5,555
800	8.0	5,436	3.6	5,986	4.5	6,404	5.9	6,955
900	3.2	7,390	3.2	7,390	5	6,706	5.3	8,462
1000	2.9	8,992	2.9	8,992	5	8,231	4.7	10,171
1100	2.7	10,751	2.7	10,751	3.3	11,310	4.3	12,037
1200	2.4	12,668	2.4	12,668	3	13,273	4.0	14,061

Standard sizes
Non-standard sizes

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available



D112F

> with embedded vacuum ring

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Installation length (L_E) at design pressure

⌀ mm	up to 10 bar L_E = 130 mm Movement ±°	A cm²	up to 10 bar L_E = 150 mm Movement ±°	A cm²	up to 10 bar L_E = 175 mm Movement ±°	A cm²	up to 10 bar L_E = 200 mm Movement ±°	A cm²
	higher pressures on request							
20								
25								
32								
40								
50								
65								
80								
100								
125								
150								
200					6.3	401	9.1	515
250					5	603	7.3	740
300					4.2	840	6.1	1,001
350					3.6	1,064	5.2	1,244
400					3.1	1,439	4.6	1,647
450					2.8	1,787	4.1	2,019
500					2.5	2,190	3.7	2,445
600					2.1	3,068	3.1	3,370
700					1.8	4,174	2.6	4,525
800					1.6	5,398	2.3	5,795
900					1.4	6,735	2	7,178
1000					1.3	8,268	1.8	8,758
1100					1.1	9,958	1.7	10,496
1200					1.1	11,805	1.5	12,390

Installation length (L_E) at design pressure

⌀ mm	up to 10 bar L_E = 250 mm Movement ±°	A cm²	up to 10 bar L_E = 275 mm Movement ±°	A cm²	up to 10 bar L_E = 300 mm Movement ±°	A cm²	up to 10 bar L_E = 350 mm Movement ±°	A cm²
	higher pressures on request							
20								
25								
32								
40								
50								
65								
80								
100								
125								
150								
200	9.9	531	9.9	531	12.4	661	16.4	804
250	8	760	8	760	10	913	13.3	1,081
300	6.7	1,024	6.7	1,024	8.3	1,201	11.1	1,392
350	5.7	1,269	5.7	1,269	7.2	1,466	9.6	1,676
400	5	1,676	5	1,676	6.3	1,901	8.4	2,140
450	4.4	2,051	4.4	2,051	5.6	2,299	7.5	2,561
500	4	2,481	4	2,481	5	2,753	6.7	3,039
600	3.3	3,411	3.3	3,411	4.2	3,728	5.6	4,060
700	2.9	4,572	2.9	4,572	3.6	4,939	4.8	5,320
800	2.5	5,849	2.5	5,849	3.1	6,263	4.2	6,691
900	2.2	7,238	2.2	7,238	2.8	7,698	3.8	8,171
1000	2	8,825	2	8,825	2.5	9,331	3.4	9,852
1100	1.8	10,568	1.8	10,568	2.3	11,122	3.1	11,690
1200	1.7	12,469	1.7	12,469	2.1	13,070	2.8	13,685

Standard sizes
Non-standard sizes

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

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Appendix

Spring rates

U110A / D110 non-standard

Axial spring rates (average spring rates from full way and at room temperature in the pipeline*)

Ø mm	Spring rate for 0 bar N/mm	1 bar N/mm	2.5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
100	32	50	64	113	161	235
125	35	58	71	121	175	267
150	38	65	77	129	189	298
175	42	72	84	136	202	329
200	45	79	90	144	216	360
250	51	88	107	166	246	405
300	56	98	118	180	269	454
350	73	129	153	239	350	599
400	40	70	83	131	190	322
450	48	85	102	152	235	389
500	55	99	118	171	265	457
550	62	109	127	195	296	501
600	68	119	136	218	326	544
650	69	120	142	223	332	551
700	70	121	147	228	338	557
750	72	126	151	232	346	583
800	73	129	153	239	350	599
850	84	149	178	270	408	685
900	95	169	202	300	466	770
950	116	207	247	361	561	950
1000	136	245	291	422	656	1129
1050	173	322	377	589	893	1497
1100	210	399	462	756	1130	1865
1150	225	429	500	816	1204	2001
1200	240	458	538	876	1277	2136
1250	242	460	537	883	1287	2151
1300	243	461	535	889	1297	2165
1350	244	462	534	896	1307	2179
1400	245	463	532	902	1316	2193
1450	250	478	560	923	1360	2244
1500	255	492	587	944	1403	2295
1600	310	597	685	1138	1668	2821
1650	350	630	752	1303	1905	3195
1700	390	662	818	1468	2142	3569
1800	480	926	1051	1819	2616	4416
1900	550	1064	1216	2050	3021	5049
1950	620	1202	1381	2281	3426	5682
2000	690	1339	1546	2512	3830	6314
2100	835	1607	1879	2998	4676	7690
2200	910	1747	2029	3367	4969	8099
2250	957	1830	2141	3516	5210	8550
2300	1004	1913	2252	3664	5451	9000
2400	1050	1995	2363	3812	5691	9450
2500	1143	2170	2573	4146	6194	10279
2550	1189	2257	2678	4313	6445	10693
2600	1235	2345	2783	4481	6697	11107
2700	1328	2519	2992	4815	7200	11936
2800	1420	2694	3202	5149	7703	12765
2850	1466	2781	3307	5316	7954	13179
2900	1513	2869	3412	5483	8205	13593
3000	1605	3044	3622	5818	8708	14422
3100	1698	3218	3831	6152	9211	15250
3150	1744	3306	3936	6319	9463	15665
3200	1790	3393	4041	6486	9714	16079
3300	1883	3568	4251	6820	10217	16908
3400	1975	3743	4461	7155	10720	17736
3450	2021	3830	4565	7322	10971	18151
3500	2068	3917	4670	7489	11223	18565
3600	2160	4092	4880	7823	11726	19394
4000	2530	4791	5719	9160	13737	22708

Lateral spring rates (average spring rates from full way and at room temperature in the pipeline*)

Ø mm	Spring rate for 0 bar N/mm	1 bar N/mm	2.5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
100	100	147	165	196	250	302
125	125	193	216	254	323	381
150	150	239	266	312	395	459
175	175	284	316	370	468	538
200	200	330	366	428	540	616
250	220	370	407	475	605	686
300	250	425	470	545	695	783
350	280	482	529	610	781	882
400	180	315	347	400	513	576
450	190	338	371	420	536	604
500	200	330	366	428	540	616
550	218	359	398	466	588	670
600	235	388	430	503	635	724
650	273	455	502	587	744	846
700	310	521	574	670	853	967
750	310	527	583	676	862	970
800	340	585	643	741	949	1071
850	350	613	673	769	982	1108
900	360	641	702	796	1015	1145
950	370	657	726	876	1049	1181
1000	380	673	749	956	1083	1216
1050	388	643	716	929	1075	1217
1100	395	612	683	901	1067	1217
1150	418	668	733	963	1132	1304
1200	440	724	783	1025	1197	1390
1250	450	734	807	1052	1231	1424
1300	460	744	831	1079	1264	1458
1350	470	754	855	1106	1297	1492
1400	480	763	878	1133	1330	1526
1450	505	824	940	1197	1405	1617
1500	530	885	1002	1261	1479	1707
1600	645	1109	1238	1548	1819	2090
1650	678	1207	1308	1636	1969	2223
1700	710	1304	1378	1723	2118	2355
1800	775	1418	1519	1899	2217	2519
1900	813	1506	1618	2008	2332	2652
1950	852	1594	1717	2117	2448	2786
2000	890	1682	1816	2225	2563	2919
2100	886	1692	1852	2304	2596	2835
2200	1050	2016	2226	2940	3150	3465
2250	1153	2223	2527	3275	3528	3820
2300	1257	2431	2828	3610	3906	4175
2400	1360	2638	3128	3944	4284	4529
2500	1449	2829	3364	4244	4592	4834
2550	1494	2925	3482	4393	4746	4986
2600	1539	3020	3601	4543	4900	5139
2700	1628	3211	3837	4843	5208	5444
2800	1718	3403	4073	5142	5517	5749
2850	1762	3498	4191	5292	5671	5901
2900	1807	3594	4309	5442	5825	6053
3000	1896	3785	4546	5741	6133	6358
3100	1986	3976	4782	6041	6441	6663
3150	2030	4071	4900	6190	6595	6816
3200	2075	4167	5018	6340	6749	6968
3300	2164	4358	5254	6640	7057	7273
3400	2254	4549	5491	6939	7365	7578
3450	2298	4645	5609	7089	7519	7730
3500	2343	4740	5727	7239	7673	7883
3600	2433	4932	5963	7538	7982	8188
4000	2790	5696	6908	8736	9214	9407

*These spring rates should be considered only as approximates which may vary with the elastomers and fabrics used in fabrication and specific construction design.
To calculate the approximate spring rate of a multiple arch joint, divide the single arch values by the number of arches.

Spring rates

D110A standard

Axial spring rates (average spring rates from full way and at room temperature in the pipeline*)

	Spring rate for					
Ø mm	0 bar N/mm	1 bar N/mm	2.5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
50	25	42	51	98	134	173
65	24	43	53	100	150	190
80	28	48	58	104	148	185
100	35	59	71	116	206	274
125	36	59	71	137	214	282
150	49	84	102	189	293	390
200	100	153	180	365	568	735
250	105	173	207	388	609	778
300	123	206	248	448	658	883
350	105	153	177	349	567	753
400	154	225	261	516	535	1090
450	167	269	320	581	903	1162
500	196	316	376	686	1060	1364
600	208	264	292	692	1123	1441
700	140	179	198	521	714	954
800	180	240	270	594	975	1258
900	200	320	380	690	1080	1395
1000	225	355	420	742	1248	1568

Lateral spring rates (average spring rates from full way and at room temperature in the pipeline*)

	Spring rate for					
Ø mm	0 bar N/mm	1 bar N/mm	2.5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
50	50	60	65	80	105	145
65	40	65	78	115	150	165
80	35	59	74	136	155	173
100	55	74	88	143	168	192
125	100	162	200	261	293	383
150	120	206	260	309	366	466
200	323	555	723	836	949	1219
250	379	624	806	1022	1173	1479
300	392	647	837	1068	1216	1542
350	305	508	610	762	875	1098
400	338	541	642	817	946	1199
450	342	540	639	821	971	1200
500	426	687	818	1048	1204	1495
600	456	708	834	1062	1295	1586
700	516	798	939	1191	1449	1775
800	558	826	960	1055	1557	1758
900	800	1253	1480	1984	2248	2560
1000	960	1536	1824	2361	2736	2976

D210A standard

Axial spring rates (average spring rates from full way and at room temperature in the pipeline*)

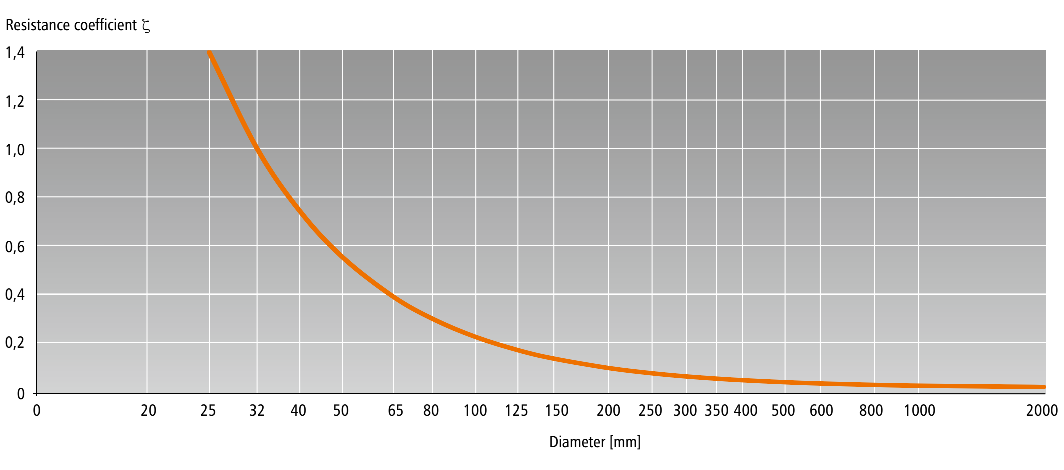
	Spring rate for					
Ø mm	0 bar N/mm	1 bar N/mm	2.5 bar N/mm	3 bar N/mm	6 bar N/mm	10 bar N/mm
32	14	30	56	62	116	180
40	14	30	56	62	116	180
50	12	30	66	76	142	220
65	14	45	87	99	189	286
80	33	75	135	150	258	396
100	28	80	156	176	320	480
125	30	95	186	218	374	580
150	8	68	144	248	320	528
200	42	90	178	204	370	594
250	20	112	224	256	480	768
300	22	108	236	277	520	854
350	28	128	270	310	570	940
400	44	140	296	342	646	1052
500	46	172	354	416	792	1264

Lateral spring rates (average spring rates from full way and at room temperature in the pipeline*)

	Spring rate for					
Ø mm	0 bar N/mm	1 bar N/mm	2.5 bar N/mm	3 bar N/mm	6 bar N/mm	10 bar N/mm
32	11	17	27	30	45	63
40	11	17	27	30	45	63
50	17	35	47	54	79	107
65	21	37	61	61	96	136
80	32	56	92	94	144	204
100	38	77	112	123	180	243
125	45	88	133	150	225	315
150	48	80	116	123	188	265
200	103	155	221	238	343	473
250	126	208	179	308	442	603
300	167	267	337	400	550	750
350	137	263	385	418	587	833
400	187	293	423	457	633	900
500	203	380	536	573	840	1140

*These spring rates should be considered only as approximates which may vary with the elastomers and fabrics used in fabrication and specific construction design.
To calculate the approximate spring rate of a multiple arch joint, divide the single arch values by the number of arches.

Guideline values for pressure drop



Flange tables

		PN 2.5				PN 6				PN 10				PN 16			
Ø mm	**Ø "**	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}
100	4	210	170	4	18	210	170	4	18	220	180	8	18	220	180	8	18
125	5	240	200	8	18	240	200	8	18	250	210	8	18	250	210	8	18
150	6	265	225	8	18	265	225	8	18	285	240	8	22	285	240	8	22
175	7	295	255	8	18	295	255	8	18	315	270	8	22	315	270	8	22
200	8	320	280	8	18	320	280	8	18	340	295	8	22	340	295	12	22
250	10	375	335	12	18	375	335	12	18	395	350	12	22	405	355	12	26
300	12	440	395	12	22	440	395	12	22	445	400	12	22	460	410	12	26
350	14	490	445	12	22	490	445	12	22	505	460	16	22	520	470	16	26
400	16	540	495	16	22	540	495	16	22	565	515	16	26	580	525	16	30
450	18	595	550	16	22	595	550	16	22	615	565	20	26	640	585	20	30
500	20	645	600	20	22	645	600	20	22	670	620	20	26	715	650	20	33
550	22																
600	24	755	705	20	26	755	705	20	26	780	725	20	30	840	770	20	36
650	26																
700	28	860	810	24	26	860	810	24	26	895	840	24	30	910	840	24	36
750	30																
800	32	975	920	24	30	975	920	24	30	1015	950	24	33	1025	950	24	39
850	34																
900	36	1075	1020	24	30	1075	1020	24	30	1115	1050	28	33	1125	1050	28	39
950	38																
1000	40	1175	1120	28	30	1175	1120	28	30	1230	1160	28	36	1255	1170	28	42
1050	42																
1100	44					1290	1230	28	33	1345	1270	32	36	1370	1280	28	48
1150	46																
1200	48	1375	1320	32	30	1405	1340	32	33	1455	1380	32	39	1485	1390	32	48
1250	50																
1300	52					1520	1450	32	36	1565	1485	32	42	1585	1490	36	48
1350	54																
1400	56	1575	1520	36	30	1630	1560	36	36	1675	1590	36	42	1685	1590	36	48
1450	58																
1500	60					1730	1660	36	36	1795	1705	36	48	1810	1705	36	56
1600		1790	1730	40	30	1830	1760	40	36	1915	1820	40	48	1930	1820	40	56
1650	66																
1700						1940	1865	40	39	2015	1920	44	48	2030	1920	44	56
1800	72	1990	1930	44	30	2045	1970	44	39	2115	2020	44	48	2130	2020	44	56
1900						2155	2075	44	42	2220	2125	48	48	2240	2125	44	62
1950	78																
2000		2190	2130	48	30	2265	2180	48	42	2325	2230	48	48	2345	2230	48	62
2100	84					2375	2285	48	42	2440	2335	48	56				
2200		2405	2340	52	33	2475	2390	52	42	2550	2440	52	56	2555	2440	52	62
2250	90																
2300																	
2400	96	2605	2540	56	33	2685	2600	56	42	2760	2650	56	56	2765	2650	56	62
2500						2795	2705	56	48	2860	2750	56	56	2865	2750	60	62
2550	102																
2600		2805	2740	60	33	2905	2810	60	48	2960	2850	60	56	2965	2850	60	62
2700	108																
2800		3030	2960	64	36	3115	3020	64	48	3180	3070	64	56				
2850	114																
2900																	
3000	120	3230	3160	68	36	3315	3220	68	48	3405	3290	68	62				
3100																	
3150	126																
3200		3430	3360	72	36	3525	3430	72	48								
3300	132																
3400		3630	3560	76	36	3735	3640	76	48								
3450	138																
3600	144	3840	3770	80	36	3970	3860	80	56								
3800		4045	3970	80	39												
4000		4245	4170	84	39												

D_3 Flange external dimension [mm]
D_2 Hole circle [mm]
N_{01} Hole quantity
D_{01} Hole diameter [mm]

Flange tables

		PN 25				AWWA C207 Class D				ASME B 16.47 Series A 150 lbs				ASME B 16.47 Series B 150 lbs			
Ø mm	Ø "	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}
100	4	235	190	8	22	228.6	190.5	8	19.0								
125	5	270	220	8	26	235.0	215.9	8	22.2								
150	6	300	250	8	26	279.4	241.3	8	22.2								
175	7	330	280	12	26												
200	8	360	310	12	26	342.9	298.4	8	22.2								
250	10	425	370	12	30	406.4	361.9	12	25.4								
300	12	485	430	16	30	482.6	431.8	12	25.4	482.6	431.8	12	25.4				
350	14	555	490	16	33	533.4	476.2	12	28.6	533.4	476.3	12	28.6				
400	16	620	550	16	36	596.9	539.7	16	28.6	596.9	539.8	16	28.6				
450	18					635.0	577.8	16	31.8	635.0	577.9	16	31.8				
500	20	730	660	20	33	698.5	635.0	20	31.8	698.5	635.0	20	31.8				
550	22					749.3	692.2	20	34.9	749.3	692.2	20	34.9				
600	24	845	770	20	39	812.8	749.3	20	34.9	812.8	749.3	20	34.9				
650	26					870.0	806.4	24	34.9	870.0	806.4	24	34.9	785.9	744.5	36	22.4
700	28	960	875	24	42	927.1	863.6	28	34.9	927.1	863.6	28	34.9	836.7	795.3	40	22.4
750	30					984.3	914.4	28	34.9	984.3	914.4	28	34.9	887.5	846.1	44	22.4
800	32	1085	990	24	48	1060.5	977.9	28	41.3	1060.5	977.9	28	41.3	941.3	900.2	48	22.4
850	34					1111.3	1028.7	32	41.3	1111.3	1028.7	32	41.3	1004.8	957.3	40	25.4
900	36	1185	1090	28	48	1168.4	1085.8	32	41.3	1168.4	1085.9	32	41.3	1057.1	1009.7	44	25.4
950	38					1238.3	1149.4	32	41.3	1238.3	1149.4	32	41.3	1124.0	1069.8	40	28.4
1000	40	1320	1210	28	56	1289.1	1200.2	36	41.3	1289.1	1200.2	36	41.3	1174.8	1120.6	44	28.4
1050	42					1346.2	1257.3	36	41.3	1346.2	1257.3	36	41.3	1225.6	1171.4	48	28.4
1100	44					1403.4	1314.5	40	41.3	1403.4	1314.5	40	41.3	1276.4	1222.2	52	28.4
1150	46					1454.2	1365.3	40	41.3	1454.2	1365.3	40	41.3	1341.4	1284.2	40	31.8
1200	48					1511.3	1422.4	44	41.3	1511.3	1422.4	44	41.3	1392.2	1335.0	44	31.8
1250	50					1568.5	1479.6	44	47.6	1568.5	1479.6	44	47.6	1435.4	1385.8	48	31.8
1300	52					1625.6	1536.7	44	47.6	1625.6	1536.7	44	47.6	1493.8	1436.6	52	31.8
1350	54					1682.7	1593.8	44	47.6	1682.7	1593.8	44	47.6	1549.4	1492.3	56	31.8
1400	56					1746.3	1651.0	48	47.6	1746.3	1651.0	48	47.6	1600.2	1543.1	60	31.8
1450	58					1803.4	1708.2	48	47.6	1803.4	1708.2	48	47.6	1674.9	1611.4	48	35.1
1500	60					1854.2	1758.9	52	47.6	1854.2	1759.0	52	47.6	1725.7	1662.2	52	35.1
1600																	
1650	66					2032.0	1930.4	52	47.6								
1700																	
1800	72					2197.1	2095.5	60	47.6								
1900																	
1950	78					2362.2	2260.6	64	54.0								
2000																	
2100	84					2533.7	2425.7	64	54.0								
2200																	
2250	90					2705.1	2590.8	68	61.9								
2300																	
2400	96					2876.5	2755.9	68	61.9								
2500																	
2550	102					3048.0	2908.3	72	68.3								
2600																	
2700	108					3219.5	3067.1	72	68.3								
2800																	
2850	114					3390.9	3219.5	76	74.6								
2900																	
3000	120					3562.4	3371.9	76	74.6								
3100																	
3150	126					3734	3537	80	81								
3200																	
3300	132					3905	3702	80	81								
3400																	
3450	138					4077	3861	84	87								
3600	144					4248	4020	84	87								
3800																	
4000																	

D_3 Flange external dimension [mm]
D_2 Hole circle [mm]
N_{01} Hole quantity
D_{01} Hole diameter [mm]

Flange tables

		ASME B 16.5 - 150 lbs				API Standard 605 - 150 lbs				MSS SP-44				BS Table E			
Ø mm	Ø "	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}
100	4	228.6	190.5	8	19.0									215.9	177.8	8	19.0
125	5	235.0	215.9	8	22.2									254.0	209.5	8	19.0
150	6	279.4	241.3	8	22.2									279.4	234.9	8	22.2
175	7	311.2	269.9	8	22.2									304.8	260.3	8	22.2
200	8	342.9	298.4	8	22.2									336.5	292.1	8	22.2
250	10	406.4	361.9	12	25.4									406.4	355.6	12	22.2
300	12	482.6	431.8	12	25.4									457.2	406.4	12	25.4
350	14	533.4	476.2	12	28.6									527.0	469.9	12	25.4
400	16	596.9	539.7	16	28.6									577.8	520.7	12	25.4
450	18	635.0	577.8	16	31.8									641.3	584.2	16	25.4
500	20	698.5	635.0	20	31.8									704.8	641.3	16	25.4
550	22	749.3	692.2	20	34.9												
600	24	812.8	749.3	20	34.9									825.5	755.7	16	25.4
650	26					785.8	744.5	36	22.2	870.0	806.4	24	34.9	870.0	806.4	24	34.9
700	28					836.6	795.3	40	22.2	927.1	863.6	28	34.9	927.1	863.6	28	34.9
750	30					887.4	846.1	44	22.2	984.3	914.4	28	34.9	984.3	914.4	28	34.9
800	32					941.4	900.1	48	22.2	1060.5	977.9	28	41.3	1060.5	977.9	28	41.3
850	34					1004.9	957.3	40	25.4	1111.3	1028.7	32	41.3	1111.3	1028.7	32	41.3
900	36					1057.3	1009.6	44	25.4	1168.4	1085.8	32	41.3	1168.4	1085.8	32	41.3
950	38									1238.3	1149.4	32	41.3	1238.3	1149.4	32	41.3
1000	40									1289.1	1200.2	36	41.3	1289.1	1200.2	36	41.3
1050	42					1225.5	1171.6	48	28.6	1346.2	1257.3	36	41.3	1346.2	1257.3	36	41.3
1100	44									1403.4	1314.5	40	41.3	1403.4	1314.5	40	41.3
1150	46									1454.2	1365.3	40	41.3	1454.2	1365.3	40	41.3
1200	48					1392.2	1335.1	44	31.7	1511.3	1422.4	44	41.3	1511.3	1422.4	44	41.3
1250	50									1568.5	1479.6	44	47.6				
1300	52									1625.6	1536.7	44	47.6				
1350	54					1549.4	1492.3	56	31.7	1682.7	1593.8	44	47.6				
1400	56									1746.3	1651.0	48	47.6				
1450	58									1803.4	1708.2	48	47.6				
1500	60					1725.6	1662.1	52	34.9	1854.2	1758.9	52	47.6				
1600																	
1650	66																
1700																	
1800	72																
1900																	
1950	78																
2000																	
2100	84																
2200																	
2250	90																
2300																	
2400	96																
2500																	
2550	102																
2600																	
2700	108																
2800																	
2850	114																
2900																	
3000	120																
3100																	
3150	126																
3200																	
3300	132																
3400																	
3450	138																
3600	144																
3800																	
4000																	

D_3 Flange external dimension [mm]
D_2 Hole circle [mm]
N_{01} Hole quantity
D_{01} Hole diameter [mm]

Flange tables

		JIS B2220 5K				JIS B2220 10K				JIS B2220 16K			
Ø mm	Ø "	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}	D_3	D_2	N_{01}	D_{01}
100	4	200.0	165.0	8	19.0	210.0	175.0	8	19.0	225.0	185.0	8	23.0
125	5	235.0	200.0	8	19.0	250.0	210.0	8	23.0	270.0	225.0	8	25.0
150	6	265.0	230.0	8	19.0	280.0	240.0	8	23.0	305.0	260.0	12	25.0
175	7	300.0	260.0	8	23.0	305.0	265.0	12	23.0				
200	8	320.0	280.0	8	23.0	330.0	290.0	12	23.0	350.0	305.0	12	25.0
250	10	385.0	345.0	12	23.0	400.0	355.0	12	25.0	430.0	380.0	12	27.0
300	12	430.0	390.0	12	23.0	445.0	400.0	16	25.0	480.0	430.0	16	27.0
350	14	480.0	435.0	12	25.0	490.0	445.0	16	25.0	540.0	480.0	16	33.0
400	16	540.0	495.0	16	25.0	560.0	510.0	16	27.0	605.0	540.0	16	33.0
450	18	605.0	555.0	16	25.0	620.0	565.0	20	27.0	675.0	605.0	20	33.0
500	20	655.0	605.0	20	25.0	675.0	620.0	20	27.0	730.0	660.0	20	33.0
550	22	720.0	665.0	20	27.0	745.0	680.0	20	33.0	795.0	720.0	20	39.0
600	24	770.0	715.0	20	27.0	795.0	730.0	24	33.0	845.0	770.0	24	39.0
650	26	825.0	770.0	24	27.0	845.0	780.0	24	33.0	895.0	820.0	24	39.0
700	28	875.0	820.0	24	27.0	905.0	840.0	24	33.0	960.0	875.0	24	42.0
750	30	945.0	880.0	24	33.0	970.0	900.0	24	33.0	1020.0	935.0	24	42.0
800	32	995.0	930.0	24	33.0	1020.0	950.0	28	33.0	1085.0	990.0	24	48.0
850	34	1045.0	980.0	24	33.0	1070.0	1000.0	28	33.0	1135.0	1040.0	24	48.0
900	36	1095.0	1030.0	24	33.0	1120.0	1050.0	28	33.0	1185.0	1090.0	28	48.0
950	38												
1000	40	1195.0	1130.0	28	33.0	1235.0	1160.0	28	39.0	1320.0	1210.0	28	56.0
1050	42												
1100	44	1305.0	1240.0	28	33.0	1345.0	1270.0	28	39.0	1420.0	1310.0	32	56.0
1150	46												
1200	48	1420.0	1350.0	32	33.0	1465.0	1380.0	32	39.0	1530.0	1420.0	32	56.0
1250	50												
1300	52									1645.0	1530.0	32	62.0
1350	54	1575.0	1505.0	32	33.0	1630.0	1540.0	36	45.0	1700.0	1590.0	32	62.0
1400	56									1755.0	1640.0	36	62.0
1450	58												
1500	60	1730.0	1660.0	36	33.0	1795.0	1700.0	40	45.0	1865.0	1750.0	36	62.0
1600													
1650	66												
1700													
1800	72												
1900													
1950	78												
2000													
2100	84												
2200													
2250	90												
2300													
2400	96												
2500													
2550	102												
2600													
2700	108												
2800													
2850	114												
2900													
3000	120												
3100													
3150	126												
3200													
3300	132												
3400													
3450	138												
3600	144												
3800													
4000													

D_3 Flange external dimension [mm]
D_2 Hole circle [mm]
N_{01} Hole quantity
D_{01} Hole diameter [mm]

Penetration seals

W100FF W110FF

⌀ 200 - 4,000 mm
⌀ up to 4,000 x 4,000 mm
⌀ up to 6,000 x 3,000 mm

- **Type W100FF** without arch, without vacuum ring
- **Type W110FF** with arch, without vacuum ring
- **Type W111FF** with arch, with vacuum ring

Type key > page 22
W1 1 0 FF
- Tie rod variant
- Support ring variant
- Number of arches
- Type

Penetration seal without arch or with one arch

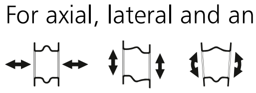
Design: Cylindrical, single or multiple arch penetration seals with excellent all-directional movement capability, available in flanged or slip-on designs, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and with single- or multi-part backing flanges or fixing clamps. Arch styles optional with vacuum ring. Available customised round or rectangular styles, also offset designs for pipe misalignment and split wrap designs available for field installation around existing penetrating pipe applications.

Dimensions: ⌀ 200 to 4,000 mm
⌀ up to 4,000 x 4,000 mm or 6,000 x 3,000 mm
Custom diameters/rectangular cross-sections possible

Length: Standard L_E = 150 to 250 mm (> page 308–310)
Custom length on request

Pressure: Up to 2.5 bar depending on diameter and length
Vacuum or external pressure not allowed without vacuum ring

Movement: For axial, lateral and angular movements



(> page 308–310)

Application:
Power plants, plant construction, armature shafts, turbine houses e.g. for building / ground settlements for pipe or vessel penetrations, noise absorption, vibration, pipe misalignment, thermal movements, seismic displacements or as ground water seals

TÜV Type Approval

Request assembly instructions at: **www.ditec-adam.de/en/contact**

Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Backing flanges

Design: Single- or multi-part round backing flanges with clearance holes
Optional support collar for high internal pressure

Flange norms: DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

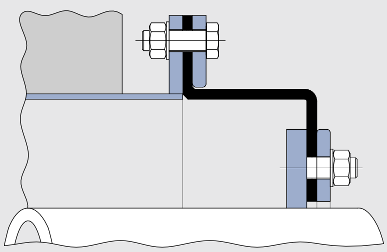
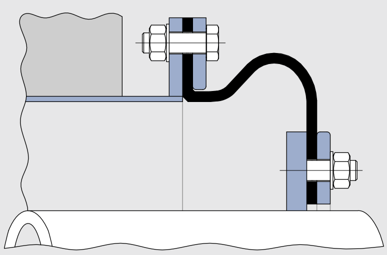
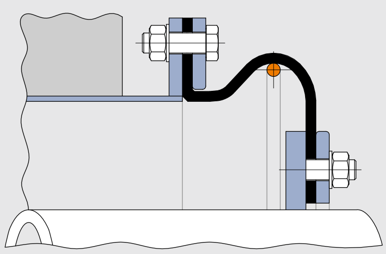
Clamps

Design: Depending on pressure and diameter, endless clamp belt or hinge bolt clamps
At higher pressures, 2 parallel clamps per side

Width: Endless clamp belt: ¾"
Hinge bolt clamp: depending on Ø: 18 – 30 mm

Materials: Endless clamp belt with screw lugs (tongs): 1.7300
Hinge bolt clamp, belt and housing: 1.4016 (Screw steel galvanised)

Support rings

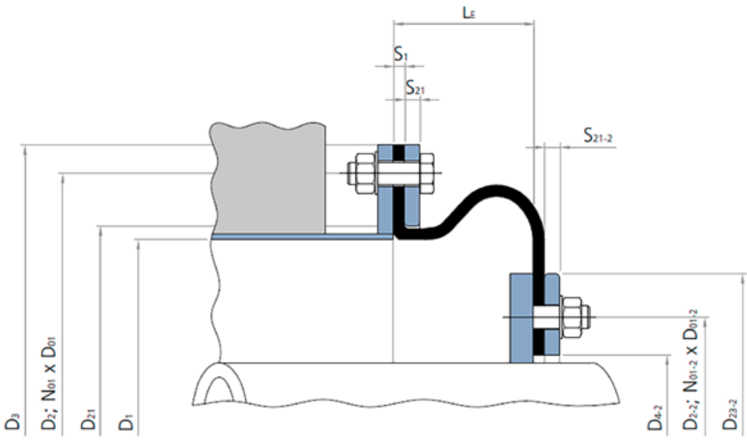
TYPE	Support rings	Vacuum ring	Pressure	Movement
W100FF		None	Depending on the diameter up to 2.5 bar, vacuum stability on request	> page 308
W110FF		None	Depending on the diameter up to 2.5 bar, vacuum stability on request	> page 309
W111FF		Inside the arch	Depending on diameter up to 2.5 bar, tested for external pressure up to 2.0 bar	> page 310

Materials		
Stainless steel	Carbon steel, rubberised	Carbon steel, embedded

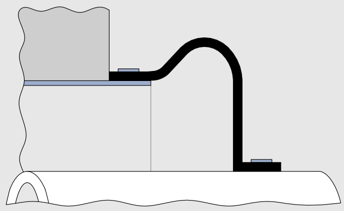
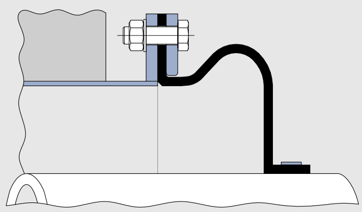
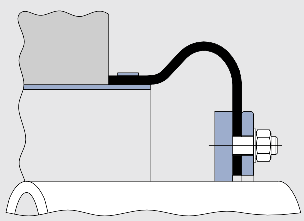
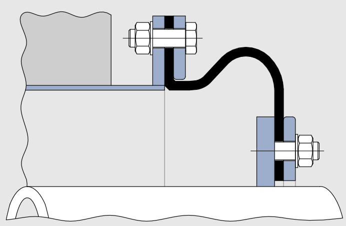
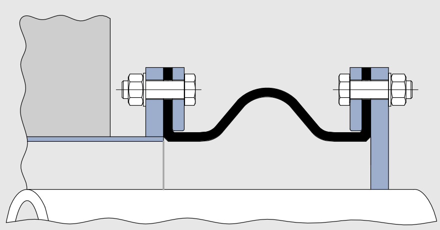
Accessories

Protective covers: Ground protective shield
Protective shield or cover
Fire protective shield (> page 58)

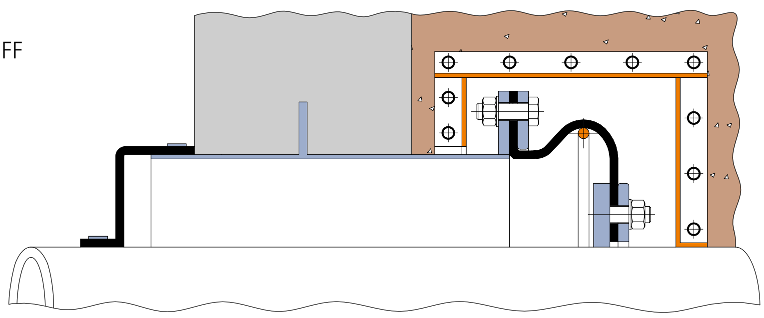
Cross section W110FF

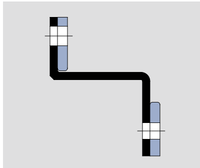


Installation variants

TYPE		Wall pipe fixing	Medium pipe fixing	Pressure	Dimensions
W110SS		Sleeve	Sleeve	Low	Medium pipe up to ∅ 1,000 mm
W110FS		Flange	Sleeve	Low	Medium pipe up to ∅ 1,000 mm
W110SF		Sleeve	Flange	Low	Wall pipe up to ∅ 1,000 mm
W110FF		Flange	Flange	up to 2.5 bar with vacuum ring, tested for external pressure, up to 20 m water column	Wall pipe / duct up to ∅ 4,000 mm, ⌀ 4,000 x 4,000 mm or ⌀ 6,000 x 3,000 mm
U110A > page 70		Flange	Flange	high pressure	Wall pipe / duct up to ∅ 4,000 mm, ⌀ 4,000 x 4,000 mm or ⌀ 6,000 x 3,000 mm

Installation example
- wall penetration seal type W111FF
- wall pipe
- ground protective shield
- test expansion joint





W100FF

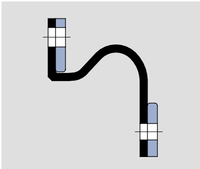
> without arch, without vacuum ring

Installation length (L_E) at design pressure																
		up to 2.5 bar L_E = 150 mm					up to 2.5 bar L_E = 200 mm					up to 2.5 bar L_E = 250 mm				
		higher pressures on request														
Wall pipe ∅	Medium pipe ∅	Movement				A	Movement				A	Movement				A
mm	mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	80	8	5	9	2.9	314	10	6	12	3.4	314	13	8	14	4.6	314
250	100	8	5	8	2.3	491	10	6	11	2.7	491	13	8	14	3.7	491
300	125	8	5	8	1.9	716	10	6	11	2.3	716	13	8	13	3.1	716
	150	8	5	8	1.9	716	10	6	11	2.3	716	13	8	13	3.1	716
400	175	8	5	8	1.4	1,269	10	6	10	1.7	1,269	13	8	13	2.3	1,269
	200	8	5	8	1.4	1,269	10	6	10	1.7	1,269	13	8	13	2.3	1,269
500	250	8	5	7	1.1	1,987	10	6	10	1.4	1,987	13	8	12	1.8	1,987
	300	8	5	7	1.1	1,987	10	6	10	1.4	1,987	13	8	12	1.8	1,987
600	350	8	5	7	1.0	2,856	10	6	9	1.1	2,856	13	8	12	1.5	2,856
	400	8	5	7	1.0	2,856	10	6	9	1.1	2,856	13	8	12	1.5	2,856
700	450	8	5	7	0.8	3,893	10	6	9	1.0	3,893	13	8	11	1.3	3,893
	500	8	5	7	0.8	3,893	10	6	9	1.0	3,893	13	8	11	1.3	3,893
800	550	8	5	7	0.7	5,090	10	6	9	0.9	5,090	13	8	11	1.1	5,090
	600	8	5	7	0.7	5,090	10	6	9	0.9	5,090	13	8	11	1.1	5,090
900	650	8	5	6	0.6	6,433	10	6	9	0.8	6,433	13	8	11	1	6,433
	700	8	5	6	0.6	6,433	10	6	9	0.8	6,433	13	8	11	1	6,433
1000	750	8	5	6	0.6	7,933	10	6	8	0.7	7,933	13	8	10	0.9	7,933
	800	8	5	6	0.6	7,933	10	6	8	0.7	7,933	13	8	10	0.9	7,933
1100	850	8	5	6	0.5	9,590	10	6	8	0.6	9,590	13	8	10	0.8	9,590
	900	8	5	6	0.5	9,590	10	6	8	0.6	9,590	13	8	10	0.8	9,590
1200	950	8	5	6	0.5	11,404	10	6	8	0.6	11,404	13	8	10	0.8	11,404
	1000	8	5	6	0.5	11,404	10	6	8	0.6	11,404	13	8	10	0.8	11,404
1400	1050	8	5	6	0.4	15,504	10	6	8	0.5	15,504	13	8	10	0.7	15,504
	1100	8	5	6	0.4	15,504	10	6	8	0.5	15,504	13	8	10	0.7	15,504
	1150	8	5	6	0.4	15,504	10	6	8	0.5	15,504	13	8	10	0.7	15,504
	1200	8	5	6	0.4	15,504	10	6	8	0.5	15,504	13	8	10	0.7	15,504
1600	1250	8	5	6	0.4	20,232	10	6	8	0.4	20,232	13	8	10	0.6	20,232
	1300	8	5	6	0.4	20,232	10	6	8	0.4	20,232	13	8	10	0.6	20,232
	1350	8	5	6	0.4	20,232	10	6	8	0.4	20,232	13	8	10	0.6	20,232
	1400	8	5	6	0.4	20,232	10	6	8	0.4	20,232	13	8	10	0.6	20,232
1800	1450	8	5	6	0.3	25,588	10	6	7	0.4	25,588	13	8	9	0.5	25,588
	1500	8	5	6	0.3	25,588	10	6	7	0.4	25,588	13	8	9	0.5	25,588
	1600	8	5	6	0.3	25,588	10	6	7	0.4	25,588	13	8	9	0.5	25,588
2000	1650	8	5	5	0.3	31,573	10	6	7	0.3	31,573	13	8	9	0.5	31,573
	1700	8	5	5	0.3	31,573	10	6	7	0.3	31,573	13	8	9	0.5	31,573
	1800	8	5	5	0.3	31,573	10	6	7	0.3	31,573	13	8	9	0.5	31,573
2200	1900	8	5	5	0.3	38,186	10	6	7	0.3	38,186	13	8	9	0.4	38,186
	1950	8	5	5	0.3	38,186	10	6	7	0.3	38,186	13	8	9	0.4	38,186
	2000	8	5	5	0.3	38,186	10	6	7	0.3	38,186	13	8	9	0.4	38,186
2400	2100	8	5	5	0.2	45,428	10	6	7	0.3	45,428	13	8	9	0.4	45,428
	2200	8	5	5	0.2	45,428	10	6	7	0.3	45,428	13	8	9	0.4	45,428
2600	2250	8	5	5	0.2	53,297	10	6	7	0.3	53,297	13	8	9	0.4	53,297
	2300	8	5	5	0.2	53,297	10	6	7	0.3	53,297	13	8	9	0.4	53,297
	2400	8	5	5	0.2	53,297	10	6	7	0.3	53,297	13	8	9	0.4	53,297
2800	2500	8	5	5	0.2	61,795	10	6	7	0.2	61,795	13	8	9	0.3	61,795
	2550	8	5	5	0.2	61,795	10	6	7	0.2	61,795	13	8	9	0.3	61,795
	2600	8	5	5	0.2	61,795	10	6	7	0.2	61,795	13	8	9	0.3	61,795
3000	2700	8	5	5	0.2	70,922	10	6	7	0.2	70,922	13	8	8	0.3	70,922
	2800	8	5	5	0.2	70,922	10	6	7	0.2	70,922	13	8	8	0.3	70,922
3200	2850	8	5	5	0.2	80,676	10	6	7	0.2	80,676	13	8	8	0.3	80,676
	2900	8	5	5	0.2	80,676	10	6	7	0.2	80,676	13	8	8	0.3	80,676
	3000	8	5	5	0.2	80,676	10	6	7	0.2	80,676	13	8	8	0.3	80,676
3400	3100	8	5	5	0.2	91,059	10	6	7	0.2	91,059	13	8	8	0.3	91,059
	3150	8	5	5	0.2	91,059	10	6	7	0.2	91,059	13	8	8	0.3	91,059
	3200	8	5	5	0.2	91,059	10	6	7	0.2	91,059	13	8	8	0.3	91,059
3600	3300	8	5	5	0.2	102,071	10	6	6	0.2	102,071	13	8	8	0.3	102,071
	3400	8	5	5	0.2	102,071	10	6	6	0.2	102,071	13	8	8	0.3	102,071
3800	3450	8	5	5	0.2	113,710	10	6	6	0.2	113,710	13	8	8	0.2	113,710
	3600	8	5	5	0.2	113,710	10	6	6	0.2	113,710	13	8	8	0.2	113,710
4000	3800	8	5	5	0.1	125,978	10	6	6	0.2	125,978	13	8	8	0.2	125,978

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Other installation lengths and combinations on request.
For larger movements see type W110FF.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN2,5. In case of deviating flange dimensions, please contact us.

Customised products available



W110FF

> with arch, without vacuum ring

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Installation length (L_E) at design pressure

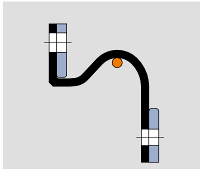
higher pressures on request

Wall pipe Ø	Medium pipe Ø	up to 2.5 bar L_E = 150 mm					up to 2.5 bar L_E = 200 mm					up to 2.5 bar L_E = 250 mm				
		Movement				A	Movement				A	Movement				A
mm	mm	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	80	34	17	26	9.6	616	45	26	37	14.6	765	59	37	49	20.3	962
250	100	34	17	26	7.7	855	45	26	36	11.7	1,029	59	37	48	16.5	1,257
300	125	34	17	26	6.5	1,146	45	26	36	9.8	1,346	59	37	48	13.9	1,605
	150	34	17	26	6.5	1,146	45	26	36	9.8	1,346	59	37	48	13.9	1,605
400	175	34	17	25	4.9	1,825	45	26	35	7.4	2,075	59	37	46	10.5	2,393
	200	34	17	25	4.9	1,825	45	26	35	7.4	2,075	59	37	46	10.5	2,393
500	250	34	17	24	3.9	2,669	45	26	34	5.9	2,971	59	37	45	8.4	3,349
	300	34	17	24	3.9	2,669	45	26	34	5.9	2,971	59	37	45	8.4	3,349
600	350	34	17	24	3.2	3,664	45	26	33	5.0	4,015	59	37	45	7	4,453
	400	34	17	24	3.2	3,664	45	26	33	5.0	4,015	59	37	45	7	4,453
700	450	34	17	24	2.8	4,827	45	26	33	4.2	5,230	59	37	44	6	5,728
	500	34	17	24	2.8	4,827	45	26	33	4.2	5,230	59	37	44	6	5,728
800	550	34	17	23	2.4	6,151	45	26	33	3.7	6,604	59	37	43	5.3	7,163
	600	34	17	23	2.4	6,151	45	26	33	3.7	6,604	59	37	43	5.3	7,163
900	650	34	17	23	2.2	7,620	45	26	32	3.3	8,123	59	37	43	4.7	8,742
	700	34	17	23	2.2	7,620	45	26	32	3.3	8,123	59	37	43	4.7	8,742
1000	750	34	17	23	1.9	9,246	45	26	32	3.0	9,799	59	37	43	4.2	10,477
	800	34	17	23	1.9	9,246	45	26	32	3.0	9,799	59	37	43	4.2	10,477
1100	850	34	17	23	1.8	11,029	45	26	32	2.7	11,632	59	37	42	3.8	12,370
	900	34	17	23	1.8	11,029	45	26	32	2.7	11,632	59	37	42	3.8	12,370
1200	950	34	17	22	1.6	12,969	45	26	31	2.5	13,623	59	37	42	3.5	14,420
	1000	34	17	22	1.6	12,969	45	26	31	2.5	13,623	59	37	42	3.5	14,420
1400	1050	34	17	22	1.4	17,320	45	26	31	2.1	18,074	59	37	41	3	18,991
	1100	34	17	22	1.4	17,320	45	26	31	2.1	18,074	59	37	41	3	18,991
	1150	34	17	22	1.4	17,320	45	26	31	2.1	18,074	59	37	41	3	18,991
	1200	34	17	22	1.4	17,320	45	26	31	2.1	18,074	59	37	41	3	18,991
1600	1250	34	17	22	1.2	22,299	45	26	31	1.9	23,154	59	37	41	2.6	24,190
	1300	34	17	22	1.2	22,299	45	26	31	1.9	23,154	59	37	41	2.6	24,190
	1350	34	17	22	1.2	22,299	45	26	31	1.9	23,154	59	37	41	2.6	24,190
	1400	34	17	22	1.2	22,299	45	26	31	1.9	23,154	59	37	41	2.6	24,190
1800	1450	34	17	22	1.1	27,907	45	26	30	1.7	28,863	59	37	40	2.4	30,018
	1500	34	17	22	1.1	27,907	45	26	30	1.7	28,863	59	37	40	2.4	30,018
	1600	34	17	22	1.1	27,907	45	26	30	1.7	28,863	59	37	40	2.4	30,018
2000	1650	34	17	21	1.0	34,143	45	26	30	1.5	35,199	59	37	40	2.1	36,474
	1700	34	17	21	1.0	34,143	45	26	30	1.5	35,199	59	37	40	2.1	36,474
	1800	34	17	21	1.0	34,143	45	26	30	1.5	35,199	59	37	40	2.1	36,474
2200	1900	34	17	21	0.9	41,007	45	26	30	1.4	42,164	59	37	40	1.9	43,558
	1950	34	17	21	0.9	41,007	45	26	30	1.4	42,164	59	37	40	1.9	43,558
	2000	34	17	21	0.9	41,007	45	26	30	1.4	42,164	59	37	40	1.9	43,558
2400	2100	34	17	21	0.8	48,500	45	26	29	1.2	49,757	59	37	39	1.8	51,271
	2200	34	17	21	0.8	48,500	45	26	29	1.2	49,757	59	37	39	1.8	51,271
2600	2250	34	17	21	0.7	56,621	45	26	29	1.1	57,979	59	37	39	1.6	59,612
	2300	34	17	21	0.7	56,621	45	26	29	1.1	57,979	59	37	39	1.6	59,612
	2400	34	17	21	0.7	56,621	45	26	29	1.1	57,979	59	37	39	1.6	59,612
2800	2500	34	17	21	0.7	65,370	45	26	29	1.1	66,829	59	37	39	1.5	68,581
	2550	34	17	21	0.7	65,370	45	26	29	1.1	66,829	59	37	39	1.5	68,581
	2600	34	17	21	0.7	65,370	45	26	29	1.1	66,829	59	37	39	1.5	68,581
3000	2700	34	17	21	0.6	74,748	45	26	29	1.0	76,307	59	37	39	1.4	78,179
	2800	34	17	21	0.6	74,748	45	26	29	1.0	76,307	59	37	39	1.4	78,179
3200	2850	34	17	21	0.6	84,754	45	26	29	0.9	86,413	59	37	38	1.3	88,405
	2900	34	17	21	0.6	84,754	45	26	29	0.9	86,413	59	37	38	1.3	88,405
	3000	34	17	21	0.6	84,754	45	26	29	0.9	86,413	59	37	38	1.3	88,405
3400	3100	34	17	20	0.6	95,388	45	26	29	0.9	97,148	59	37	38	1.2	99,259
	3150	34	17	20	0.6	95,388	45	26	29	0.9	97,148	59	37	38	1.2	99,259
	3200	34	17	20	0.6	95,388	45	26	29	0.9	97,148	59	37	38	1.2	99,259
3600	3300	34	17	20	0.5	106,651	45	26	28	0.8	108,511	59	37	38	1.2	110,741
	3400	34	17	20	0.5	106,651	45	26	28	0.8	108,511	59	37	38	1.2	110,741
3800	3450	34	17	20	0.5	118,542	45	26	28	0.8	120,503	59	37	38	1.1	122,852
	3600	34	17	20	0.5	118,542	45	26	28	0.8	120,503	59	37	38	1.1	122,852
4000	3800	34	17	20	0.5	131,061	45	26	28	0.7	133,123	59	37	38	1.1	135,591

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (**>** page 29).
Other installation lengths and combinations on request.
Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN2,5. In case of deviating flange dimensions, please contact us.

Customised products available



W111FF

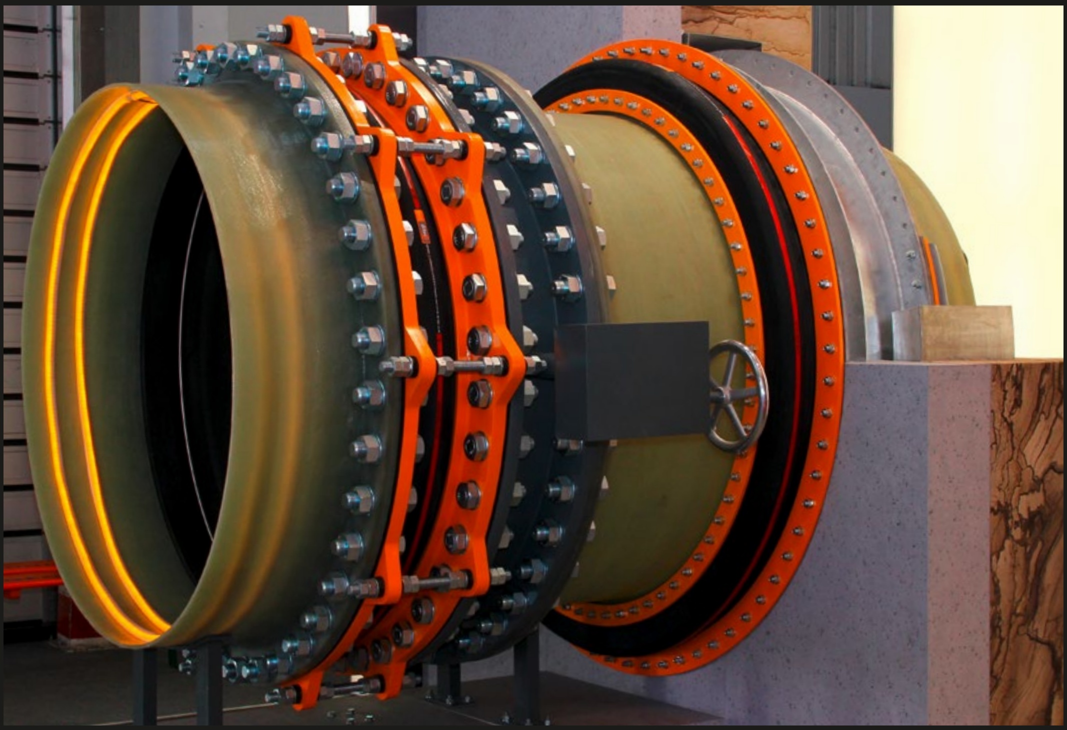
> with arch, with vacuum ring

Installation length (L_E) at design pressure																
		up to 2.5 bar **L_E = 150 mm**					up to 2.5 bar **L_E = 200 mm**					up to 2.5 bar **L_E = 250 mm**				
		higher pressures on request														
Wall pipe Ø	**Medium pipe Ø**	Movement				A	Movement				A	Movement				A
mm	**mm**	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²	mm	mm	±mm	±°	cm²
200	**80**	34	6	26	3.4	616	45	9	37	5.1	765	59	12	49	6.8	962
250	**100**	34	6	26	2.7	855	45	9	36	4.1	1,029	59	12	48	5.5	1,257
300	**125**	34	6	26	2.3	1,146	45	9	36	3.4	1,346	59	12	48	4.6	1,605
	150	34	6	26	2.3	1,146	45	9	36	3.4	1,346	59	12	48	4.6	1,605
400	**175**	34	6	25	1.7	1,825	45	9	35	2.6	2,075	59	12	46	3.4	2,393
	200	34	6	25	1.7	1,825	45	9	35	2.6	2,075	59	12	46	3.4	2,393
500	**250**	34	6	24	1.4	2,669	45	9	34	2.1	2,971	59	12	45	2.7	3,349
	300	34	6	24	1.4	2,669	45	9	34	2.1	2,971	59	12	45	2.7	3,349
600	**350**	34	6	24	1.1	3,664	45	9	33	1.7	4,015	59	12	45	2.3	4,453
	400	34	6	24	1.1	3,664	45	9	33	1.7	4,015	59	12	45	2.3	4,453
700	**450**	34	6	24	1.0	4,827	45	9	33	1.5	5,230	59	12	44	2	5,728
	500	34	6	24	1.0	4,827	45	9	33	1.5	5,230	59	12	44	2	5,728
800	**550**	34	6	23	0.9	6,151	45	9	33	1.3	6,604	59	12	43	1.7	7,163
	600	34	6	23	0.9	6,151	45	9	33	1.3	6,604	59	12	43	1.7	7,163
900	**650**	34	6	23	0.8	7,620	45	9	32	1.1	8,123	59	12	43	1.5	8,742
	700	34	6	23	0.8	7,620	45	9	32	1.1	8,123	59	12	43	1.5	8,742
1000	**750**	34	6	23	0.7	9,246	45	9	32	1.0	9,799	59	12	43	1.4	10,477
	800	34	6	23	0.7	9,246	45	9	32	1.0	9,799	59	12	43	1.4	10,477
1100	**850**	34	6	23	0.6	11,029	45	9	32	0.9	11,632	59	12	42	1.2	12,370
	900	34	6	23	0.6	11,029	45	9	32	0.9	11,632	59	12	42	1.2	12,370
1200	**950**	34	6	22	0.6	12,969	45	9	31	0.9	13,623	59	12	42	1.1	14,420
	1000	34	6	22	0.6	12,969	45	9	31	0.9	13,623	59	12	42	1.1	14,420
1400	**1050**	34	6	22	0.5	17,320	45	9	31	0.7	18,074	59	12	41	1	18,991
	1100	34	6	22	0.5	17,320	45	9	31	0.7	18,074	59	12	41	1	18,991
	1150	34	6	22	0.5	17,320	45	9	31	0.7	18,074	59	12	41	1	18,991
	1200	34	6	22	0.5	17,320	45	9	31	0.7	18,074	59	12	41	1	18,991
1600	**1250**	34	6	22	0.4	22,299	45	9	31	0.6	23,154	59	12	41	0.9	24,190
	1300	34	6	22	0.4	22,299	45	9	31	0.6	23,154	59	12	41	0.9	24,190
	1350	34	6	22	0.4	22,299	45	9	31	0.6	23,154	59	12	41	0.9	24,190
	1400	34	6	22	0.4	22,299	45	9	31	0.6	23,154	59	12	41	0.9	24,190
1800	**1450**	34	6	22	0.4	27,907	45	9	30	0.6	28,863	59	12	40	0.8	30,018
	1500	34	6	22	0.4	27,907	45	9	30	0.6	28,863	59	12	40	0.8	30,018
	1600	34	6	22	0.4	27,907	45	9	30	0.6	28,863	59	12	40	0.8	30,018
2000	**1650**	34	6	21	0.3	34,143	45	9	30	0.5	35,199	59	12	40	0.7	36,474
	1700	34	6	21	0.3	34,143	45	9	30	0.5	35,199	59	12	40	0.7	36,474
	1800	34	6	21	0.3	34,143	45	9	30	0.5	35,199	59	12	40	0.7	36,474
2200	**1900**	34	6	21	0.3	41,007	45	9	30	0.5	42,164	59	12	40	0.6	43,558
	1950	34	6	21	0.3	41,007	45	9	30	0.5	42,164	59	12	40	0.6	43,558
	2000	34	6	21	0.3	41,007	45	9	30	0.5	42,164	59	12	40	0.6	43,558
2400	**2100**	34	6	21	0.3	48,500	45	9	29	0.4	49,757	59	12	39	0.6	51,271
	2200	34	6	21	0.3	48,500	45	9	29	0.4	49,757	59	12	39	0.6	51,271
2600	**2250**	34	6	21	0.3	56,621	45	9	29	0.4	57,979	59	12	39	0.5	59,612
	2300	34	6	21	0.3	56,621	45	9	29	0.4	57,979	59	12	39	0.5	59,612
	2400	34	6	21	0.3	56,621	45	9	29	0.4	57,979	59	12	39	0.5	59,612
2800	**2500**	34	6	21	0.2	65,370	45	9	29	0.4	66,829	59	12	39	0.5	68,581
	2550	34	6	21	0.2	65,370	45	9	29	0.4	66,829	59	12	39	0.5	68,581
	2600	34	6	21	0.2	65,370	45	9	29	0.4	66,829	59	12	39	0.5	68,581
3000	**2700**	34	6	21	0.2	74,748	45	9	29	0.3	76,307	59	12	39	0.5	78,179
	2800	34	6	21	0.2	74,748	45	9	29	0.3	76,307	59	12	39	0.5	78,179
3200	**2850**	34	6	21	0.2	84,754	45	9	29	0.3	86,413	59	12	38	0.4	88,405
	2900	34	6	21	0.2	84,754	45	9	29	0.3	86,413	59	12	38	0.4	88,405
	3000	34	6	21	0.2	84,754	45	9	29	0.3	86,413	59	12	38	0.4	88,405
3400	**3100**	34	6	20	0.2	95,388	45	9	29	0.3	97,148	59	12	38	0.4	99,259
	3150	34	6	20	0.2	95,388	45	9	29	0.3	97,148	59	12	38	0.4	99,259
	3200	34	6	20	0.2	95,388	45	9	29	0.3	97,148	59	12	38	0.4	99,259
3600	**3300**	34	6	20	0.2	106,651	45	9	28	0.3	108,511	59	12	38	0.4	110,741
	3400	34	6	20	0.2	106,651	45	9	28	0.3	108,511	59	12	38	0.4	110,741
3800	**3450**	34	6	20	0.2	118,542	45	9	28	0.3	120,503	59	12	38	0.4	122,852
	3600	34	6	20	0.2	118,542	45	9	28	0.3	120,503	59	12	38	0.4	122,852
4000	**3800**	34	6	20	0.2	131,061	45	9	28	0.3	133,123	59	12	38	0.3	135,591

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).
Other installation lengths and combinations on request.
Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN2,5. In case of deviating flange dimensions, please contact us.

Customised products available



Exhibition model of size ∅ 1,600 mm
tied dismantling expansion joint in front of a butterfly valve
wall penetration seal for underground pipe

∅ 2,600 mm double arch ground water penetration seal
made from radiation resistant silicone rubber installed outside of a building
design pressure 20 m WC, lateral displacement 60 mm from building settlement

W200SS W300SS

⌀ 25 - 6,000 mm
⧄ up to 4,000 x 4,000 mm
⧄ up to 6,000 x 3,000 mm

> **Type W200SS**
without steam barrier

> **Type W300SS**
with steam barrier

Type key > page 22
W2 0 0 SS
- SS → Tie rod variant
- 0 → Support ring variant
- 0 → Number of arches
- W2 → Type

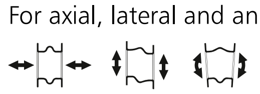
Penetration seal membrane

Design: Straight or folded penetration seal membranes with excellent all-directional movement capability, available in slip-on or flanged designs, standard made from extremely flexible thin silicone materials, and with multi-part backing flanges or fixing clamps. Type W300SS/FS for cold water lines optional with steam diffusion barrier. Available customised round or rectangular styles, also offset designs for pipe misalignment and split wrap designs available for field installation around existing penetrating pipe applications.

Dimensions: ⌀ 25 to 6,000 mm
⧄ up to 4,000 x 4,000 mm or 6,000 x 3,000 mm
Custom diameters/rectangular cross-sections possible

Length: Standard L_E = 60 mm (> page 314–315)
Custom length on request

Pressure: Up to ±20 mbar

Movement: For axial, lateral and angular movements
 (> page 314–315)

Application:
Power plants, plant construction, turbine houses, e.g. for building / ground settlements for pipe or vessel penetrations, noise absorption, vibration, pipe misalignment, thermal movements, seismic displacements or as airtight seal or splash protection of pipe penetrations, seals for district heating pipelines

Suitability verifications for nuclear power plant

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers

Elastomers			Carrier
up to 200 °C:	Silicon (Q)	Air, water, saltwater atmosphere	without
	Silicon special compound	Nuclear applications	
	FPM	Tank pit seals	Aramid
Other elastomers on request			

Clamps

Design: Screw thread belt or small clamps

Width: Screw thread belt: ½"
Small clamp: depending on Ø: 9–12 mm

Materials: Screw thread belt with threaded screw lug: 1.4310
Small clamp, belt and housing: 1.4016 (Screw steel galvanised)

Backing flanges

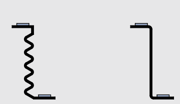
Design: Multi-part clamping flange with clearance holes

Flange norms: According to specification

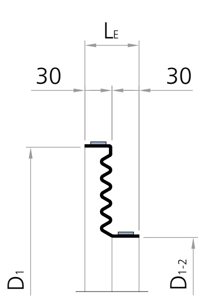
Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Installation variants

TYPE		Wall pipe fixing	Medium pipe fixing	Pressure	Dimensions
W200SS W300SS		Sleeve	Sleeve	Low	Wall pipe / duct up to ∅ 6,000 mm, ⊠ 4,000 x 4,000 mm or ⊠ 6,000 x 3,000 mm
W200FS W300FS		Flange	Sleeve	Low	Medium pipe / duct up to ∅ 6,000 mm, ⊠ 4,000 x 4,000 mm or ⊠ 6,000 x 3,000 mm

Cross section W200SS



W200SS

> without steam barrier

Potential combinations		Movement		
Wall pipe ∅ mm	Medium pipe ∅ mm	mm	mm	±mm
	10	15	15	13
	15	14	14	12
50	20	12	12	10
	25	9	9	8
	32	6	6	5
	15	19	19	16
	20	17	17	15
65	25	15	15	13
	32	12	12	10
	40	10	10	8
	20	22	22	19
	25	19	19	17
80	32	16	16	14
	40	14	14	12
	50	10	10	9
	25	28	28	24
	32	25	25	22
100	40	23	23	20
	50	19	19	16
	65	13	13	11
	32	34	34	29
	40	32	32	27
125	50	28	28	24
	65	22	22	19
	80	18	18	15
	40	42	42	36
	50	38	38	32
150	65	32	32	28
	80	28	28	24
	100	19	19	16
	65	50	50	43
	80	46	46	39
200	100	37	37	31
	125	28	28	24
	150	18	18	15
	80	64	64	55
	100	56	56	48
250	125	47	47	40
	150	37	37	31
	200	19	19	16
	100	73	73	63
	125	64	64	55
300	150	54	54	47
	200	37	37	31
	250	18	18	15
	125	76	76	65
	150	66	66	56
350	200	48	48	41
	250	29	29	25
	300	11	11	10
	150	83	83	71
	200	66	66	56
400	250	47	47	40
	300	29	29	25
	350	18	18	15

Potential combinations		Movement		
Wall pipe ∅ mm	Medium pipe ∅ mm	mm	mm	±mm
	200	83	83	71
	250	64	64	55
450	300	47	47	40
	350	36	36	30
	400	18	18	15
	250	82	82	71
	300	64	64	55
500	350	53	53	46
	400	36	36	30
	450	18	18	15
	300	82	82	70
	350	71	71	61
550	400	53	53	46
	450	36	36	30
	500	18	18	15
	350	89	89	76
	400	71	71	61
600	450	53	53	46
	500	36	36	30
	550	18	18	15
	400	89	89	76
	450	71	71	61
650	500	53	53	46
	550	36	36	30
	600	18	18	15
	450	89	89	76
	500	71	71	61
700	550	53	53	46
	600	36	36	30
	650	18	18	15
	500	89	89	76
	550	71	71	61
750	600	53	53	46
	650	36	36	30
	700	18	18	15
	400	142	142	122
	450	124	124	107
800	500	107	107	91
	600	71	71	61
	700	36	36	30
	450	160	160	137
	500	142	142	122
900	600	107	107	91
	700	71	71	61
	800	36	36	30
	500	178	178	152
	600	142	142	122
1000	700	107	107	91
	800	71	71	61
	900	36	36	30

For wall pipes use nominal diameters if possible.
For medium pipes, all diameters can be delivered.
Other combinations possible.

Customised products available

W300SS

> with steam barrier

MEMBER OF THE
ELAFLEX GROUP

Potential combinations		Movement		
Wall pipe Ø mm	**Medium pipe Ø mm**	mm	mm	±mm
	10	5	5	3
	15	5	5	3
50	**20**	4	4	3
	25	3	3	2
	32	2	2	1
	15	7	7	4
	20	6	6	4
65	**25**	5	5	3
	32	4	4	3
	40	3	3	2
	20	8	8	5
	25	7	7	4
80	**32**	6	6	3
	40	5	5	3
	50	4	4	2
	25	10	10	6
	32	9	9	5
100	**40**	8	8	5
	50	7	7	4
	65	5	5	3
	32	12	12	7
	40	11	11	7
125	**50**	10	10	6
	65	8	8	5
	80	6	6	4
	40	15	15	9
	50	14	14	8
150	**65**	12	12	7
	80	10	10	6
	100	7	7	4
	65	18	18	11
	80	16	16	10
200	**100**	13	13	8
	125	10	10	6
	150	6	6	4
	80	23	23	14
	100	20	20	12
250	**125**	17	17	10
	150	13	13	8
	200	7	7	4
	100	26	26	16
	125	23	23	14
300	**150**	19	19	12
	200	13	13	8
	250	6	6	4
	125	27	27	16
	150	23	23	14
350	**200**	17	17	10
	250	10	10	6
	300	4	4	2
	150	30	30	18
	200	23	23	14
400	**250**	17	17	10
	300	10	10	6
	350	6	6	4

Potential combinations		Movement		
Wall pipe Ø mm	**Medium pipe Ø mm**	mm	mm	±mm
	200	30	30	18
	250	23	23	14
450	**300**	17	17	10
	350	13	13	8
	400	6	6	4
	250	29	29	18
	300	23	23	14
500	**350**	19	19	11
	400	13	13	8
	450	6	6	4
	300	29	29	18
	350	25	25	15
550	**400**	19	19	11
	450	13	13	8
	500	6	6	4
	350	32	32	19
	400	25	25	15
600	**450**	19	19	11
	500	13	13	8
	550	6	6	4
	400	32	32	19
	450	25	25	15
650	**500**	19	19	11
	550	13	13	8
	600	6	6	4
	450	32	32	19
	500	25	25	15
700	**550**	19	19	11
	600	13	13	8
	650	6	6	4
	500	32	32	19
	550	25	25	15
750	**600**	19	19	11
	650	13	13	8
	700	6	6	4
	400	51	51	30
	450	44	44	27
800	**500**	38	38	23
	600	25	25	15
	700	13	13	8
	450	57	57	34
	500	51	51	30
900	**600**	38	38	23
	700	25	25	15
	800	13	13	8
	500	64	64	38
	600	51	51	30
1000	**700**	38	38	23
	800	25	25	15
	900	13	13	8

For wall pipes use nominal diameters if possible.
For medium pipes, all diameters can be delivered.
Other combinations possible.

Customised products available

Fire penetration seals > Basics

Protection objectives

The German constitution describes fire protection as follows: "Buildings and structures ... must be placed, erected, modified and maintained such that order and public safety are not jeopardised, especially not the lives and health of the public. Buildings and structures must be built such that the occurrence and spread of fire and smoke is prevented, and must allow for effective extinguishing and the rescue of people and animals in the event of a fire."

Fire progression

A fire can only occur when there is enough oxygen and combustible material, and an ignition source. During the smouldering phase, the energy released by a fire heats all surrounding material. If this material is combustible, it will ignite upon reaching the limit temperature. The fire behaviour of the construction materials is of significance until the ignition point is reached. Afterwards, during what is called the blazing fire phase, the fire resistance and the fire behaviour of the component design will determine the duration of a fire in a given space. The spread of the fire depends on the design of the construction components surrounding the fire area, such as walls and ceilings, as well as the pipe bulkheads in the fire walls or ceilings.

Structural fire protection

Structural fire protection cannot prevent the occurrence of fires, but ensures that a fire remains limited to the smallest possible area through the building's design and fire protection measures. For this reason, stringent requirements are imposed, particularly on structural components that run through the entire structure (beyond the limits of the individual fire compartments), such as ventilation ducts, pipelines and electric cabling. In principle, no openings may be made in fire walls. However, if these are structurally unavoidable, the structural regulations of the German states stipulate that fire and smoke must not be able to spread to other floors or fire compartments in the event of fire.

A simple system for preventing fire and smoke spreading through pipe penetrations through walls and ceilings is through the use of "fire protection bulkheads". We have a system certified by the Building Inspectorate that can be used to create bulkheads using non-flammable pipes in fire walls or fire ceilings. These elastic seals accommodate axial and lateral pipeline movements against the wall or ceiling and ensure reliable bulkheading in the event of fire. Movements occur as a result of thermal pipeline expansions during plant operation or, in the event of a fire, because of additional expansions due to pipeline heating and the relative movement of the building with regard to the lines as a result of wind loads, building displacement or earthquakes.

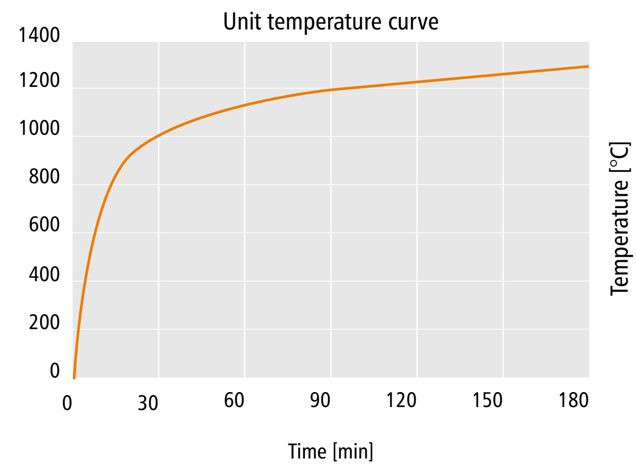
Pipe bulkheads in accordance with DIN 4102, Section 11

DIN 4102, Section 11 states the following: Pipe penetration bulkheads must be designed such that fire and smoke are not spread through walls and ceilings during the period of fire resistance. The fire resistance period is the minimum duration, in minutes, for the prevention of fire spreading. Various fire resistance classes are differentiated according to the fire resistance period:

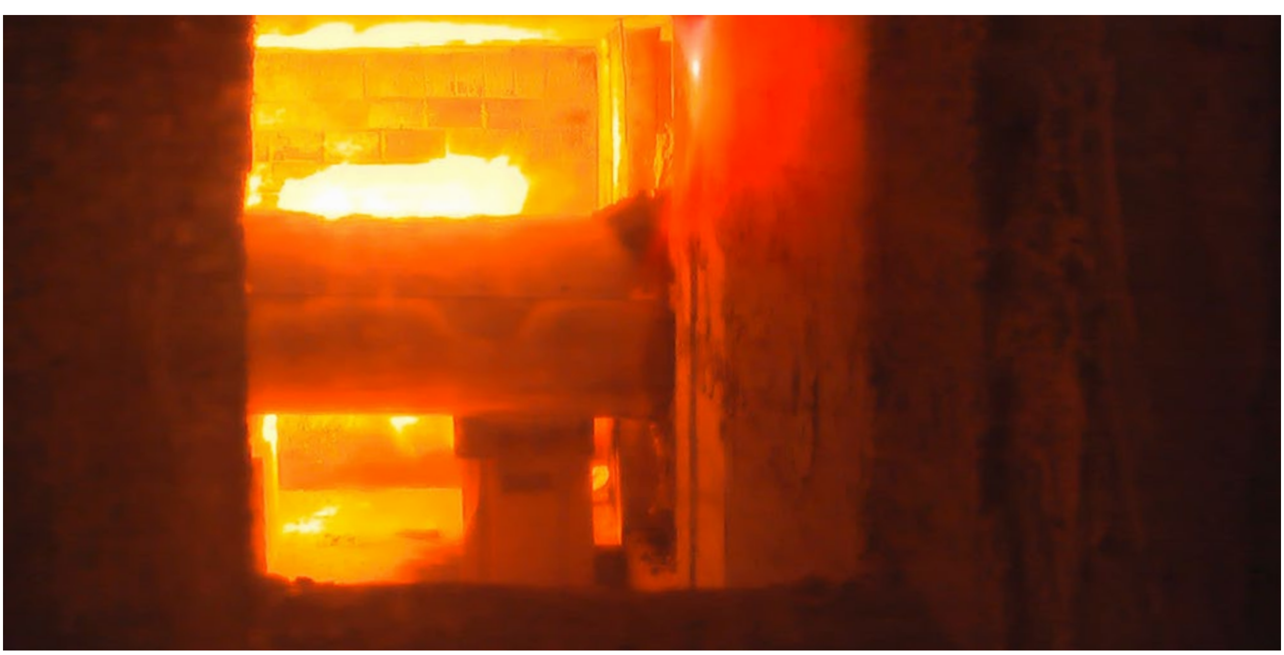
Fire resistance classes	Duration of fire resistance [min]
R 30	≥ 30
R 60	≥ 60
R 90	≥ 90
R 120	≥ 120

The installation of fire protection bulkheads helps to prevent a fire spreading via pipe penetrations. The fire resistance class of fire protection bulkheads must be certified by the test result of an officially recognised testing centre. The test is performed in keeping with DIN 4102, Section 11. During a fire test, DIN 4102, Section 11 specifies that the spreading of fire and smoke from the incendiary space, or from pipe claddings or the pipelines themselves located outside of the incendiary space, must be prevented during the fire resistance period. In addition, in no place outside of the incendiary space may the exposed exteriors of the fire protection bulkheads or pipelines be heated by more than 180 K.

The fire test is usually conducted in keeping with DIN 4102, Section 2. The required incendiary space temperatures are shown in the following diagram; these temperatures correspond to the unit temperature curve. This allows the fire resistance period of the construction component to be determined in minutes.



In principle, an installation construction component is only recognised by the certifying body if a "General Building Supervision Certificate" is present. This certificate is issued by the Materials Testing Institute based on the design used in the fire test and described in the test certificate. For special solutions, the official testing institute may be able to provide certification on an individual basis.



Test of ditec fire penetration seals

Fire penetration seals > Planning

The wall/ceiling sealing membranes and wall/ceiling sealing expansion joints are classified under building materials class B2 ("normal flammability") pursuant to DIN 4102, Section 1. Their fire behaviour is documented in the "General Building Supervision Certificates" issues by the Materials Testing Institute in Braunschweig.

Materials

Elastic wall and ceiling seals are made using silicone rubber and are reinforced with non-flammable fabrics, depending on the design. In the event of a pressure differential between the fire compartments, the wall or ceiling sealer membranes or expansion joints can be additionally equipped with carrier fabrics. The silicone rubber used can tolerate temperatures between –60 °C and +200 °C and has a lifetime of up to 40 years under normal conditions. Many test reports testify that the mechanical properties of the silicone rubber barely change in response to extreme UV, weather and ozone loads. This silicone rubber is also halogen-free, dermatologically safe, and non-toxic. A radiation-proof version of silicone rubber was developed exclusively for use in nuclear power plants; this rubber still possesses sufficient elongation at rupture after 300 kGy of ionising radiation. For use in nuclear facilities, the surfaces of the elastic seals made from this silicone rubber can demonstrably be decontaminated without any problems.

Pipeline eccentricity

The medium pipes are rarely run precisely through the middle of the wall pipes. The position of the medium pipe relative to the wall pipe can easily be taken into account when manufacturing the wall and ceiling seals. This will help you avoid expensive pipeline adjustments, and allows for strainless installation. The narrowest spot between the medium pipe and wall pipe is referred to as the X measurement.

Installation seam

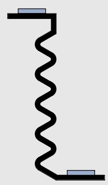
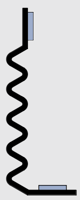
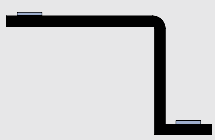
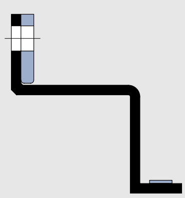
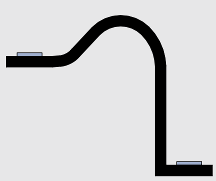
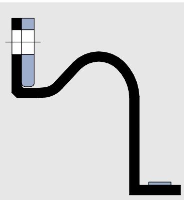
In general, seals are installed after the pipeline is laid, and therefore need to be delivered with an installation seam. The stepped installation seam allows for easy installation and is closed using a cold-vulcanising silicone rubber glue. The position of the joint should be easily accessible to the fitter.

Fixing types

If possible, the seals are fixed to an overhead wall pipe and to the medium pipe using clamps. If no wall pipe is planned, the elastic seals can also be made with a flange and then attached to the wall using a clamping flange (see adjacent table).

To fix the flange to the wall, take the following into account: The fixing screws of size ≥ M8 or through wall anchors must have a Fire Safety Certification and should be fitted at a distance of 100 mm to ensure its impermeability to smoke. In addition, the fire protection bulkheads are covered with silicone glue to counterbalance any potential unevenness in the wall or ceiling. When selecting a appropriate approved fixing method, a few points need to be remembered and ascertained in advance:

- *Manufacturer Fire Safety Certification*
  Often, not all sizes of the dowels or anchors in a product line possess the general building authority approval, even if the product documentation and labels list "general building authority approval" and "fire protection". In some cases, limitations are listed with respect to substrate and the type and height of the permitted load.
- *Fixing*
  Not all dowels or anchors are certified for all common anchoring materials.

TYPE		Wall pipe fixing		Medium pipe fixing	
W200SS		Sleeve	Screw thread belt ½″ or Small clamp width depending on ø: 9–12 mm	Sleeve	Screw thread belt ½″ or Small clamp width depending on ø: 9–12 mm
W200FS		Flange	Steel flange min. 30x6 mm Total clamp thickness 8 mm	Sleeve	Screw thread belt ½″ or Small clamp width depending on ø: 9–12 mm
W400SS		Sleeve	Clamp belt ¾″	Sleeve	Clamp belt ¾″ or Hinge bolt clamp width depending on ø: 18–30 mm
W400FS		Flange	Steel flange min. 40x6 mm Total clamp thickness 8 mm	Sleeve	Clamp belt ¾″ or Hinge bolt clamp width depending on ø: 18–30 mm
W410SS		Sleeve	Clamp belt ¾″	Sleeve	Clamp belt ¾″ or Hinge bolt clamp width depending on ø: 18–30 mm
W410FS		Flange	Steel flange min. 40x6 mm Total clamp thickness 8 mm	Sleeve	Clamp belt ¾″ or Hinge bolt clamp width depending on ø: 18–30 mm

> *Edge distance to the breach*

In order to prevent the material from breaking in the area of the connection, dowel and anchor manufacturers specify edge distances of between 50 and 100 mm, depending on the load. In general, we design with an edge distance of 50 mm between the breach and hole circle, since the force per dowel or screw is less than 0.25 kN for screw distances of approx. 100.
All screws support only the weight of the expansion joint or membrane, and must ensure a reliable seal against the wall or ceiling.

> *Material of the fixing screws*

We recommend using galvanised steel in covered buildings and stainless steel fasteners outdoors.

Wall pipe

The seals in a fire protection bulkhead should preferably be fastened to an overhanging wall pipe using clamps. When planning the fire protection bulkhead, we recommend using norm nominal bores for the wall pipes to the extent possible. The overhang should be 30 mm for membranes and 60 mm for expansion joints. The required distance between individual wall pipes shall be:

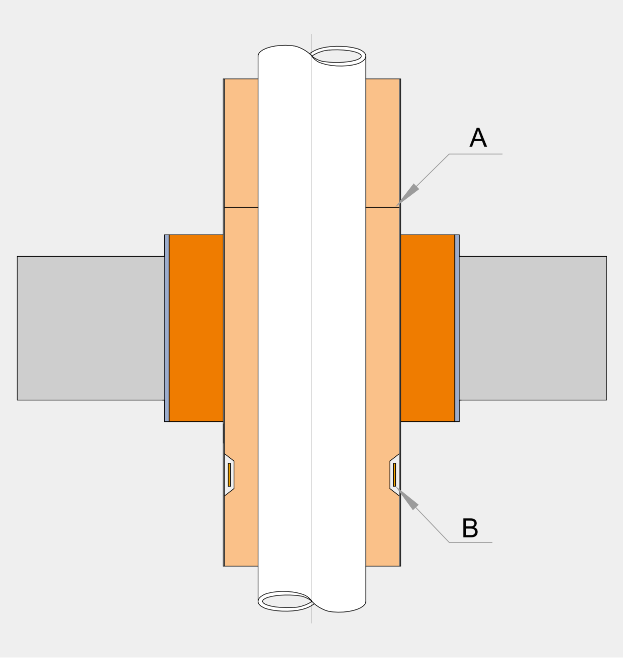
Ø ≤ 200 mm a ≥ 100 mm
Ø > 200 mm a ≥ 200 mm

Sectional medium pipe insulation

The insulation of a pipeline not only protects it against heat, cold and noise, but also actively contributes to structural fire protection. Depending on the diameter and wall thickness of the pipeline, it may have to be equipped with external insulation in the area of the wall or ceiling duct. This sectional medium pipe insulation should be made from non-flammable rock wool in materials class A1 with a melting point greater than 1000 °C. Standard pipe shells or rock wool mats are commonly used. If other insulation materials are used, e. g. closed-cell foamed plastic or foam glass, pay attention to the manufacturer's Building Supervisory certifications. In principle, the pipeline insulation needs to be designed such that fire and smoke cannot spread to the side facing away from the fire.

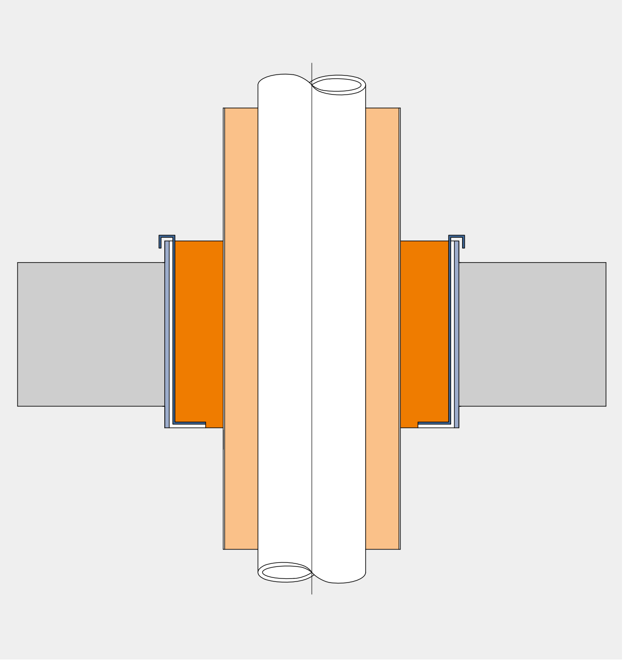
The surface of the insulation should be shielded throughout using galvanised steel or stainless steel plates at least 0,8 mm thick. If using sectional medium pipe insulation, the front faces should also be covered with sheet metal. Circular and longitudinal joints should be designed in the form of corrugations, and should be secured using sheet metal driving screws (distance ≤ 150 mm), straps or clamp lever fasteners.

Sectional medium pipe insulation for ceilings
For ceiling ducts, the sectional medium pipe insulation should be secured against slippage by appropriate actions. For example, the insulation can be stayed using steel belt clamps (B) before fitting the steel plate sheathing or pins fixed to the medium pipes can hold the insulation. If the sectional medium pipe insulation consists of several parts, the clamp (B) must be fitted below the seam (A). For large diameters (> 400 mm), the medium pipe insulation should be reinforced in the fastening area of the wall or ceiling sealing membrane or the wall or ceiling sealing expansion joint. For instance, additional sheet metal strips can be installed there between the insulation and the surface shield.



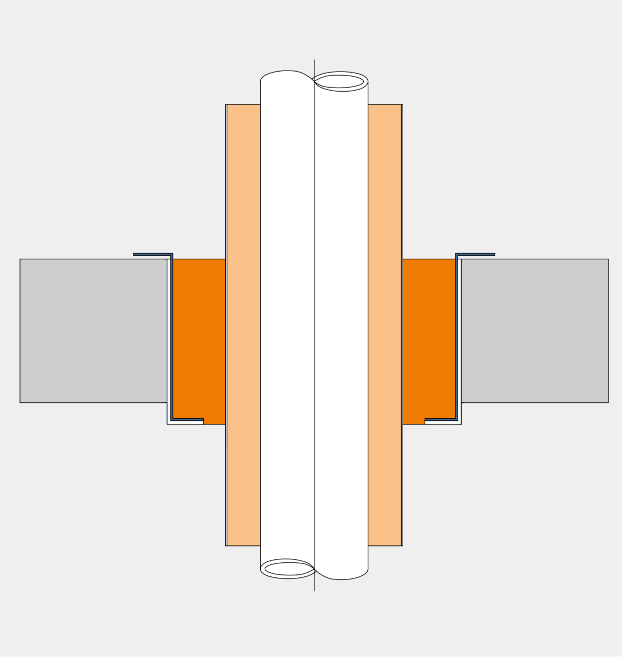
Ring gap and ring gap insulation

The ring gap is the distance between the wall pipe and the medium pipe or sectional medium pipe insulation. According to the Building Supervisory Certification, a ring gap between 10 and 100 mm is required. Mineral wool insulation with a density of ≥ 120 kg/m³ in materials class A1 and with a melting point of > 1000 °C will prevent the temperature and flames from spreading to the next fire compartment.



Brackets for ring gap insulation in ceiling ducts

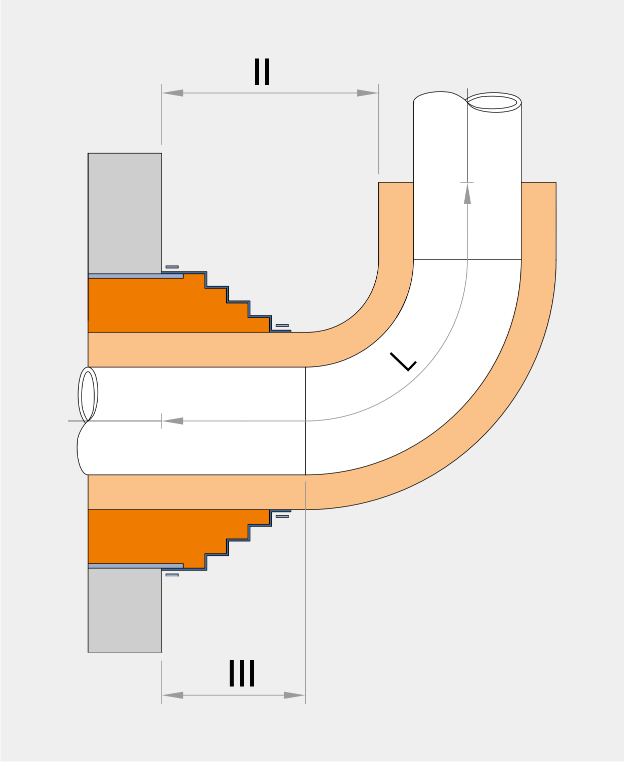
For ceiling ducts, the ring gap insulation between the medium and wall pipes must be supported using several additional brackets around the circumference. Otherwise there is a risk that the ring gap insulation will slip during a fire. When designing the bracket layout, the lateral movement of the medium pipe must be taken into account. The bracket angles should be made using galvanised or stainless steel and must have a thickness of at least 2 mm.

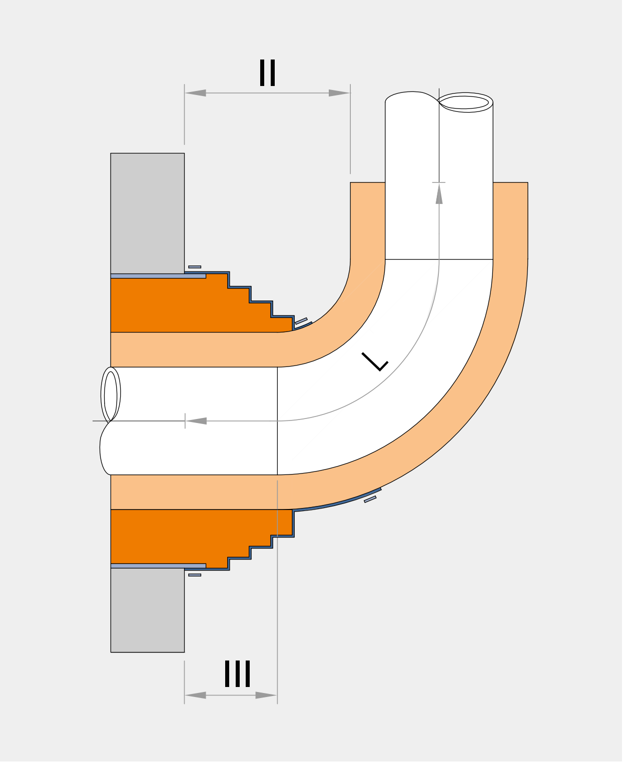


Pipeline elbow

Our extensive experience with fire protection bulkheads has shown that pipeline elbows in the area of the bulkhead are often unavoidable. In principle, standard structural forms can be provided if the following points are taken into consideration to the extent possible.

For sectional medium pipe insulation, the required length (L) needs to be based on the neutral fibre of the medium pipe. The pipe clamp should be fitted outside the pipeline elbow (distance III). The thickness of the insulation should be taken into account when laying the pipeline (distance II). For large axial movements, the installation length of the membrane or expansion joint needs to be at least 300 mm in order to accommodate movements. If the construction site conditions do not allow for the installation of standardised structural forms, application-specific fire protection bulkheads can be manufactured. The clamping area can also be located in the elbow radius for these.



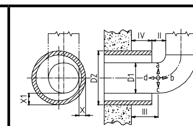


Installation

Our optimally equipped installation team will install wall seals for new construction or retrofitting activities; we can also appoint a field supervisor to train your workers and to support and monitor installation activities.

Measurements

Wall and ceiling seals are measured and manufactured after the pipeline is laid. This means that the location of the medium pipe with respect to the wall pipe and the position of the installation seam can be taken into account. The seals are dimensioned once the laid pipelines are in their final positions and the pipe insulation is complete at least in the area of the bulkhead. All the information relevant to their manufacture is listed on a form. Please note that each wall or ceiling face should be listed separately and that the opposing positions should be listed as Pos. 1 and Pos. 1A. We will take the measurements for you if desired.

Distribution list: Orig./Oper./Inst./...				Sheet: _____of_____	
Date of issue:	Password: EXAMPLE	Structure:	Order no.:	Deadline:	

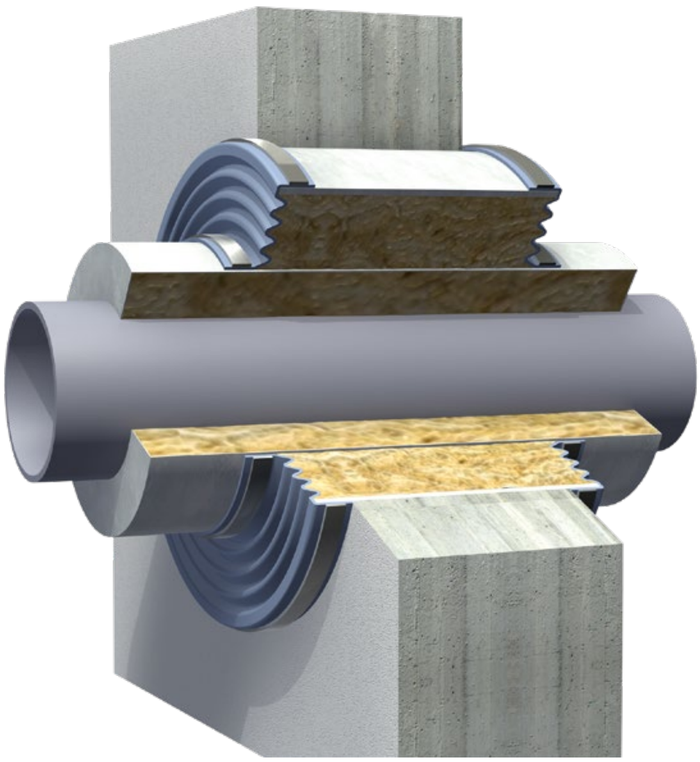
Pos.	Drawing	Room	Type	D1	D2	D3	III	IV	X	X1		II		E	Each	Production ready	Installation ready	Movement	
5			W410SS	114.3	406.4	– –		60	50						2				

Note: All dimensions refer to penetration – the shape of the membrane and expansion joint is determined by us.

Pos.: Position no.
Type: e.g. W200SS, W400SS, W410SS, ...
D1: Outer diameter of medium pipe insulation layer
D2: Outer diameter of wall pipe
D3: Outer diameter of medium pipe
III: Distance from wall to next obstacle, e.g. weld seam
IV: Length of wall pipe overhang
X: Least distance between medium and wall pipe diameter
X1: Not valid for W2 or W3
Only stated in connection with "X" (see sketch) if the expansion joint needs to be adjusted to the elbow shape, e.g. if dimension "III" is too small
Location of seam "•" or the seam area
Location of "X" dimension (this allows a good, accessible location for the seam to be determined)
II: Distance between the wall pipe end and the inner edge of the elbow
L: Moving length of expansion joint, e.g. length of arch (determined by us)
E: Total length of membrane or expansion joint, incl. fixing widths (determined by us)
x/y Axial/lateral movement

Date/Stamp/Signature	Date/Stamp/Signature
Acceptance	Measurement/installation confirmed

W200SS + W200SS for wall pipes up to ⌀ 400 mm, medium pipes up to ⌀ 150 mm



> Type W200SS + W200SS

Type key > page 22
W2 0 0 SS
- Fixing variant
- Support ring variant
- Number of arches
- Type

Fire penetration seal for wall tubes up to ⌀ 400 mm

Design: Air- and splash water-tight fire bulkhead sealing for 120 min fire resistance for pipe penetrations through walls and ceilings. Bothsided, straight or folded penetration seal membranes with all-directional movement capability, made from extremly flexible thin silicone materials, and with fixing clamps (type W200SS) or multi-part backing flanges (type W200FS). Available round or rectangular styles, also offset designs for pipe misalignment and spilt wrap designs available for field installation around existing penetrating pipe applications. Fire resistance test acc. DIN EN 1366-3, approval acc. DIN 4102 part 11. Technical details must be followed according to Building Authority Approval.

Diameters: System approval for wall pipes up to ⌀ 400 mm and for medium pipes up to ⌀ 150 mm

Length: W200SS or W200FS standard 60 mm
Custom length on request

Pressure: Up to ± 20 mbar

Movement: For axial and lateral movements (> page 327)

Wall pipe: Distance "a" between individual penetrations:
for wall pipes Ø ≤ 200 mm a ≥ 100 mm, Ø > 200 mm a ≥ 200 mm
Wall pipe thickness (> page 327)

Application:
Power plants, plant construction, turbine houses, R120 fire penetration sealing for pipes with axial and lateral movements

Tested according to DIN 4102
Section 11 General
Building Supervision Certificate
MPA Braunschweig
No. P-3740/4280-MPA BS

Request assembly instructions at:
www.ditec-adam.de/en/contact

Medium pipe insulation:	Mineral wool insulation (materials class A1, melting point > 1000 °C) The surface of this insulating material should be shielded with galvanised or stainless steel sheet with a thickness of min. 0.8 mm Length and thickness (> page 327)
Ring gap:	Distance between wall and medium pipe or medium pipe insulation from 10 mm to 100 mm Ring gap stuffing with mineral wool (materials class A1, melting point > 1000 °C) Stuffing density ≥ 120 kg/m³ (usually supplied by others) Ring gap insulation of ceiling penetrations must be secured against slippage using several brackets around the circumference
Pipe hanger:	Distance of next pipe hanger to wall / ceiling: 400 mm for ≤ ∅ 150 mm and 1,400 mm for > ∅ 150 mm medium pipe diameter
Wall/ceiling thickness:	Min. 240 mm concrete, reinforced concrete or gas concrete

Bellows elastomers

Elastomers		
up to 200°C	Silicone Q	Air, water, saltwater atmosphere Special compound
	Silicone (special)	Special compound with certifications for nuclear applications

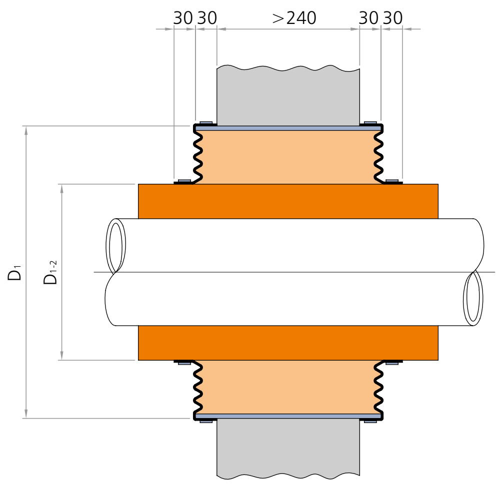
Clamps

Design:	Screw thread belt or small clamps	
Width:	Screw thread belt:	½“
	Small clamp:	depending on Ø: 9–12 mm
Materials:	Screw thread belt with threaded screw lug:	1.4310
	Small clamp, belt and housing:	1.4016 (Screw steel galvanised)

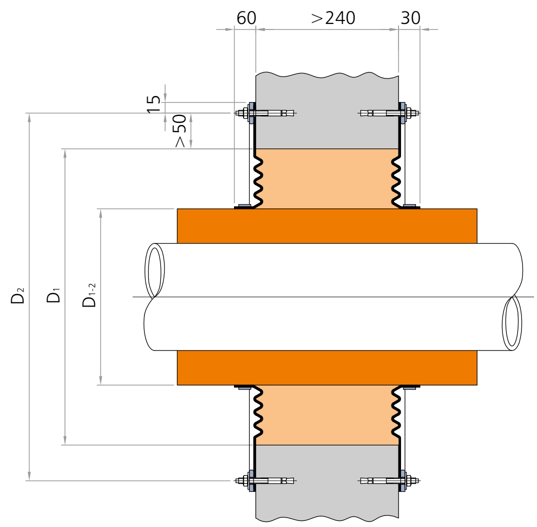
Backing flanges

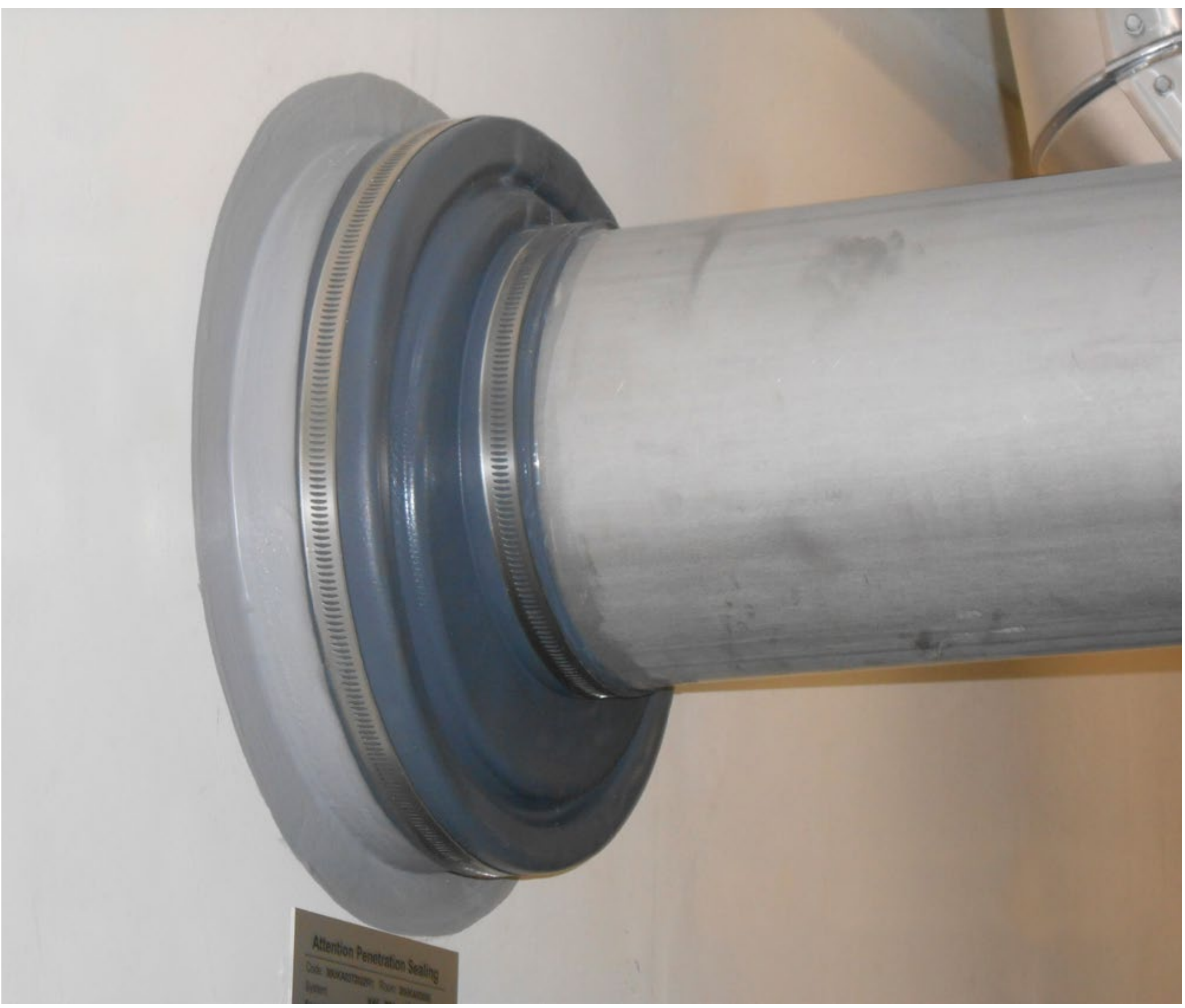
Design:	Multi-part clamping flange with clearance holes
Flange norms:	According to specification
Materials:	Carbon steel, stainless steel
Coating:	Primed, hot-dip galvanised, special paint

Cross section W200SS + W200SS

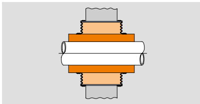


Cross section W200FS + W200FS





Flexible air-tight fire penetration seal of type W200SS + W200SS
in a nuclear power plant



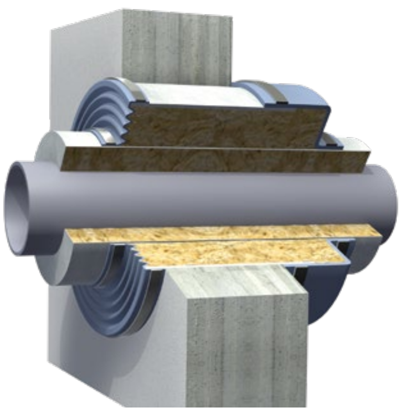
W200SS + W200SS

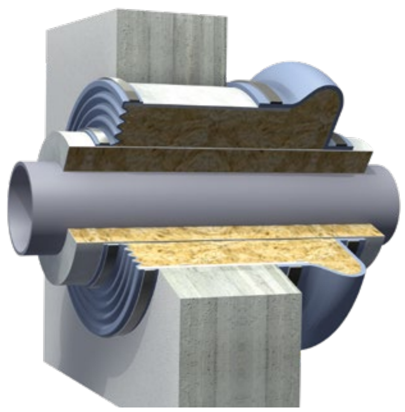
Potential combinations		Wall pipe	Required medium pipe insulation		W200SS + W200SS Movement		
Wall pipe D_1	Medium pipe D_{1-2}	Thickness	Length ≥	Thickness			
mm	mm	mm	mm	mm	mm	mm	mm
50	10	≥ 3,2 ≤ 14,2			15	15	13
	15				14	14	12
	20				12	12	10
	25				9	9	8
	32				6	6	5
65	15	≥ 3,2 ≤ 14,2			19	19	16
	20				17	17	15
	25				15	15	13
80	10	≥ 3,2 ≤ 14,2			25	25	22
	15				24	24	20
	20				22	22	19
	25				19	19	17
100	15	≥ 3,2 ≤ 14,2			33	33	28
	20				31	31	26
	25				28	28	24
	32				11	11	10
	40				9	9	8
125	20	≥ 3,0 ≤ 14,2			39	39	34
	25				37	37	32
	32				20	20	17
	40				18	18	15
	50				7	7	6
150	32	≥ 3,0 ≤ 14,2			30	30	26
	40				28	28	24
	50				17	17	14
	65		700	30	11	11	10
	80		700	30	7	7	6
200	40	≥ 3,0 ≤ 14,2			46	46	39
	50				35	35	30
	65		700	30	29	29	25
	80		700	30	25	25	21
	100		700	30	16	16	13
250	65	≥ 3,0 ≤ 14,2	700	30	48	48	41
	80		700	30	43	43	37
	100		700	30	35	35	30
	125		700	30	26	26	22
	150		700	30	16	16	13
300	65	≥ 3,0 ≤ 14,2	700	30	66	66	56
	80		700	30	61	61	53
	100		700	30	52	52	45
	125		700	30	43	43	37
	150		700	30	33	33	29
350	80	≥ 3,0 ≤ 14,2	700	30	70	70	60
	100		700	30	63	63	54
	125		700	30	55	55	47
	150		700	30	45	45	38
400	100	≥ 3,0 ≤ 14,2	700	30	70	70	60
	125		700	30	70	70	60
	150		700	30	62	62	53

Above data refer to wall penetrations only; for ceiling penetration please contact our sales department.
Other combinations possible.
The movements listed are based on a concentric position of the medium pipe in relation to the wall pipe as well as minimal medium pipe insulation thicknesses and a maximum ring gap of 100 mm.
Larger movements on request.

W200SS + W400SS W200SS + W410SS

for wall pipes up to ∅ 900 mm, medium pipes up to ∅ 600 mm





> **Type W200SS + W400SS**
without arch for small movements

> **Type W200SS + W410SS**
with arch for large movements

Type key > page 22
W4 0 0 SS
- Fixing variant
- Support ring variant
- Number of arches
- Type

Fire penetration seal for wall tubes up to ∅ 900 mm

Design: Air- and splash water-tight fire bulkhead sealing for 120 min fire resistance for pipe penetrations through walls and ceilings. Penetration seal membrane (type W200SS) and straight (type W400SS) or single-arch (type W410SS) expansion joint with all-directional movement capability, made from flexible silicone materials, and with fixing clamps (type W200SS / W400SS / W410SS) or multi-part backing flanges (type W200FS / W400FS / W410FS). Available round or rectangular styles, also offset designs for pipe misalignment and spilt wrap designs available for field installation around existing penetrating pipe applications. Fire resistance test acc. DIN EN 1366-3, approval acc. DIN 4102 part 11. Technical details according to Building Authority Approval.

Diameters: System approval for wall pipes up to ∅ 900 mm and for medium pipes up to ∅ 600 mm

Length: W200SS or FS standard 60 mm
W400SS or FS standard 180 mm
W410SS or FS standard 210 mm
Custom length on request

Pressure: Up to ± 20 mbar

Movement: For axial and lateral movements
(> page 332–333)

Wall pipe: Distance "a" between individual penetrations:
for wall pipes Ø ≤ 200 mm a ≥ 100 mm, Ø > 200 mm a ≥ 200 mm
Wall pipe thickness (> page 332–333)

Application:
Power plants, plant construction, turbine houses, R120 fire penetration sealing for pipes with axial and lateral movements

Tested according to DIN 4102
Section 11 General
Building Supervision Certificate
MPA Braunschweig
No. P-3740/4280-MPA BS

Request assembly instructions at:
www.ditec-adam.de/en/contact

Medium pipe insulation: Mineral wool insulation (materials class A1, melting point > 1000 °C)
The surface of this insulating material should be shielded with galvanised or stainless steel sheet with a thickness of 0.8 mm
Length and thickness (> page 332-333)

Ring gap: Distance between wall and medium pipe / medium pipe insulation from 10 mm to 100 mm
Ring gap stuffing with mineral wool (materials class A1, melting point > 1000 °C)
Stuffing density ≧ 120 kg/m³ (usually supplied by others)
Ring gap insulation of ceiling penetrations must be secured against slippage using several brackets around the circumference

Pipe hanger: Distance of next pipe hanger to wall / ceiling: 400 mm for ≤ ∅ 150 mm and 1,400 mm for > ∅ 150 mm medium pipe diameter

Wall/ceiling thickness: Min. 240 mm concrete, reinforced concrete or gas concrete

Bellows elastomers

Elastomers		
up to 200°C	Silicone Q	Air, water, saltwater atmosphere
	Silicone (special)	Special compound with certifications for nuclear applications

Clamps

Design: Depending on pressure and diameter, endless clamp belt, screw thread belt, small clamps or hinge bolt clamps. At higher pressures, 2 parallel clamps per side

Width:
Endless clamp belt: ¾"
Screw thread belt: ½"
Small clamp: depending on Ø: 9–12 mm
Hinge bolt clamp: depending on Ø: 18–30 mm

Materials:
Endless clamp belt with screw lugs (tongs): 1.7300
Screw thread belt with threaded screw lugs: 1.4310
Small clamp, belt and housing: 1.4016 (Screw steel galvanised)
Hinge bolt clamp, belt and housing: 1.4016 (Screw steel galvanised)

Backing flanges

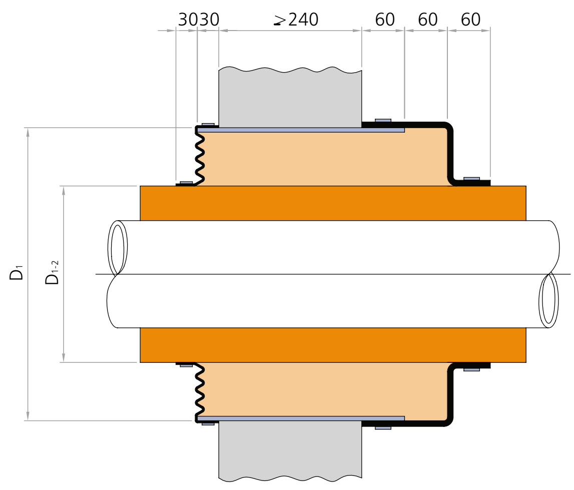
Design: Multi-part clamping flange with clearance holes

Flange norms: According to specification

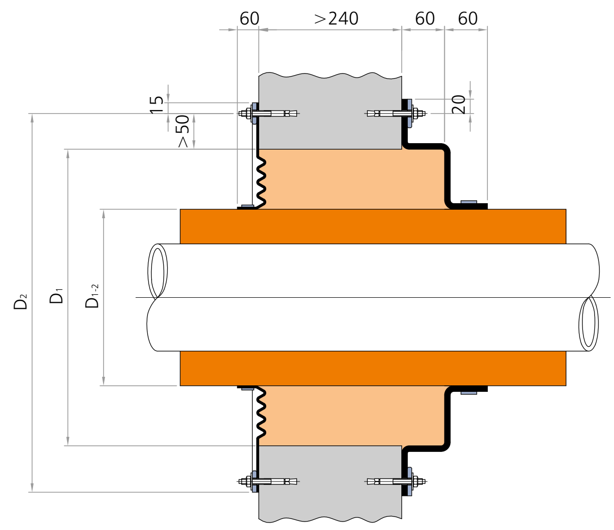
Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

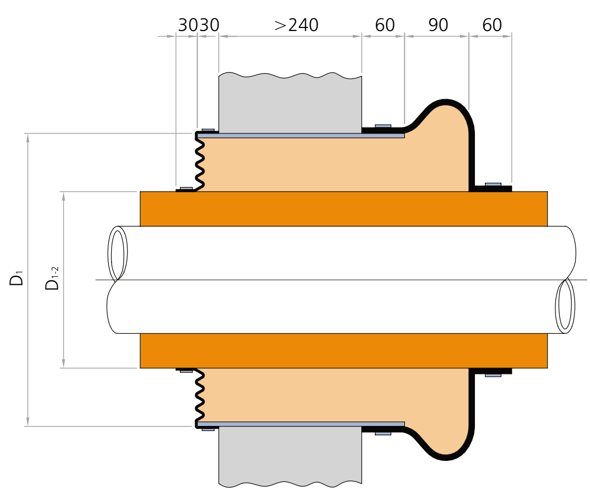
Cross section W200SS + W400SS



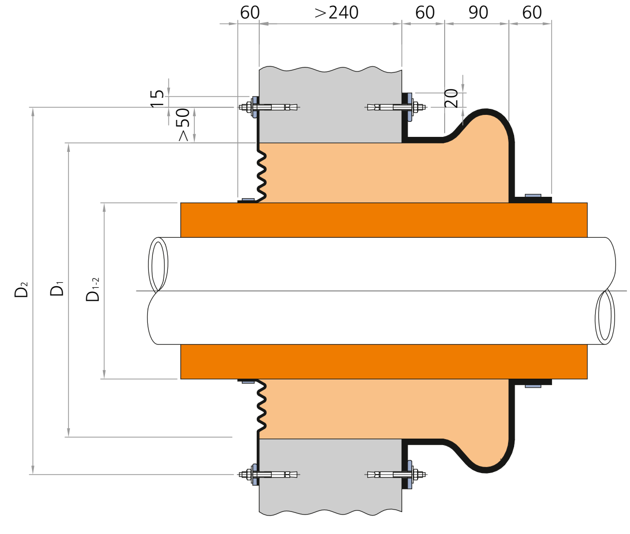
Cross section W200FS + W400FS



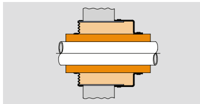
Cross section W200SS + W410SS



Cross section W200FS + W410FS



Fire protection bulkhead of type W200FS + W410FS
for large pipe movements between machines house and boiler house

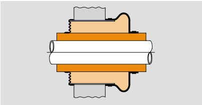


W200SS + W400SS

> without arch for small movements

Potential combinations		Wall pipe	Required medium pipe insulation		W200SS + W400SS Movement		
Wall pipe D_1	Medium pipe D_{1-2}	Thickness	Length ≥	Thickness			
mm	mm	mm	mm	mm	mm	mm	mm
350	200	≥ 3,0 ≤ 14,2	1600	40	6	6	5
400	200	≥ 3,0 ≤ 14,2	1600	40	15	15	13
	250		1600	40	6	6	5
450	125	≥ 3,0 ≤ 14,2	1600	40	35	35	30
	150		1600	40	35	35	30
	200		1600	40	24	24	21
	250		1600	40	15	15	13
	300		1600	40	6	6	5
500	150	≥ 3,0 ≤ 14,2	1600	40	35	35	30
	200		1600	40	33	33	28
	250		1600	40	24	24	20
	300		1600	40	15	15	13
	350		1600	40	9	9	8
550	200	≥ 3,0 ≤ 14,2	1600	40	35	35	30
	250		1600	40	33	33	28
	300		1600	40	24	24	20
	350		1600	40	18	18	15
	400		1600	40	9	9	8
600	250	≥ 3,0 ≤ 14,2	1600	40	35	35	30
	300		1600	40	32	32	28
	350		1600	40	27	27	23
	400		1600	40	18	18	15
	450		1600	40	9	9	8
650	300	≥ 3,0 ≤ 14,2	1600	40	35	35	30
	350		1600	40	35	35	30
	400		1600	40	27	27	23
	450		1600	40	18	18	15
	500		1600	40	9	9	8
700	350	≥ 3,0 ≤ 14,2	1600	40	35	35	30
	400		1600	40	35	35	30
	450		1600	40	27	27	23
	500		1600	40	18	18	15
	550		1600	40	9	9	8
750	400	≥ 3,0 ≤ 14,2	1600	40	35	35	30
	450		1600	40	35	35	30
	500		1600	40	27	27	23
	550		1600	40	18	18	15
	600		1600	40	9	9	8
800	450	≥ 3,0 ≤ 14,2	1600	40	35	35	30
	500		1600	40	35	35	30
	550		1600	40	27	27	23
	600		1600	40	18	18	15
850	450	≥ 3,0 ≤ 14,2	1600	40	35	35	30
	500		1600	40	35	35	30
	550		1600	40	27	27	23
900	450	≥ 3,0 ≤ 14,2	1600	40	35	35	30
	500		1600	40	35	35	30

Above data refer to wall penetrations only; for ceiling penetration please contact our sales department.
Other combinations possible.
The movements listed are based on a concentric position of the medium pipe in relation to the wall pipe as well as minimal medium pipe insulation thicknesses and a maximum ring gap of 100 mm.
Larger movements on request.



W200SS + W410SS

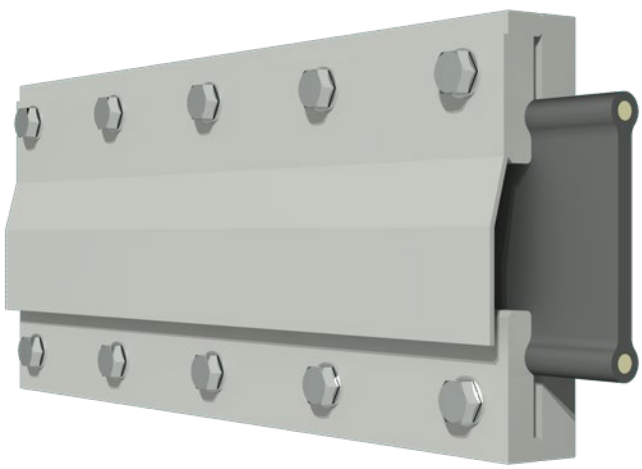
> with arch for large movements

Potential combinations		Wall pipe	Required medium pipe insulation		W200SS + W410SS Movement		
Wall pipe D_1 mm	Medium pipe D_{1-2} mm	Thickness mm	Length ≥ mm	Thickness mm	mm	mm	mm
350	**200**	≥ 3,0 ≤ 14,2	1600	40	12	12	10
400	**200**	≥ 3,0 ≤ 14,2	1600	40	31	31	26
	250		1600	40	12	12	10
450	**125**	≥ 3,0 ≤ 14,2	1600	40	70	70	60
	150		1600	40	70	70	60
	200		1600	40	48	48	41
	250		1600	40	29	29	25
	300		1600	40	12	12	10
500	**150**	≥ 3,0 ≤ 14,2	1600	40	70	70	60
	200		1600	40	66	66	57
	250		1600	40	47	47	41
	300		1600	40	29	29	25
	350		1600	40	18	18	16
550	**200**	≥ 3,0 ≤ 14,2	1600	40	70	70	60
	250		1600	40	65	65	56
	300		1600	40	47	47	40
	350		1600	40	36	36	31
	400		1600	40	18	18	16
600	**250**	≥ 3,0 ≤ 14,2	1600	40	70	70	60
	300		1600	40	65	65	56
	350		1600	40	54	54	46
	400		1600	40	36	36	31
	450		1600	40	18	18	16
650	**300**	≥ 3,0 ≤ 14,2	1600	40	70	70	60
	350		1600	40	70	70	60
	400		1600	40	54	54	46
	450		1600	40	36	36	31
	500		1600	40	18	18	16
700	**350**	≥ 3,0 ≤ 14,2	1600	40	70	70	60
	400		1600	40	70	70	60
	450		1600	40	54	54	46
	500		1600	40	36	36	31
	550		1600	40	18	18	16
750	**400**	≥ 3,0 ≤ 14,2	1600	40	70	70	60
	450		1600	40	70	70	60
	500		1600	40	54	54	46
	550		1600	40	36	36	31
	600		1600	40	18	18	16
800	**450**	≥ 3,0 ≤ 14,2	1600	40	70	70	60
	500		1600	40	70	70	60
	550		1600	40	54	54	46
	600		1600	40	36	36	31
850	**450**	≥ 3,0 ≤ 14,2	1600	40	70	70	60
	500		1600	40	70	70	60
	550		1600	40	54	54	46
900	**450**	≥ 3,0 ≤ 14,2	1600	40	70	70	60
	500		1600	40	70	70	60

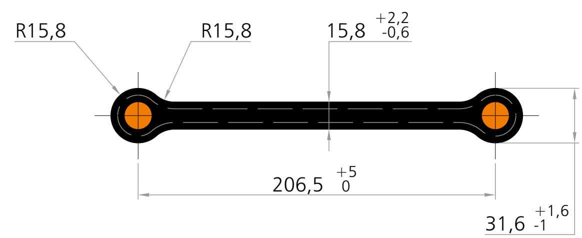
Above data refer to wall penetrations only; for ceiling penetration please contact our sales department.
Other combinations possible.
The movements listed are based on a concentric position of the medium pipe in relation to the wall pipe as well as minimal medium pipe insulation thicknesses and a maximum ring gap of 100 mm.
Larger movements on request.

Dog bone expansion joint

Dog bone expansion joint



Cross section Dog bone



Dog bone expansion joint

Design: Straight rubber belt type expansion joint with self-sealing rubber knobs on both sides to insure leak tightness, designed to compensate axial compression and lateral movements, constructed of laminated fabric plies, tied to a solid bulb core, all bonded, covered in rubber and vulcanised. Dog bone types with molded arch are also available.

It is initially furnished with specially machined steel clamping fixtures, as a component of the condenser. As standard, it is designed to operate under full vacuum and at temperatures up to 120°C. Future replacements typically involves changing the rubber element only.

All dog bone joints will require a splice to make endless. Only one splice per joint is necessary. For new construction, most dog bones can be supplied with a factory splice. Subsequent replacements, most often require a field splice, due to added interference with the condenser. In any case, splicing should be done by experienced technicians.

Length: According to customer specification

Width: Standard = 240 mm

Media: Water, steam, air

Pressure: +1,5 bar / full vacuum

Movements: (max.)* Axial compression = 30 mm
Axial extension = 3 mm
Lateral displacement = 16 mm

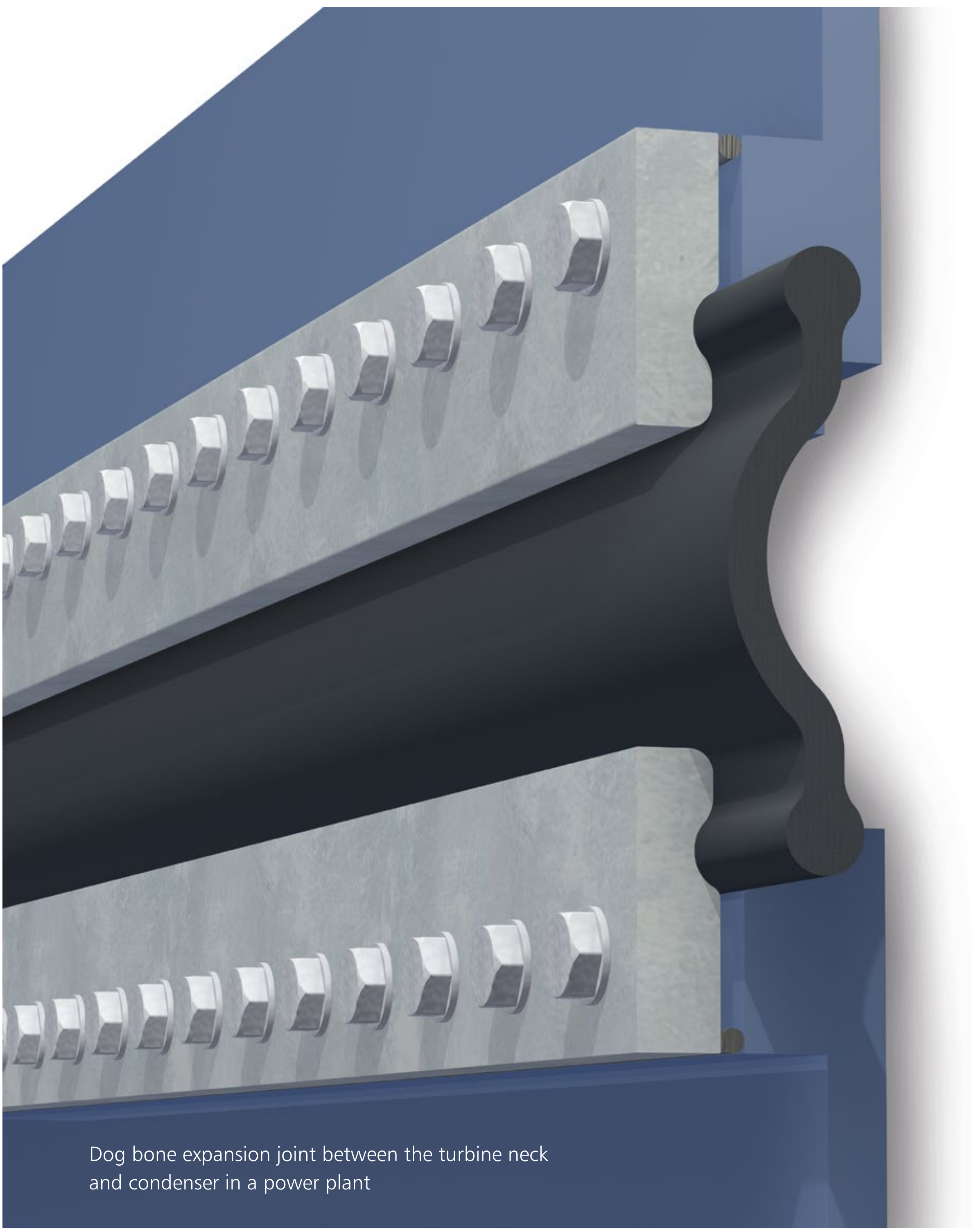
*for a standard width of 240 mm

Application:
Dog bone expansion joints are used as flexible connection between turbines neck and condensers in power generating stations, to isolate low pressure steam turbines from condensers. One of its main functions is to absorb the differential thermal compression and lateral movements of the two components, as the equipment heats and expands during operation. Dog bone expansion joints transfer minimal forces and moments on the turbine exhaust flange.

Request assembly instructions at:
www.ditec-adam.de/en/contact

Bellows elastomers and reinforcements

Elastomer	Fabric	°C	Remark
EPDM	Polyamid	up to 100°C	with peaks of 120°C for max. 36 hours during whole service life
EPDMht	Aramid	up to 120°C	with peaks of 140°C for max. 36 hours during whole service life
CR	Polyamid	up to 90°C	with peaks of 110°C for max. 36 hours during whole service life
FPM	Aramid	up to 140°C	with peaks of 160°C for max. 36 hours during whole service life

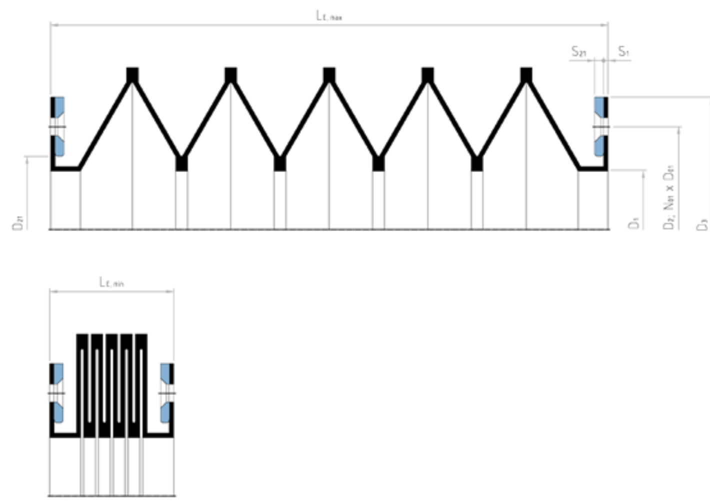


Dog bone expansion joint between the turbine neck and condenser in a power plant

Rubber moulded parts

Disc bellows ⌀ 100 - 4,000 mm

Cross section Disc Bellows



Design: Round disc bellows made of rubber with customised number and depth of folds with sleeve or flanged fixture. Produced on a single piece or small-batch basis.

Bellows are dust- and liquid-proof, have excellent dimensional stability, extremely short compressed length, and are suitable for vertical, horizontal and diagonal use. Depending on length and use, furnished with guides, or wire rings for stabilization. On request, provided with suitable ventilation openings.

Diameters: ⌀ 100 to 4,000 mm

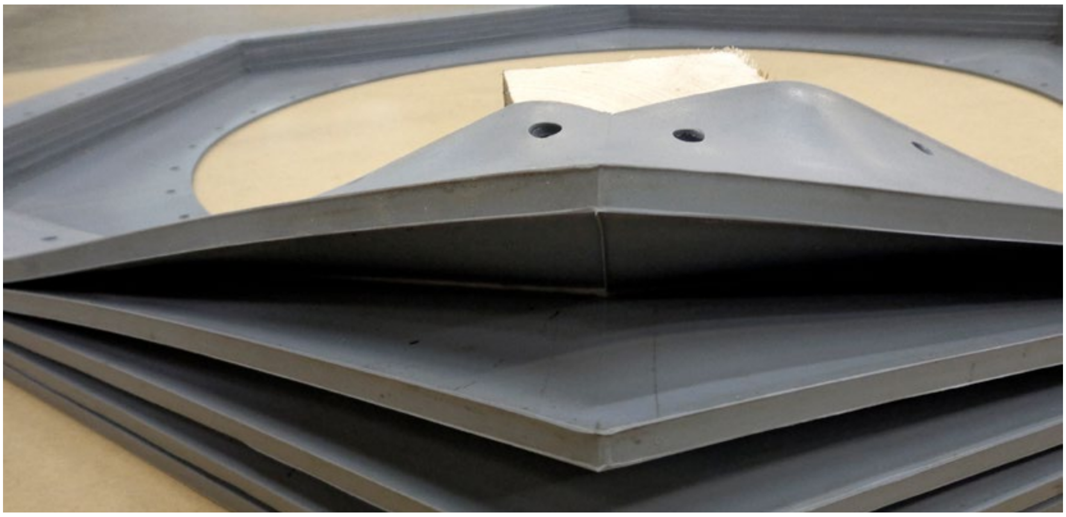
Length: Depending on L_{min} = folds completely flattened onto block and L_{max} = maximum length

Pressure: Pressureless

Axial Movement: Depth of fold Ft = (D4-D1)/2
Number of folds Fz = L_{max}/Ft
L_{min} = Fz x S_1 x 2
L_{max} = L_{min} + stroke

Application:
Protective covers for hydraulic and pneumatic cylinders, threaded spindles, and processing machines. Machine components are reliably protected against dust, dirt, sawdust and metal filings, or liquids

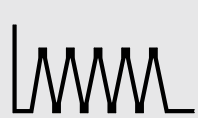
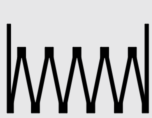
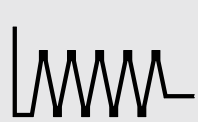
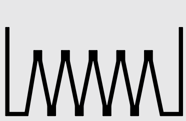
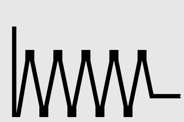
Request assembly instructions at:
www.ditec-adam.de/en/contact



Bellows elastomers and reinforcements

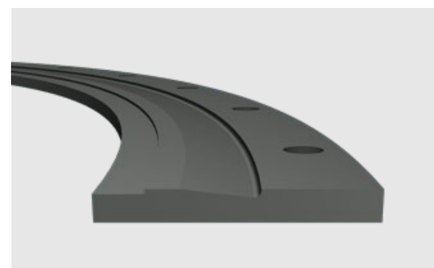
Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology

Installation variants

	Fixing variant 1	Fixing variant 2		Fixing variant 1	Fixing variant 2
	Sleeve	Sleeve		Spacer flange	Flange
	Sleeve	Sleeve with different diameters		Spacer flange	Sleeve
	Flange	Flange		Spacer flange	Spacer flange with different diameters
	Flange	Sleeve		Spacer flange	Sleeve with different diameters
	Spacer flange	Spacer flange		Flange	Sleeve with different diameters

Vulcanized rubber gaskets

∅ up to 4,000 mm
⍁ up to 4,000 x 4,000 mm
⍁ up to 6,000 x 3,000 mm



Design: One-piece homogeneously mold-vulcanized round, rectangular or oval shaped rubber gaskets, with or without reinforcements to suit to different design pressures and temperatures. Inserts can be from synthetic fabrics, wire mesh or metal. Can be provided against specification, thickness suitable to service conditions, and suitably molded for all flange dimensions. Rubber gaskets to be made as full flat face, optionally with protrusion, recess, impressed O-ring or in special design according to drawing.

Gaskets are individually manufactured from several separate unvulcanized rubber sheets and appropriate elastomer laminated reinforcements and vulcanized afterwards to one single rubber part without seam or glueing. Standard surface of the gasket is textile pattern or shiny.

Large range of different elastomers on stock individually chosen for service medium, also in conformity with food regulations according FDA or 1935/2004. Rubber grades with proven radiation resistancy also available.

Dimensions: ∅ up to 4,000 mm
⍁ up to 4,000 x 4,000 mm
⍁ up to 6,000 x 3,000 mm
Custom sizes and forms possible

Flange norms: DIN, ANSI, EN, AWWA, BS, JIS, special measurements

Thickness: Standard up to 50 mm
Custom thickness and inserts on request

Pressure: Up to 100 bar

Application:
Flange connections of ducts, pipelines, valves, tanks, man holes, or other pipeline equipment of the chemical, petrochemical, pharmaceutical and food industry, for refineries, power plants, steel and paper mills, ore dressing plants, ship building industry and all other kind of industries where flange connections must be sealed with rubber gaskets

CE PED 2014/68/EU | KTW WRAS | FDA | <10⁵ Ohm | EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology
PTFE lamination: one- or both-sided alternatively available				

Custom moulded rubber products

Design: We develop moulded rubber parts such as sleeves, membranes, bellows, profiles, hoses or seals together with you for your special application or manufacture them individually according to your specifications.

Due to our comprehensive knowledge and because of our vulcanisation possibilities, we are specialised in the production of large-volume moulded rubber parts. We are your ideal partner for one-off and small batch production, especially when it comes to special requirements for the rubber material, the geometry of the moulded part or precision. We process all types of commercially available elastomers, can reinforce them with fabrics or also combine them with PTFE or metals.

The required moulds are economically produced from a wide range of materials on modern CNC machines in our pattern shop.

Dimensions: Custom size, length and forms

Thickness: Custom thickness and inserts on request

Pressure: Up to 100 bar depending on design and dimensions

Application:
We supply in all areas of mechanical and plant engineering, rail vehicle construction, energy and handling technology as well as agricultural, food and textile industry and environmental technology

CE PED 2014/68/EU | KTW WRAS | FDA | <10⁹ Ohm | EX

Request assembly instructions at: **www.ditec-adam.de/en/contact**

Elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40 | +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40 | +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40 | +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40 | +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40 | +100	Foodstuffs
EPDMbeige	Aramid		-40 | +100	Foodstuffs
IIR	Polyamid		-20 | +100	Hot water, acids, bases, gases
IIR	Aramid		-20 | +100	Hot water, acids, bases, gases
CSM	Polyamid		-20 | +100	Strong acids, bases, chemicals
CSM	Aramid		-20 | +100	Strong acids, bases, chemicals
NBR	Polyamid		-30 | +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30 | +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30 | +100	Oil, fatty foods
NBRbeige	Aramid		-30 | +100	Oil, fatty foods
CR	Polyamid		-20 | +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20 | +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20 | +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20 | +180	Oil, fatty foods
NR	Polyamid		-20 | +70	Abrasive materials
Silicon	Aramid Glass		-60 | +200	Air, saltwater atmosphere, foodstuffs, medical technology
PTFE lamination: one- or both-sided alternatively available				

Rubber elements

Silicone rubber seal vulcanized to foam rubber for a cheese lifter

Wall seal

Inflation bellows

Expansion bellows

Ring gap seal with
hexagonal penetration

Silicon ring gap seal

Rubber bend in pressure test
∅ 100 mm, 40 bar

Double-walled expansion joint in a coal pulveriser with a connection for a leak sensor
∅ 250 - 140 mm

Conical adapter with embedded flange and internal rubber coated flange tube

Expansion bellows, oval, as actuating rod protection

FPM rubber cone from round to rectangular, with stainless steel flow liner
test pressure 2,5 bar

FPM rubber cone

Cheese lifter rubber bumper

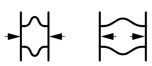
MEMBER OF THE ELAFLEX GROUP

Fabric expansion joints

Technical information

Planning > Installation location

Fabric expansion joints are specially designed and dimensioned for each application with regard to the operating conditions in question. In addition to the dimensions, we need information about the medium, temperature, pressure and movements. The pipeline expands at operating temperature. Depending on the configuration of the fixed and sliding points, such stretching is accommodated by the expansion joint in an

- axial 
- lateral and/or 
- angular 

direction. The thermal expansion must be determined when planning the pipeline, and will influence the choice of expansion joint construction shape as well as the choice of optimal installation length.

Our comprehensive customer service includes, in addition to on-site measurements, the complete engineering process, manufacture at our Kitzingen factory in Germany, installation or installation monitoring, the acceptance of newly installed expansion joints, as well as regular inspections of the expansion joints at your facility. As accessories for all expansion joint types, we are able to deliver backing flanges, clamp bars, support rings, flow liners or installation-ready units from our own production line.

For complete installation or for closing the expansion joint at the installation location, we have a factory installation crew and installation supervisor with many years of installation experience as well as extensive expansion joint training.

Accessibility of installation location
When planning new facilities, the accessibility of the installation location should be taken into account with regard to the installation of the expansion joint, especially if welded flow liners or duct lining require that expansion joints be delivered with an installation seam, and this seam can only be closed on site.

External influences
If the expansion joints are installed in the open, we recommend using protective coverings against external influences such as rain, snow, ozone or UV radiation. These are also contact protection as well as avoid external mechanical damage. Protective covers prevent the expansion joint from convecting freely in the event of high ambient temperatures combined with high media temperatures. In this case, special materials for the sealer and external layers, as well as forced air circulation or radiation protection shields, protect the expansion joint from overheating.

Find out more on our website at
www.ditec-adam.de/qr/movements

Movements

Planning > Design criteria

The exact operating parameters and constraints are needed to design the expansion joint. Temperature information that is higher than actual operating temperatures may lead, for instance, to the expansion joints being designed with unnecessary insulating layers, which has an unfavourable effect on pressure tightness in the fixing area.

The following criteria have an effect on the design of the expansion joint:

Medium

The medium, in conjunction with the operating temperature and operating pressure, determines which material is selected for the construction of the expansion joint. The following media properties should be taken into account:

> Crude or scrubbed gases
> Solid fraction (load and particle size)
> Chemical composition (acids, bases, solvents, radiation)
> Flue gas from coal, oil or gas firing
> Dry or wet medium
> Duct rinsing or cleaning

In the event of flow rates greater than 30 m/s, we recommend using flow liners in order to avoid turbulence in the area of the expansion joint. Due to the rebound elasticity of the rubber, for elastomer expansion joints, the flow liner can be dispensed with in the event that the medium exhibits a low solid fraction and high flow speeds.

Depending on where the joint is installed along the duct, e.g. after a bend or if the installation is horizontal, vertical or diagonal, the solids in the medium may expose the expansion joint to wear. The volume and particle size of these solids influence the choice of material. In the event of high concentrations of dust, soot, flue ash or similar solids, we recommend that you use flow liners.

Temperature

In addition to the operating temperature, it is important to know the maximum possible temperature in the event of an accident or the design temperature when selecting the bellows material. The medium temperature also determines whether the expansion joint can be installed at the duct level or if a duct angle needs to be used to establish a distance from the hot medium. In the event of a high ambient temperature, e.g. in the vicinity of a boiler or for expansion joints in housings, this also constitutes a design criterion.

If there is a risk of falling below the dew point and for medium temperatures of up to 220 °C, we recommend insulating the expansion joints from outside. Otherwise condensation may form and corrode the duct or lead to leaks in the expansion joint connection area. Since condensation constitutes yet another chemical strain, forecasted situations where the temperature might fall below the dew point must be specified, especially in the event of process-dependent start-up or shut-down or in the event of partial load operation. Dew point shortfalls influence the design of the expansion joint as well as the selection of the construction material.

Pressure

In addition to temperature, pressure determines both the material and the design of the expansion joint. For high pressure, we recommend using flange expansion joints, since these can handle high pressure-tightness requirements as a result of their clamping. You should also check whether additional design measures are needed, such as the use of pressure support rings or vacuum support rings. If pressure oscillations or pressure surges are anticipated, please specify them.

Movements

Depending on the type, fabric expansion joints can accommodate large movements in an axial, lateral or angular direction. Axial and lateral movement mostly occur in combination, and it is important to know which movement will occur first during start-up or shut-down. The movements to be accommodated determine the design and the installation gaps to be used for the expansion joint. Large movements can be distributed across several expansion joints in some cases.

Expansion joint technology > Bellows construction

For fabric expansion joints, there are no stiffness rates acting on the adjacent ducts, contrary to steel or rubber expansion joints. These need comparatively little installation space even for large movements.

Each fabric expansion joint is individually adapted to the conditions, and our technicians decide whether to use an elastomer or multilayer expansion joint when preparing a quotation.

Elastomer expansion joints

This is a single-layer expansion joint made from rubber, approx. 3 to 6 mm thick, with one or more reinforcement carriers. Elastomer expansion joints are characterised by their gas-tightness and drip-tightness, even if there is condensation. The maximum deployment temperature is 200 °C. The choice of rubber grade depends on the operating temperature and the medium. This decision is made on the basis of our extensive experience and with regard to relevant durability tables.

The following table provides an overview of the elastomers we handle. For the most corrosive media, we can furnish the expansion joint with an additional interior PTFE lining, which is firmly joined to the rubber bellows. PTFE is resistant to a number of chemicals and to many different mixtures, and can for that reason be used in the event of corrosive chemical attack.

Rubber grades		
up to 100 °C:	EPDM	Flue gases, acids, bases, rinsing acids, dilute chlorine compounds, cooling water, hot water
	EPDM, drinking water approved	Drinking water
	EPDM, white, food grade	Foodstuffs
	EPDM, insulating	Electrical systems construction
	IIR	Acids, bases, gases
	CSM	Strong acids, bases, chemicals
	NBR	Oils, petrol, solvents, compressed air
	NBR, bright, food grade	Oil, fatty foods
up to 80 °C:	CR	Cooling water, slightly oily water, seawater
up to 70 °C:	NR	Abrasive media
up to 180 °C:	FPM	Corrosive chemicals, petroleum distillates
up to 200 °C:	Silicon (Q)	Air, saltwater atmosphere
	Silicon (Q), white, food grade	Foodstuffs, medical technology
PTFE lining:	Permanently embedded against chemical attacks on the interior at the rubber bellows, available starting at ∅ 300 mm.	

Multilayer expansion joints

These consist of one or more superimposed insulating layers, a chemically resistant sealing film, and an external skin that ensures that the expansion joint maintains its shape under pressure. For simple applications, single-layer expansion joints are used. In general, these consist of a thin rubber or PTFE film with a fabric reinforcement.

Insulating layers
The function of the internal insulating layers is to dissipate the medium temperature out to the sealing films located further to the outside. Insulating layers consist of a glass fibre fabric or glass felt, ceramic fabrics or ceramic fibre mats, or of a combination of these materials.

Sealing films
For almost all applications, these consist of PTFE film, and take over the actual sealing function of the expansion joint. The PTFE film may also be laminated onto glass fibre fabric on one or both sides, and ensures the necessary pressure tightness of the expansion joint for this material design as well. PTFE is chemically resistant to almost all media. In rare cases with extreme temperature requirements or high ambient temperatures in addition, stainless steel films are used. As opposed to PTFE film, which is welded to be gas-tight, stainless steel films are simply clinched tight and are only sufficient for low impermeability requirements.

External layer
The external layer is usually a silicon-based glass fibre fabric or, in the event of harsh environmental conditions, a PTFE-coated glass fibre fabric. This layer is the pressure carrier and provides mechanical protection against external damage and weather effects. The choice of the external layer also depends on whether the expansion joint can be delivered in a closed state and thus already made "endless" at the factory, or if it needs to be designed with an installation seam.

Materials		
Insulating layers:	up to 400 °C:	Glass fibre fabric, glass mat
	up to 800 °C:	High temperature-resistant glass fibre fabric
	up to 1050 °C:	Silicate fabric
	up to 1200 °C:	Ceramic felt
Sealing layer:	up to 220 °C:	PTFE film
	up to 450 °C:	V4A film
	up to 900 °C:	Alloy film
External layer:	up to 100 °C:	EPDM film with polyester fabric
	up to 200 °C:	Silicon film with glass fibre fabric insert
	up to 220 °C:	Glass fibre fabric with PTFE coating

Tightness

Expansion joints with a wall thickness of up to 6 mm and for an operating pressure of up to 0.3 bar are elastomer expansion joints. These are gas-tight and drip-proof. Rubber expansion joints are used at higher pressure.

In multilayer expansion joints, the inner insulating layers in the clamping area lead to marginal diffusion. The bellows itself is gas-tight as a result of its sealing layer. Multilayer expansion joints are therefore only considered impermeable to flue gas, whereas elastomer expansion joints are impermeable to nekal.

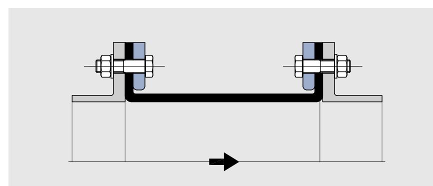
Multilayer expansion joints are not impermeable to drips, and precautions may have to be taken in the design phase. Up to 220 °C, multilayer expansion joints can be manufactured for relative high gas-tightness requirements. These are furnished with an inner layer of PTFE-coated glass fibre fabric that is then sealed using a PTFE sealing belt or a temperature-resistant rubber seal against the duct flange. In this case, these seals are attached to the expansion joint at the factory.

Expansion joint technology > Fixing types

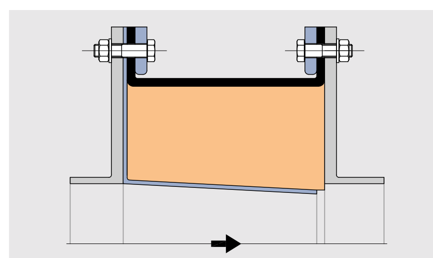
The distance between the ends of the pipeline and the duct flanges or duct angles is dependent on the axial and lateral movements. Guideline values for determining the installation gaps can be found under the respective expansion joint types. In principal, the expansion joint should only be compressed or displaced by a quarter of its original installation length, since extreme compression can lead to buckles, and thus also to heat pockets and overheating. Our technicians will be happy to help you determine the optimal installation gap.

Flange expansion joints

In this fixing variant, flanges are built onto the expansion joint bellows, which are then pressed against the duct flanges using the backing flanges. This construction is able to meet high impermeability requirements. The temperature limit for flanged expansion joints is approx. 400 °C.

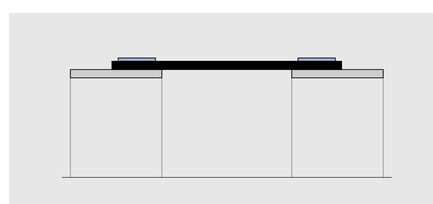


At high temperature, the duct flanges need to be enlarged in order to create distance between the expansion joint and the duct. Pre-insulation ensures additional temperature dissipation.

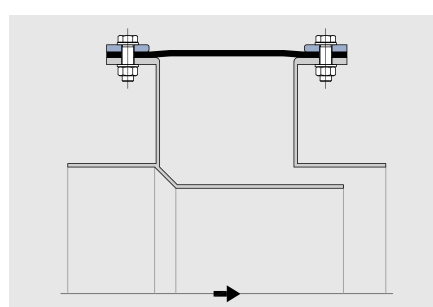


Belt expansion joints

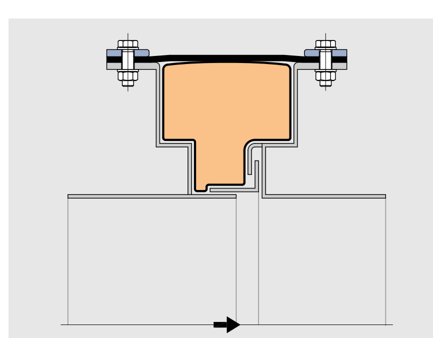
The belt design is the simplest way to join an expansion joint to a pipeline. For small dimensions and round duct cross sections, the expansion joint is attached directly to the pipeline using clamps. This design can be used for maximum temperatures of up to 400 °C.



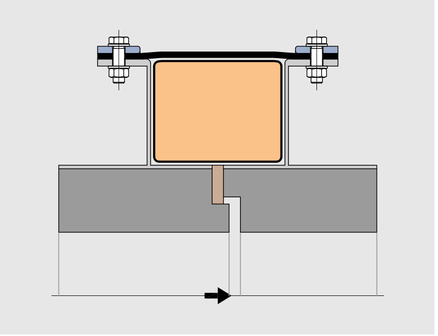
For temperatures greater than 400 °C, there needs to be a distance separating the expansion joint and duct. Angle profiles are also welded on, to which the expansion joint is then fixed using clamp bars. The height of the duct angle is dependent on the medium temperature, and is between 100 and 200 mm. The clamp bars must be designed with slotted holes to allow the expansion joint to be pressed on. For rectangular ducts, the corners must be furnished with a radius that corresponds to the height of the angle profile.



For high temperatures, we recommend that the duct angle be edged in order to reduce heat stress. This design is suitable for both round and rectangular ducts.



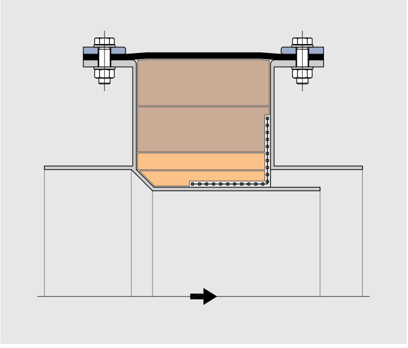
To shield against high temperatures, these expansion joints are often furnished with pre-insulation. In conjunction with a lined duct, such a design can be used up to 1200 °C.

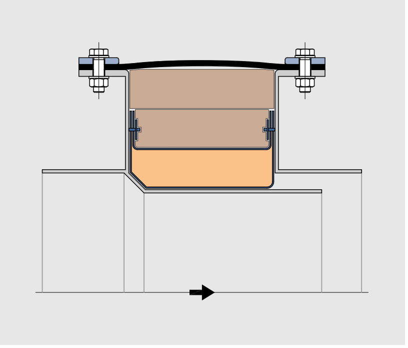


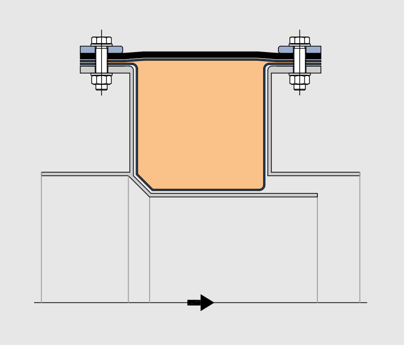
Expansion joint technology > Insulation and accessories

Pre-insulation

Pre-insulation reduces the medium temperature up to the expansion joint bellows and protects it against dust. It also supports the expansion joint in the event of pressure variations, and contributes to sound insulation. The pre-insulation layer is installed between the expansion joint bellows and the flow liner. It consists of individual, loosely superimposed layers of wire mesh, ceramic felt and mineral wool, or of pre-fabricated insulation pillows. Pre-insulation is added either to the flow liner or laterally to the construction angles using insulation spikes. In rare cases, insulating pillows are fixed together with the expansion joint belt.

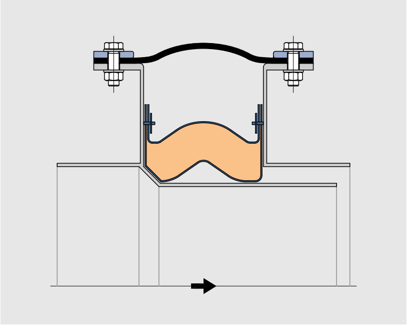


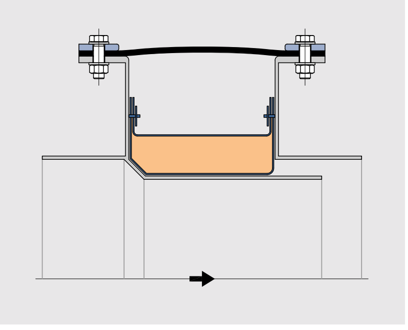




For very large movements, the insulation pillow is affixed laterally to the construction angles. In the event of movement, the pillow is compressed, and returns to its original shape when the system cools. Thus, the insulation will performs its function when the temperature begins to rise again.

In the temperature range between 150 °C and 200 °C, the thickness of the pre-insulation layer must be planned very carefully, since there is a risk that the temperature will drop below the dew point in the pre-insulation layer and that condensate will form.

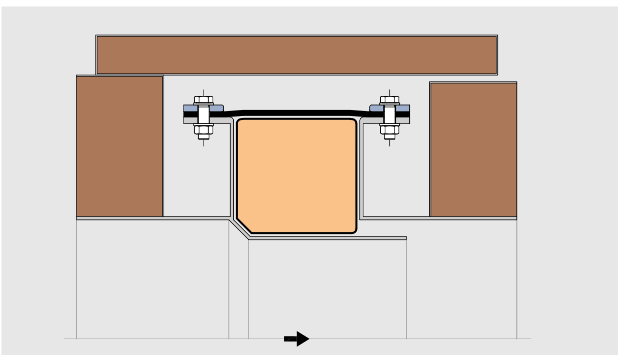


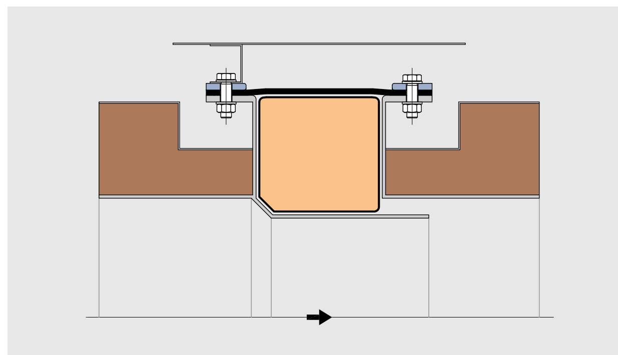


External insulation

If there is a risk of falling below the dew point and for medium temperatures of up to 220 °C, we recommend insulating the expansion joints from outside. Otherwise condensate may form and corrode the duct or lead to leaks in the expansion joint connection area.

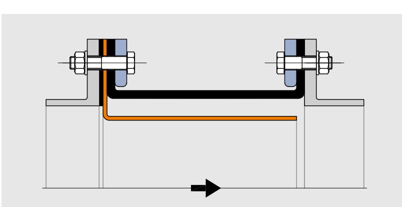
For temperatures over 220 °C, the expansion joint may in no event be insulated from the outside, since the expansion joint's convection would otherwise no longer be assured. The external insulation should then simply be applied up to the construction angle. In order to reduce the temperature up to the expansion joint in any case, at least 1/3 of the construction angle height remains uninsulated. A rear-ventilated system installed externally to protect against accidental contact allows for the expansion joint's thermal radiation, and protects it against both adverse weather effects and mechanical damage.

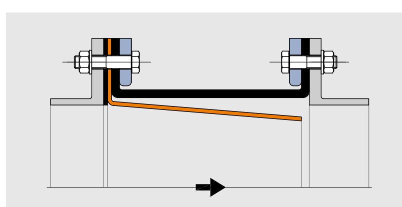


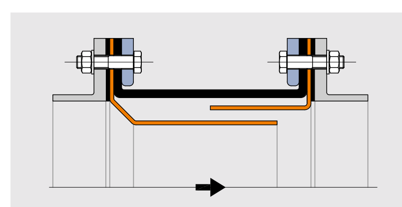


Flow liners

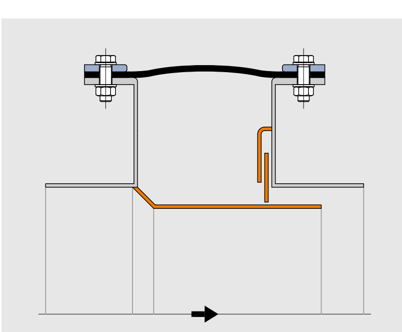
Flow liners should be used if the flow rate is greater than 30 m/s or if there are solids present in the medium. Flow liners are also used if the expansion joint has been installed immediately after a change in the direction of the duct. For horizontal ducts and vertical ducts with a media flow from the top down, the flow liners are installed in the direction of flow.

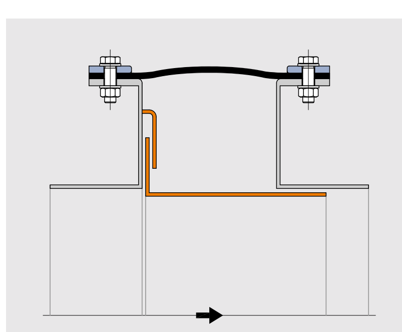


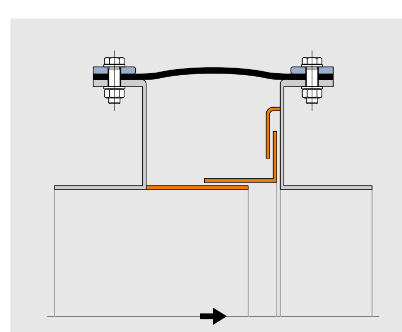




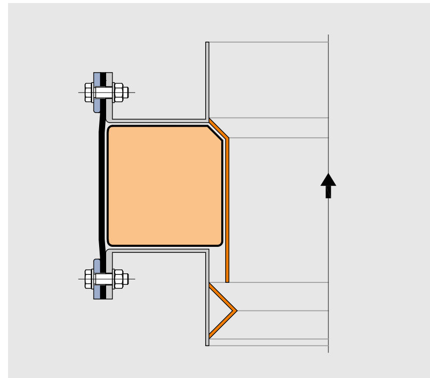
For expansion joints with construction angles, the flow liners are usually welded on. In some cases, the expansion joint will need to be designed with an installation seam. In order to protect the pre-insulation layer from dust accumulation in expansion joints with construction angles, a swimming flow liner or sliding plate has proven to be of value when guided on one side with a retaining plate on the construction angle, such that it permits duct movements in all directions.







In the event of media flow from the bottom up in vertical or inclined lines, they are installed against the media flow. A bend is welded to the inside of the duct before the open end of the flow liner, which will then conduct the medium past the flow liner opening. Deposits of solid matter between the expansion joint and flow liner are thus avoided.

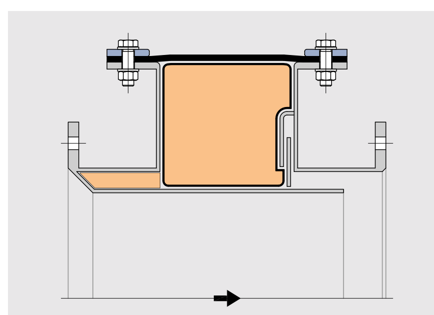


Fixing elements

Flange expansion joints are fixed using backing flanges on the duct flange. For belt expansion joints installed directly onto the line, clamps are used. If a duct angle is necessary, the expansion joints are pressed onto the angle flange using clamp bars. In order to keep the pressure of the backing flange or clamp bar constant when the system is at high temperature, disc spring packets can be used. If needed, we can deliver all necessary fixing elements as accessories.

Expansion joint installation units

Expansion joint installation units are pre-fabricated installation sets that make installation much easier. Expansion joints, pre-insulation layers and steel parts are fully pre-mounted and can simply be screwed or welded into the duct. In the event of system modifications, the installation unit can be removed and overhauled at our factory.



Installation

Flange expansion joints are usually supplied without an installation seam. Belt expansion joints are manufactured more often as an open belt, especially for very large dimensions, and if flow liners are welded on or if duct lining is present. In order to compensate for assembly tolerances, these expansion joints are usually only punched on one side at the factory.

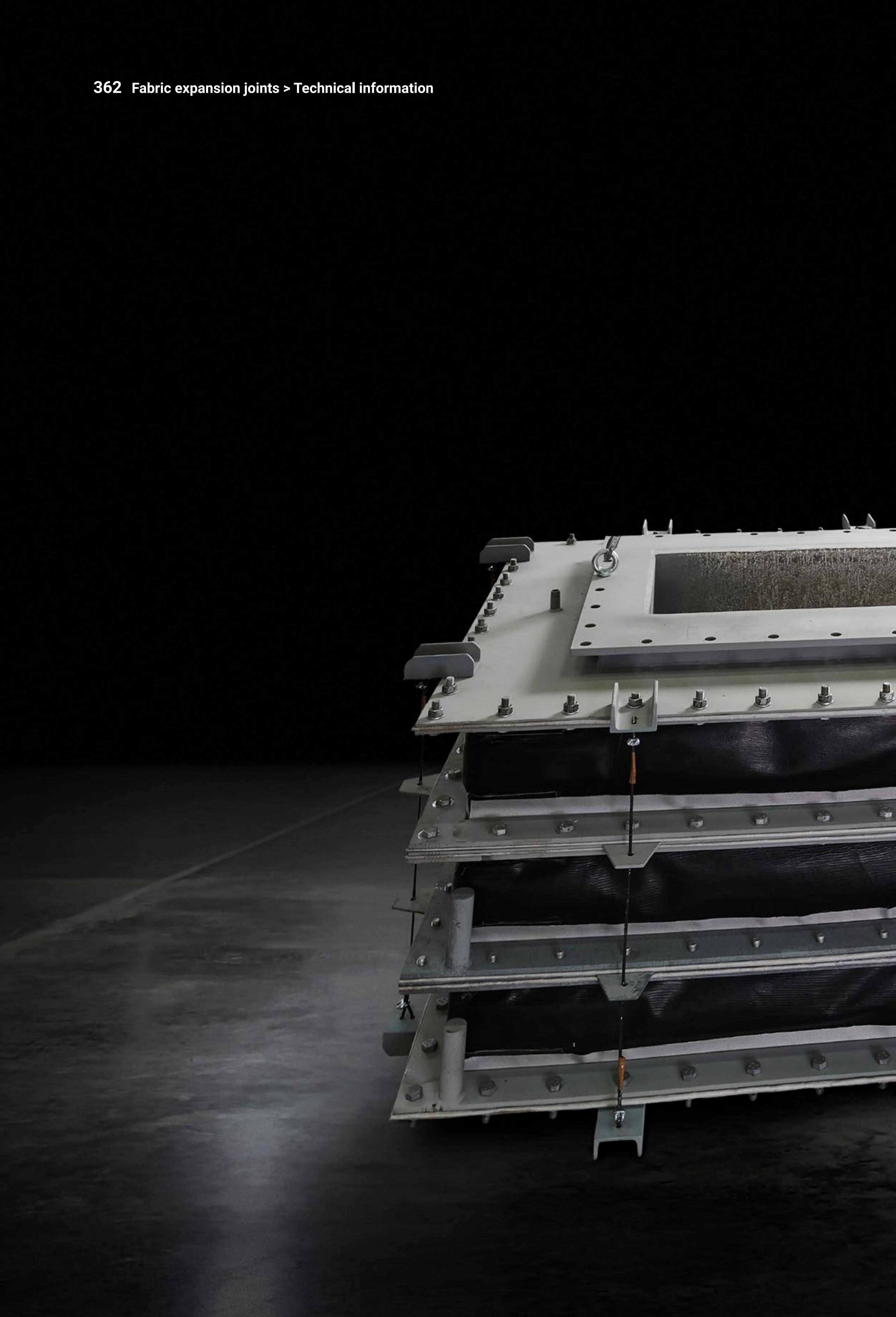
Our optimally equipped installation team will provide complete installation services for new construction or retrofitting activities; we can also appoint a field supervisor to train your workers and to support and monitor installation activities.

Installation set

Our installation set contains all the tools and aids needed to close fabric expansion joints, including a PTFE welding tool. You can use it to weld a gas-tight sealing layer using PTFE film. With reference to our detailed assembly instructions that specially cover the closure of individual fabric layers, sealing films and external layers, any trained assembler will be able to close fabric expansion joints independently at the installation site.

The scope of delivery for expansion joints with installation seams includes the tools needed to close the expansion joint, such as sewing needles, thread and glue. If the installation set with PTFE welding tools is not ordered, the PTFE film is made endless by clinching.

We will be happy to train your staff in the installation and closure of our expansion joints at our factory.



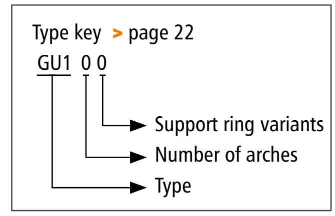
Fabric expansion joint unit for large axial movements ready to install after ash cyclone. Operating temperatur 550 °C

Flange expansion joints

Ducting Expansion Joints

GU100

> Type GU100



Flange expansion joint without arch

Design:	Straight or conical elastomer or multilayer expansion joint with self-sealing flanges and single or multi-part backing flanges
Installation method:	Fixes to flange at duct level
Dimensions:	For round, rectangular and oval duct cross sections
Installation length:	According to customer specification
Media temperature:	Suitable for up to 400 °C
Pressure:	Up to ±0.25 bar Higher pressures on request
Movement:	For axial, lateral and angular movements Benchmarks: axial compression = approx. 0.20 x installation length axial extension = approx. 0.20 x installation length lateral displacement = approx. 0.15 x installation length In the event of axial extension and simultaneous lateral displacement, movements are reduced For large lateral movements, we recommend presetting the duct against the direction of movement

Application:
Power plants, waste incineration plants, gas turbines, cement factories, paper industry, steel industry e. g. in the exhaust pipes, in ventilators, in air ducts, in the flue gas scrubber, in filter systems

<10⁶ Ohm

EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Expansion joint variants

	Elastomer expansion joint	Multilayer expansion joint
Temperature:	up to 200 °C	up to 400 °C
Design:	Single-layer elastomer expansion joint fully joined with one or more fabric reinforcement inserts	Multilayer fabric expansion joint consisting of interior insulating layers, embedded sealing films and exterior pressure carrier fabrics
Material:	**Rubber grades:** up to 100 °C: EPDM, IIR, CSM, NBR up to 180 °C: FPM up to 200 °C: Silicon (Q) **PTFE lining:** Permanently embedded on the inside at the rubber bellows in order to withstand corrosive chemical attack, available starting at ∅ 300 mm **Inserts:** Polyamid, polyester, aramide, glass fibre, and steel mesh	**Internal layers:** PTFE glass fibre fabric laminate, glass fibre fabric, glass mat, silicate fabric **Sealing films:** PTFE film, stainless steel film **External layer:** Silicon coated glass fibre fabric PTFE-glass fibre fabric laminate

Flanges

Design: Single- or multi-part backing flanges with clearance holes

Flange norms: According to customer specification

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Flow liners

Design: Cylindrical, conical or telescoping flow liner (> page 360)

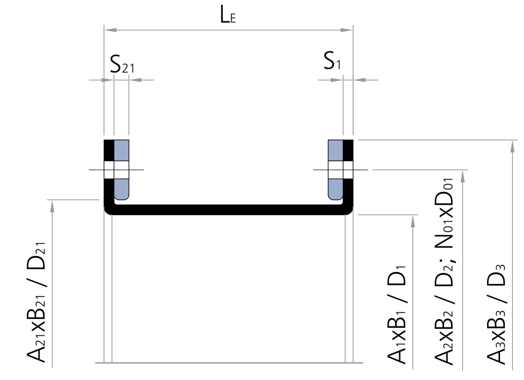
Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Optional accessories

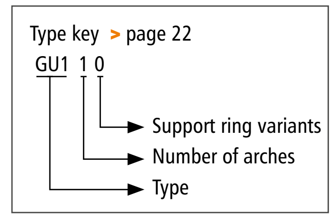
Fixing:
Screws
Nuts
Washers
Disc springs

Cross section GU100



GU110

> Type GU110



Flange expansion joint with one or more arches

Design: Single or multi-arch elastomer or multilayer expansion joint with self-sealing flanges and single or multi-part backing flanges
Optional external pressure support rings in the arch trough
Optional vacuum support rings

Installation method: Fixes to flange at duct level

Dimensions: For round, rectangular and oval duct cross sections

Installation length: According to customer specification

Media temperature: Suitable for up to 400 °C

Pressure: Up to ±0.25 bar
Higher pressures on request

Movement: For axial, lateral and angular movements
Benchmarks:
axial compression = approx. 0.25 x installation length
axial stretching = approx. 0.25 x installation length
lateral displacement = approx. 0.20 x installation length
In the event of axial extension and simultaneous lateral displacement, movements are reduced
For large lateral movements, we recommend presetting the duct against the direction of movement

Application:
Power plants, waste incineration plants, gas turbines, cement factories, paper industry, steel industry e. g. in the exhaust pipes, in ventilataors, in air ducts, in the flue gas scrubber, in filter systems

<10⁶ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Expansion joint variants

	Elastomer expansion joint	Multilayer expansion joint
Temperature:	up to 200 °C	up to 400 °C
Design:	Single-layer elastomer expansion joint fully joined with one or more fabric reinforcement inserts	Multilayer fabric expansion joint consisting of interior insulating layers, embedded sealing films and exterior pressure carrier fabrics
Material:	**Rubber grades:** up to 100 °C: EPDM, IIR, CSM, NBR up to 180 °C: FPM up to 200 °C: Silicon (Q) **PTFE lining:** Permanently embedded on the inside at the rubber bellows in order to withstand corrosive chemical attack, available starting at ∅ 300 mm **Inserts:** Polyamid, polyester, aramide, glass fibre, and steel mesh	**Internal layers:** PTFE glass fibre fabric laminate, glass fibre fabric, glass mat, silicate fabric **Sealing films:** PTFE film, stainless steel film **External layer:** Silicon coated glass fibre fabric PTFE glass fibre fabric laminate

Flanges

Design: Single- or multi-part backing flanges with clearance holes

Flange norms: According to customer specification

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Flow liners

Design: Cylindrical, conical or telescoping flow liner (> page 360)

Materials: Carbon steel, stainless steel

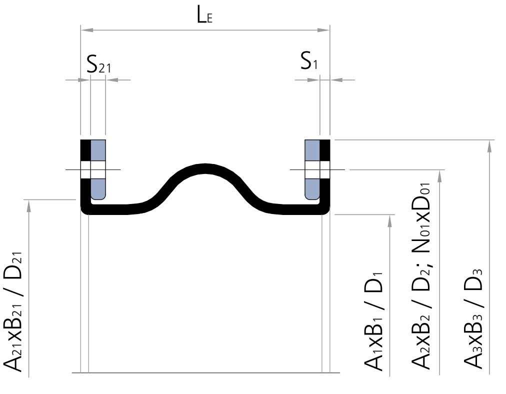
Coating: Primed, hot-dip galvanised, special paint

Optional accessories

Fixing: Screws
Nuts
Washers
Disc springs

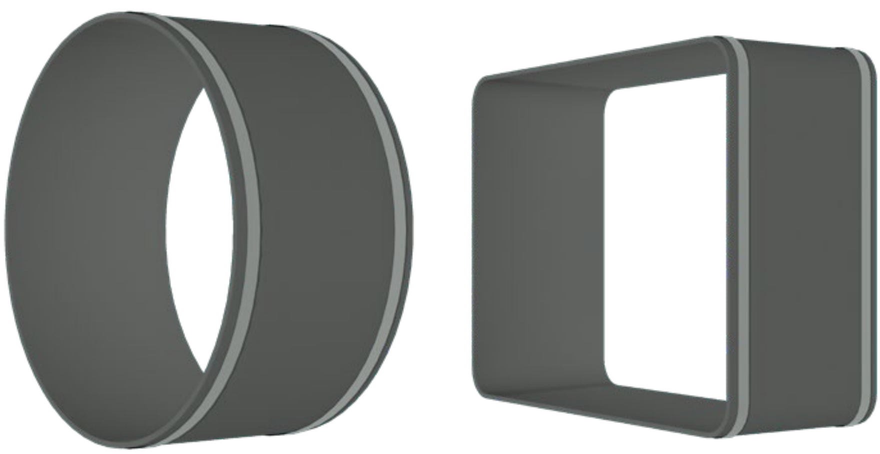
Support rings: Vacuum rings inside in the arch apex and/or external support rings in the arch trough

Cross section GU110

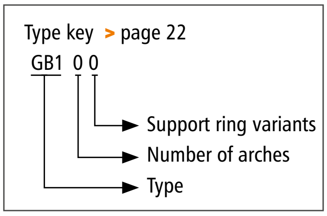


Belt expansion joints

GB100



> Type GB100



Belt expansion joint without arch

Design:	Straight or conical elastomer or multilayer expansion joint with sleeves for clamped fixing, ideally only for round or oval duct cross sections Optional expansion joint with installation seam
Installation method:	Clamped fixing at duct level
Dimensions:	For round and oval duct cross sections of up to approx. ∅ 1,500 mm
Installation length:	= Installation gap + 2x fixing width Individually according to customer specifications
Fixing width:	Depends on pressure, diameter and clamp design at least 40 mm
Media temperature:	Suitable for up to 400 °C
Pressure:	Up to ±0.25 bar Higher pressures on request
Movement:	For axial, lateral and angular movements Benchmarks: axial compression = approx. 0.20 x installation gap axial extension = approx. 0.20 x installation gap lateral displacement = approx. 0.15 x installation gap In the event of axial extension and simultaneous lateral displacement, movements are reduced In the event of axial extension or vacuum, the expansion joint can be pulled from the pipeline (provide groove at end of pipeline if needed) For large lateral movements, we recommend presetting the duct against the direction of movement

Application:
Power plants, waste incineration plants, gas turbines, cement factories, paper industry, steel industry e. g. in exhaust pipes, in ventilators, in air ducts, in ash lines, in filter systems

<10⁵ Ohm

Request assembly instructions at:
www.ditec-adam.de/en/contact

Expansion joint variants

	Elastomer expansion joint	Multilayer expansion joint
Temperature:	up to 200 °C	up to 400 °C
Design:	Single-layer elastomer expansion joint fully joined with one or more fabric reinforcement inserts	Multilayer fabric expansion joint consisting of interior insulating layers, embedded sealing films and exterior pressure carrier fabrics.
Material:	**Rubber grades:** up to 100 °C: EPDM, IIR, CSM, NBR up to 180 °C: FPM up to 200 °C: Silicon (Q) **PTFE lining:** Permanently embedded on the inside at the rubber bellows in order to withstand corrosive chemical attack, available starting at ∅ 300 mm **Inserts:** Polyamid, polyester, aramide, glass fibre, and steel mesh	**Internal layers:** PTFE glass fibre fabric laminate, glass fibre fabric, glass mat, silicate fabric **Sealing films:** PTFE film, stainless steel film **External layer:** Silicon coated glass fibre fabric PTFE-glass fibre fabric laminate

Fastening clamps

Design: Depending on pressure and diameter, endless clamp belt or hinge bolt clamps
At higher pressures, 2 parallel clamps per side

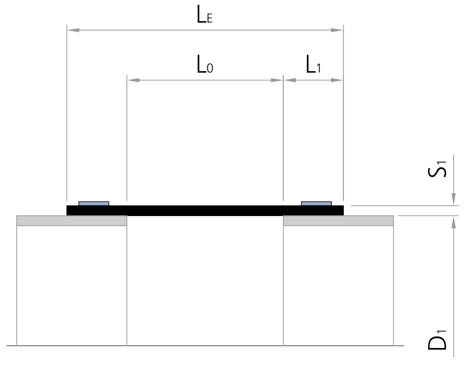
Width: Endless clamp belt: ¾"
Hinge bolt clamp: depending on Ø: 18–30 mm

Materials: Endless clamp belt with screw lugs (tongs): 1.7300
Hinge bolt clamp, belt and housing: 1.4016 (Screw steel galvanised)

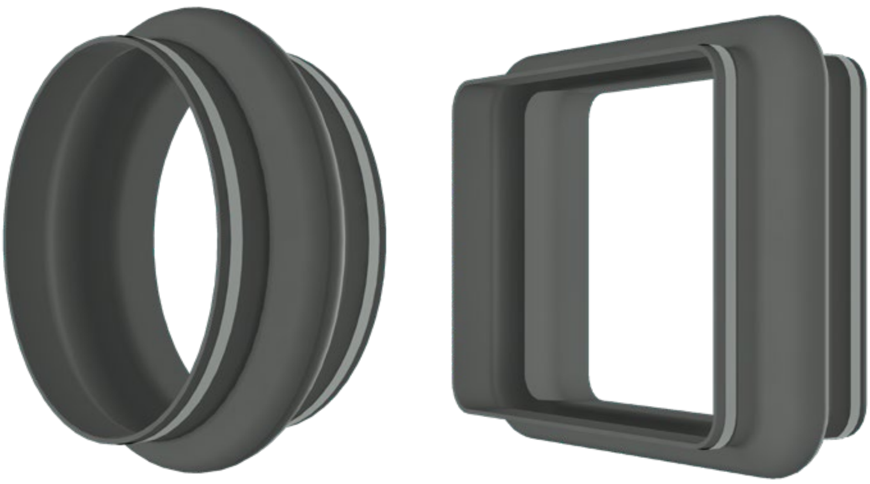
Optional accessories

Installation set: Tools and aids for punching and closing the expansion joint seam

Cross section GB100



GB110



> Type GB110

Type key > page 22

GB1 1 0

- Support ring variants
- Number of arches
- Type

Belt expansion joint with one or more arches

Design: Cylindrical, single or multi-arch elastomer or multilayer expansion joint with sleeves for clamped fixing, ideally only for round or oval duct cross sections
Optional expansion joint with installation seam
Optional external pressure support rings in the arch trough
Optional vacuum support rings

Installation method: Clamped fixing at duct level

Dimensions: For round and oval duct cross sections of up to approx. ∅ 1,500 mm

Installation length: = Installation gap + 2x fixing width
Individually according to customer specifications

Fixing width: Depends on pressure, diameter and clamp design at least 40 mm

Media temperature: Suitable for up to 400 °C

Pressure: Up to ±0.25 bar. Higher pressures on request

Movement: For axial, lateral and angular movements
Benchmarks:
axial compression = approx. 0.25 x installation gap
axial extension = approx. 0.25 x installation gap
lateral displacement = approx. 0.20 x installation gap
In the event of axial extension and simultaneous lateral displacement, movements are reduced
In the event of axial extension or vacuum, the expansion joint can be pulled from the pipeline (provide groove at end of pipeline if needed)
For large lateral movements, we recommend presetting the duct against the direction of movement

Application:
Power plants, waste incineration plants, gas turbines, cement factories, paper industry, steel industry e. g. in exhaust pipes, in ventilators, in air ducts, in ash lines, in filter systems

<10⁶ Ohm EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Expansion joint variants

	Elastomer expansion joint	Multilayer expansion joint
Temperature:	up to 200 °C	up to 400 °C
Design:	Single-layer elastomer expansion joint fully joined with one or more fabric reinforcement inserts	Multilayer fabric expansion joint consisting of interior insulating layers, embedded sealing films and exterior pressure carrier fabrics.
Material:	**Rubber grades:** up to 100 °C: EPDM, IIR, CSM, NBR up to 180 °C: FPM up to 200 °C: Silicon (Q) **PTFE lining:** Permanently embedded on the inside at the rubber bellows in order to withstand corrosive chemical attack, available starting at ∅ 300 mm **Inserts:** Polyamid, polyester, aramide, glass fibre, and steel mesh	**Internal layers:** PTFE glass fibre fabric laminate, glass fibre fabric, glass mat, silicate fabric **Sealing films:** PTFE film, stainless steel film **External layer:** Silicon coated glass fibre fabric PTFE-glass fibre fabric laminate

Fastening clamps

Design: Depending on pressure and diameter, endless clamp belt or hinge bolt clamps
At higher pressures, 2 parallel clamps per side

Width: Endless clamp belt: ¾"
Hinge bolt clamp: depending on Ø: 18–30 mm

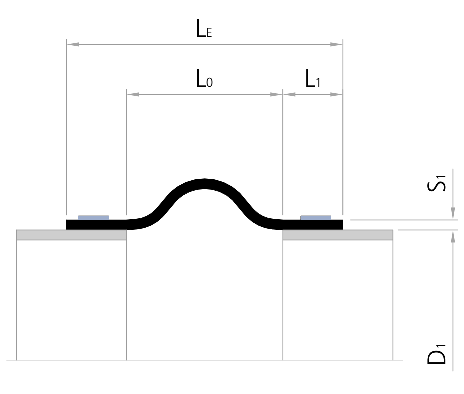
Materials: Endless clamp belt with screw lugs (tongs): 1.7300
Hinge bolt clamp, belt and housing: 1.4016 (Screw steel galvanised)

Optional accessories

Support rings: Vacuum support rings inside in the arch apex and/or external pressure support rings in the arch trough

Installation set: Tools and aids for punching and closing the expansion joint seam

Cross section GB110



GB200

> Type GB200

Type key > page 22
GB2 0 0
- Support ring variants
- Number of arches
- Type

Belt expansion joint on duct angles without arch

Design:	Straight or conical elastomer or multilayer expansion joint with sleeves for clamp bar fixing Optional expansion joint with installation seam
Installation method:	Clamp bar fixing on duct angles
Dimensions:	For round and rectangular duct cross sections
Installation length:	= Installation gap + 2x fixing width Individually according to customer specifications
Fixing width:	Depends on pressure and diameter between 60 and 100 mm
Media temperature:	Depending on the height of the duct angle, suitable for up to 500 °C
Pressure:	Up to ±0.25 bar Higher pressures on request
Movement:	For axial, lateral and angular movements Benchmarks: axial compression = approx. 0.20 x installation length axial extension = approx. 0.20 x installation gap lateral displacement = approx. 0.15 x installation gap In the event of axial extension and simultaneous lateral displacement, movements are reduced For large lateral movements, we recommend presetting the duct against the direction of movement

Application:
Power plants, waste incineration plants, gas turbines, cement factories, paper industry, steel industry e. g. in exhaust pipes, in ventilators, in air ducts, in ash lines, in filter systems

Ω <10^9 Ohm
EX

Request assembly instructions at:
www.ditec-adam.de/en/contact

Expansion joint variants

	Elastomer expansion joint	Multilayer expansion joint
Temperature:	up to 200 °C	up to 500 °C
Design:	Single-layer elastomer expansion joint fully joined with one or more fabric reinforcement inserts	Multilayer fabric expansion joint consisting of interior insulating layers, embedded sealing films and exterior pressure carrier fabrics.
Material:	**Rubber grades:** up to 100 °C: EPDM, IIR, CSM, NBR up to 180 °C: FPM up to 200 °C: Silicon (Q) **PTFE lining:** Permanently embedded on the inside at the rubber bellows in order to withstand corrosive chemical attack, available starting at ∅ 300 mm **Inserts:** Polyamid, polyester, aramide, glass fibre, and steel mesh	**Internal layers:** PTFE glass fibre fabric laminate, glass fibre fabric, glass mat, silicate fabric **Sealing films:** PTFE film, stainless steel film **External layer:** Silicon coated glass fibre fabric PTFE-glass fibre fabric laminate

Clamp bar

Design: Multi-part clamp bar with slotted holes

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

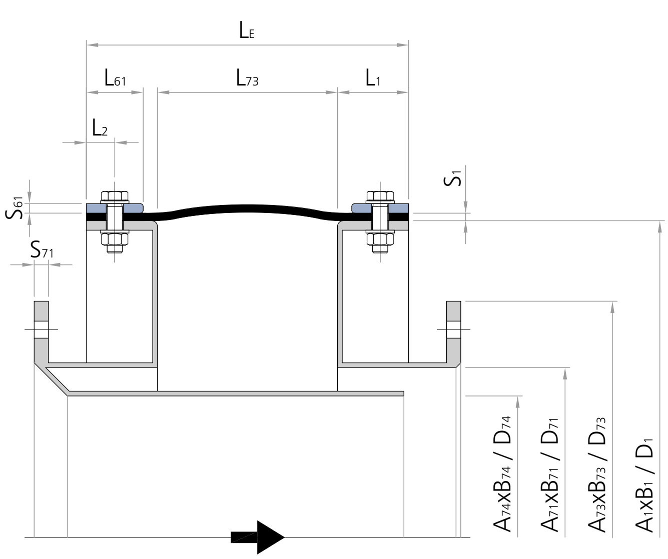
Optional accessories

Fixing: Screws, nuts, washers, disc springs

Installation unit: Installation-ready installation unit complete with pre-mounted expansion joint, flow liner and connecting ends for welding or screwing into the duct (> page 361)

Installation set: Tools and aids for punching and closing the expansion joint seam

Cross section GB200



GB210

> Type GB210

Type key > page 22

GB2 1 0

- Support ring variants
- Number of arches
- Type

Belt expansion joint on duct angles with one or more arches

Design: Cylindrical, single or multi-arch elastomer or multilayer expansion joint with sleeve for clamp bar fixing
Optional expansion joint with installation seam
Optional external pressure support rings in the arch trough
Optional vacuum support rings

Installation method: Clamp bar fixing on duct angles

Dimensions: For round and rectangular duct cross sections

Installation length: = Installation gap + 2x fixing width
Individually according to customer specifications

Fixing width: Depends on pressure and diameter between 60 and 100 mm

Media temperature: Depending on the height of the duct angle, suitable for up to 500 °C

Pressure: Up to ±0.25 bar
Higher pressures on request

Movement: For axial, lateral and angular movements
Benchmarks:
axial compression = approx. 0.25 x installation gap
axial extension = approx. 0.25 x installation gap
lateral displacement = approx. 0.20 x installation gap
In the event of axial extension and simultaneous lateral displacement, movements are reduced
For large lateral movements, we recommend presetting the duct against the direction of movement

Application:
Power plants, waste incineration plants, gas turbines, cement factories, paper industry, steel industry e. g. in exhaust pipes, in ventilators, in air ducts, in ash lines, in filter systems

Request assembly instructions at:
www.ditec-adam.de/en/contact

Expansion joint variants

	Elastomer expansion joint	Multilayer expansion joint
Temperature:	up to 200 °C	up to 500 °C
Design:	Single-layer elastomer expansion joint fully joined with one or more fabric reinforcement inserts	Multilayer fabric expansion joint consisting of interior insulating layers, embedded sealing films and exterior pressure carrier fabrics.
Material:	**Rubber grades:** up to 100 °C: EPDM, IIR, CSM, NBR up to 180 °C: FPM up to 200 °C: Silicon (Q) **PTFE lining:** Permanently embedded on the inside at the rubber bellows in order to withstand corrosive chemical attack, available starting at ∅ 300 mm **Inserts:** Polyamid, polyester, aramide, glass fibre, and steel mesh	**Internal layers:** PTFE glass fibre fabric laminate, glass fibre fabric, glass mat, silicate fabric **Sealing films:** PTFE film, stainless steel film **External layer:** Silicon coated glass fibre fabric PTFE-glass fibre fabric laminate

Clamp bar

Design: Multi-part clamp bar with slotted holes

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Optional accessories

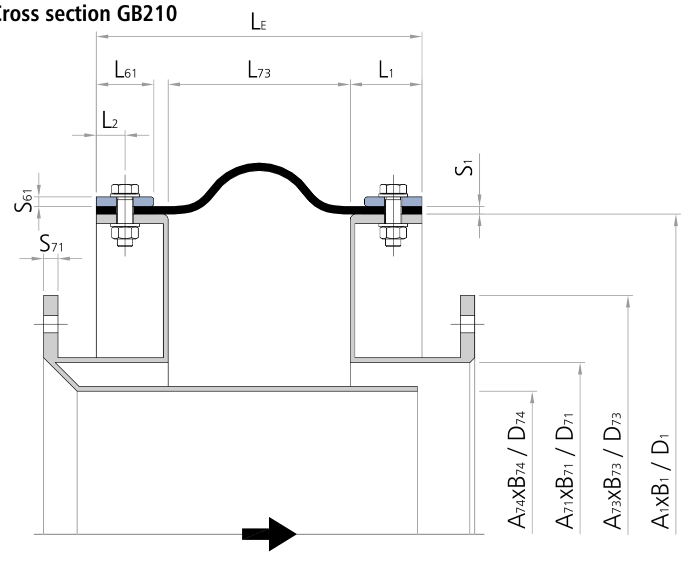
Fixing: Screws, nuts, washers, disc springs

Support ring: Vacuum rings inside in the arch apex and/or external support rings in the arch trough

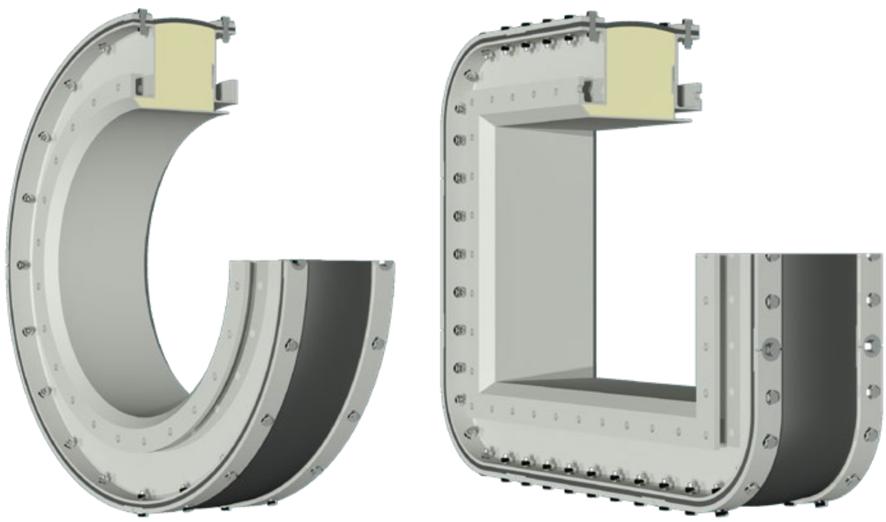
Installation unit: Installation-ready installation unit complete with pre-mounted expansion joint, flow liner and connecting ends for welding or screwing into the duct (> page 361)

Installation set: Tools and aids for punching and closing the expansion joint seam

Cross section GB210



GB300



> Type GB300

Type key > page 22
GB3 0 0
- Support ring variants
- Number of arches
- Type

Belt expansion joint on duct angles with pre-insulation, without arch

Design:	Straight or conical elastomer or multilayer expansion joint with sleeve for clamp bar fixing Optional expansion joint with installation seam
Installation method:	Clamp bar fixing on duct angles
Dimensions:	For round and rectangular duct cross sections
Installation length:	= Installation gap + 2x fixing width Individually according to customer specifications
Fixing width:	Depends on pressure and diameter between 60 and 100 mm
Media temperature:	Depending on the height of the duct angle and duct lining, suitable for up to 1200 °C
Pressure:	Up to ±0.25 bar Higher pressures on request
Movement:	For axial, lateral and angular movements Benchmarks: axial compression = approx. 0.20 x installation gap axial extension = approx. 0.20 x installation gap lateral displacement = approx. 0.15 x installation gap In the event of axial extension and simultaneous lateral displacement, movements are reduced For large lateral movements, we recommend presetting the duct against the direction of movement

Application:
Power plants, waste incineration plants, gas turbines, cement factories, paper industry, steel industry e. g. in exhaust pipes, in ventilators, in air ducts, in ash lines, in filter systems

Request assembly instructions at:
www.ditec-adam.de/en/contact

Expansion joints

	Multilayer expansion joint
Temperature:	Depending on the duct angle height and lining, up to 1200 °C
Design:	Multilayer fabric expansion joint consisting of interior insulating layers, embedded sealing films and exterior pressure carrier fabrics.
Material:	**Internal layers:** PTFE glass fibre fabric laminate, glass fibre fabric, glass mat, silicate fabric **Sealing films:** PTFE film, stainless steel film **External layer:** Silicon coated glass fibre fabric, PTFE-glass fibre fabric laminate

Pre-insulation

Design: Insulation layers, cut to the installation gap, consisting of heat-resistant wire mesh
Insulation layers made from glass, ceramic, silicate or mineral wool
Optional installation-ready, fabric-sheathed insulation pillow
Duct lining necessary for high medium temperatures

Clamp bar

Design: Multi-part clamp bar with slotted holes

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

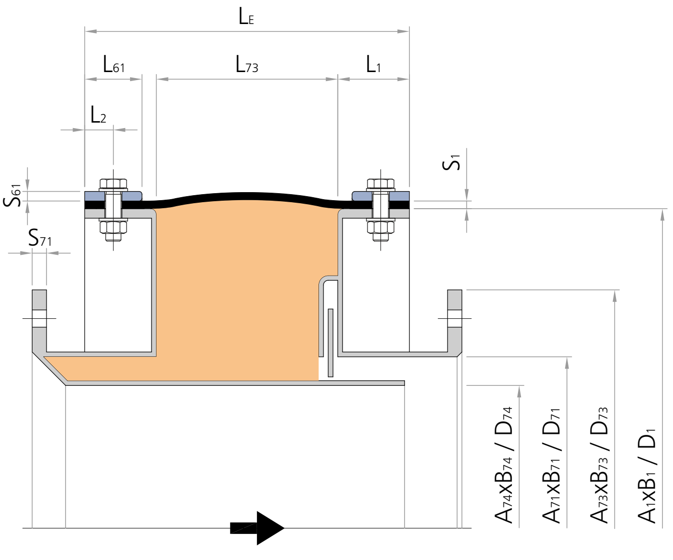
Optional accessories

Fixing: Screws, nuts, washers, disc springs

Installation unit: Installation-ready installation unit complete with pre-mounted expansion joint, flow liner and connecting ends for welding or screwing into the duct (> page 361)

Installation set: Tools and aids for punching and closing the expansion joint seam

Cross section GB300



GB310

> **Type GB310**

Type key > page 22

GB3 1 0
- Support ring variants
- Number of arches
- Type

Belt expansion joint on duct angles with pre-insulation, with one or more arches

Design: Cylindrical, single or multi-arch elastomer or multilayer expansion joint with sleeve for clamp bar fixing
Optional expansion joint with installation seam
Optional external pressure support rings in the arch trough
Optional vacuum support rings

Installation method: Clamp bar fixing on duct angles

Dimensions: For round and rectangular duct cross sections

Installation length: = Installation gap + 2x fixing width
Individually according to customer specifications

Fixing width: Depends on pressure and diameter between 60 and 100 mm

Media temperature: Depending on the height of the duct angle and duct lining, suitable for up to 1200 °C

Pressure: Up to ±0.25 bar
Higher pressures on request

Movement: For axial, lateral and angular movements
Benchmarks:
axial compression = approx. 0.25 x installation gap
axial extension = approx. 0.25 x installation gap
lateral displacement = approx. 0.20 x installation gap
In the event of axial extension and simultaneous lateral displacement, movements are reduced. For large lateral movements, we recommend presetting the duct against the direction of movement

Application:
Power plants, waste incineration plants, gas turbines, cement factories, paper industry, steel industry e. g. in exhaust pipes, in ventilators, in air ducts, in ash lines, in filter systems

Request assembly instructions at:
www.ditec-adam.de/en/contact

Expansion joints

	Multilayer expansion joint
Temperature:	Depending on the duct angle height and lining, up to 1200 °C
Design:	Multilayer fabric expansion joint consisting of interior insulating layers, embedded sealing films and exterior pressure carrier fabrics
Material:	**Internal layers** PTFE glass fibre fabric laminate, glass fibre fabric, glass mat, silicate fabric **Sealing films:** PTFE film, stainless steel film **External layer:** Silicon coated glass fibre fabric, PTFE-glass fibre fabric laminate

Pre-insulation

Design: Insulation layers, cut to the installation gap, consisting of heat-resistant wire mesh
Insulation layers made from glass, ceramic, silicate or mineral wool
Optional installation-ready, fabric-sheathed insulation pillow
Duct lining necessary for high medium temperatures

Clamp bar

Design: Multi-part clamp bar with slotted holes

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Optional accessories

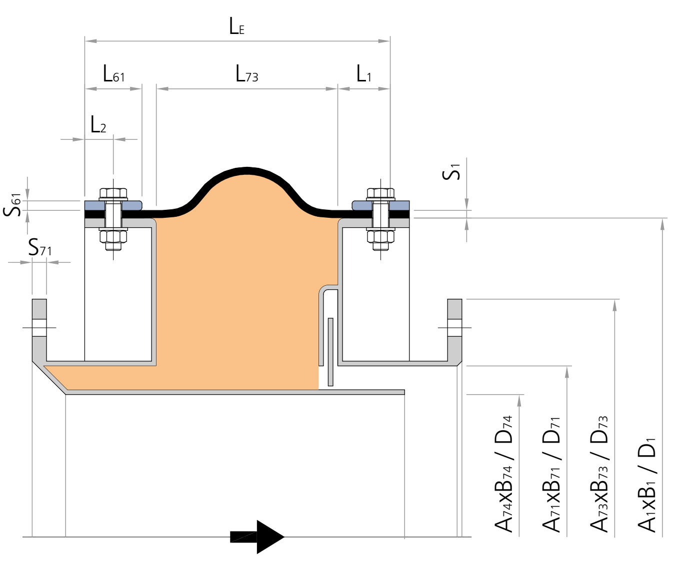
Fixing: Screws, nuts, washers, disc springs

Support rings: Vacuum rings inside in the arch apex and/or external support rings in the arch trough

Installation unit: Installation-ready installation unit complete with pre-mounted expansion joint, flow liner and connecting ends for welding or screwing into the duct (> page 361)

Installation set: Tools and aids for punching and closing the expansion joint seam

Cross section GB310



Multilayer expansion joint bellows, type GB300
as a seal between the grate and boiler in a waste incineration plant

Multilayer expansion joint, type GB300
as a pre-fabricated installation unit
for ash discharge in a power plant
⌀ 5,500 x 600 mm, 750 °C

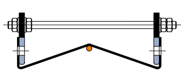
Elastomer expansion joints, type GU110
in the chute between the screw conveyor and sludge container
in a slurry incineration facility
⌀ 400 x 400 mm, 60 °C

Elastomer expansion joints, type GU100
on the scrubbing drums of a waste incineration plant
⌀ 2,400 mm, 80 °C


9850
E-2

Expansion joints for smoke escape, ventilation and EX protection zones

Expansion Joints for Smoke Escape



Expansion Joints for Ventilation and Air Conditioning Systems

Expansion Joints with Explosion Protection

BGS600

> **Type BGS600**

Type key > page 22
BGS6 0 0
- Support ring variants
- Number of arches
- Type

Smoke extraction fan expansion joint
at 600 °C for 120 minutes

Design:	Straight or conical fabric expansion joints (silicon free) with self-sealing flanges Single-part backing flange on both sides
Test temperature:	600 °C for 120 minutes
Test vacuum:	1,500 Pa at room temperature, 500 Pa at 600 °C
Installation method:	Fixes to flange at duct level
Dimensions:	For round and rectangular duct cross sections
Installation length:	100 to 250 mm
Media temperature:	Suitable for up to 120 °C long-term temperature
Pressure:	Up to ±15,000 Pa at room temperature
Movement:	For axial and lateral movements axial compression = 50 mm lateral displacement= 20 mm

Application:
Elastic connection to axial or radial ventilators in automatic smoke escape systems to compensate for vibrations and for sound separation e. g. for smoke escape in buildings and tunnels

Request assembly instructions at:
www.ditec-adam.de/en/contact

Flanges

Design: Single-part backing flange with clearance holes

Flange norms: The usual norms for ventilation systems

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Flow liners

Design: Cylindrical, conical or telescoping flow liner (> page 360)

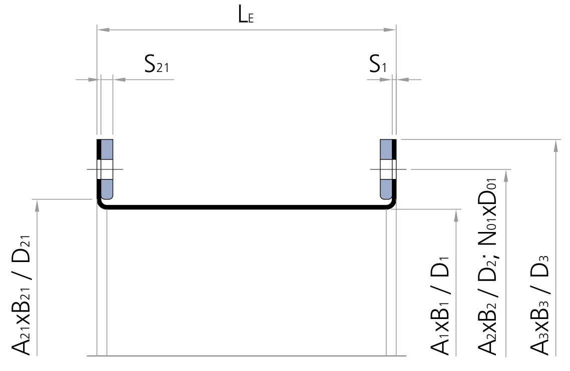
Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Optional accessories

Support rings: Vacuum ring made from spring steel

Cross section BGS600



BGK611

> Type BGK611

Type key > page 22

BGK6 1 1
- 1 → Support ring variants
- 1 → Number of arches
- BGK6 → Type

Smoke extraction single arch ducting expansion joint

at 600 °C for 120 minutes

Design:	Single-arch fabric expansion joint (silicon-free) with self-sealing flanges Vacuum support ring made from spring steel wire inside at the arch apex Single-part backing flange on both sides with guide rods
Test temperature:	600 °C for 120 minutes
Test vacuum:	1,500 Pa at room temperature, 500 Pa at 600 °C
Installation method:	Fixes to flange at duct level
Dimensions:	For round and rectangular duct cross sections
Installation length:	160 mm
Media temperature:	Suitable for up to 120 °C long-term temperature
Pressure:	Up to ±15,000 Pa at room temperature
Movement:	For axial movements axial compression = 100 mm

Application:
Expansion joints in ducts and on smoke escape flaps in automatic smoke escape systems to compensate for thermal growth in the event of fire e. g. for building and tunnel smoke escape

Request assembly instructions at:
www.ditec-adam.de/en/contact

Flanges

Design: Single-part backing flange with clearance holes and guide bolts

Flange norms: According to customer specification

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

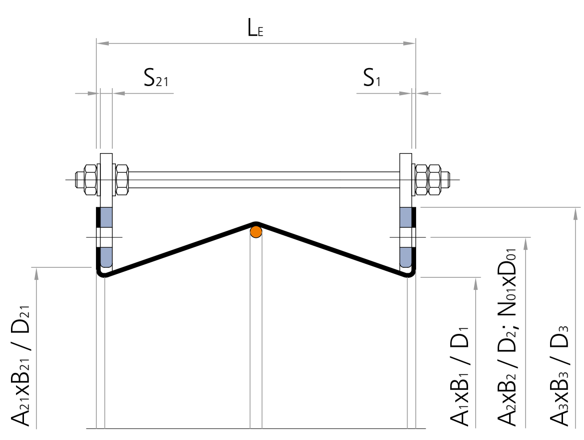
Flow liners

Design: Cylindrical, conical or telescoping flow liner (> page 360)

Materials: Carbon steel, stainless steel

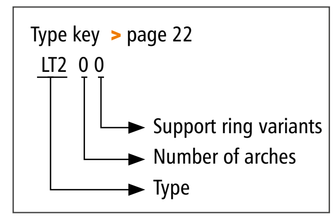
Coating: Primed, hot-dip galvanised, special paint

Cross section BGK611



LT200

> **Type LT200**



Fan or ducting expansion joint
up to 200 °C

Design: Straight or conical fabric expansion joint made from silicon with a aramide fibre fabric insert and self-sealing flanges or sleeve for clamped fixing
Optional single-part backing flanges or clamps

Installation method: Fixing to flanges or using clamps at duct level

Dimensions: For round, rectangular and oval duct cross sections

Installation length: According to customer specification

Media temperature: Suitable from –60 to +200 °C, maximum 250 °C

Pressure: Up to ±15,000 Pa

Movement: For axial and lateral movements

Application:
Power plants, waste incineration plants, cement factories, paper industry e. g. on ventilators, in air conditioning and ventilation ducts

Request assembly instructions at:
www.ditec-adam.de/en/contact

Flanges

Design: Single-part backing flange with clearance holes

Flange norms: According to customer specification

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Fastening clamps

Design: Depending on pressure and the diameter, endless clamp belt, screw thread belt, small clamps or hinge bolt clamps. At higher pressures, 2 adjacent clamps per side.

Width:

Endless clamp belt:	¾″
Screw thread belt:	½″
Small clamp:	depending on Ø: 9 – 12 mm
Hinge bolt clamp:	depending on Ø: 18 – 30 mm

Materials:

Endless clamp belt with screw lugs (tongs):	1.7300
Screw thread belt with threaded screw lugs:	1.4310
Small clamp, belt and housing:	1.4016 (Screw steel galvanised)
Hinge bolt clamp, belt and housing:	1.4016 (Screw steel galvanised)

Flow liners

Design: Cylindrical, conical or telescoping flow liner (> page 360)

Materials: Carbon steel, stainless steel

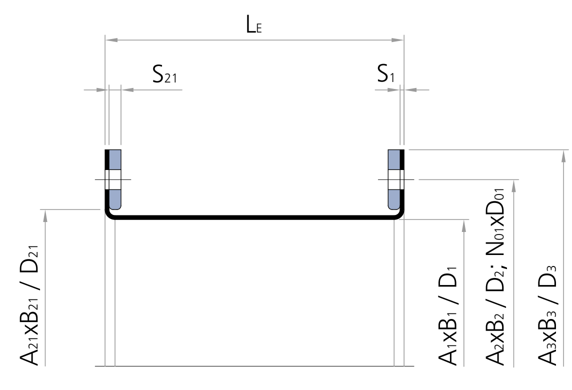
Coating: Primed, hot-dip galvanised, special paint

Optional accessories

Fixing:

Screws
Nuts
Washers
Disc springs

Cross section LT200



EX100

> Type EX100

Type key > page 22

EX1 0 0

- Support ring variants
- Number of arches
- Type

Conductive fan or ducting expansion joint

Design:	Straight or conical fabric expansion joint made from EPDM rubber with a polyamide fabric insert and self-sealing flanges or sleeves for clamped fixing and proof electrical conductivity Optional single-part backing flanges or clamps
Conductivity:	Surface resistance 1.4 x 10^5 Ω electrical discharge capability
Installation method:	Fixing to flanges or using clamps at duct level Earthing with min. 10 cm^2 contact surface required
Dimensions:	For round, rectangular and oval duct cross sections
Installation length:	According to customer specification
Media temperature:	Suitable between –30 to +100 °C
Pressure:	Up to ±15,000 Pa
Movement:	For axial and lateral movements

Application:
Pharmaceutical industry, food processing, petrochemical and refining technology, varnish industry, e. g. on ventilators, in air conditioning and ventilation ducts, in suction units

<10^5 Ohm

EX

Request assembly instructions at:

www.ditec-adam.de/en/contact

Flanges

Design: Single-part backing flange with clearance holes

Flange norms: According to customer specification

Materials: Carbon steel, stainless steel

Coating: Primed, hot-dip galvanised, special paint

Fastening clamps

Design: Depending on pressure and the diameter, endless clamp belt, screw thread belt, small clamps or hinge bolt clamps. At higher pressures, 2 adjacent clamps per side.

Width:

Endless clamp belt:	¾"
Screw thread belt:	½"
Small clamp:	depending on Ø: 9–12 mm
Hinge bolt clamp:	depending on Ø: 18–30 mm

Materials:

Endless clamp belt with screw lugs (tongs):	1.7300
Screw thread belt with threaded screw lugs:	1.4310
Small clamp, belt and housing:	1.4016 (Screw steel galvanised)
Hinge bolt clamp, belt and housing:	1.4016 (Screw steel galvanised)

Flow liners

Design: Cylindrical, conical or telescoping flow liner (> page 360)

Materials: Carbon steel, stainless steel

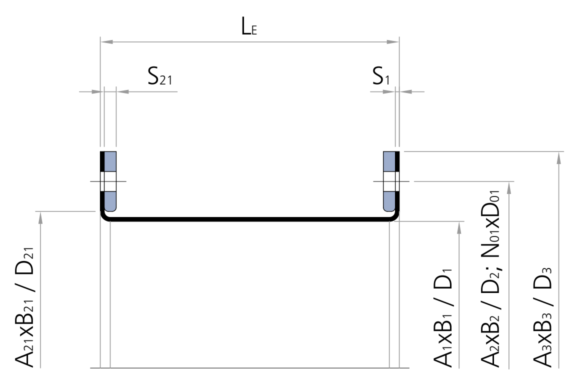
Coating: Primed, hot-dip galvanised, special paint

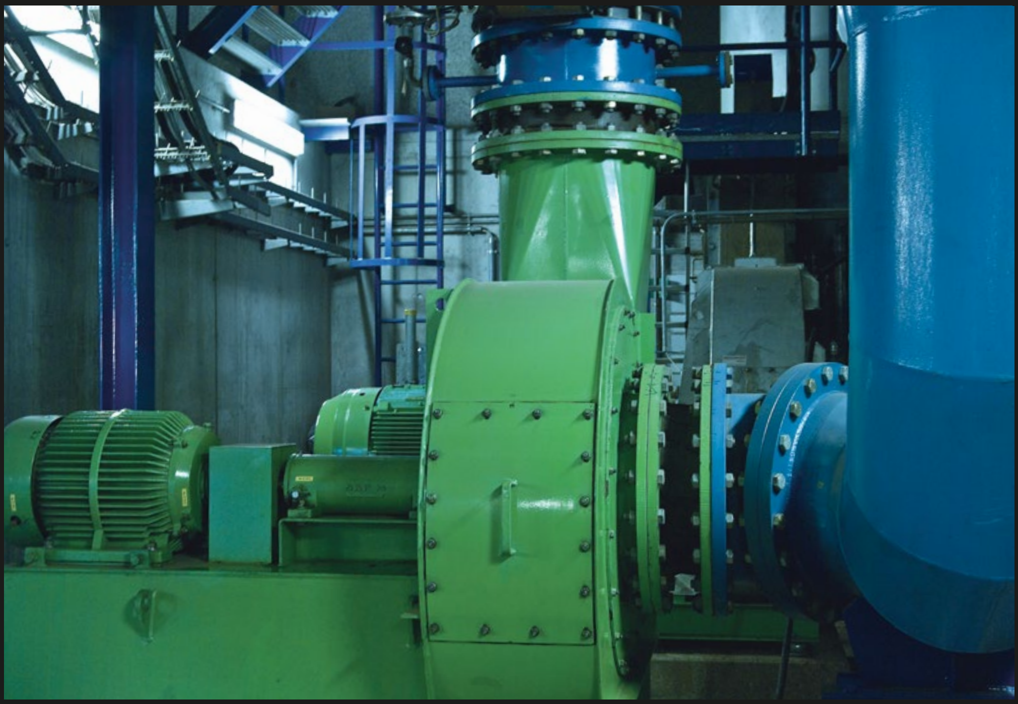
Optional accessories

Fixing:

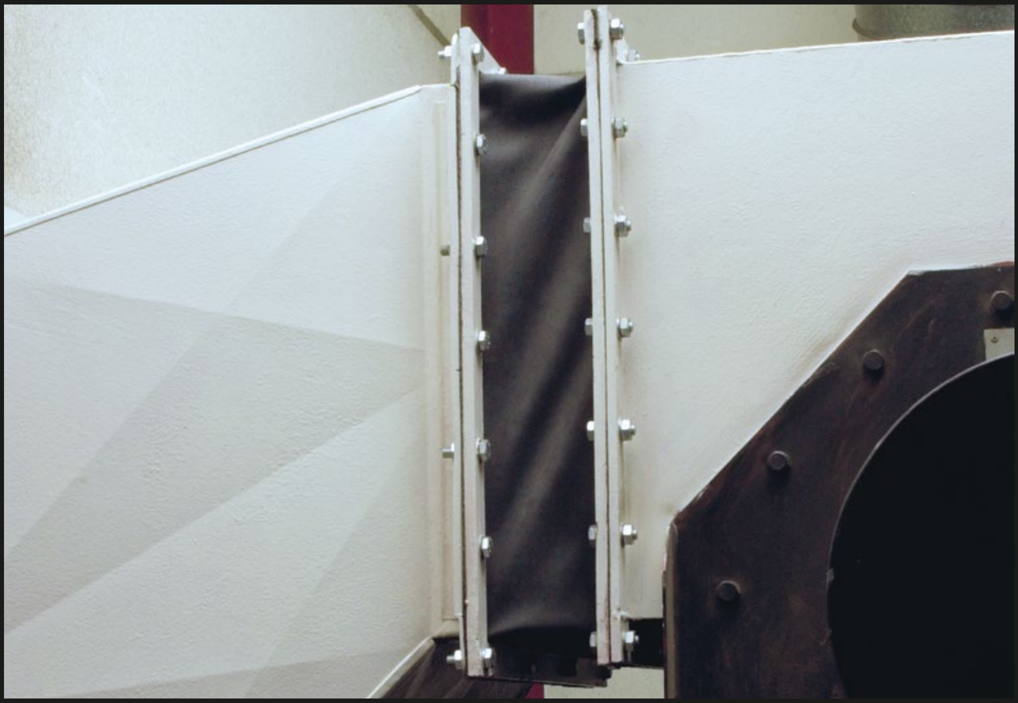
Screws
Nuts
Washers
Disc springs

Cross section EX100





Elastomer expansion joint, type GU100
on the vacuum and pressure side of a ventilator
in a slurry incineration facility
⌀ 500 mm, 180 °C



Fabric expansion joint, type EX100
in a solvent extraction facility
⌀ 500 x 500 mm, 80 °C

New fabric expansion joint installation unit at the ash outlet of a power plant

Belt expansion joint type GB300 on duct angles with pre-insulation

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