Rubber expansion joints

General description of rubber expansion joints

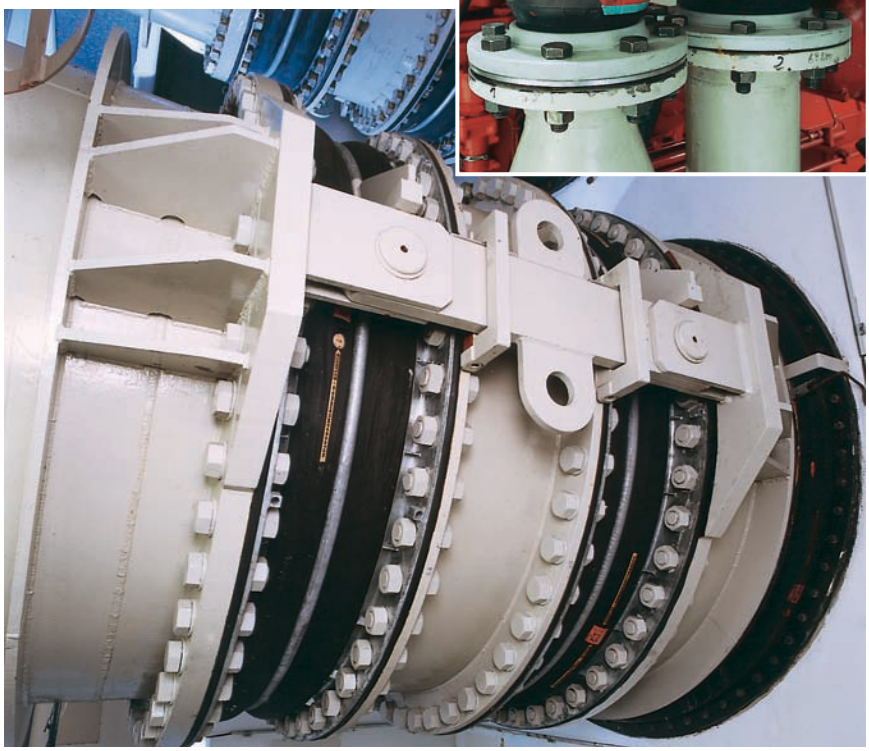
STENFLEX® rubber expansion joints have served with distinction for more than 45 years. They are the preferred flexible pipe connection elements of choice in manufactured appliances, machinery, apparatus and piping engineering.

Constant further development and innovations update our product range to meet the needs of current and changing markets. Numerous patent applications and on-going optimization of the formulae for our rubber grades ensure that our customers always receive state-of-the-art products; highly reliable and of superior durability.

The large-scale industrial manufacture of the rubber bellows, constant control of compliance with all manufacturing, business and quality processes in line with EN ISO 9001:2008 and decades of experience in the development and manufacture of rubber expansion joints: all this guarantees a uniform product of the highest standard. It underlines the STENFLEX® Quality Claim.

Nearly all nuclear plants throughout Europe are equipped with STENFLEX® expansion joints. Many of our rubber expansion joints have been used in a large variety of applications. They have served on site in trouble-free operation for decades. STENFLEX® rubber expansion joints have passed national and international type approvals and suitability tests and are certified by numerous classification societies.

Our engineers in the fields of mechanical-, and processing-plant engineering work hand-in-hand with our modern R & D department. They are always available for technical consultation and ready to help in solving specific application problems at any time.



Purpose

Expansion joints are used in appliances, machinery, apparatus and pipe systems where space is limited:

- to compensate for movement
- to compensate for expansion caused by differences in temperature
- to reduce tension
- to absorb noise and vibration transmission
- to compensate for ground, and foundation settlement
- to compensate for pipeline movement aboard ships
- as adapters to compensate for installation inaccuracies
- as dismantling pieces for fittings
- as elastic sealing elements, where pipelines pass through walls

Rubber expansion joints are used in a variety of industrial applications:

- Machine engineering
- Domestic industry
- Processing plant engineering
- Power station technology
- Shipbuilding

Development/Design

STENFLEX® rubber expansion joints are rated by state-of-the-art computing techniques (which include the Finite Element Method). They are optimized under experimental conditions.

Our development engineers use the most up-to-date development tools throughout the development stage to validate the construction process in terms of form, function and installation. This means we offer our customers the following advantages:

- Design and development in line with the specific requirements, resulting in safe and extremely durable expansion joints
- Efficient products by incorporating superior product functionality
- Structures that are easy to install
- Reduced lead times for special designs

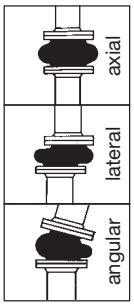
The excellent features of STENFLEX® rubber expansion joints include outstanding absorption of movement and good vibration damping properties. Depending on the particular expansion joint type, a maximum of the forces produced by the pipe internal pressure is absorbed by the specific design of the expansion joint itself, and not passed on to neighbouring system components.

Versions

Rubber expansion joints differ according to the following criteria:

- type (universal/lateral/angular expansion joints)
- pipe connection type (flange, thread)
- rubber quality of the bellows (rated to the media transported in the pipes)
- bellows structure (rated to the pressure and temperature load)

Our expansion joints are delivered ready to install. Together with the standard versions featured in the catalogue, special versions can also be developed and produced on request for special operating conditions. Connection parts (that deviate from DIN) such as ISO, ANSI, BS, VG and SAE standards etc. are also possible.

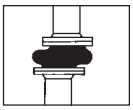


Universal rubber expansion joints

Structure:
Rubber bellows with connection parts (flange or thread)

Movement absorption:
Axial, lateral, angular and simultaneous movement absorption is possible. Universal expansion joints with two bellows and a connecting pipe are used to absorb large movement.

Fixed points:
To absorb axial force a pipe's fixed points must be robust. Pipe routing must be correct.

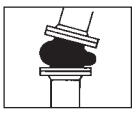


Lateral rubber expansion joints:

Structure:
Rubber bellows with flanges and laterally movable restraints.

Movement absorption:
Lateral shift of the expansion joints is possible. The restraint absorbs axial reaction force and relieves the pressure on the pipe's fixed points. In double joints the type of restraint allows for movement on one plane; in ball joints it allows for all-around movement. Lateral expansion joints with two bellows and a connecting pipe are used to absorb large movement.

Fixed points:
Only light fixed points are required to absorb force from lateral movement and friction force.



Angular rubber expansion joints:

Structure:
Rubber bellows with flanges and hinge restraint. The rotating axis of the hinge restraint is in the middle of the bellows.

Movement absorption:
Angular movement of the expansion joint is possible. The angular joints regulate a defined angular movement, absorb axial reaction force and relieve the pressure on the pipe's fixed points.
We differentiate between angular expansion joints with a hinge (bellows' angular movement guided on one plane) and angular expansion joints with a cardan hinge restraint (bellows movement guided on two planes). Angular expansion joints with connecting pipe are used to compensate large movements.

Fixed points:
Only light fixed points are required to absorb angular movement force and friction force.

Rubber expansion joints

General description of rubber expansion joints

Rubber bellows

Structure

STENFLEX® rubber bellows have been optimized by calculation and verified by experimentation to produce highly elastic pressure-resistant bellows with flow contours to meet demanding absorption tasks.

Rubber bellows have a three-ply wall structure:

- inner ply (core) of medium-resistant rubber compound
- intermediate ply of rubber compound with tensile elements for reinforcement
- outer ply (cover layer) of weather-proof rubber compound

The arrangement of the tensile reinforcing elements is ascertained by calculation and experimentation to ensure that the force of pressure within the bellows can be absorbed. A permanent bond exists between the embedded tensile reinforcing elements and the rubber material.

The rubber grades used for the inner- and outer ply are empirically defined rubber compounds rated to certain properties (media resistance, ozone resistance, UV resistance, elasticity, wear-proof characteristics, etc.)

Material qualities

STENFLEX® rubber bellows are made of elastic synthetic elastomers. Their wide range of industrial applications are covered with combinations of the four standard elastomer qualities EPDM, CIIR, NBR and CR together with tensile reinforcing elements.

Elastomers are basic materials that are processed by adding sulphur, fillers, plasticizers and aging protection agents to produce rubber compounds suitable for vulcanization. Under the influence of temperature and pressure the vulcanization process (cross linkage) converts the rubber compounds into rubber grades – with their typical elastic properties.

Material properties such as hardness, elasticity, tensile strength, temperature resistance, etc., are rated to the corresponding application. Documents detailing media resistance of the rubber grades are available on request.

Rubber grade	Trade name	STENFLEX® colour code	Properties	Applications
EPDM Ethylene propylene diene rubber	Buna AP Keltan Vistaton	orange	Heat- and weather-proof rubber grade with special resistance to highly oxidizing media and very many chemicals (not oil-resistant). Temperature resistance in continuous operation* from –40 °C to +100 °C. Resistant to hot water up to +100 °C.	Water, hot water, cooling water, sea water, steam, acids, lyes, pickling lyes, hypochlorite solutions etc. Special type AS in heating systems (as per DIN 4809 up to +110 °C)
CIIR Chloro isobutylene isoprene rubber	Butyl	white	Rubber grade complying with the latest hygiene directives for drinking water systems as per KTW recommendation by the German Health Department (KTW = Plastics for drinking water). Impermeable to gas. Temperature resistance in continuous operation* –40 °C to +90 °C. Resistant to hot water up to +90 °C.	Recommended for drinking water supply systems
NBR Nitril-butadiene rubber	Perbunan	red	Quality with excellent oil resistance, very resistant to swelling, e.g. even in contact with petrol/benzole mixture, impermeable to gas for hydrocarbons. Temperature resistance in continuous operation* –30 °C to +100 °C, resistant to hot water up to +70 °C.	Municipal gas, fuel oil, mineral oil, blast furnace waste gas, compressed air systems, cooling water with antifreezing compound
CR Polychloroprene rubber	Neoprene Baypren	--	Multi-purpose rubber grade with good oil, weather and flame resistance, very good resistance to ageing. Resistant to various organic and inorganic chemicals. Impermeable to gas for hydrocarbons. Temperature resistance in continuous operation* from –30 °C to +100 °C, resistant to hot water up to +70 °C.	weather-proof outer ply (cover layer)

*The given temperature for continuous operation refers solely to the rubber grade. When reinforcements or other filling material is embedded, the temperature resistance in continuous operation increases.

Connection parts

STENFLEX® rubber expansion joints are supplied ready for installation. They are connected to pipes, fittings, pumps, tanks etc., by flanges or screwed union. The connections are standardized to fit commercially available pipes, flanges and threads.

Flanges

Flanges for rubber expansion joints in the series A, AR, AS, B, E, G, GR-SAE R and RS have a specially turned groove designed to accommodate the rubber rim. They are fitted in a rotating position at the bellows to simplify mounting to the pipeline.

STENFLEX® rubber expansion joints in the series C, D, and W have press-on retaining flanges.

The flanges have a stabilizing collar on the side facing the bellows (moulded bead or welded rim). This stabilizes the rubber bellows and ensures compliance with safety spacing between the ends of the screws and the rubber bellows throughout the entire range of pressure and movement. The purpose is to eliminate the risk of damage to the rubber bellows caused by the screw ends. Special flanges are fitted with stabilizer rings.

Standard screws can be used because the flanges are drilled for through-bolts according to EN 1092 (DIN 2501). Other pitch circles and bores are possible e.g. to ANSI (ASA), BS, SAE and for ventilation systems.

Flanges vary according to expansion joint type (universal, lateral and angular expansion joints) and size as follows:

- Standard flanges
- Flanges with molded ears
- Flanges with welded ears
- Oval flanges
- Flanges with two pitch circles
- Flanges made to other standards

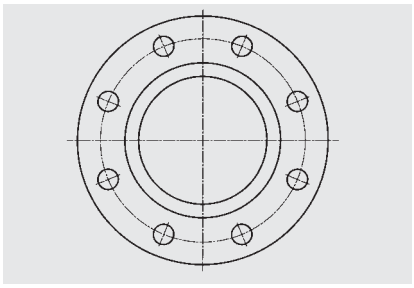
Standard flanges for rubber expansion joints are machined to produce a fit within the tolerances.

The following special versions are possible on request:

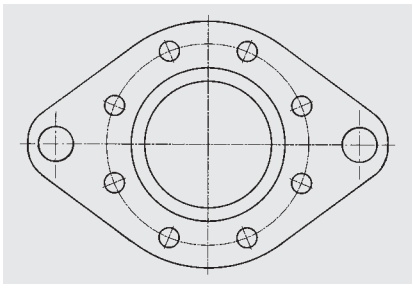
- All-round machined flanges
- Special materials deviating from the standard data sheet (stainless steels, aluminum, plastic, etc.)

Flanges made of unalloyed steels are galvanized and blue chromated or given an anti-corrosion prime coating. Stainless steel is used to meet tougher corrosion protection requirements. Other materials and forms of corrosion protection (hot-dip galvanizing, special varnish, coating etc.) can be supplied on request.

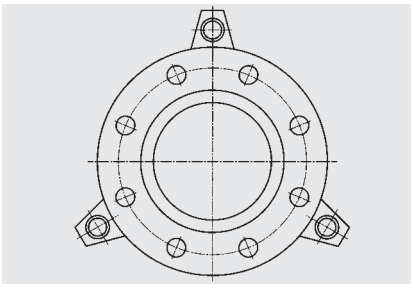
Flange material	Material No. as per DIN EN	Abbreviation as per DIN EN (DIN)
Unalloyed steel	**1.0038**	**S235JR**
	1.0577	**S355J2**
Stainless steel	**1.4541**	**X6CrNiTi18-10**
	1.4571	**X6CrNiMoTi17-12-2**
	1.4404	**X2CrNiMo17-12-2**



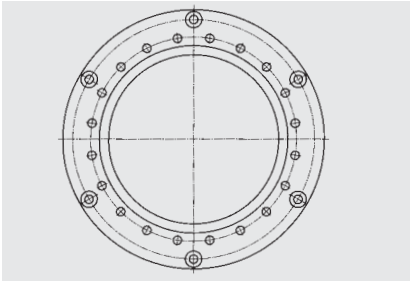
Standard flange with turned groove for rubber rim and stabilizing collar (universal expansion joint)



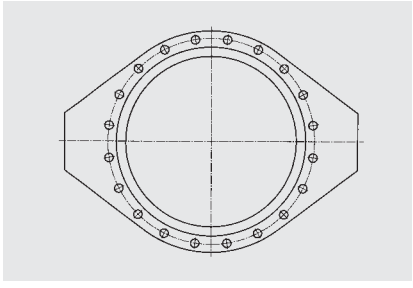
Flange with molded ears for the restraints (lateral expansion joints)



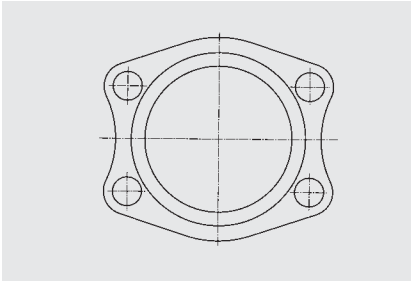
Flange with welded ears or molded ears for the restraints (lateral expansion joints)



Flange with second pitch circle for the restraints (lateral expansion joints)



Oval flange (angular expansion joints)



Flange as per SAE standard (type GR-SAE)

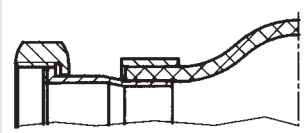
Rubber expansion joints

General description of rubber expansion joints

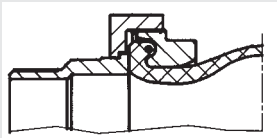
Threaded connections

Threaded connections are primarily used in domestic industry. Rubber expansion joints type AG-5 and AS-5 are equipped with female thread and flat seal in accordance with ISO 228-1, or with female or male thread (thread sealing) in accordance with ISO 7-1 (DIN 2999).

The threaded connections for type AS-5 are made of galvanized annealed cast iron. Stainless steel connection parts are used to meet increased anti-corrosion requirements (type AG-5). These are also suitable for pipes made of copper or plastic.



Type AG-5 with union nut as per ISO 228-1



Type AS-5 with male thread as per ISO 7-1

Material threaded part	Material No. as per DIN EN	Designation as per DIN EN (DIN)
Unalloyed steel	**1.0038**	**S235JR**
Stainless steel	**1.4571**	**X6CrNiMoTi17-12-2**

Restraints

Restraints are used for lateral and angular expansion joints. The restraints absorb the axial reaction force produced by internal pressure. Even so, the connected pipe must be equipped with light fixed points to absorb momentum force. The precise rating and operating parameters of the corresponding machinery or equipment must be known to calculate the degree of restrain correctly. Standard restraints are available for the lateral and angular expansion joint program. They are calculated on the basis of the material strength values at +50 °C. Reduced strength values are taken into consideration at higher temperatures.

Tie rod restraints

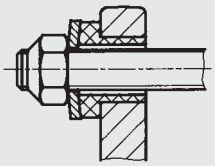
There are two types of tie rod restraints for lateral rubber expansion joints:

- Outer restraints to absorb reaction force from internal pressure (e.g. type A-2, AR-2, AS-2, B-2, R-2)
- Outer and inner restraints to absorb reaction force from internal pressure and vacuum (e.g. type A-4, AR-4, AS-4, B-4).

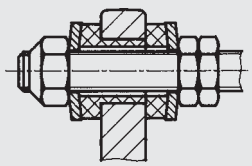
The tie rods in the flange ears for the lateral movement are carried

- by sound damping rubber sockets up to DN 150
- by spherical washers and conical seats as from DN 175

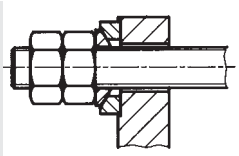
The tie rods, spherical washers and conical seats are galvanized and blue chromated. Stainless steel can be used for restraint elements to satisfy increased corrosion protection requirement. Other anti-corrosion coatings (hot-dip galvanizing, special varnish, coating) are available on request.



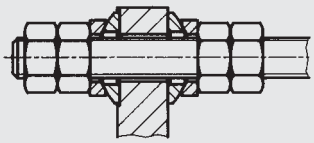
Sound damping outer restraint (lateral expansion joint)



Sound damping outer and inner restraint (lateral expansion joint)



Outer restraint with spherical washer and conical seat (lateral expansion joint)



Outer and inner restraint with spherical washer and conical seat (lateral expansion joint)

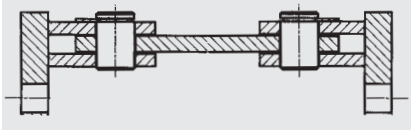
Material tie rod restraint	Material No. as per DIN EN	Designation as per DIN EN (DIN) or strength class
Unalloyed steel		
Tie rods	**–**	**5.6, 8.8**
Washers	**–**	**5, 8**
Stainless steel		
Tie rods, washers	**A2, 1.4057**	**50, 70, C3-80**
	A4, 1.4057	**50, 70, C3-80**

Hinge restraints

Angular rubber expansion joints are equipped with oval flanges and welded hinge restraints that consist of joint bars and bolts.

The hinge restraints of unalloyed steel are coated with anti-corrosion primer. Stainless steel parts are used to satisfy tougher corrosion protection requirements. Other materials and forms of corrosion protection (hot-dip galvanizing, special varnish, coating, etc.,) are available on request.

Restraint with welded joint bars and bolts (angular expansion joint)



Double hinge restraint with welded straps and bolts (lateral expansion joint)

Material hinge restraint	Material No. as per DIN EN	Designation as per DIN EN (DIN)
Unalloyed steel	**1.0038**	**S235JR**
	1.0577	**S355J2**
Stainless steel	**1.4541**	**X6CrNiTi18-10**
	1.4571	**X6CrNiMoTi17-12-2**

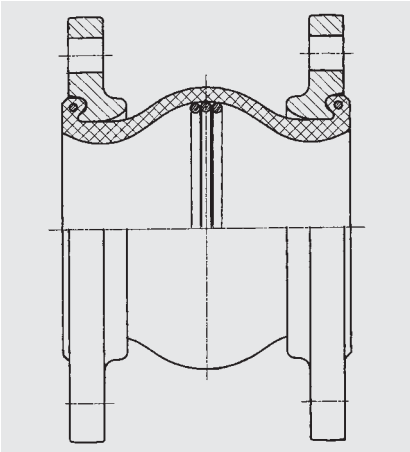
Accessories

STENFLEX® rubber expansion joints can be equipped with vacuum supporting rings, internal guide sleeves, outer protective covers, protective hoods or protective tubes.

Vacuum supporting rings

Depending on diameter and type, STENFLEX® rubber expansion joints are used for light to medium negative pressure. Vacuum supporting rings are fitted to the inner surface of the bellows convolutions for greater negative pressures (vacuum).

As a rule, the supporting rings are made of stainless steel up to DN 1000; for DN 1050 and larger, rubber-covered steel rings are used.



Rubber expansion joint with vacuum supporting ring

Guide sleeves

Normally internal guide sleeves are not required to reduce flow resistance because STENFLEX® rubber expansion joints have a streamlined inner surface with large transition radii (flow lines).

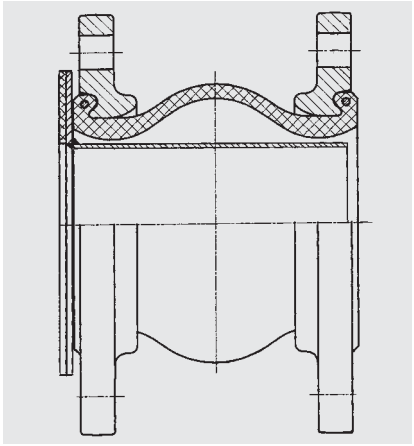
However, abrasive media or high flow velocities (see diagram) with high-frequency vibrations or turbulence (e.g. behind a pump) require that internal guide sleeves are installed to protect the rubber structure.

As a rule, the internal guide sleeves are made of stainless steel and are fitted with a flared flange. This seals the internal guide sleeve on the one side directly to the sealing face of the rubber bellows; on the other side of the flared flange an additional seal must be used against the counter flange.

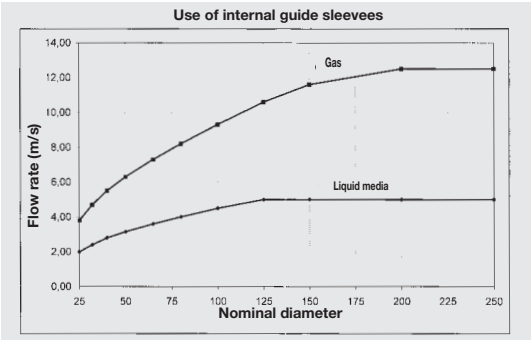
In the case of purely axial movement, cylindrical guide sleeves are used. For lateral and/or angular movement, conical internal guide sleeves are fitted (tapering cross section).

Telescopic internal guide sleeves are only used in special cases.

Being aware of the flow direction is very important when installing expansion joints with internal guide sleeves.



Rubber expansion joint with cylindrical internal guide sleeve and additional soft seal to the counter flange.



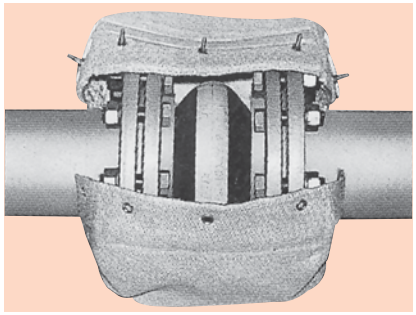
For flow rates, above the curve, it is advisable to install internal guide sleeves to protect the bellows. The data are of indicative nature.

Rubber expansion joints

General description of rubber expansion joints

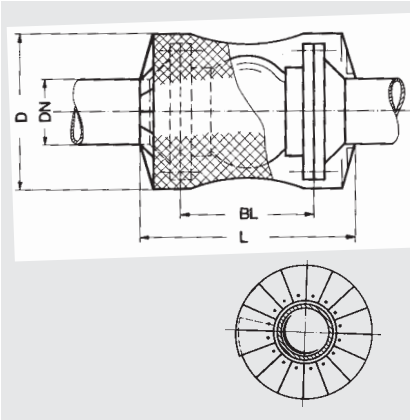
Protective covers

STENFLEX® protective covers for expansion joints are used where special operating conditions make it necessary to protect the expansion joint from external effects, or where adverse operating conditions and dangerous flow media make it necessary to protect the environment with a preventive splash-guard.



STENFLEX® flame protective cover K-1

Flame protective cover K-1



Application:
As protective cover to prevent flame penetration up to +800 °C for up to 30 minutes at a medium temperature of +80 °C, to maintain full operational ability of the expansion joint over this period.

When used aboard ships the protective cover together with STENFLEX® rubber expansion joints complies with the requirements of the classification agencies.

However, the best solution is to use our special type AS which is flame-proof.

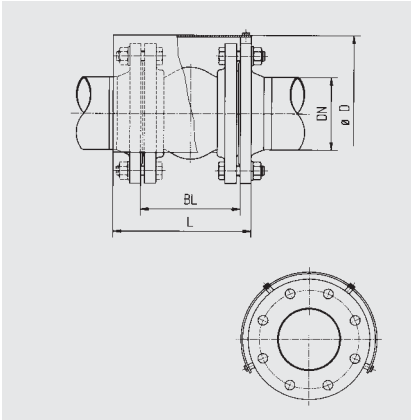
Properties
- Flame-proof
- Flexible material

Material
- Fabric

Structure
Flexible protective cover of special fabric with heat-proof insulation inlays; ready for installation with fastening screws to seal the cover.

Installation
The expansion joint is mounted according to the prescribed installation and mounting instructions. The protective cover also encompasses the pipe flanges.

Protective hood K-3



Application:
As protective hood under extremely adverse operating conditions or exposure to the elements (extreme sunshine), or risk of damage from external mechanical effects (sea, river, or road traffic).

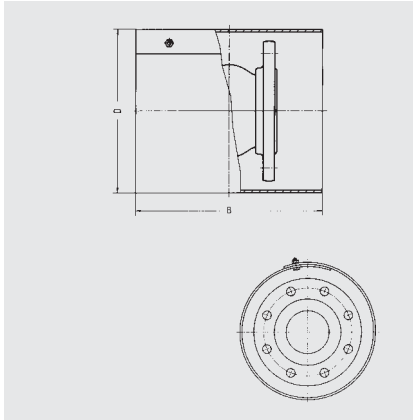
Properties
- Impact resistant
- Weather-proof
- Rigid

Material
- Stainless steel

Structure
Rigid protective stainless steel hood, mounted on one side (pre-mounted in the factory).

Installation
The expansion joint is mounted according to the prescribed installation and mounting instructions. The protective hood, open at the bottom, is placed over the expansion joint and counter flange and screwed on one side; the other side remains unfastened to give the expansion joint room to move.

Protective tube K-4



Application:
Primarily for underground pipelines to protect the expansion joint from soiling and possible earth pressure.

Properties
- Impact-proof
- Corrosion-resistant
- Rigid

Material
- Plastic
- Stainless steel

Structure
Rigid, cylindrical protective tube of impact-proof plastic or stainless steel, overlapping. With corrosion-proof screwed union.

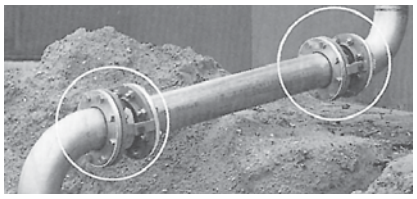
Installation
Before fitting the expansion joint, the closed protective tube is pushed over one of the two connection pipes; after the expansion joint has been installed, the tube is pulled back over the expansion joint and fastened in position.

Compensation systems

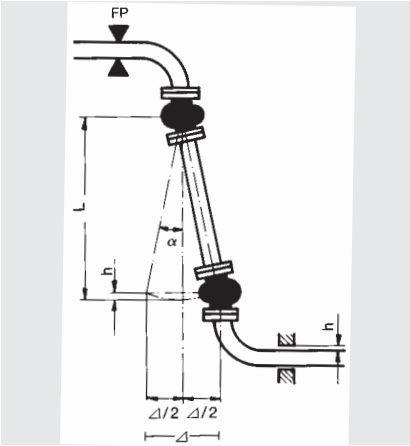
With more than 35 years of experience in expansion joint engineering, STENFLEX® is the competent partner for application-orientated solutions.

STENFLEX® compensation pipe pieces can be supplied on request as complete system solution with ready mounted expansion joints. As a rule, these are angular and lateral expansion joints, designed according to customer requirements. Pipe sections, bends, T-pieces and expansion joints are put together with the necessary restraints, hinges, protective covers etc., to form a unit.

Our experts assist in the selection and optimum arrangement of the system components to produce a compensation system ready to be installed.



Compensation with STENFLEX® type A-3 for tank settlement



Installation with 50 % pre-tension

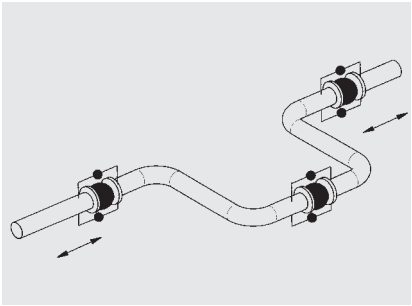
Expansion absorption Δl depends on the centre-to-centre spacing L of the expansion joints and the maximum deflection angle α. It is calculated according to the following formula:

$$L = \frac{\Delta l/2}{\sin \alpha} \qquad \Delta l/2 = L \cdot \sin \alpha$$

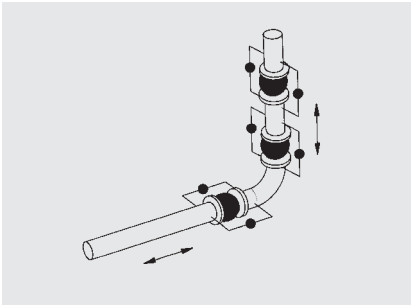
The deflecting pipeline must have sufficient play in the guide bearing to allow for the radian measure. It is calculated as follows:

$$h = L\,(1 - \cos \alpha)$$

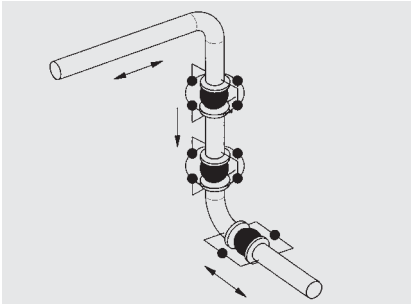
Compensation systems with angular expansion joints



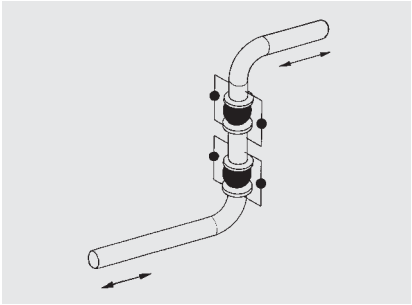
U-shaped triple joint, 3 angular expansion joints



L-shaped triple joint, 3 angular expansion joints



3D triple joint, 2 cardan hinged restraint expansion joints, 1 angular expansion joint



Z-shaped double joint, 2 angular expansion joints

STENFLEX® angle balanced system with type C expansion joints

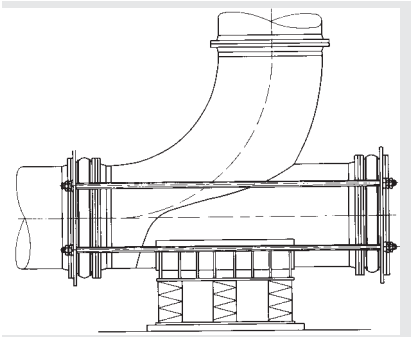


Diagram showing angle balanced system with rubber expansion joints

Rubber expansion joints

General description of rubber expansion joints

Symbols for a quick product selection

The easy-to-find list: symbols and their meaning. The colour bar of the following data sheets indicate small symbols that illustrate the special features of the corresponding types, for easy pre-selection.

Expansion joint to absorb axial movement

Expansion joint to absorb lateral movement

Expansion joint to absorb angular movement

Universal expansion joint to absorb simultaneous movement in all three directions

Maximum product pressure rate

Flange connections

Threaded connection to ISO

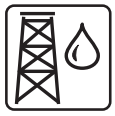
Maximum temperature

Resistant to hot water (combined with temperature symbol)

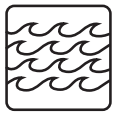
Suitable for noise and vibration absorption

Suitable for drinking water

Suitable for acids and lyes



Suitable for oils or fatty media



Suitable for sea water

Suitable for sewage, and brackish water with suspended solid particles

Suitable for gaseous media

Flame-proof

Applications/Possible uses/Industries

Basic expansion joint types	Universal compensators												Lateral compensators										Angular compensators				Wall sealing expansion joints
STENFLEX® Expansion joint types	A-1	AR-1	AS-1	AG-5	AS-5	B-1	C-1	C-2	D-11, D-42	GR-SAE	R-1	RS-1	A-2, A-4	AR-2, AR-4	AS-2, AS-4	B-2, B-4	C-31	C-32	C-35	E, G	R-2	RS-2	A-3	AS-3	C-41	C-42	W-1, W-2
Applications																											
Reducing tension	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■	■	
Absorbing axial movement	■	■	■	■	■	■	■	■	■	■	■	■															■
Absorbing lateral movement	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					■
Absorbing angular movement	■	■	■	■	■		■	■		■	■	■											■	■	■	■	
Absorbing simultaneous movement	■	■	■	■	■	■	■	■	■	■	■	■															■
Double or triple joint systems for absorbing large lateral movement																							■	■	■	■	
Vibration damping	■	■	■	■	■	■			■	■	■	■	■	■	■	■					■	■					
Sound muffling	■	■	■	■	■	■			■	■	■	■	■	■	■	■				■	■	■					
Installation and dismantling aid	■					■	■				■						■	■	■	■							
To compensate for installation inaccuracies	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■					■
Groundwater sealing where pipelines pass through walls (buildings, tanks)									■																		
Possible uses																											
Metal pipes	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Plastic pipes	■					■			■		■		■			■	■	■			■		■				■
Cooling water pipes	■	■	■			■	■	■			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Drinking water pipes	■			■			■	■					■				■	■	■				■		■	■	■
Lubrication oil pipes	■	■	■	■	■	■				■	■	■	■	■	■	■					■	■	■	■			
Air ducts, gas ducts									■																		
Motors	■	■	■								■	■		■	■					■		■					
Pumps	■	■	■			■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■					
Compressors	■	■	■			■			■		■	■	■	■	■	■				■	■	■					
Fittings	■						■	■		■	■		■				■	■	■		■						
Condensers							■	■									■	■	■								
Biogas plants	■					■					■		■			■					■		■				
Solar technology	■	■	■	■	■	■					■	■	■	■	■	■					■	■	■	■			
Industries																											
Mechanical engineering	■	■	■			■				■	■	■	■	■	■	■					■	■					
Domestic industry	■	■	■	■	■						■	■	■	■	■						■	■	■	■			
Heating installation		■	■	■	■							■		■	■							■		■			
Chemical industry	■										■		■								■		■	■			
Plant construction	■						■	■			■		■				■	■	■		■				■	■	■
Power industry	■					■	■	■			■		■			■	■	■	■		■		■		■	■	■
Shipbuilding	■	■	■	■	■						■	■	■	■	■						■	■		■			
Ventilation and air-con technology							■		■																		
Hydraulic systems							■		■	■																	
Refuse incineration plant	■		■				■				■	■	■		■	■	■	■	■		■	■	■				■
Dust removal and filtration technology							■		■								■	■	■	■							
Conveyor systems																				■							
Water supply/treatment	■						■						■				■	■	■								■
Renewable energy technology	■	■	■	■	■	■					■	■	■	■	■	■					■	■	■	■			

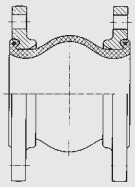
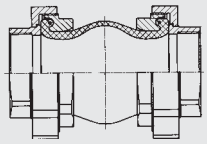
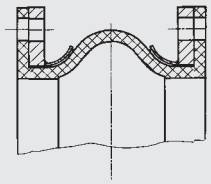
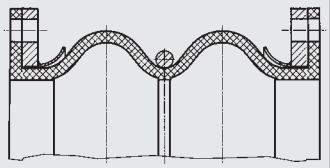
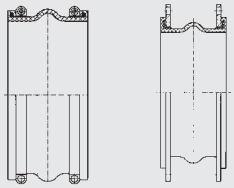
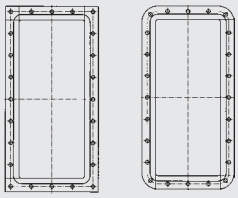
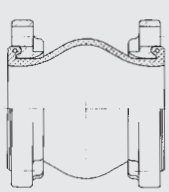
Table showing the prime applications, possible uses and industries

STENFLEX®

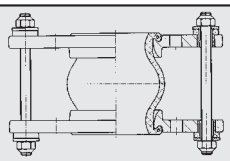
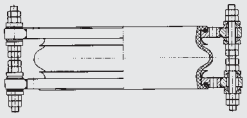
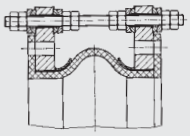
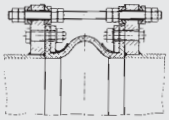
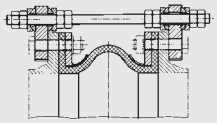
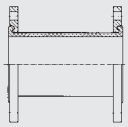
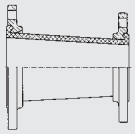
Rubber Expansion joints

Program summary

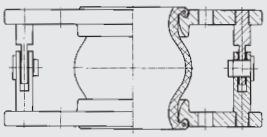
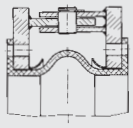
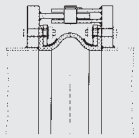
Universal rubber expansion joints

	Type	DN	Pressure rate bar	Max. operating temperature	Rubber grades	Connection parts	Page
	**A-1** **AR-1** **AS-1** **B-1** **R-1** **RS-1**	DN 20-1000 DN 20- 400 DN 25- 400 DN 32- 400 DN 25- 300 DN 25- 300	PN 16 PN 25 PN 16 PN 16 PN 16 PN 16	+90 °C +110 °C +110 °C +90 °C +90 °C +90 °C	EPDM, NBR, CIIR EPDM, NBR EPDM, NBR EPDM, NBR EPDM, NBR, CIIR EPDM, NBR	rotating flanges	**1.13** **1.15** **1.17** **1.21** **1.33** 1.35
	**AG-5** **AS-5**	DN 20-50 DN 32-40	**PN 16** **PN 16**	+100 °C +110 °C	EPDM, NBR, CIIR EPDM, NBR	female and/or male thread	**1.19** **1.20**
	**C-1**	DN 300-2400 DN 300-2800 DN 300-3600	PN 16 PN 10 PN 4	+90 °C +90 °C +90 °C	EPDM, NBR, CIIR EPDM, NBR, CIIR EPDM, NBR, CIIR	press-on retaining flange	**1.23**
	**C-2**	DN 300-2000 DN 300-2000	PN 10 PN 4	+90 °C +90 °C	EPDM, NBR, CIIR EPDM, NBR, CIIR	press-on retaining flange	1.25
	**D-11** **D-30**	DN 300-7500 DN 300-7500	PN 0,7 PN 0,7	+90 °C +90 °C	EPDM, NBR EPDM, NBR	rotating press-on retaining flange or tightening straps	1.27
	**D-21** **D-22** **D-41** **D-42**	DN 150-7500 DN 150-7500 DN 150-7500 DN 150-7500	PN 0,7 PN 0,7 PN 0,7 PN 0,7	+90 °C +90 °C +90 °C +90 °C	EPDM, NBR EPDM, NBR EPDM, NBR EPDM, NBR	press-on retaining frame	**1.29**
	**GR-SAE**	DN 40-125	PN 16	+110 °C	NBR	rotating SAE flange	1.31

Lateral rubber expansion joints

	Type	DN	Pressure rate bar	Max. operating temperature	Rubber grades	Connection parts	Page
	**A-2** **AR-2** **AS-2** **B-2** **R-2** **RS-2**	DN 20-1000 DN 20- 400 DN 25- 400 DN 32- 400 DN 25- 300 DN 25- 300	PN 16 PN 25 PN 16 PN 16 PN 16 PN 16	+90 °C +110 °C +110 °C +90 °C +90 °C +90 °C	EPDM, NBR, CIIR EPDM, NBR EPDM, NBR EPDM, NBR EPDM, NBR, CIIR EPDM, NBR	rotating flange with tie rod restraint	1.37 1.39 1.41 1.43 1.53 1.55
	**A-4** **AR-4** **AS-4** **B-4**	DN 20-1000 DN 20- 400 DN 25- 400 DN 32- 400	PN 16 PN 25 PN 16 PN 16	+90 °C +110 °C +110 °C +90 °C	EPDM, NBR, CIIR EPDM, NBR EPDM, NBR EPDM, NBR	rotating flange with tie rod restraint	1.37 1.39 1.41 1.43
	**C-31**	DN 300-1000 DN 300-1000 DN 300-2400 DN 2500-3600	PN 16 PN 10 PN 4 on request	+90 °C +90 °C +90 °C	EPDM, NBR, CIIR EPDM, NBR, CIIR EPDM, NBR, CIIR	press-on retaining flange with tie rod restraint	1.45
	**C-32**	DN 300-3600	on request	+90 °C	EPDM, NBR, CIIR	press-on retaining flange with tie rod restraint on counter flange	1.47
	**C-35**	DN 300-3600	on request	+90 °C	EPDM, NBR, CIIR	press-on retaining flange with tie rod restraint on segments	1.48
	**E**	DN 20-250	PN 10	+90 °C	EPDM, NBR	rotating flange	1.49
	**G**	DN 25-100 DN 125-250	PN 16 PN 10	+90 °C +90 °C	EPDM, NBR EPDM, NBR	rotating flange	1.51

Angular rubber expansion joints

	**A-3** **AS-3**	DN 32-1000 DN 25- 400	PN 16 PN 16	+90 °C +110 °C	EPDM, NBR, CIIR EPDM, NBR	rotating flange with hinge restraint	1.57 1.59
	**C-41**	DN 300-3600	on request	+90 °C	EPDM, NBR, CIIR	press-on retaining flange with hinge restraint	1.61
	**C-42**	DN 300-3600	on request	+90 °C	EPDM, NBR, CIIR	press-on re-taining flange with hinge restraint on counter flange	1.62

Wall sealing expansion joints

	**W-1** **W-2**	DN 80-3400 DN 200- 800	PN 1 PN 2,5 PN 2,5	+90 °C +90 °C +90 °C	EPDM, NBR EPDM, NBR EPDM, NBR	press-on retaining flange	1.63

Rubber expansion joint ▪ Type A-1

Universal expansion joint DN 20 – DN 1000

DN 20 - DN 400

DN 450 - DN 1000

Structure type A-1

Universal expansion joint, consisting of a rubber bellows with rotating flanges

Rubber bellows PN 16

- ☐ Highly elastic molded bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Hot water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+100 °C**
Bursting pressure	≥ **48 bar**
Vacuum operation	**DN 20-50 without vacuum supporting ring,**
	DN 65-1000 with vacuum supporting ring

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Rotating flanges with stabilizing collar
- ☐ Flange drilling for through bolts
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 20 - DN 175 (PN 16)
DN 200 - DN 1000 (PN 10)
DN 20 - DN 400 (PN 6) according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.4541, 1.4571, plastic (PP), aluminum, etc.

Corrosion protection

Standard: DN 20 - DN 400 electrogalvanized
DN 450 - DN 1000 hot-dip galvanized
Others: special varnish, special coating, etc.

Applications

- ■ **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - ■ **pumps**
  - ■ **compressors**
  - ■ **motors**
- ■ **for absorbing vibration and noise**
- ■ **for compensating axial, lateral and angular movement**
- ■ **for compensating simultaneous movement in cooling water pipes**
- ■ **to compensate for installation inaccuracies**
- ■ **as installation and dismantling aid**

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Flame-proof protective cover
- ☐ Protective hood
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EG)
- ☐ Bureau Veritas
- ☐ Det Norske Veritas
- ☐ Lloyd´s Register of Shipping
- ☐ Drinking water
- ☐ TÜV Süddeutschland (KTA)

Others see technical annex

STENFLEX® type A-1 used at pumps

Dimensions standard program

DN	BL* mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm
20	100	16	22±3	51	30	55	16	115	16
25	100	16	22±3	51	30	55	16	115	16
32	125	16	31±3	72	39	78	16	140	16
40	125	16	39±3	81	45	86	16	150	16
50	125	16	49±3	95	56	97	16	165	16
65	125	16	65±3	115	72	113	16	185	18
80	150	16	77±3	127	84	135	16	200	20
100	150	16	100±3	151	109	160	16	220	20
125	150	16	127±3	178	133	184	16	250	22
150	150	16	153±3	206	161	212	16	285	22
175	150	16	176±3	230	185	236	16	315	22
200	175	10	202±3	260	209	265	10	340	25
250	175	10	252±3	313	262	318	10	395	25
300	200	10	303±3	363	312	373	10	445	25
350	200	10	344±3	423	360	420	10	505	30
400	200	10	396±3	474	410	460	10	565	30
450	250	10	435±8	532	450	575	10	615	35
500	250	10	485±8	584	500	625	10	670	35
600	250	10	585±8	684	600	725	10	780	40
700	275	10	690±10	800	700	850	10	895	40
800	275	10	790±10	900	800	950	10	1015	40
900	300	10	890±10	1008	900	1050	10	1115	40
1000	300	10	990±10	1108	1000	1150	10	1230	40

*DN 25 to DN 300 also available in BL 130 mm as type R
From DN 200 pressure rate 16 bar also available with flanges PN 16

Movement compensation/bellows cross sectional area

DN	Δ ax Axial movement Compression - mm	Δ ax Axial movement Elongation + mm	Δ lat Lateral movement ± mm	Δ ang* Angular movement ± ∢ degrees*	A** Effective bellows cross sectional area at 16 bar cm²	Permissible vacuum without supporting ring for length bar absolute	Weight approx. kg
20	20	10	10	25	0	–	2.3
25	20	10	10	25	0	–	2.3
32	35	10	15	25	1	0.6	3.3
40	35	10	15	25	6	0.6	3.7
50	35	10	15	25	12	0.6	4.4
65	35	10	15	25	23	0.6	5.2
80	40	10	15	20	42	0.65	7.2
100	40	10	15	15	68	0.65	8.0
125	40	10	15	15	92	0.7	10.7
150	40	10	15	12	173	0.75	13.0
175	40	10	15	10	247	0.8	15.6
200	45	15	15	8	264	0.9	18.6
250	45	15	15	7	503	0.9	24.2
300	45	15	15	6	550	0.9	30.2
350	45	15	15	5	990	0.95	40.1
400	45	15	15	5	1100	0.95	48.8
450	50	30	30	8	1706	0.35	64.0
500	50	30	30	7	2013	0.35	72.0
600	50	30	30	6	3006	0.35	90.0
700	50	30	30	5	4250	0.5	120.0
800	50	30	30	5	5440	0.5	155.0
900	50	30	30	4	7000	0.6	170.0
1000	50	30	30	3,5	8544	0.6	205.0

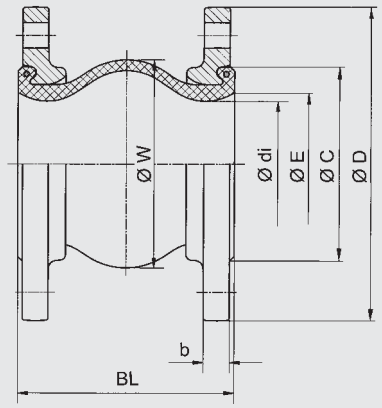
*Larger Δ D ang possible for compressed installation length.
Please inquire for simultaneous (different) movement.
**Effective bellows cross sectional area is a theoretical value.

Note

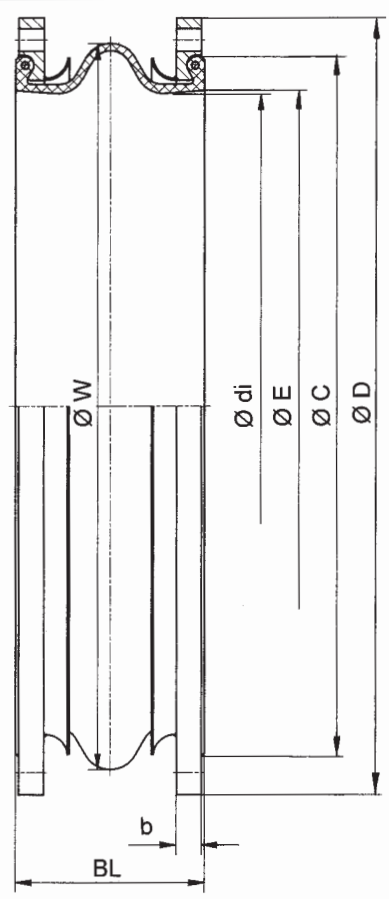
Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Versions



DN 20 - DN 400



DN 450 - DN 1000

Type A-1
Universal expansion joint, without restraint

Rubber expansion joint ▪ Type AR-1

Universal expansion joint DN 20 – DN 400

Structure type AR-1

Universal expansion joint, consisting of a rubber bellows and rotating flanges

Rubber bellows PN 25

- ☐ Highly elastic molded bellows in various rubber grades
- ☐ High-tensile synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange/yellow**	**Hot water, acids, lyes**
NBR	**red/yellow**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**25 bar***
Max. perm. temperature	**+130 °C**
Bursting pressure	≥ **75 bar**
Vacuum operation	**DN 20-50 without vacuum supporting ring,**
	DN 65-400 with vacuum supporting ring

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Rotating flanges with stabilizing collar
- ☐ Flange drilling for through bolts
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 20 - DN 400 (PN 25) according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.4541, 1.4571 etc.

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized, special varnish, specail coating, etc.

Applications

- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **compressors**
- **for muffling vibration and noise**
  - **at appliances**
  - **in cooling water and lube oil pipes**
- **for compensating axial, lateral and angular movement**
- **for compensating simultaneous movement in cooling water pipes**
- **to compensate for installation inaccuracies**
- **in sprinkler systems**

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Flame-proof protective cover
- ☐ Protective hood
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)

STENFLEX® type AR-1 used at pumps

Dimensions standard program

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN* Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm
20	100	25	22±3	51	30	55	25	115	16
25	100	25	22±3	51	30	55	25	115	16
32	125	25	31±3	72	39	78	25	140	16
40	125	25	39±3	81	45	86	25	150	16
50	125	25	49±3	95	56	97	25	165	16
65	125	25	65±3	115	72	113	25	185	18
80	150	25	77±3	127	84	135	25	200	20
100	150	25	100±3	151	109	160	25	235	20
125	150	25	127±3	178	133	184	25	270	22
150	150	25	153±3	206	161	212	25	300	22
200	175	25	202±3	260	209	265	25	360	25
250	175	25	252±3	313	262	318	25	425	25
300	200	25	303±3	363	312	373	25	485	25
350	200	25	344±3	423	360	420	25	555	30
400	200	25	396±3	474	410	460	25	620	30

*also available with flanges PN 16 and PN 10.

Movement compensation/bellows cross sectional area

DN	Δ ax Axial movement Compression - mm	Δ ax Axial movement Elongation + mm	Δ lat Lateral movement ± mm	Δ ang* Angular movement ± ∢ degrees*	A** Effective bellows cross sectional area at 16 bar cm²	Permissible vacuum without supporting ring for length bar absolute	Weight approx. kg
20	20	10	10	25	0	–	2.3
25	20	10	10	25	0	–	2.3
32	35	10	15	25	0	0	3.3
40	35	10	15	25	1	0.5	3.7
50	35	10	15	25	1	0.4	4.4
65	35	10	15	25	1	0.5	4.9
80	40	10	15	20	2	0.6	6.5
100	40	10	15	15	5	0.6	9.5
125	40	10	15	15	8	0.5	13.0
150	40	10	15	12	41	0.4	15.3
200	45	15	15	8	54	0.6	21.8
250	45	15	15	7	72	0.6	31.6
300	45	15	15	6	226	0.6	41.6
350	45	15	15	5	460	0.65	56.7
400	45	15	15	5	880	0.8	69.0

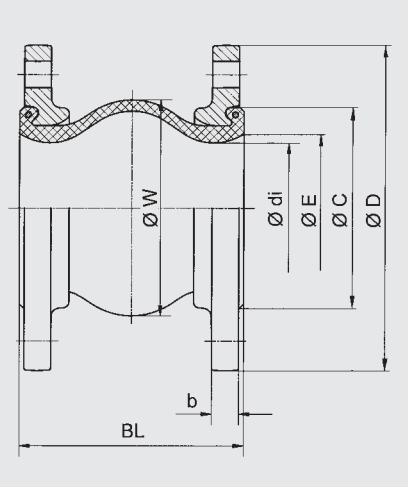
* Larger Δ ang possible for compressed installation length.
Please inquire for simultaneous (different) movement.
**Effective bellows cross sectional area is a theoretical value.

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Version



Type AR-1
Universal expansion joint, without restraint

Rubber expansion joint ▪ Type AS-1

Universal expansion joint DN 25 – DN 400

flame-proof

Structure type AS-1

Universal expansion joint, consisting of a rubber bellows and rotating flanges

Rubber bellows PN 16

- ☐ Highly elastic molded bellows in various rubber grades
- ☐ Steel wire cord reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance < 100 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange/blue**	**Hot water, acids, lyes**
NBR	**red/blue**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+130 °C**
Bursting pressure	≥ **50 bar**
Vacuum operation	**DN 20-50 without vacuum supporting ring,**
	DN 65-400 with vacuum supporting ring

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Rotating flanges with stabilizing collar
- ☐ Flange drilling for through bolts, DN 25 with Drill holes
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 25 - DN 175 (PN 16)
DN 200 - DN 400 (PN 10)
DN 20 - DN 400 (PN 6)
according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.4541, 1.4571 etc.

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized, special varnish, special coating, etc.

Applications

- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **compressors**
  - **motors**
- **for muffling vibration and noise**
  - **at appliances**
  - **in cooling water and lub oil pipes**
- **for compensating axial, lateral and angular movement**
- **to compensate for installation inaccuracies**
- **to meet fire protection regulations**
- **shipbuilding industry**
- **in heating plants**

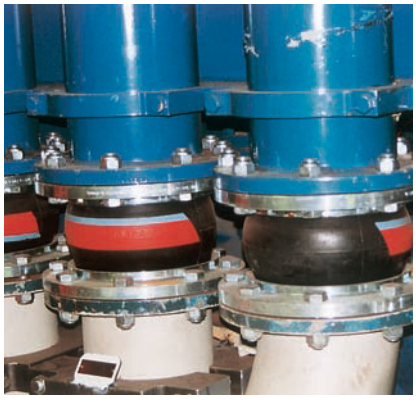
Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Protective hood
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)
- ☐ American Bureau of Shipping
- ☐ Bureau Veritas
- ☐ Det Norske Veritas
- ☐ Germanischer Lloyd
- ☐ Lloyd´s Register of Shipping
- ☐ TÜV/DIN 4809 (DN 25-200)

Others see technical annex



STENFLEX® type AS-1 used in cooling water system of ship's engine

Dimensions standard program

DN	BL* mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm
25	125	16	31±3	72	39	78	16**	115	16
32	125	16	31±3	72	39	78	16	140	16
40	125	16	39±3	81	45	86	16	150	16
50	125	16	49±3	95	56	97	16	165	16
65	125	16	65±3	115	72	113	16	185	18
80	150	16	77±3	127	84	135	16	200	20
100	150	16	100±3	151	109	160	16	220	20
125	150	16	127±3	178	133	184	16	250	22
150	150	16	153±3	206	161	212	16	285	22
175	150	16	176±3	230	185	236	16	315	22
200	175	10	202±3	260	209	265	10	340	25
250	175	10	252±3	313	262	318	10	395	25
300	200	10	303±3	363	312	373	10	445	25
350	200	10	344±3	423	360	420	10	505	30
400	200	10	396±3	474	410	460	10	565	30

From DN 200 pressure rate 16 bar also available with flanges PN 16.
*DN 25 up to DN 300 also available as type RS-1 in length 130.
** Flanges with drill holes M 12

Movement compensation/bellows cross sectional area

DN	Δ ax Axial movement Compression - mm	Δ ax Axial movement Elongation + mm	Δ lat Lateral movement ± mm	Δ ang* Angular movement ± ∢ degrees*	A** Effective bellows cross sectional area at 16 bar cm²	Permissible vacuum without supporting ring for length bar absolute	Weight approx. kg
25	30	10	15	25	0	–	2.2
32	30	10	15	25	0	0	3.3
40	30	10	15	25	0	0	3.7
50	30	10	15	25	0	0	4.4
65	30	10	15	25	0	0	5.2
80	40	10	15	20	12	0.2	7.2
100	40	10	15	15	9	0.4	8.0
125	40	10	15	15	18	0.65	10.7
150	40	10	15	12	52	0.65	13.0
175	40	10	15	10	54	0.7	15.9
200	45	15	15	8	6	0.7	19.1
250	45	15	15	7	191	0.7	24.8
300	45	15	15	6	255	0.75	30.9
350	45	15	15	5	563	0.5	42.0
400	45	15	15	5	875	0.3	51.0

* Larger Δ ang possible for compressed installation length.
Please inquire for simultaneous (different) movement.
**Effective bellows cross sectional area is a theoretical value.

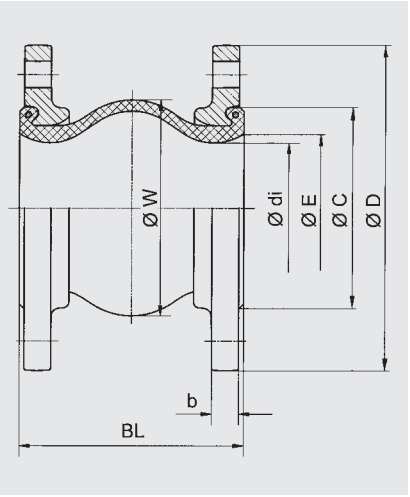
Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Chemicals used for water treatment (particularly in heating systems and coolant systems) can corrode the materials of the rubber expansion joint. According to VDI Directive 2035, DIN 4809 part 1 and VGB R 455P, the manufacturer of the chemicals must state that the materials used in the expansion joint, especially for the rubber bellows, will not be damaged by the chemicals.

Versions



Type AS-1
Universal expansion joint without restraint

Rubber expansion joint ▪ Type AG-5

Universal expansion joint DN 20 – DN 50

Structure type AG-5

- ☐ Universal expansion joint consisting of a rubber bellows with threaded ends
- ☐ Male or female thread
- ☐ Combination of female/male thread

Rubber bellows PN 16

- ☐ Highly elastic molded bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Hot water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+100 °C**
Bursting pressure	≥ **48 bar**

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Dimensions standard program

DN	L_1 mm	L_2 mm	Pressure rate bar	ø di Bellows inner ø mm	ø W Convolution ø unpressurized mm	ø D_1 Male thread ø inch	ø D_2 Female thread ø inch	SW_1 Width across mm	SW_2 Width across mm
20	**200**	**172**	**16**	**20**	**60**	**R ¾**	**G 1**	**30**	**36**
25	**200**	**172**	**16**	**26**	**67**	**R 1**	**G 1¼**	**36**	**46**
32	**200**	**172**	**16**	**33**	**80**	**R 1¼**	**G 1½**	**46**	**55**
40	**200**	**172**	**16**	**40**	**87**	**R 1½**	**G 2**	**55**	**65**
50	**200**	**172**	**16**	**52**	**99**	**R 2**	**G 2½**	**65**	**80**

Threaded ends

Version

- ☐ Male thread acc. ISO 7-1 (DIN 2999).
- ☐ Union nut with female thread acc. ISO 228-1; flat sealing, suitable for drinking water

Materials

Standard: 1.4571

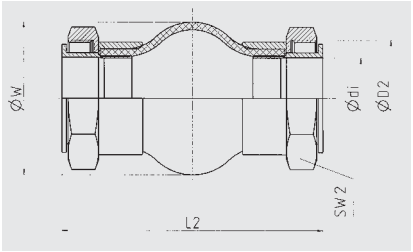
Certificates

- ☐ CE (DGR 97/23/EC)
- ☐ Drinking water

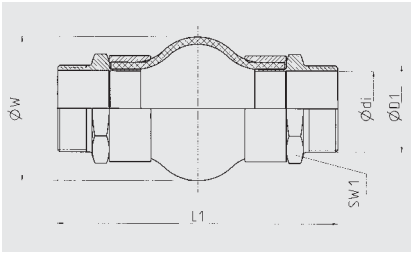
Applications

- **for reducing thermal and mechanical tension**
- **for muffling vibration and noise**
- **for compensating axial, lateral and angular movement**
- **to compensate for installation inaccuracies**
- **domestic industry**
- **for heating plants and hot water pipes**
- **in oil hydraulic systems**

Versions



Type AG-5 with female thread union nut with flat gasket



Type AG-5 with male thread

Movement compensation

DN	Δ ax Axial movement Compression - mm	Δ ax Axial movement Elongation + mm	Δ lat Lateral movement ± mm	Δ ang Angular movement ± ∢ Grad	Weight approx. kg
20	**30**	**10**	**10**	**25**	**0.5**
25	**30**	**10**	**10**	**25**	**0.6**
32	**35**	**10**	**15**	**25**	**0.8**
40	**35**	**10**	**15**	**25**	**1.1**
50	**35**	**10**	**15**	**22**	**1.3**

Please inquire for simultaneous (different) movement

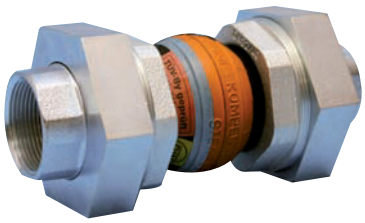
Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Rubber expansion joint ▪ Type AS-5

Universal expansion joint DN 32 – DN 40



Structure type AS-5

- ☐ Universal expansion joint consisting of a rubber bellows with threaded ends
- ☐ Male or female thread
- ☐ Combination of female/male thread

Rubber bellows PN 16

- ☐ Highly elastic molded bellows in various rubber grades
- ☐ Steel wire cord reinforcement
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange/blue**	**Hot water, acids, lyes**
NBR	**red/blue**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+130 °C**
Bursting pressure	**≥ 50 bar**
Vacuum operation	**without vacuum supporting ring**

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Dimensions standard program

DN	L_1 mm	L_2 mm	Pressure rate bar	ø di Bellows inner ø mm	ø W Convolution ø unpressurized mm	ø D_1 Male thread ø Inch	ø D_2 Female thread ø Inch	SW_1 Width across mm	SW_2 Width across mm	SW_3 Width across mm	ø A Union nut ø mm
32	**237**	**187**	**16**	**34±3**	**70**	**R 1¼"**	**G 1¼"**	**75**	**47**	**90**	**104**
40	**239**	**189**	**16**	**34±3**	**70**	**R 1½"**	**G 1½"**	**75**	**54**	**90**	**104**

Threaded ends

Version

- ☐ Male thread acc. ISO 7-1 (DIN 2999).
- ☐ Union nut with female thread acc. ISO 228-1; flat sealing.

Materials

Standard: 1.0038 (S235 JR) (Malleable iron), electrogalvanized

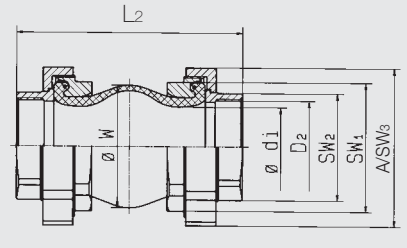
Certificates

- ☐ CE (DGR 97/23/EC)
- ☐ TÜV/DIN 4809

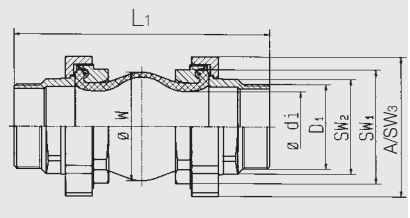
Applications

- **for reducing thermal and mechanical tension**
- **for muffling vibration and noise**
- **for compensating axial, lateral and angular movement**
- **to compensate for installation inaccuracies**
- **for heating plants and hot water pipes**

Versions



Type AS-5 with female thread



Type AS-5 with male thread

Movement compensation

DN	Δ ax Axial movement Compression - mm	Δ ax Axial movement Elongation + mm	Δ lat Lateral movement ± mm	Δ ang Angular movement ± ∢ degrees	Weight approx. kg
32	**30**	**10**	**15**	**25**	**2.4**
40	**30**	**10**	**15**	**25**	**2.6**

Please inquire for simultaneous (different) movement

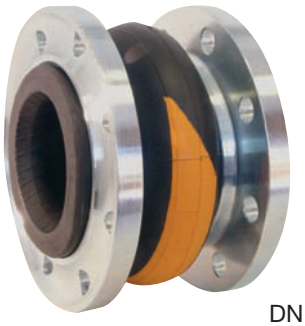
Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Rubber expansion joint ▪ Type B-1

Highly flexible universal expansion joint DN 32 – DN 400



DN 32 – DN 150

DN 175 – DN 400

Structure type B-1

Universal expansion joint consisting of a rubber bellows and rotating flanges

Rubber bellows PN 16

- ☐ Very elastic molded bellows with specially deep convolution in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Hot water, acids, lyes**
NBR**	**red**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.
**Only available in large lots.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+100 °C**
Bursting pressure	≥ **48 bar**
Vacuum operation	**DN 32-40 without vacuum supporting ring, DN 50-400 with vacuum supporting ring**

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ DN 32 – DN 150 rotating flanges with stabilizing collar and drilling for through bolts
- ☐ DN 175 – DN 400 rotating flanges drilled with threaded holes
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 32 - DN 175 (PN 16)
DN 200 - DN 400 (PN 10)
according to EN 1092

Others: DIN EN, ANSI, BS etc.

Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)

Others: 1.4541, 1.4571 etc.

Corrosion protection

Standard: DN 32 – DN 400 electrogalvanized

Others: hot-dip galvanized, special varnish, special coating, etc.

Applications

- ■ **for compensating large axial and lateral movements**
- ■ **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - ■ **pumps**
  - ■ **compressors**
- ■ **for muffling vibration and noise at appliances**
- ■ **for compensating simultaneous movement in cooling water pipes**
- ■ **to compensate for installation inaccuracies**
- ■ **power station technology**
- ■ **chemical industry**

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Flame-proof protective cover
- ☐ Protective hood
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)

STENFLEX® type B-1 for compensating large movements

Dimensions standard program

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm
32	125	16	30±3	7	42	100	16	150	16
40	125	16	30±3	7	42	100	16	150	16
50	125	16	40±3	86	61	115	16	165	16
65	125	16	61±3	105	71	144	16	185	16
80	150	16	74±3	118	82	167	16	200	18
100	150	16	92±3	137	101	197	16	220	18
125	150	16	116±3	166	130	230	16	250	18
150	150	16	139±3	191	150	266	16	285	18
175	100	16	177±3	217	183	282	16	315	18
200	125	10	201±3	264	207	320	10	340	20
250	125	10	251±3	314	260	374	10	395	22
300	150	10	302±3	370	313	443	10	445	24
350	150	10	347±3	424	354	485	10	505	24
400	150	10	392±3	474	407	535	10	565	24

From DN 200 pressure rate 16 bar also available with flanges PN 16.

Movement compensation/bellows cross sectional area

DN	Δ ax Axial movement Compression - mm	Δ ax Axial movement Elongation + mm	Δ lat Lateral movement ± mm	A* Effective bellows cross sectional area at 16 bar cm^2	Weight approx. kg
32	25	15	15	21	4.0
40	25	15	15	21	4.4
50	30	15	15	30	4.3
65	35	20	15	55	4,9
80	45	20	20	90	5.7
100	45	25	20	150	7.2
125	45	35	25	220	9.5
150	45	35	25	330	10.4
175	25	40	25	432	13.6
200	35	40	35	553	15.6
250	35	40	35	730	20.6
300	45	50	35	975	25.3
350	45	50	35	1242	31.6
400	45	50	35	1600	38.3

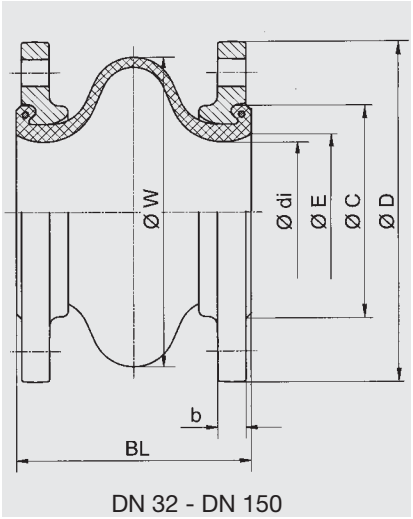
Please inquire for simultaneous (different) movement.
*Effective bellows cross sectional area is a theoretical value.

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

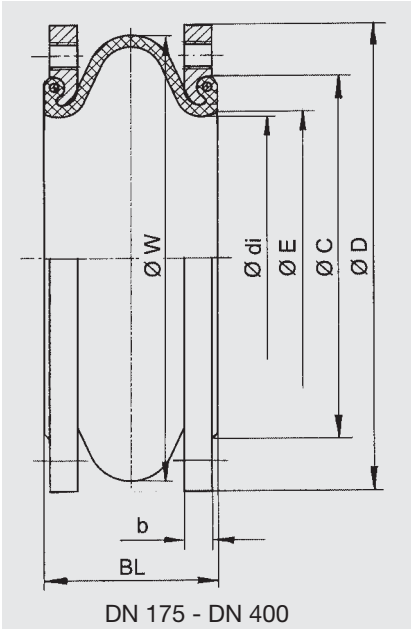
Subject to technical alterations and deviations resulting from the manufacturing process.

Versions



DN 32 - DN 150

Type B-1
Universal expansion joint without restraint, flanges with drilling for through bolts



DN 175 - DN 400

Type B-1
Universal expansion joint without restraint, flanges drilled with threaded holes

Rubber expansion joint ▪ Type C-1

Universal expansion joint DN 300 – DN 3600

Structure type C-1

- ☐ Universal expansion joint consisting of a rubber bellows and press-on retaining flanges
- ☐ Available in various bellow's geometries and special lengths

Rubber bellows PN 4 / PN 10 / PN 16

- ☐ Elastic robust bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Full-faced self-sealing rubber flanges with drilling for through bolts
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Ccooling, sea, brackish water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design			
DN	DN 300 - 3600	DN 300 - 2800	DN 300 - 2400
Pressure rate	PN 4	PN 10	PN 16
Max. perm. operating pressure	**4 bar***	**10 bar***	**16 bar***
Max. perm. temperature	**+100 °C**	**+100 °C**	**+100 °C**
Bursting pressure	**≥ 15 bar**	**≥ 30 bar**	**≥ 48 bar**
Vacuum operation	**with vacuum supporting ring (at permanent vacuum)**		

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Press-on retaining flanges with stabilizing collar
- ☐ Flange drilling for through bolts

Dimensions

Standard: see table PN 6/PN 10 according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.0577 (S355J2), 1.4541, 1.4571 etc.

Corrosion protection

Standard: DN 300 - DN 700 electrogalvanized
DN 800 - DN 1000 hot-dip galvanized
DN 1100 - DN 3600 anti-corrosion primed
Others: special varnish, special coating, etc.

Applications

- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **condensers**
- **for compensating axial, lateral and angular movement**
- **for compensating simultaneous movement in cooling water pipes**
- **to compensate for installation inaccuracies**
- **to compensate for ground and foundation settlement**
- **as installation and dismantling aid**
- **power station technology**
- **process plant engineering**

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)
- ☐ Drinking water
- ☐ TÜV (KTA)

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

STENFLEX® type C-1 with special high restraints in cooling water system of a power plant

Dimensions standard program

DN	Pressure rate	Bellows		Steel flange			**without** vacuum supporting ring			**with** vacuum supporting ring		
		ø di Bellows inner ø tolerance±1%	h Rubber flange thickness	ø D Flange outer ø PN 6 (EN 1092)	ø D Flange outer ø PN 10 (EN 1092)	b Flange thickness	BL	ø W Convolution ø unpressurized	Weight	BL	ø W Convolution ø unpressurized	Weight
	bar	mm	mm	mm	mm	mm	mm	mm	approx. kg	mm	mm	approx. kg
300	4/10/16	300	15	440	445	20	250	413	34	250	413	40
350	4/10/16	350	15	490	505	20	250	463	38	250	463	45
400	4/10/16	400	15	540	565	20	250	513	43	250	513	55
450	4/10/16	450	15	595	615	20	250	563	54	250	563	60
500	4/10/16	500	15	645	670	20	250	613	59	250	613	65
600	4/10/16	600	15	755	780	20	250	713	80	250	713	80
700	4/10/16	700	15	860	895	20	250	813	93	250	813	95
750	4/10/16	750	15	925	965	20	250	863	103	250	863	115
800	4/10/16	800	20	975	1015	20	250	923	118	250	923	130
900	4/10/16	900	20	1075	1115	20	250	1023	131	250	1023	145
1000	4/10/16	1000	20	1175	1230	20	250	1123	160	250	1123	165
1100	4/10/16	1100	20	1290	1345	20	300	1268	185	325	1310	210
1200	4/10/16	1200	20	1405	1455	20	300	1368	215	325	1410	240
1300	4/10/16	1300	20	1520	1565	20	300	1468	230	325	1510	255
1400	4/10/16	1400	20	1630	1675	20	300	1568	260	325	1610	290
1500	4/10/16	1500	20	1730	1795	20	300	1668	295	325	1710	325
1600	4/10/16	1600	20	1830	1915	20	300	1768	340	325	1810	380
1700	4/10/16	1700	20	1940	2015	20	300	1868	365	325	1910	400
1800	4/10/16	1800	20	2045	2115	20	300	1968	370	325	2010	410
2000	4/10/16	2000	20	2265	2325	20	300	2168	430	325	2210	460
2100	4/10/16	2100	20	2375	2440	20	300	2268	475	325	2310	515
2200	4/10/16	2200	25	2475	2550	20	300	2378	525	325	2420	575
2300	4/10/16	2300	25	2590	2650	20	300	2478	550	325	2520	600
2400	4/10/16	2400	25	2685	2760	20	300	2578	600	325	2620	650
2500	4/10	2500	25	2795	2860	20	300	2678	620	325	2720	670
2600	4/10	2600	25	2905	2960	20	300	2778	640	325	2820	690
2800	4/10	2800	25	3115	3180	20	300	2978	690	325	3020	730
3000	4	3000	25	3315	3405	20	300	3178	720	325	3220	770
3200	4	3200	25	3525	–	20	300	3378	740	325	3420	790
3400	4	3400	25	3735	–	20	300	3578	770	325	3620	820
3600	4	3600	25	3975	–	20	300	3778	820	325	3820	870

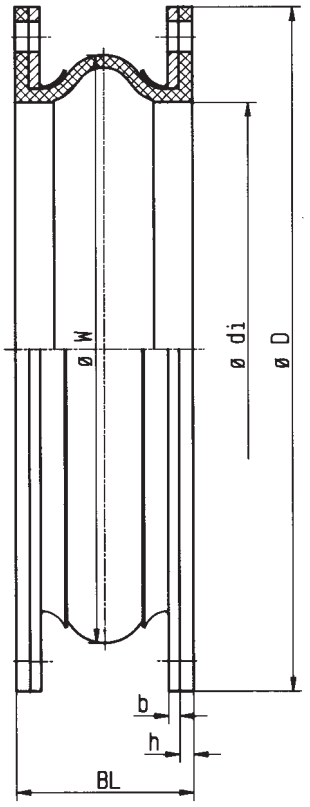
Other lengths (BL) and pressure rates on request.

Movement compensation/bellows cross sectional area

DN	**without** vaccum supporting ring					**with** vacuum supporting ring				
	Δ ax Axial movement Compression -mm	Δ ax Axial movement Elongation +mm	Δ lat Lateral movement ±mm	Δ ang Angular movement ±∢ degrees*	A* Effective bellows cross sectional area cm²	Δ ax Axial movement Compression -mm	Δ ax Axial movement Elongation +mm	Δ lat Lateral movement ±mm	Δ ang Angular movement ±∢ degrees*	A* Effective bellows cross sectional area cm²
300	40	30	30	11.3	1020	40	30	30	11.3	1020
350	40	30	30	9.7	1300	40	30	30	9.7	1300
400	40	30	30	8.5	1620	40	30	30	8.5	1620
450	40	30	30	7.7	1970	40	30	30	7.7	1970
500	40	30	30	6.9	2360	40	30	30	6.9	2360
600	40	30	30	5.7	3240	40	30	30	5.7	3240
700	40	30	30	4.9	4250	40	30	30	4.9	4250
750	40	30	30	4.6	4820	40	30	30	4.6	4820
800	40	30	30	4.3	5410	40	30	30	4.3	5410
900	40	30	30	3.8	6700	40	30	30	3.8	6700
1000	40	30	30	3.4	8140	40	30	30	3.4	8140
1100	40	30	30	3.2	10500	60	35	35	3.6	11200
1200	40	30	30	2.9	12300	60	35	35	3.3	13000
1300	40	30	30	2.7	14200	60	35	35	3.0	15000
1400	40	30	30	2.5	16300	60	35	35	2.8	17100
1500	40	30	30	2.3	18500	60	35	35	2.6	19300
1600	40	30	30	2.2	20800	60	35	35	2.5	21700
1700	40	30	30	2.0	23300	60	35	35	2.3	24300
1800	40	30	30	1.9	25900	60	35	35	2.2	26900
2000	40	30	30	1.7	31500	60	35	35	2.0	32700
2100	40	30	30	1.6	34500	60	35	35	1.9	35800
2200	40	30	30	1.6	37700	60	35	35	1.8	39000
2300	40	30	30	1.5	41000	60	35	35	1.7	42300
2400	40	30	30	1.4	44500	60	35	35	1.6	45800
2500	40	30	30	1.4	48000	60	35	35	1.6	49500
2600	40	30	30	1.3	51800	60	35	35	1.5	53300
2800	40	30	30	1.2	59600	60	35	35	1.4	61200
3000	40	30	30	1.1	68000	60	35	35	1.3	69700
3200	40	30	30	1.0	77000	60	35	35	1.2	78800
3400	40	30	30	1.0	86500	60	35	35	1.1	88500
3600	40	30	30	1.0	96600	60	35	35	1.1	98600

Please inquire for simultaneous (different) movement.
*Effective bellows cross sectional area is a theoretical value.

Versions



Type C-1
Universal expansion joint without restraints

Rubber expansion joint ▪ Type C-2

Highly flexible twin-convoluted universal expansion joint DN 300 – DN 3600

Structure type C-2

- ☐ Universal expansion joint consisting of a rubber bellows and press-on retaining flanges
- ☐ Outer stabilizing ring between the convolutions
- ☐ Available in special lengths

Rubber bellows PN 4 / PN 10

- ☐ Twin-convoluted very elastic robust bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Full-faced self-sealing rubber flanges with drilling for through bolts
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Cooling, sea, brackish water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design DN Pressure rate	DN 300 - 2000 PN 4	DN 300 - 2600 PN 6	DN 300 - 2000 PN 10
Max. perm. operating pressure	**4 bar***	**6 bar***	**10 bar***
Max. perm. temperature	**+100 °C**	**+100 °C**	**+100 °C**
Bursting pressure	≥ **12 bar**	≥ **20 bar**	≥ **30 bar**
Vacuum operation	**Vacuum supporting rings** on request (only for horizontal installation)		

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Press-on retaining flanges with stabilizing collar
- ☐ Flange drilling for through bolts

Dimensions

Standard: see table PN 6/PN 10 according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.0577 (S355J2), 1.4541, 1.4571 etc.

Corrosion protection

Standard: DN 300 - DN 700 electrogalvanized
DN 800 - DN 1000 hot-dip galvanized
DN 1100 - DN 3600 anti-corrosion primed
Others: special varnish, special coating, etc.

Applications

- ■ **for compensating large axial, lateral and angular movement**
- ■ **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - ■ **pumps**
  - ■ **fittings**
  - ■ **condensers**
- ■ **for compensating simultaneous movement in cooling water pipes**
- ■ **to compensate for installation inaccuracies**
- ■ **to compensate for ground and foundation settlement**
- ■ **power station technology**
- ■ **process plant engineering**

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Protective tube

Certificates

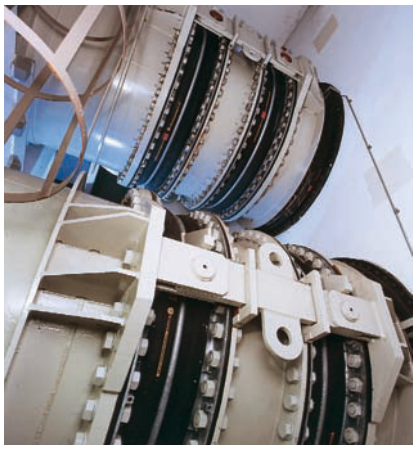
- ☐ CE (DGR 97/23/EC)
- ☐ Drinking water
- ☐ TÜV (KTA)

Note

For vertical installation please consult us for technical advice.

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.



STENFLEX® type C-2 with special high restraints

Dimensions standard program

DN	Pressure rate	Bellows		Steel flange			**without** vacuum supporting ring			**with** vacuum supporting ring		
		ø di Bellows inner ø tolerance±1%	h Rubber flange thickness	ø D Flange outer ø PN 6 (EN 1092)	ø D Flange outer ø PN 10 (EN 1092)	b Flange thickness	BL	ø W Convolution ø unpressurized	Weight	BL	ø W Convolution ø unpressurized	Weight
	bar	mm	mm	mm	mm	mm	mm	mm	approx. kg	mm	mm	approx. kg
300	4/10	300	15	440	445	20	400	413	35	400	413	40
350	4/10	350	15	490	505	20	400	463	45	400	463	50
400	4/10	400	15	540	565	20	400	513	55	400	513	60
450	4/10	450	15	595	615	20	400	563	60	400	563	65
500	4/10	500	15	645	670	20	400	613	65	400	613	70
600	4/10	600	15	755	780	20	400	713	80	400	713	85
700	4/10	700	15	860	895	20	400	813	100	400	813	105
750	4/10	750	15	925	965	20	400	863	115	400	863	120
800	4/10	800	20	975	1015	20	400	923	130	400	923	135
900	4/10	900	20	1075	1115	20	400	1023	150	400	1023	155
1000	4/10	1000	20	1175	1230	20	400	1123	170	400	1123	175
1100	4/10	1100	20	1290	1345	20	550	1268	220	525	1310	280
1200	4/10	1200	20	1405	1455	20	550	1368	240	525	1410	310
1300	4/10	1300	20	1520	1565	20	550	1468	280	525	1510	350
1400	4/10	1400	20	1630	1675	20	550	1568	320	525	1610	400
1500	4/10	1500	20	1730	1795	20	550	1668	360	525	1710	450
1600	4/10	1600	20	1830	1915	20	550	1768	400	525	1810	490
1700	4/10	1700	20	1940	2015	20	550	1868	415	525	1910	520
1800	4/10	1800	20	2045	2115	20	550	1968	430	525	2010	540
2000	4/10	2000	20	2265	2325	20	550	2168	460	525	2210	620
2100		2100	20	2375	2440	20	550	2268		525	2310	
2200		2200	25	2475	2550	20	550	2378		525	2420	
2300		2300	25	2590	2650	20	550	2478		525	2520	
2400	on request	2400	25	2685	2760	20	550	2578	on request	525	2620	on request
2500		2500	25	2795	2860	20	550	2678		525	2720	
2600		2600	25	2905	2960	20	550	2778		525	2820	
2800		2800	25	3115	3180	20	550	2978		525	3020	
3000		3000	25	3315	3405	20	550	3178		525	3220	
3200		3200	25	3525	–	20	550	3378		525	3420	
3400		3400	25	3735	–	20	550	3578		525	3620	
3600		3600	25	3975	–	20	550	3778		525	3820	

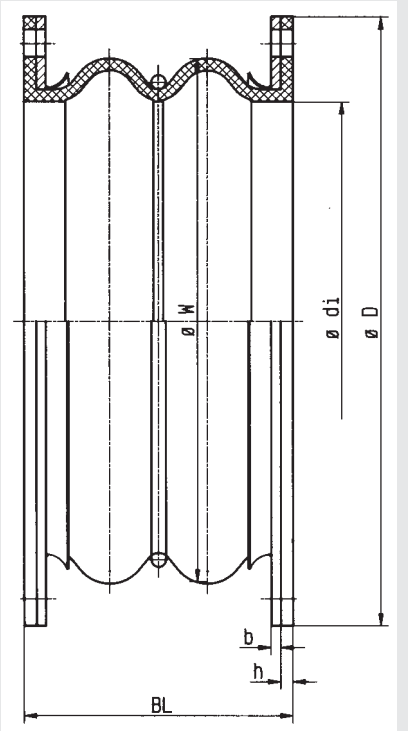
Other lengths (BL) and pressure rates on request.

Movement compensation/bellows cross sectional area

DN	**without** vaccum supporting ring					**with** vacuum supporting ring				
	Δ ax Axial movement Compression -mm	Δ ax Axial movement Elongation +mm	Δ lat Lateral movement ±mm	Δ ang Angular movement ±∢ degrees*	A* Effective bellows cross sectional area cm²	Δ ax Axial movement Compression -mm	Δ ax Axial movement Elongation +mm	Δ lat Lateral movement ±mm	Δ ang Angular movement ±∢ degrees*	A* Effective bellows cross sectional area cm²
300	80	60	60	21.8	1020	80	60	60	21.8	1020
350	80	60	60	18.9	1300	80	60	60	18.9	1300
400	80	60	60	16.7	1620	80	60	60	16.7	1620
450	80	60	60	15.0	1970	80	60	60	15.0	1970
500	80	60	60	13.5	2360	80	60	60	13.5	2360
600	80	60	60	11.3	3240	80	60	60	11.3	3240
700	80	60	60	9.8	4250	80	60	60	9.8	4250
750	80	60	60	9.1	4820	80	60	60	9.1	4820
800	80	60	60	8.6	5410	80	60	60	8.6	5410
900	80	60	60	7.6	6700	80	60	60	7.6	6700
1000	80	60	60	6.9	8140	80	60	60	6.9	8140
1100	80	60	60	6.5	10500	120	70	70	7.3	11200
1200	80	60	60	5.9	12300	120	70	70	6.7	13000
1300	80	60	60	5.5	14200	120	70	70	6.2	15000
1400	80	60	60	5.1	16300	120	70	70	5.7	17100
1500	80	60	60	4.9	18500	120	70	70	5.4	19300
1600	80	60	60	4.5	20800	120	70	70	5.0	21700
1700	80	60	60	4.1	23300	120	70	70	4.7	24300
1800	80	60	60	3.9	25900	120	70	70	4.5	26900
2000	80	60	60	3.7	31500	120	70	70	4.0	32700
2100	80	60	60	3.3	34500	120	70	70	3.8	35800
2200	80	60	60	3.2	37700	120	70	70	3.7	39000
2300	80	60	60	3.1	41000	120	70	70	3.5	42300
2400	80	60	60	3.0	44500	120	70	70	3.4	45800
2500	80	60	60	2.9	48000	120	70	70	3.2	49500
2600	80	60	60	2.7	51800	120	70	70	3.1	53300
2800	80	60	60	2.5	59600	120	70	70	2.9	61200
3000	80	60	60	2.4	68000	120	70	70	2.7	69700
3200	80	60	60	2.3	77000	120	70	70	2.5	78800
3400	80	60	60	2.2	86500	120	70	70	2.4	88500
3600	80	60	60	2.1	96600	120	70	70	2.3	98600

Please inquire for simultaneous (different) movement.
*Effective bellows cross sectional area is a theoretical value.

Version



Type C-2
Highly flexible universal expansion joint without restraint

Rubber expansion joint ▪ Type D-11, D-30

Round universal expansion joint DN 300 – DN 7500

Type D-11

Customized production

Applications

- for reducing thermal and mechanical tension, e.g. at
  - ventilating fans
  - blowers
- for muffling vibration and noise
- for compensating axial and lateral movement
- to compensate for installation inaccuracies
- air and ventilation technology
- dedusting and filter engineering (clean-room technology)

Structure type D-11

☐ Round universal expansion joint consisting of a rubber bellows and rotating flanges
☐ Wide rubber rim

Structure type D-30

☐ Round universal expansion joint consisting of a rubber bellows and stainless steel tightening straps
☐ Narrow rubber rim

Rubber bellows PN 0,7 bar g

☐ Extruded endless vulcanized profile band
☐ Without reinforcement
☐ Self-sealing rubber rim

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Air, gases containing acids or lyes, dust**
NBR	**red**	**Gases containing oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Property	Pressure	Temperature
Max. perm. operating	**depending on DN not exceeding 0.7 bar g**	**up to +90 °C**
pressure	(see table)	
Vacuum operation	**for light vacuum down to 0.98 bar abs.**	

Max. operating pressure to be set 30 % lower for shock loads.

Accessories

☐ Internal guide sleeve

Note

Please comply with the general technical instructions and installation instructions.

Subject to technical alterations and deviations resulting from the manufacturing process.

Admissible operating pressure, effective cross sectional area, reaction forces, moving forces and spring rates depend on expansion joint's size. Please inquire.

Flanges

Version

☐ Rotating flanges
☐ Flange drilling for through bolts

Dimensions

Standard: according to DIN 86044
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)

Corrosion protection

Standard: anti-corrosion primed
Others: hot-dip galvanized, special varnish, special coating, etc.
supply only for large order volumens

STENFLEX® type D-30 with tightening straps in an air duct

Dimensions standard program

DN	BL	Pressure rate at 20 °C	ø di Bellows inner ø	ø W Convolution ø unpressurized	ø C Raised face ø		h Rubber rim thickness		ø D Flange outer ø		b Flange thickness
					Type D-11	Type D-30	Type D-11	Type D-30	DIN 86044*	EN 1092, PN 6	
	mm	bar	mm	mm	mm	mm	mm	mm	mm	mm	mm
300	150	0.70	300	354	370	340	12	15	440	440	10
350	150	0.60	350	404	420	390	12	15	490	490	10
400	150	0.50	400	454	470	440	12	15	540	540	10
450	150	0.45	450	504	520	490	12	15	595	595	10
500	150	0.40	500	554	570	540	12	15	645	645	10
550	150	0.37	550	604	620	590	12	15	705		10
600	150	0.33	600	654	670	640	12	15	754	755	10
700	150	0.28	700	754	770	740	12	15	856	860	10
800	150	0.25	800	854	870	840	12	15	958	975	10
900	150	0.22	900	954	970	940	12	15	1060	1075	10
1000	150	0.20	1000	1054	1070	1040	12	15	1162	1175	10
1100	150	0.18	1100	1154	1170	1140	12	15	1266		10
1200	150	0.17	1200	1254	1270	1240	12	15	1366	1405	10
1300	150	0.15	1300	1354	1370	1340	12	15	1466		10
1400	150	0.14	1400	1454	1470	1440	12	15	1566	1630	10
1500	150	0.13	1500	1554	1570	1540	12	15	1666		10
1600	150	0.12	1600	1654	1670	1640	12	15	1766	1830	10
1700	150	0.11	1700	1754	1770	1740	12	15	1866		10
1800	150	0.10	1800	1854	1870	1840	12	15	1966	2045	10
1900	150	0.10	1900	1954	1970	1940	12	15	2066		10
2000	150	0.10	2000	2054	2070	2040	12	15	2166	2265	10

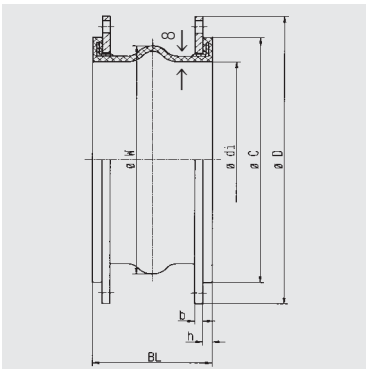
Other sizes up to DN 7500 on request.

Movement compensation/bellows cross sectional area

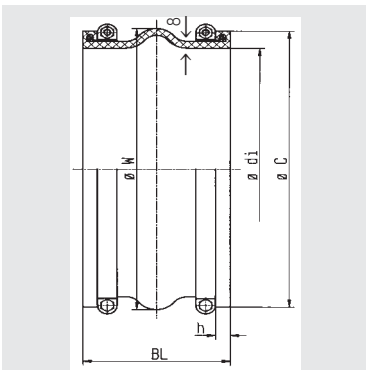
DN	Δ ax Axial movement		C ax Spring rate axial		Δ lat Lateral movement	C lat Spring rate lateral	A* Effective bellows cross sectional area
	Compression -mm	Elongation +mm	Compression -mm	Elongation +mm	+/- mm	N/mm	cm^2
300	25	15	12	45	20	15	750
350	25	15	14	52	20	18	1012
400	25	15	15	60	20	20	1300
450	25	15	17	67	20	22	1655
500	25	15	20	75	20	25	2000
550	25	15	22	83	20	28	2400
600	25	15	23	90	20	30	2900
700	25	15	27	105	20	35	3900
800	25	15	30	120	20	40	5100
900	25	15	35	135	20	45	6400
1000	25	15	39	150	20	51	7900
1100	25	15	43	165	20	57	9600
1200	25	15	47	180	20	63	11500
1300	25	15	50	195	20	70	13400
1400	25	15	54	210	20	77	15500
1500	25	15	58	225	20	85	17800
1600	25	15	62	240	20	93	20300
1700	25	15	66	255	20	102	22800
1800	25	15	70	270	20	112	25700
1900	25	15	74	285	20	123	28600
2000	25	15	78	300	20	135	31700

Please inquire for simultaneous (different) movement. *Effective bellows cross sectional area is a theoretical value.

Versions



Type D-11 with flanges



Type D-30 with tightening straps

Rubber expansion joint ▪ Type D-21, D-22, D-41, D-42

Square or oval universal expansion joint DN 150 – DN 7500

Customized production

Type D-21

Type D-41

Structure type D-21

- ☐ Rectangular universal expansion joint consisting of a rubber bellows and press-on retaining frame
- ☐ Wide rubber rim

Structure type D-41

- ☐ Rectangular universal expansion joint consisting of a rubber bellows and press-on retaining frame (round corners)
- ☐ Wide rubber rim

Structure type D-22

- ☐ Rectangular universal expansion joint consisting of a rubber bellows and press-on retaining frame
- ☐ Frame with stiffening ring
- ☐ Narrow rubber rim

Structure type D-42

- ☐ Rectangular universal expansion joint consisting of a rubber bellows and press-on retaining frame (round corners)
- ☐ Frame with stiffening ring
- ☐ Narrow rubber rim

Applications

- **for reducing thermal and mechanical tension, e.g. at**
  - **ventilating fans**
  - **blowers**
- **for muffling vibration and noise**
- **for compensating axial and lateral movement**
- **to compensate for installation inaccuracies**
- **air and ventilation technology**
- **dedusting and filter engineering (clean-room technology)**

Accessories

- ☐ Internal guide sleeve

Rubber bellows PN 0,7 bar g

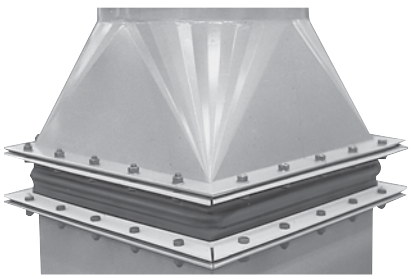
- ☐ Extruded, endless vulcanized profile band
- ☐ Without reinforcement
- ☐ Self-sealing rubber rim

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Air, gases containing acids or lyes, dust**
NBR	**red**	**Gases containing oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Property	Pressure	Temperature
Max. perm. operating	**depending on DN not exceeding 0.7 bar g**	**up to +90 °C**
pressure	(see table)	
Vacuum operation	**for light vacuum down to 0.98 bar abs.**	

Max. operating pressure to be set 30 % lower for shock loads.



STENFLEX® type D-21 in an air-conditioning duct

Press-on retaining frame

Version

- ☐ Retaining frame with drilling for through bolts

Dimensions

- ☐ Dimensions and drillings according to customer's specification

Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: unalloyed steel, stainless steel, etc.

Corrosion protection

Standard: anti-corrosion primed
Others: hot-dip galvanized, special varnish, special coating, etc.

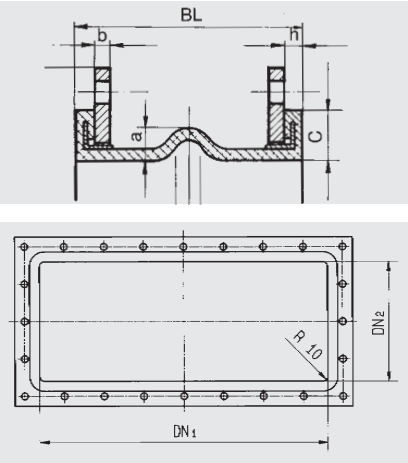
Dimensions standard program

Type	DN 1 Maximum size mm	DN 2 Minimum size mm	BL mm	Minimum circumferential size inside mm	a External height of convolution mm	C Rubber rim height mm	h Rubber rim thickness mm	b Flange thickness mm
D 21	**7500**	**150**	**150**	**900**	**27**	**35**	**12**	**10**
D 22	**7500**	**150**	**150**	**900**	**27**	**20**	**15**	**10**
D 41	**7500**	**150**	**150**	**900**	**27**	**35**	**12**	**10**
D 42	**7500**	**150**	**150**	**900**	**27**	**20**	**15**	**10**

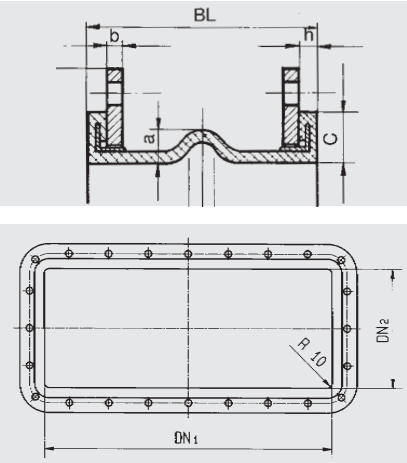
Movement compensation

Type	ax Axial movement		lat Lateral movement
	Compression - mm	Elongation + mm	+/- mm
D 21	**25**	**15**	**20**
D 22	**25**	**15**	**20**
D 41	**25**	**15**	**20**
D 42	**25**	**15**	**20**

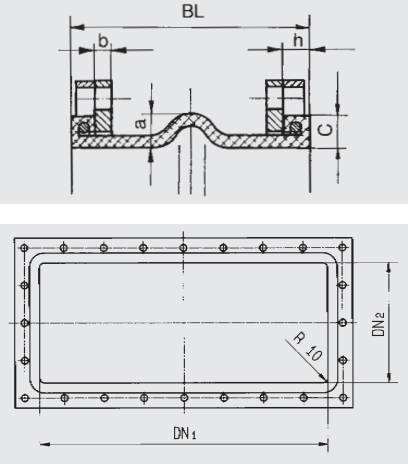
Versions



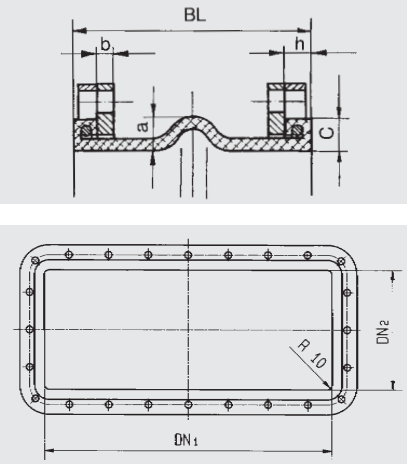
Type D-21



Type D-41



Type D-22



Type D-42

Note

Please comply with the general technical instructions and installation instructions.

Subject to technical alterations and deviations resulting from the manufacturing process.

Admissible operating pressure, effective cross sectional area, reaction forces, moving forces and spring rates depend on expansion joint's size. Please inquire.

Rubber expansion joint ▪ Type GR-SAE

Universal expansion joint DN 32 – DN 125

Structure type GR-SAE

Universal expansion joint consisting of a rubber bellows and rotating flanges

Rubber bellows PN 16

- ☐ Elastic molded bellows
- ☐ High-tensile synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
NBR	**red/yellow**	**Oil, hydraulic oil**

*Inquire about the resistance of the rubber grade depending on the kind of oil and additives.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+130 °C**
Bursting pressure	≥ **48 bar**
Vacuum operation	**DN 32-50 without vacuum supporting ring, DN 65-125 with vacuum supporting ring**

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Rotating flanges with stabilizing collar
- ☐ Flange drilling for through bolts according to SAE-standard, suitable for socket head cap screw acc. DIN 6912
- ☐ Special turned groove for rubber rim

Dimensions

Standard: SAE-standard 3000 psi
Others: PN 16 according to EN 1092
Connection dimensions see technical annex

Materials

Standard: aluminium
Others: 1.0038 (S235JR) etc.

Corrosion protection

Standard: not necessary for aluminium
Others: electrogalvanized, etc.

Applications

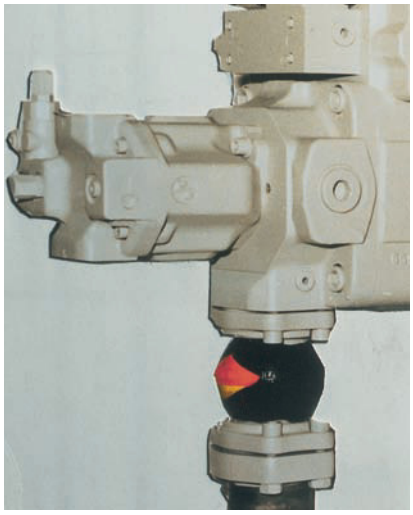
- ■ **for reducing thermal and mechanical tension in pipes and their system components**
- ■ **for compensating axial, lateral and angular movement**
- ■ **for muffling vibration and oscillation at aggregates**
- ■ **for damping noise transmission at**
  - ■ **pumps**
  - ■ **machines**
  - ■ **fittings**
- ■ **in hydraulic plants**
- ■ **in lub oil lines**
- ■ **mechanical engineering**

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Flame-proof protective cover
- ☐ Protective hood
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)



STENFLEX® type GR-SAE in a low-pressure hydraulic system

Dimensions standard program

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm
32	100	16	22±3	51	30	55
40	130	16	28±3	66	34	81
50	130	16	38±3	76	44	91
65	130	16	48±3	89	57	103
80	130	16	66±3	106	74	118
100	130	16	90±3	135	101	146
125	130	16	118±4	161	130	170

Movement compensation/bellows cross sectional area

DN	Δ ax Axial movement Compression - mm	Elongation + mm	Δ lat Lateral movement ± mm	Δ ang Angular movement ± ∢ degrees	A* Effective bellows cross sectional area at 16 bar cm^2	Weight approx. kg
32	20	10	10	25	0	0.5
40	20	10	10	20	38	1.0
50	20	10	10	20	46	1.2
65	20	10	10	15	62	1.8
80	20	10	10	12	76	2.1
100	20	10	10	8	109	2.6
125	20	10	10	8	165	3.4

Please inquire for simultaneous (different) movement.
*Effective bellows cross sectional area is a theoretical value.

Flange dimensions according to SAE-standard

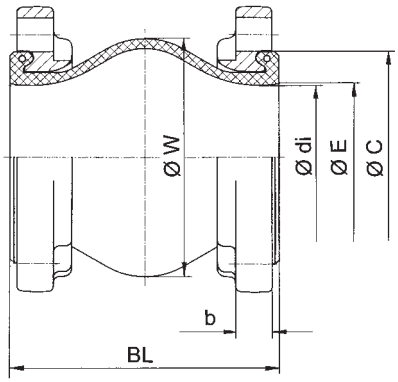
DN	L_1 mm	L_2 mm	D_1 mm	D_2 mm	b mm	d mm
32	58.7	30.2	79	64	16	11
40	70	35.7	94	75	16	13
50	78	43.0	102	86	16	13
65	89	51.0	116	98	16	13
80	106	62.0	134	120	18	17
100	130	78.0	162	146	18	17
125	152	92.0	190	170	18	17

Note

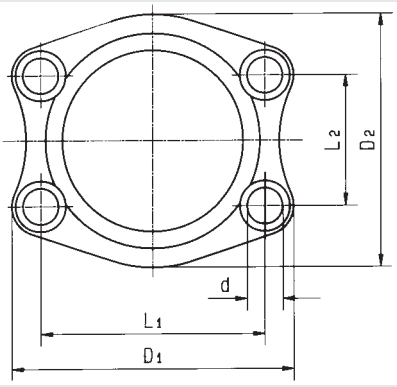
Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Versions



Type GR-SAE
Universal expansion joint



Flange according to SAE-standard

Rubber expansion joint ▪ Type R-1

Universal expansion joint DN 25 – DN 300

length 130 mm

Structure type R-1

Universal expansion joint consisting of a rubber bellows and rotating flanges

Rubber bellows PN 16

- ☐ Flat-convoluted molded bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Hot water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+100 °C**
Bursting pressure	≥ **48 bar**
Vacuum operation	**DN 25-50 without vacuum supporting ring,**
	DN 65-300 with vacuum supporting ring

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Rotating flanges with stabilizing collar
- ☐ Flange drilling for through bolts, DN 25 with Drill holes
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 25 - DN 150 (PN 16)
DN 200 - DN 300 (PN 10)
DN 25 - DN 300 (PN 6)
according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.4541, 1.4571

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized, special varnish, special coating, etc.

Applications

- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **compressors**
  - **motors**
- **for muffling vibration and noise**
- **for compensating axial, lateral and angular movement**
- **to compensate for installation inaccuracies**
- **as installation and dismantling aid**

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Flame-proof protective cover
- ☐ Protective hood
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)
- ☐ Bureau Veritas
- ☐ Lloyd's Register of shipping
- ☐ Det Norske Veritas
- ☐ Drinking water

STENFLEX® type R-1 in a proportioning system

Dimensions standard program

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm
25	130	16	31±3	72	39	88	16	115	16
32	130	16	31±3	72	39	88	16	140	16
40	130	16	39±3	81	45	96	16	150	16
50	130	16	49±3	95	56	107	16	165	16
65	130	16	65±3	115	72	123	16	185	18
80	130	16	77±3	127	84	135	16	200	20
100	130	16	100±3	151	109	160	16	220	20
125	130	16	127±3	178	133	184	16	250	22
150	130	16	153±3	206	161	212	16	285	22
200	130	10	202±3	260	209	260	10	340	25
250	130	10	252±3	313	262	313	10	395	25
300	130	10	303±3	363	312	363	10	445	25

From DN 200 pressure rate 16 bar also available with flanges PN 16.

Movement compensation/bellows cross sectional area

DN	Δ ax Axial movement Compression - mm	Δ ax Axial movement Elongation + mm	Δ lat Lateral movement ± mm	Δ ang* Angular movement ± ∢ degrees*	A** Effective bellows cross sectional area at 16 bar cm²	Permissible vacuum without supporting ring for length bar absolute	Weight approx. kg
25	35	10	15	25	8	–	2.2
32	35	10	15	25	8	0.6	3.3
40	35	10	15	25	9	0.6	3.8
50	35	10	15	25	19	0.6	4.5
65	35	10	15	25	33	0.7	5.2
80	30	10	15	20	53	0.65	7.1
100	30	10	15	15	98	0.6	8.0
125	30	10	15	15	103	0.75	10.5
150	30	10	15	10	203	0.65	12.8
200	25	10	15	7	379	0.7	18.2
250	25	10	15	6	525	0.7	23.7
300	20	10	15	5	769	0.8	30.4

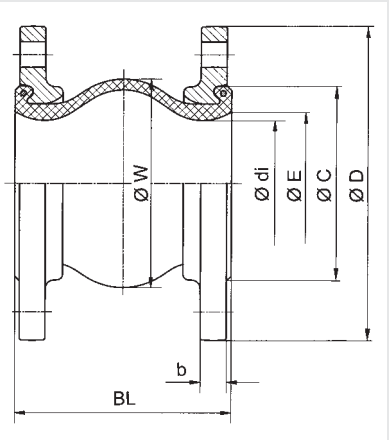
* Larger Δ ang possible for compressed installation length.
Please inquire for simultaneous (different) movement.
**Effective bellows cross sectional area is a theoretical value.

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Version



Type R-1
Universal expansion joint without restraint

STENFLEX®

RS-1/1-C12

Rubber-expansion joint ▪ Type RS-1

Universal-expansion joint DN 25 - DN 300

flame-proof

Structure Type RS-1

Universal-expansion joint, consisting of a flat-convoluted rubber bellows and rotating flanges

Applications

- **or reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **compressors**
  - **motors**
- **for muffling vibrations and noise**
  - **at appliances**
  - **in cooling water and lub oil pipes**
- **for compensating axial, lateral and angular movement**
- **to compensate for installation inaccuracies**
- **to meet fire protection regulations**
- **shipbuilding industry**
- **in heating plants**

Rubber bellows PN 16

- ☐ Flat-convoluted molded bellows in various rubber grades
- ☐ Steel wire cord reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impendance < 100 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Color code	Possible uses
EPDM	**orange/blue**	**Hot water, acids, lyes**
NBR	**red/blue**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+130 °C**
Bursting pressure	≥ **50 bar**
Vacuum operation	**DN 25-50 without vacuum supporting ring, DN 65-300 with vacuum supporting ring**

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Rotating flanges with stabilizing collar
- ☐ Flange drilling for through bolts, DN 25 with Drill holes
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 25 - DN 150 (PN 16)
DN 200 - DN 300 (PN 10)
DN 25 - DN 300 (PN 6)
according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.4541, 1.4571 etc.

Corrosion protection

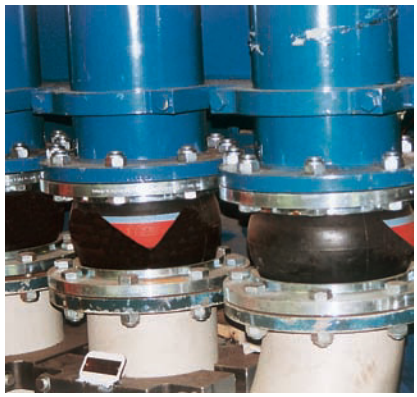
Standard: electrogalvanized
Others: hot-dip galvanized, special varnish, special coating, etc.

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Protective hood
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EG)
- ☐ Bureau Veritas
- ☐ Germanischer Lloyd
- ☐ Lloyd's Register of Shipping
- ☐ TÜV/DIN 4809 (DN 25-200)
- ☐ Det Norske Veritas
- ☐ MED



STENFLEX® Type RS-1 used in cooling water system of ship's engine

Dimensions standard program

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm
25	130	16	31±3	72	39	88	16	115	16
32	130	16	31±3	72	39	88	16	140	16
40	130	16	39±3	81	45	96	16	150	16
50	130	16	49±3	95	56	107	16	165	16
65	130	16	65±3	115	72	123	16	185	18
80	130	16	77±3	127	84	135	16	200	20
100	130	16	100±3	151	109	160	16	220	20
125	130	16	127±3	178	133	184	16	250	22
150	130	16	153±3	206	161	212	16	285	22
200	130	10	202±3	260	209	260	10	340	25
250	130	10	252±3	313	262	313	10	395	25
300	130	10	303±3	363	312	363	10	445	25

From DN 200 pressure rate 16 bar also available with flanges PN 16.

Movement compensation/bellows cross sectional area

DN	Δ ax Axial movement Compression - mm	Δ ax Axial movement Elongation + mm	Δ lat Lateral movement ± mm	Δ ang* Angular movement ± ∢ degrees*	A** Effective bellows cross sectional area at 16 bar cm^2	Permissible vacuum without supporting ring for length bar absolute	Weight approx. kg
25	35	10	15	25	0	–	2.2
32	35	10	15	25	0	0	3.3
40	35	10	15	25	0	0.2	3.8
50	35	10	15	25	2	0.2	4.5
65	35	10	15	25	3	0.4	5.2
80	30	10	15	20	16	0.4	7.1
100	30	10	15	15	48	0.4	8.0
125	30	10	15	15	81	0.4	10.5
150	30	10	15	10	143	0.4	12.8
200	25	10	15	7	191	0.4	19.0
250	25	10	15	6	413	0.5	24.5
300	20	10	15	5	533	0.6	31.3

* Larger Δ ang possible for compressed installation length.
Please inquire for simultaneous (different) movement.
**Effective bellows cross sectional area is a theoretical value.

Note

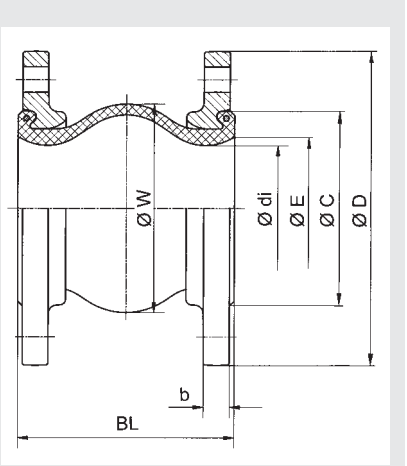
Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Chemicals used for water treatment (particularly in heating systems and coolant systems) can corrode the materials of the rubber expansion joint.

According to VDI Directive 2035, the manufacturer of the chemicals must state that the data indicating that the materials used in the expansion joint, especially for the rubber bellows, will not be damaged by the chemicals.

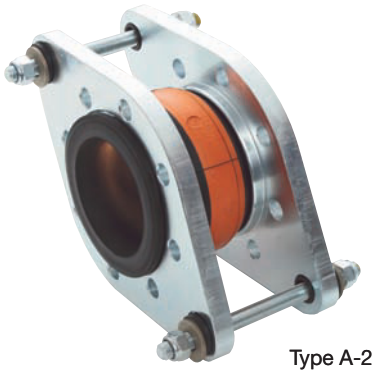
Version



Type RS-1
Universal-expansion joint, without restraint

Rubber expansion joint ▪ Type A-2 and A-4

Lateral expansion joint DN 20 – DN 1000



Type A-2

Type A-4

Structure type A-2

Lateral expansion joint consisting of a rubber bellows with rotating flanges and tie rods (outer restraints) to absorb reaction force from internal pressure

Structure type A-4

Lateral expansion joint consisting of a rubber bellows with rotating flanges and tie rods (outer and inner restraints) to absorb reaction force from internal pressure or vacuum

Applications

- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **compressors**
  - **motors**
- **for muffling vibration and noise**
- **for compensating lateral movement**
- **to compensate for installation inaccuracies**
- **to compensate for ground and foundation settlement or tank settlement during filling**

Rubber bellows PN 16

- ☐ Highly elastic molded bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Hot water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+100 °C**
Bursting pressure	≥ **48 bar**
Vacuum operation	≥ **0.05 bar abs. with vacuum supporting ring** (from DN 65)

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Tie rod restraints

- ☐ DN 20 - DN 150 Tie rods carried on silencing rubber sockets
- ☐ DN 175 - DN 1000 Tie rods carried on spherical washers and conical seats

Materials
Standard: tie rods 8.8
Others: stainless steel
Corrosion protection
Standard: electrogalvanized
Others: hot-dip galvanized

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Flame-proof protective cover
- ☐ Protective hood
- ☐ Protective tube

Flanges

Version
- ☐ Flanges with stabilizing collar and ears to carry the tie rods
- ☐ Flange drilling for through bolts
- ☐ Special turned groove for rubber rim

Dimensions
Standard: DN 20 - DN 175 (PN 16)
DN 200 - DN 1000 (PN 10)
DN 20 - DN 400 (PN 6)
according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials
Standard: 1.0038 (S235JR)
Others: 1.4541, 1.4571 etc.
Corrosion protection
Standard: DN 20 – DN 400 electrogalvanized
DN 450 – DN 1000 hot-dip galvanized
Others: special varnish, special coating, etc.

Certificates

- ☐ CE (DGR 97/23/EG)
- ☐ Bureau Veritas
- ☐ Det Norske Veritas
- ☐ Drinking water
- ☐ Lloyd´s Register of Shipping
- ☐ TÜV (KTA)

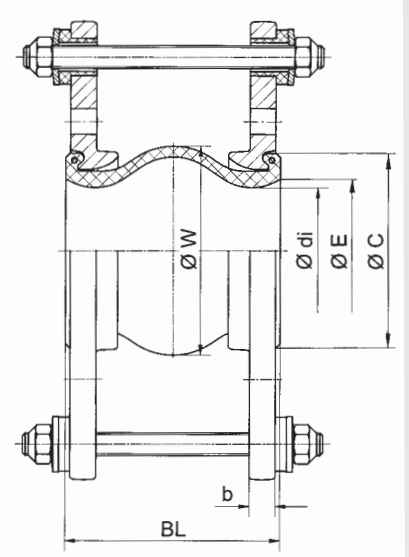
Others see technical annex

Dimensions standard program

DN	BL* mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm	H Flange height mm
20	100	16	22±3	51	30	55	16	115	16	195
25	100	16	22±3	51	30	55	16	115	16	195
32	125	16	31±3	72	39	78	16	140	16	220
40	125	16	39±3	81	45	86	16	150	16	230
50	125	16	49±3	95	56	97	16	165	16	240
65	125	16	65±3	115	72	113	16	185	18	260
80	150	16	77±3	127	84	135	16	200	20	300
100	150	16	100±3	151	109	160	16	220	20	350
125	150	16	127±3	178	133	184	16	250	22	385
150	150	16	153±3	206	161	212	16	285	22	420
175	150	16	176±3	230	185	236	16	315	22	440
200	175	10	202±3	260	209	265	10	340	25	465
250	175	10	252±3	313	262	318	10	395	25	520
300	200	10	303±3	363	312	373	10	445	25	570
350	200	10	344±3	423	360	420	10	505	30	630
400	200	10	396±3	474	410	460	10	565	30	690
450	250	10	435±8	532	450	575	10	615	35	795
500	250	10	485±8	584	500	625	10	670	35	850
600	250	10	585±8	684	600	725	10	780	40	960
700	275	6	690±10	800	700	850	10	895	40	1075
800	275	6	790±10	900	800	950	10	1015	40	1195
900	300	4	890±10	1008	900	1050	10	1115	40	1295
1000	300	4	990±10	1108	1000	1150	10	1230	40	1410

*DN 32 to DN 300 also available in BL 130 mm as type R-2.
From DN 200 higher pressure rate available on request.

Versions



Type A-2
Tie rods, outer restraints, carried on silencing rubber sockets

Movement compensation

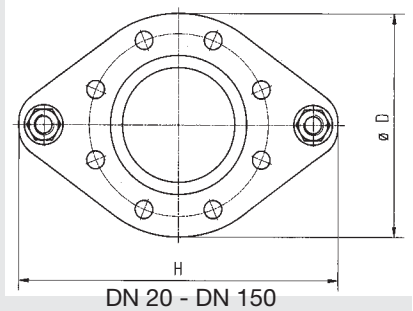
DN	Δ lat Lateral movement ± mm	Permissible vacuum without supporting ring for length bar absolute	Weight type A-2 approx. kg
20	10	–	3.9
25	10	–	3.9
32	15	0.6	5.1
40	15	0.6	5.6
50	15	0.6	6.3
65	15	0.6	8.0
80	15	0.65	10.7
100	15	0.65	12.6
125	15	0.7	16.8
150	15	0.75	19.6
175	15	0.8	19.9
200	15	0.9	22.7
250	15	0.9	27.5
300	15	0.9	31.6
350	15	0.95	46.7
400	15	0.95	57.8
450	30	0.35	85.7
500	30	0.35	98.0
600	30	0.35	133.9
700	30	0.5	173.5
800	30	0.5	213.6
900	30	0.6	250.0
1000	30	0.6	295.5

Note

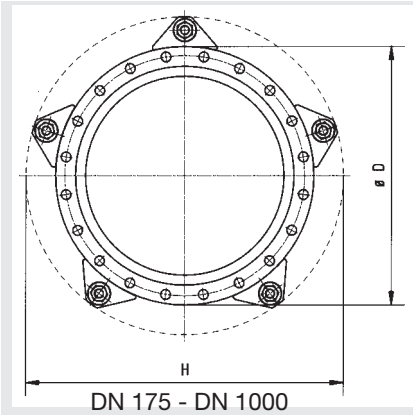
Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Flange versions

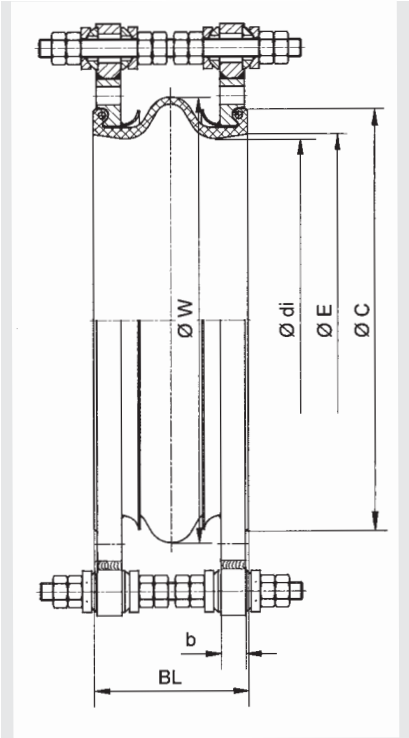


DN 20 - DN 150



DN 175 - DN 1000

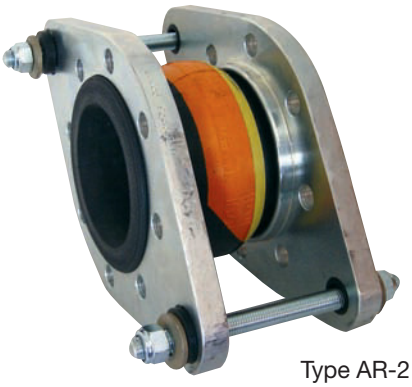
Number of tie rods depending on pressure



Type A-4
Design as type A-2, additional inner restraints, carried on spherical washers and conical seats

Rubber expansion joint Type AR-2 and AR-4

Lateral expansion joint DN 20 – DN 400



Type AR-2

Type AR-4

Structure type AR-2

Lateral expansion joint consisting of a rubber bellows with rotating flanges and tie rods (outer restraints) to absorb reaction force from internal pressure

Structure type AR-4

Lateral expansion joint consisting of a rubber bellows with rotating flanges and tie rods (outer and inner restraints) to absorb reaction force from internal pressure or vacuum

Rubber bellows PN 25

- ☐ Highly elastic molded bellows in various rubber grades
- ☐ High-tensile synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange/yellow**	**Hot water, acids, lyes**
NBR	**red/yellow**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**25 bar***
Max. perm. temperature	**+130 °C**
Bursting pressure	≥ **75 bar**
Vacuum operation	**DN 25-50 without vacuum supporting ring,**
	DN 65-400 with vacuum supporting ring

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Flanges with stabilizing collar and ears to carry the tie rods
- ☐ Flange drilling for through bolts
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 20 - DN 400 (PN 25) according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.4541, 1.4571 etc.

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized, special varnish, special coating, etc.

Applications

- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **compressors**
- **for muffling vibration and noise**
  - **at appliances**
  - **in cooling water and lube oil pipes**
- **for compensating lateral movement**
- **to compensate for installation inaccuracies**
- **in sprinkler systems**

Tie rod restraints

- ☐ DN 20 - DN 150 Tie rods carried on silencing rubber sockets
- ☐ DN 200 - DN 400 Tie rods carried on spherical washers and conical seats

Materials

Standard: tie rods 8.8
Others: stainless steel

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Flame-proof protective cover
- ☐ Protective hood
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)

Dimensions standard program

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN* Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm	H Flange height mm
20	100	25	22±3	51	30	55	25	115	16	195
25	100	25	22±3	51	30	55	25	115	16	195
32	125	25	31±3	72	39	78	25	140	16	220
40	125	25	39±3	81	45	86	25	150	16	230
50	125	25	49±3	95	56	97	25	165	16	240
65	125	25	65±3	115	72	113	25	185	18	260
80	150	25	77±3	127	84	135	25	200	20	300
100	150	25	100±3	151	109	160	25	235	20	350
125	150	25	127±3	178	133	184	25	270	22	385
150	150	25	153±3	206	161	212	25	300	22	420
200	175	25	202±3	260	209	265	25	360	25	485
250	175	25	252±3	313	262	318	25	425	25	550
300	200	25	303±3	363	312	373	25	485	25	610
350	200	25	344±3	423	360	420	25	555	30	680
400	200	25	396±3	474	410	460	25	620	30	745

* also available with flanges PN 16 and PN 10.

Movement compensation

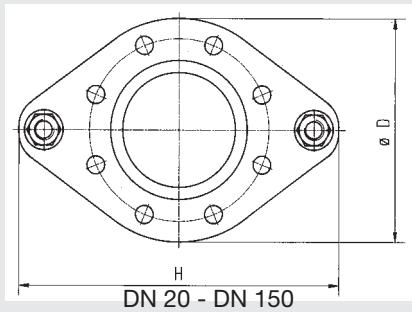
DN	Δ lat Lateral movement ± mm	Permissible vacuum without supporting ring for length bar absolute	Weight type AR-2 approx. kg
20	10	–	3.9
25	10	–	3.9
32	15	0	5.1
40	15	0.5	5.6
50	15	0.4	6.2
65	15	0.5	7.6
80	15	0.6	10.7
100	15	0.6	13.8
125	15	0.5	18.6
150	15	0.4	21.2
200	15	0.6	27.3
250	15	0.6	35.4
300	15	0.6	42.5
350	15	0.65	74.0
400	15	0.8	85.7

Note

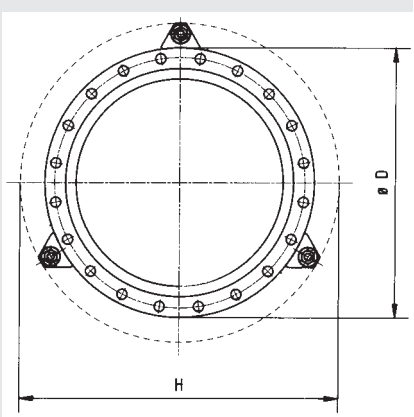
Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Flange versions



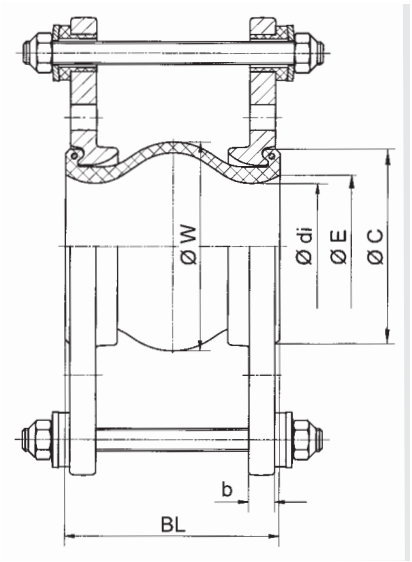
DN 20 - DN 150



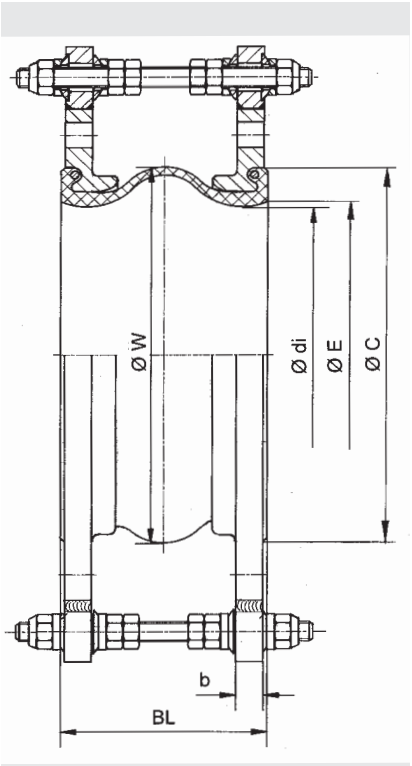
DN 200 - DN 300

Number of tie rods depending on pressure

Versions



Type AR-2
Tie rods, outer restraints, carried on silencing rubber sockets

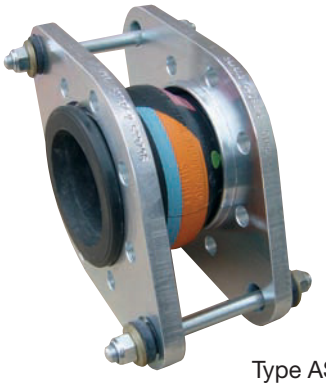


Type AR-4
Design as type AR-2, additional inner restraints, carried on spherical washers and conical seats

Rubber expansion joint Type AS-2 and AS-4

Lateral expansion joint DN 25 - DN 400

flame-proof



Type AS-2

Type AS-4

Structure type AS-2

Lateral expansion joint consisting of a rubber bellows with rotating flanges and tie rods (outer restraints) to absorb reaction force from internal pressure

Structure type AS-4

Lateral expansion joint consisting of a rubber bellows with rotating flanges and tie rods (outer and inner restraints) to absorb reaction force from internal pressure or vacuum

Rubber bellows PN 16

- ☐ Highly elastic molded bellows in various rubber grades
- ☐ Steel wire cord reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange/blue**	**Hot water, acids, lyes**
NBR	**red/blue**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+130 °C**
Bursting pressure	≥ **50 bar**
Vacuum operation	**DN 25-50 without vacuum supporting ring, DN 65-400 with vacuum supporting ring**

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Flanges with stabilizing collar and ears to carry the tie rods
- ☐ Flange drilling for through bolts, DN 25 with Drill holes
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 25 - DN 175 (PN 16)
DN 200 - DN 400 (PN 10)
DN 25 - DN 400 (PN 6)
according to EN 1092

Others: DIN EN, ANSI, BS etc.

Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.4541, 1.4571 etc.

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized, special varnish, special coating, etc.

Applications

- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **compressors**
  - **motors**
- **for muffling vibration and noise**
  - **at appliances**
  - **in cooling water and lube oil pipes**
- **for compensating lateral movement**
- **to compensate for installation inaccuracies**
- **to meet fire protection regulations**
- **shipbuilding industry**
- **in heating plants**

Tie rod restraints

- ☐ DN 20 - DN 150 Tie rods carried on silencing rubber sockets
- ☐ DN 175 - DN 400 Tie rods carried on spherical washers and conical seats

Materials

Standard: tie rods 8.8
Others: stainless steel

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Protective hood
- ☐ Protective tube

STENFLEX® type AS-2 used in an industrial plant

Certificates

- ☐ CE (DGR 97/23/EC)
- ☐ American Bureau of Shipping
- ☐ Bureau Veritas
- ☐ Det Norske Veritas
- ☐ Germanischer Lloyd
- ☐ Lloyd´s Register of Shipping
- ☐ TÜV Süddeutschland/DIN 4809

Others see technical annex

Dimensions standard program

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm	H Flange height mm
25	125	16	31±3	72	39	78	16	115	16	195
32	125	16	31±3	72	39	78	16	140	16	220
40	125	16	39±3	81	45	86	16	150	16	230
50	125	16	49±3	95	56	97	16	165	16	240
65	125	16	65±3	115	72	113	16	185	18	260
80	150	16	77±3	127	84	135	16	200	20	300
100	150	16	100±3	151	109	160	16	220	20	350
125	150	16	127±3	178	133	184	16	250	22	385
150	150	16	153±3	206	161	212	16	285	22	420
175	150	16	176±3	230	185	236	16	315	22	440
200	175	10	202±3	260	209	265	10	340	25	465
250	175	10	252±3	313	262	318	10	395	25	520
300	200	10	303±3	363	312	373	10	445	25	570
350	200	10	344±3	423	360	420	10	505	30	630
400	200	10	396±3	474	410	460	10	565	30	690

From DN 200 higher pressure rate available on request.

Movement compensation

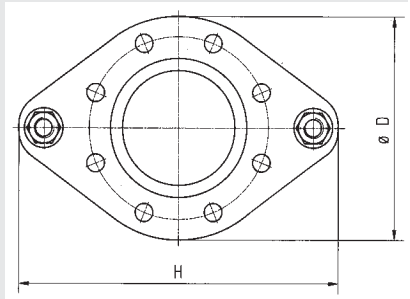
DN	Δ lat Lateral movement ± mm	Permissible vacuum without supporting ring for length bar absolute	Weight type AS-2 approx. kg
25	10	–	4.2
32	15	0	5.1
40	15	0	5.6
50	15	0	6.2
65	15	0	7.9
80	15	0.2	10.7
100	15	0.4	12.6
125	15	0.65	16.8
150	15	0.65	19.6
175	15	0.7	20.3
200	15	0.7	23.2
250	15	0.7	28.1
300	15	0.75	32.2
350	15	0.5	44.7
400	15	0.3	58.6

Note

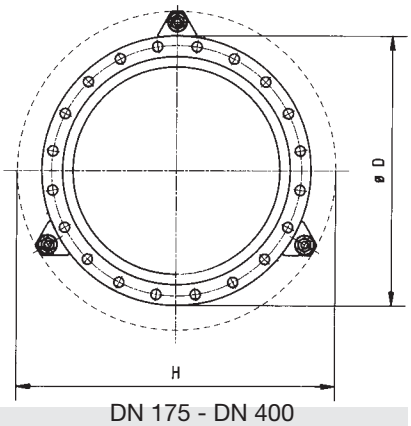
Subject to technical alterations and deviations resulting from the manufacturing process.

Chemicals used for water treatment (particularly in heating systems and coolant systems) can corrode the materials of the rubber expansion joint. According to VDI Directive 2035, DIN 4809 part 1 and VGB R 455P, the manufacturer of the chemicals must state that the materials used in the expansion joint, especially for the rubber bellows, will not be damaged by the chemicals.

Flange versions



DN 25 - DN 150

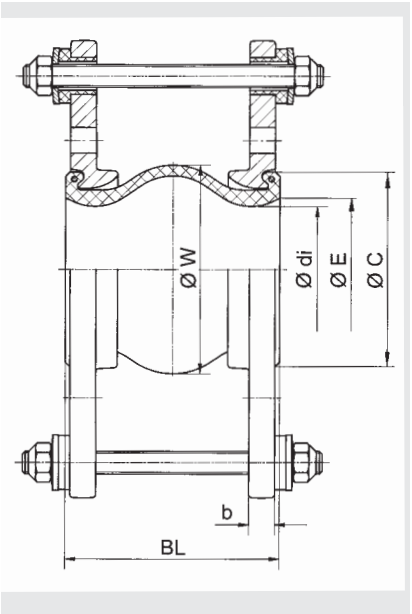


DN 175 - DN 400

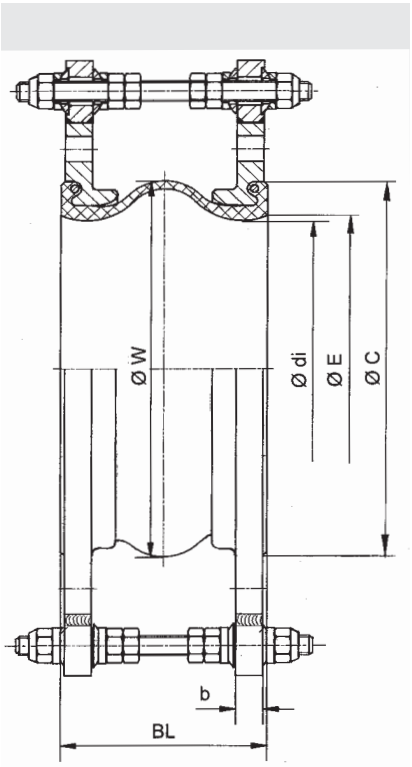
Number of tie rods depending on pressure

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Versions



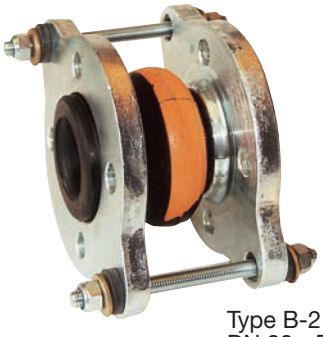
Type AS-2
Tie rods, outer restraints, carried on silencing rubber sockets



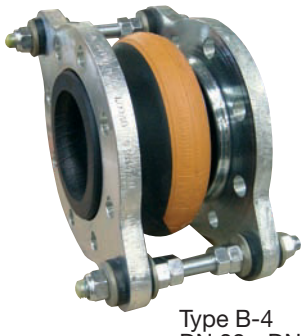
Type AS-4
Design as type AS-2, additional inner restraints, carried on spherical washers and conical seats

Rubber expansion joint Type B-2 and B-4

Highly flexible lateral expansion joint DN 32 – DN 400



Type B-2
DN 32 - DN 150



Type B-4
DN 32 - DN 150

Structure type B-2

Lateral expansion joint consisting of a rubber bellows with rotating flanges and tie rods (outer restraints) to absorb reaction force from internal pressure

Structure type B-4

Lateral expansion joint consisting of a rubber bellows with rotating flanges and tie rods (outer and inner restraints) to absorb reaction force from internal pressure or vacuum

Rubber bellows PN 16

- ☐ Very elastic molded bellows with specially high convolution in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Hot water, acids, lyes**
NBR	**red**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+100 °C**
Bursting pressure	≥ **48 bar**
Vacuum operation	**DN 32-40 without vacuum supporting ring,**
	DN 50-400 with vacuum supporting ring

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ DN 32 – DN 150 flanges with stabilizing collar and through bolts and with ears to carry the tie rods
- ☐ DN 175 – DN 400 flanges drilled with threaded holes and with segments to carry the tie rods
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 32 - DN 175 (PN 16)
DN 200 - DN 400 (PN 10)
according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.4541, 1.4571etc.

Corrosion protection

Standard: DN 32 – DN 400 electrogalvanized
Others: hot-dip galvanized, special varnish, special coating, etc.

Applications

- **for compensating large axial and lateral movements**
- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **compressors**
- **for muffling vibration and noise at appliances**
- **to compensate for installation inaccuracies**
- **power engineering**
- **chemical industry**

Tie rod restraints

- ☐ DN 20 - DN 150 Tie rods carried on silencing rubber sockets
- ☐ DN 175 - DN 1000 Tie rods carried on spherical washers and conical seats

Materials

Standard: tie rods 8.8
Others: stainless steel

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Flame-proof protective cover
- ☐ Protective hood
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)

Dimensions standard program

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm	H Flange height mm
32	125	16	30±3	75	42	100	16	150	16	220
40	125	16	30±3	75	42	100	16	150	16	220
50	125	16	40±3	86	61	115	16	165	16	230
65	125	16	61±3	105	71	144	16	185	16	260
80	150	16	74±3	118	82	167	16	200	18	280
100	150	16	92±3	137	101	197	16	220	18	320
125	150	16	116±3	166	130	230	16	250	18	350
150	150	16	139±3	191	150	266	16	285	18	400
175	100	16	177±3	217	183	282	16	315	18	425
200	125	10	201±3	264	207	320	10	340	20	460
250	125	10	251±3	314	260	374	10	395	22	510
300	150	10	302±3	370	313	443	10	445	24	575
350	150	10	347±3	424	354	485	10	505	24	635
400	150	10	392±3	474	407	535	10	565	24	685

Movement compensation

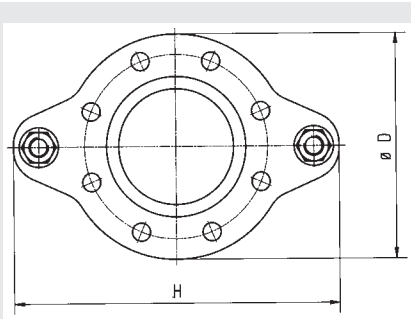
DN	Δ lat Lateral movement ± mm	Weight type B-2 approx. kg
32	15	6.0
40	15	6.0
50	15	6.6
65	15	8.2
80	20	8.9
100	20	10.9
125	25	13.9
150	25	17.1
175	25	24.0
200	35	26.0
250	35	31.0
300	35	43.0
350	35	50.0
400	35	60.0

Note

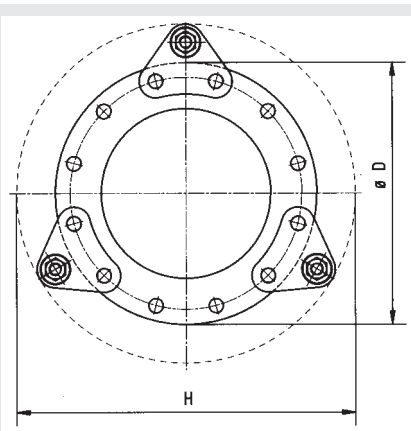
Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Flange versions



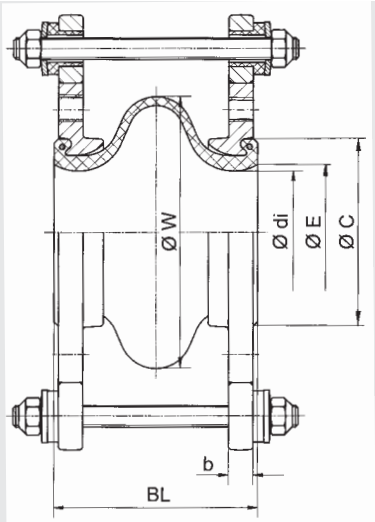
DN 32 - DN 150



DN 175 - DN 400

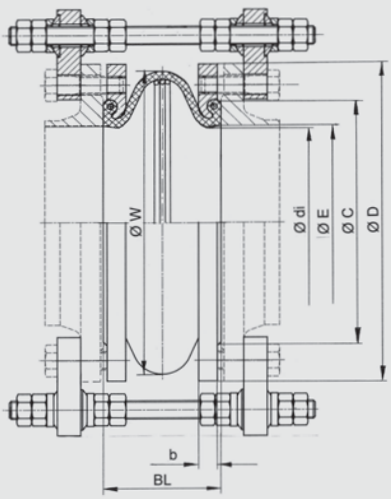
Number of tie rods depending on pressure

Versions



DN 32 - DN 150

Type B-2
DN 32 - DN 150 Tie rods, outer restraints, carried in silencing sockets
DN 175 - DN 400 Tie rods, outer restraints, carried in segments, on spherical washers and conical seats



DN 175 - DN 400

Type B-4
DN 32 - DN 150 Tie rods, outer and inner restraints, carried in silencing sockets
DN 175 - DN 400 Tie rods, outer and inner restraints, carried in segments, on spherical washers and conical seats

Rubber expansion joint ▪ Type C-31

Lateral expansion joint DN 300 – DN 3600

Customized production

Structure type C-31

- ☐ Lateral expansion joint consisting of a rubber bellows and press-on retaining flanges and tie rods
- ☐ Tie rods (outer restraints) to absorb reaction force from internal pressure
- ☐ Alternative: Tie rods (outer and inner restraints) to absorb reaction force from internal pressure or vacuum
- ☐ Available in various bellows geometries and special lengths

Rubber bellows PN 4 / PN 10 / PN 16

- ☐ Elastic robust bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Full-faced self-sealing rubber flanges with drilling for through bolts
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Cooling, sea, brackish water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design DN Pressure rate	DN 300 - 2400 PN 4	DN 300 - 1000 PN 10	DN 300 - 1000 PN 16
Max. perm. operating pressure	**4 bar***	**10 bar***	**16 bar***
Max. perm. temperature	**+100 °C**	**+100 °C**	**+100 °C**
Bursting pressure	**≥ 15 bar**	**≥ 30 bar**	**≥ 48 bar**
Vacuum operation	**with vacuum supporting ring (at permanent vacuum)**		

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Press-on retaining flanges with stabilizing collar
- ☐ With ears or with second bolt circle to carry the tie rods (depending on DN and PN)
- ☐ Flange drilling for through bolts

Dimensions

Standard: PN 10 according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR), 1.0577 (S355J2)
Others: stainless steel, etc.

Corrosion protection

Standard: DN 300 - DN 500 electrogalvanized
DN 600 - DN 1000 hot-dip galvanized
DN 1100 - DN 3600 anti-corrosion primed
Others: special varnish, special coating, etc.

Applications

- **for compensating lateral movement**
- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **condensers**
- **to compensate for installation inaccuracies**
- **to compensate for ground and foundation settlement**
- **as installation and dismantling aid**
- **power station technology**
- **process plant engineering**

Tie rod restraints

- ☐ Tie rods carried on spherical washers and conical seats

Materials

Standard: tie rods 8.8
Others: stainless steel

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)
- ☐ Drinking water
- ☐ TÜV (KTA)

STENFLEX® type C-31 in a power plant

Dimensions standard program

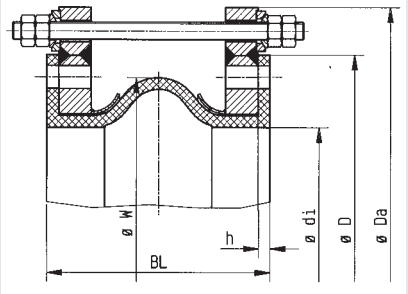
DN	Pressure rate	Bellows		Steel flange	**without** vacuum supporting ring					**with** vacuum supporting ring				
		ø di Bellows inner ø tolerance±1%	h Rubber-flange thickness	ø Da Outer ø restrainer flange	BL mm at rated pressure			ø W Convolution ø unpressurized	Weight approx.	BL mm at rated pressure			ø W Convolution ø unpressurized	Weight approx.
	bar	mm	mm	mm	4 bar	10 bar	16 bar	mm	kg	4 bar	10 bar	16 bar	mm	kg
300	4/10/16	300	15	595	275	275	275	413	86	275	275	275	413	92
350	4/10/16	350	15	655	275	275	275	463	100	275	275	275	463	108
400	4/10/16	400	15	715	275	275	275	513	118	275	275	275	513	121
450	4/10/16	450	15	765	275	275	275	563	132	275	275	275	563	137
500	4/10/16	500	15	820	275	275	275	613	144	275	275	275	613	149
600	4/10/16	600	15	930	275	275	275	713	173	275	275	275	713	205
700	4/10/16	700	15	1065	275	275	300	813	255	275	275	300	813	263
750	4/10/16	750	15	1135	275	275	300	863	294	275	275	300	863	343
800	4/10/16	800	20	1185	275	275	300	923	357	275	275	300	923	363
900	4/10/16	900	20	1285	275	300	300	1023	397	275	300	300	1023	453
1000	4/10/16	1000	20	1420	275	300	325	1123	539	275	300	325	1123	555
1100	4	1100	20	1535	325			1268	545	350			1310	565
1200	4	1200	20	1645	325			1368	665	350			1410	715
1300	4	1300	20	1785	325			1468	800	350			1510	830
1400	4	1400	20	1895	325			1568	970	350			1610	1005
1500	4	1500	20	2015	325			1668	1070	375			1710	1210
1600	4	1600	20	2135	350	on request	on request	1768	1300	375	on request	on request	1810	1340
1700	4	1700	20	2235	350			1868	1360	375			1910	1515
1800	4	1800	20	2335	350			1968	1530	375			2010	1575
2000	4	2000	20	2545	350			2168	1875	375			2210	1935
2100	4	2100	20	2660	350			2268	2115	375			2310	2175
2200	4	2200	25	2770	375			2378	2435	400			2420	2495
2300	4	2300	25	2870	375			2478	2645	425			2520	2605
2400	4	2400	25	2980	400			2578	2865	425			2620	2940

Values are based on flange dimensions according to EN 1092 PN 10.
Lengths (BL) may vary and depend on flange drilling, operating pressure, possible vacuum, operating temperature.
Larger sizes (DN) on request.

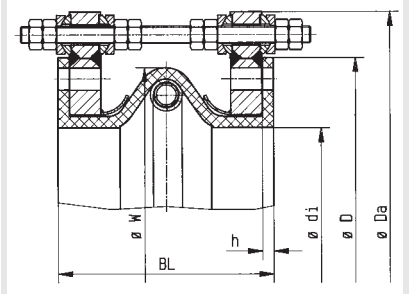
Movement compensation

DN	**without** vacuum supporting ring Δ lat Lateral movement ± mm	**with** vacuum supporting ring Δ lat Lateral movement ± mm
300	30	30
350	30	30
400	30	30
450	30	30
500	30	30
600	30	30
700	30	30
750	30	30
800	30	30
900	30	30
1000	30	30
1100	30	35
1200	30	35
1300	30	35
1400	30	35
1500	30	35
1600	30	35
1700	30	35
1800	30	35
2000	30	35
2100	30	35
2200	30	35
2300	30	35
2400	30	35

Versions



Type C-31
Lateral expansion joint, outer restraints



Type C-31
Lateral expansion joint, outer and inner restraints, with vacuum supporting ring

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Rubber expansion joint ▪ Type C-32

Lateral expansion joint DN 300 – DN 3600

Customized production

Structure type C-32

- ☐ Lateral expansion joint consisting of a rubber bellows and press-on retaining flanges
- ☐ Restrainer flanges as mating flange to be welded on the pipe at site
- ☐ Tie rods (outer restraints) to absorb reaction force from internal pressure
- ☐ Alternative: Tie rods (outer and inner restraints) to absorb reaction force from internal pressure or vacuum
- ☐ Available in various bellows geometries and special lengths

Rubber bellows PN 4 / PN 10

- ☐ Elastic robust bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Full-faced self-sealing rubber flanges with drilling for through bolts
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Cooling, sea, brackish water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design		
DN	DN 300 - 3600	DN 300 - 1000
Pressure rate	PN 4	PN 10
Max. perm. operating pressure	**4 bar***	**10 bar***
Max. perm. temperature	**+100 °C**	**+100 °C**
Bursting pressure	**≥ 15 bar**	**≥ 30 bar**
Vacuum operation	**with vacuum supporting ring at permanent vacuum**	

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Press-on retaining flanges with stabilizing collar
- ☐ Mating flanges to carry the tie rods
- ☐ Flange drilling for through bolts

Dimensions

Standard: PN 10 according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR), 1.0577 (S355J2)
Others: stainless steel, etc.

Corrosion protection

Standard: DN 300 - DN 700 electrogalvanized
DN 800 - DN 1000 hot-dip galvanized
DN 1100 - DN 3600 anti-corrosion primed
Others: special varnish, special coating, etc.

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Applications

- **for compensating lateral movement**
- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **condensers**
- **to compensate for installation inaccuracies**
- **to compensate for ground and foundation settlement**
- **as installation and dismantling aid**
- **power station technology**
- **process plant engineering**

Tie rod restraints

- ☐ Tie rods carried on spherical washers and conical seats

Materials

Standard: tie rods 8.8
Others: stainless steel

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized

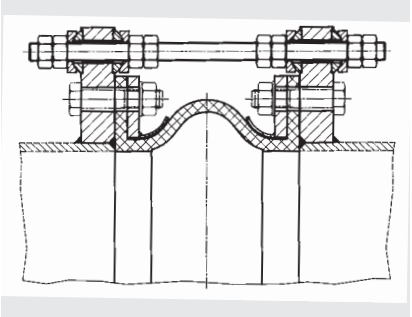
Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)
- ☐ Drinking water
- ☐ TÜV (KTA)

Versions



Type C-32
Lateral expansion joint, outer and inner restraints
Dimensions and movement compensation on request

Rubber expansion joint ▪ Type C-35

Lateral expansion joint DN 300 – DN 3600

Customized production

Structure type C-35

- ☐ Lateral expansion joint consisting of a rubber bellows and press-on retaining flanges
- ☐ Restrainer segments for fitting on the mating flanges on site
- ☐ Tie rods (outer restraints) to absorb reaction force from internal pressure
- ☐ Alternative: Tie rods (outer and inner restraints) to absorb reaction force from internal pressure or vacuum
- ☐ Available in various bellows geometries and special lengths

Rubber bellows PN 4 / PN 10

- ☐ Elastic robust bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Full-faced self-sealing rubber flanges with drilling for through bolts
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Cooling, sea, brackish water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design		
DN	DN 300 - 3600	DN 300 - 1000
Pressure rate	PN 4	PN 10
Max. perm. operating pressure	**4 bar***	**10 bar***
Max. perm. temperature	**+100 °C**	**+100 °C**
Bursting pressure	**≥ 15 bar**	**≥ 30 bar**
Vacuum operation	**with vacuum supporting ring at permanent vacuum**	

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges/Segments

Version

- ☐ Press-on retaining flanges with stabilizing collar
- ☐ Segments to carry the tie rods to fit on mating flanges
- ☐ Flange drilling for through bolts

Dimensions

Standard: PN 10 according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR), 1.0577 (S355J2)
Others: stainless steel, etc.

Corrosion protection

Standard: DN 300 - DN 700 electrogalvanized
DN 800 - DN 1000 hot-dip galvanized
DN 1100 - DN 3600 anti-corrosion primed
Others: special varnish, special coating, etc.

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Applications

- **for compensating lateral movement**
- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **condensers**
- **to compensate for installation inaccuracies**
- **to compensate for ground and foundation settlement**
- **as installation and dismantling aid**
- **power station technology**
- **process plant engineering**

Tie rod restraints

- ☐ Tie rods carried on spherical washers and conical seats

Materials

Standard: tie rods 8.8
Others: stainless steel

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized

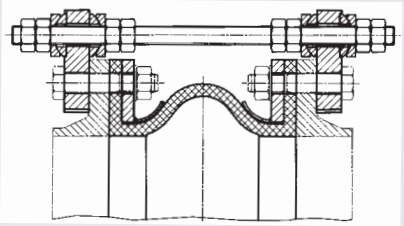
Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EC)
- ☐ Drinking water
- ☐ TÜV (KTA)

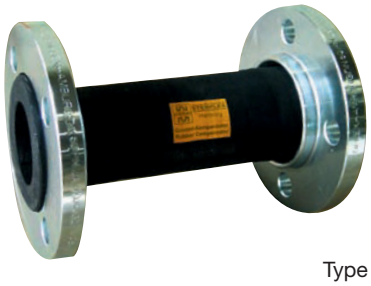
Versions



Type C-35
Lateral expansion joint, outer and inner restraints on segments
Dimensions and movement compensation on request

Rubber expansion joint ▪ Type E

Cylindrical lateral expansion joint DN 20 – DN 250



Type E

Structure type E

Lateral expansion joint consisting of a cylindrical rubber bellows without convolution and rotating flanges

Rubber bellows PN 10

- ☐ Cylindrical bellows without convolution in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim (type E)
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Cooling, hot, waste, brackish water, acids, lyes**
NBR	**red**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**10 bar***
Max. perm. temperature	**+100 °C**
Bursting pressure	**≥ 30 bar**
Vacuum operation	**not suitable**

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Applications

- ■ **for compensating lateral movement**
- ■ **to improve the flow of media (smooth passage)**
- ■ **for deposit-free passage of solid matter, e.g. at pumps for gypsum suspension**
- ■ **for muffling vibration and noise**
- ■ **as cylindrical elastic transition piece at**
  - ■ **pumps**
  - ■ **pipelines**
  - ■ **motors**
  - ■ **ventilating fans/blowers**
  - ■ **cooling water lines**
- ■ **cement industry**
- ■ **conveyance technology**

Flanges

Version

- ☐ Special turned groove for rubber rim
- ☐ Flange drilling for through bolts

Dimensions

Standard: DN 20 - DN 175 (PN 16)
DN 200 - DN 250 (PN 10)
according to EN 1092

Others: DIN EN, ANSI, BS etc.

Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)

Others: stainless steel, etc.

Corrosion protection

Standard: DN 20 - DN 250
electrogalvanized

Others: special varnish, special coating, etc.

Special versions

Other sizes or lengths on request

Certificates

- ☐ CE (DGR 97/23/EC)

Dimensions standard program type E

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face ø mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm	Δ lat Lateral movement ± mm	Weight approx. kg
20	160	10	25	51	16	115	16	30	2.3
25	160	10	25	51	16	115	16	30	2.3
32	200	10	39	72	16	140	16	25	3.4
40	200	10	45	81	16	150	16	25	3.9
50	230	10	56	95	16	165	16	25	4.7
65	290	10	72	115	16	185	18	20	5.8
80	310	10	84	127	16	200	20	20	7.9
100	350	10	109	151	16	220	20	20	9.2
125	350	10	133	178	16	250	22	20	12.1
150	350	10	161	206	16	285	22	20	14.7
200	350	10	209	260	10	340	25	15	21.3
250	350	10	262	313	10	395	25	15	26.3

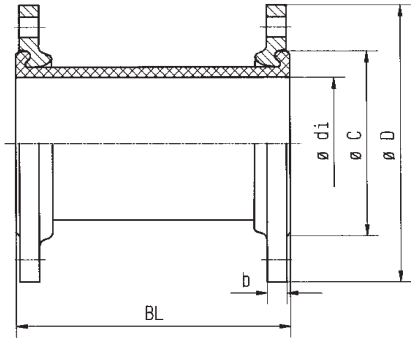
Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Reaction force, moving force and fixed point load have to be calculated as for universal expansion joints (no tie rod restraints available).

Subject to technical alterations and deviations resulting from the manufacturing process.

Versions



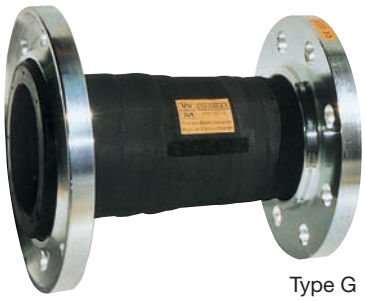
Type E
Cylindrical lateral expansion joint with rotating flanges

STENFLEX®

G/1-C12

Rubber expansion joint ▪ Type G

Conical lateral expansion joint DN 25 – DN 250



Type G

Structure type G

Lateral expansion joint consisting of a conical rubber bellows without convolution and rotating flanges.

Rubber bellows PN 6 / PN 10 / PN 16

- ☐ Conical bellows without convolution in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Cooling, hot, waste, brackish water, acids, lyes**
NBR	**red**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design DN Pressure rate	DN 125:80 - DN 250:200 PN 10	DN 40:25 - DN 100:80 PN 16
Max. perm. operating pressure	**10 bar***	**16 bar***
Max. perm. temperature	**+100 °C**	**+100 °C**
Bursting pressure	**≥ 30 bar**	**≥ 48 bar**
Vacuum operation	**not suitable**	**not suitable**

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Special turned groove for rubber rim
- ☐ Flange drilling for through bolts

Dimensions

Standard: DN 25 - DN 150 (PN 16)
DN 200 - DN 250 (PN 10)
according to EN 1092

Others: DIN EN, ANSI, BS etc.

Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)

Others: stainless steel, etc.

Corrosion protection

Standard: electrogalvanized

Others: hot-dip galvanized, special varnish, special coating, etc.

Applications

- **for compensating lateral movement**
- **to improve flowing of media (smooth passage)**
- **for deposit-free passage of solid matter, e.g. at pumps for gypsum suspension**
- **for muffling vibration and noise**
- **as conical, elastic reducing adapter at**
  - **pumps**
  - **pipelines**
  - **motors**
  - **ventilating fans/blowers**
  - **cooling water lines**
- **cement industry**
- **conveyance technology**

Special versions

Other sizes or lengths on request

Certificates

- ☐ CE (DGR 97/23/EC)

Dimensions standard program type G

DN	BL mm	Pressure rate bar	ø di_1:ø di_2 Bellows inner ø mm	ø C_1:ø C_2 Raised face ø mm	PN Flange connection EN 1092	ø D_1:ø D_2 Flange outer ø mm	b Flange thickness mm	Δ lat Lateral movement ±mm	Weight approx. kg
40 : 25	250	16	45 : 30	81 : 51	16/16	150 : 115	16 : 16	30	3.2
40 : 32	250	16	45 : 39	81 : 72	16/16	150 : 140	16 : 16	30	3.7
50 : 32	250	16	56 : 39	95 : 72	16/16	165 : 140	16 : 16	30	4.1
50 : 40	250	16	56 : 45	95 : 81	16/16	165 : 150	16 : 16	30	4.4
65 : 40	250	16	72 : 45	115 : 81	16/16	185 : 150	18 : 16	30	5.2
65 : 50	250	16	72 : 56	115 : 95	16/16	185 : 165	18 : 16	30	5.6
80 : 50	250	16	84 : 56	127 : 95	16/16	200 : 165	20 : 16	30	6.3
80 : 65	250	16	84 : 72	127 : 115	16/16	200 : 185	20 : 18	30	7.1
100 : 65	250	16	109 : 72	151 : 115	16/16	220 : 185	20 : 18	30	7.5
100 : 80	250	16	109 : 84	151 : 127	16/16	220 : 200	20 : 20	25	8.2
125 : 80	250	10	133 : 84	178 : 127	16/16	250 : 200	22 : 20	25	9.7
125 : 100	250	10	133 : 109	178 : 151	16/16	250 : 220	22 : 20	25	10.0
150 : 80	250	10	161: 84	206 : 127	16/16	285 : 200	22 : 20	25	10.9
150 : 100	250	10	161 : 109	206 : 151	16/16	285 : 220	22 : 20	25	11.4
150 : 125	250	10	161 : 133	206 : 178	16/16	285 : 250	22 : 22	25	12.8
200 : 125	250	10	209 : 133	260 : 178	10/16	340 : 250	25 : 22	25	16.0
200 : 150	250	10	209 : 161	260 : 206	10/16	340 : 285	25 : 22	25	17.2
250 : 150	250	10	262 : 161	313 : 206	10/16	395 : 285	25 : 22	25	19.3
250 : 200	250	10	262 : 209	313 : 260	10/10	395 : 340	25 : 25	25	22.4

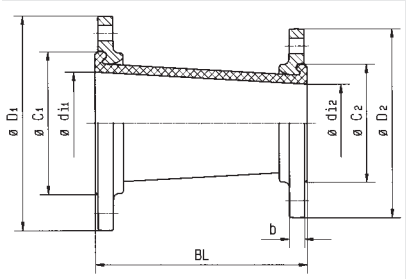
Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Reaction force, moving force and fixed point load have to be calculated as for universal expansion joints (no tie rod restraints available).

Subject to technical alterations and deviations resulting from the manufacturing process.

Versions



Type G
Conical lateral expansion joint with rotating flanges

Rubber expansion joint ▪ Type R-2

Lateral expansion joint DN 25 – DN 300

length 130 mm

Structure type R-2

Lateral expansion joint consisting of a rubber bellows with rotating flanges and tie rods (outer restraints) to absorb reaction force from internal pressure.

Applications

- **for reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **compressors**
  - **motors**
- **for muffling vibration and noise**
- **for compensating lateral movement**
- **to compensate for installation inaccuracies**
- **to compensate for ground and foundation settlement or tank settlement during filling**

Rubber bellows PN 16

- ☐ Flat-convoluted molded bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Hot water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+100 °C**
Bursting pressure	**≥ 48 bar**
Vacuum operation	**DN 25-50 without vacuum supporting ring,**
	DN 65-300 with vacuum supporting ring

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Flanges with stabilizing collar and ears to carry the tie rods
- ☐ Flange drilling for through bolts, DN 25 with Drill holes
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 25 - DN 150 (PN 16)
DN 200 - DN 300 (PN 10)
DN 25 - DN 300 (PN 6)
according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: 1.4571

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized, special varnish, special coating, etc.

Tie rod restraints

- ☐ DN 25 – DN 150 Tie rods carried on silencing rubber sockets
- ☐ DN 200 – DN 300 Tie rods carried on spherical washers and conical seats

Materials

Standard: tie rods 8.8
Others: stainless steel

Corrosion protection

Standard: electrogalvanized
Others: hot-dip galvanized

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Flame-proof protective cover
- ☐ Protective hood
- ☐ Protective tube

Certificates

- ☐ CE (DGR 97/23/EG)
- ☐ Bureau Veritas
- ☐ Det Norske Veritas
- ☐ Lloyd's Register of Shipping
- ☐ Drinking water

Dimensions standard program

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm	H Flange height mm
25	130	16	31±3	72	39	88	16	115	16	210
32	130	16	31±3	72	39	88	16	140	16	220
40	130	16	39±3	81	45	96	16	150	16	230
50	130	16	49±3	95	56	107	16	165	16	240
65	130	16	65±3	115	72	123	16	185	18	260
80	130	16	77±3	127	84	135	16	200	20	300
100	130	16	100±3	151	109	160	16	220	20	350
125	130	16	127±3	178	133	184	16	250	22	385
150	130	16	153±3	206	161	212	16	285	22	420
200	130	10	202±3	260	209	260	10	340	25	465
250	130	10	252±3	313	262	313	10	395	25	520
300	130	10	303±3	363	312	363	10	445	25	570

From DN 200 higher pressure rate available on request.

Movement compensation

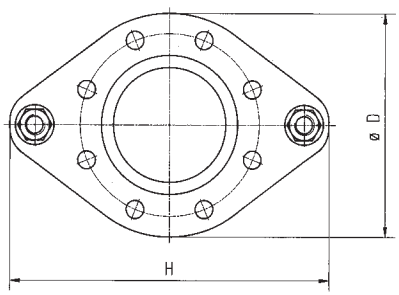
DN	Δ lat Lateral movement ± mm	Permissible vacuum without supporting ring for length bar absolute	Weight approx. kg
25	15	–	4.5
32	15	0.6	5.1
40	15	0.6	5.6
50	15	0.6	6.3
65	15	0.7	7.7
80	15	0.65	10.5
100	15	0.6	12.5
125	15	0.75	16.5
150	15	0.65	19.2
200	15	0.7	22.0
250	15	0.7	26.8
300	15	0.8	32.3

Note

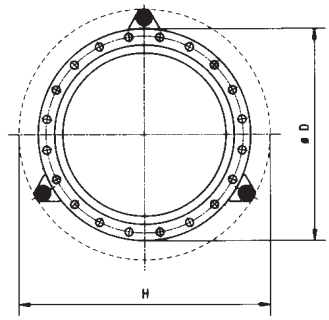
Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Flange versions



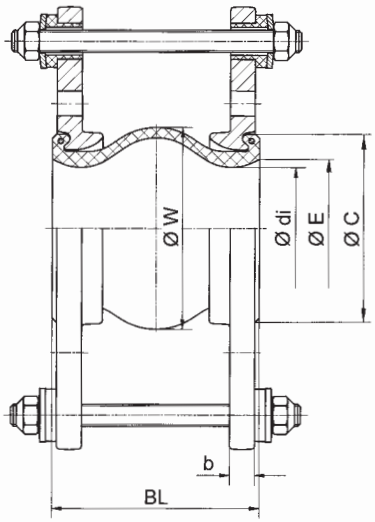
DN 25 - DN 150



DN 200 - DN 300

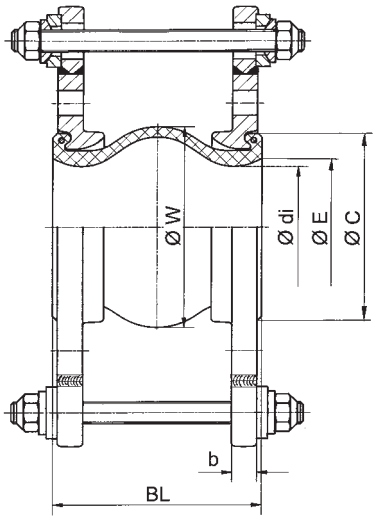
Number of tie rods depending on pressure

Versions



DN 25 - DN 150

Type R-2
Tie rods, outer restraints, carried on silencing rubber sockets



DN 200 - DN 300

Type R-2
Tie rods, outer restraints, carried on spherical washers and conical seats

STENFLEX®

RS-2/1-C12

Rubber-expansion joint ▪ Type RS-2

Lateral-expansion joint DN 25 - DN 300

flame-proof

Structure type R-2

Lateral-expansion joint, consisting of a rubber bellows with rotating flanges and tie rods (outer restraints) to absorb reaction force from internal pressure

Applications

- **or reducing thermal and mechanical tension in pipes and their system components, e.g.**
  - **pumps**
  - **compressors**
  - **motors**
- **for muffling vibrations and noise**
  - **at appliances**
  - **in cooling water and lub oil pipes**
- **for compensating lateral movement**
- **to compensate for installation inaccuracies**
- **to meet fire protection regulations**
- **shipbuilding industry**
- **in heating plants**

Rubber bellows PN 16

- ☐ Flat-convoluted molded bellows in various rubber grades
- ☐ Steel wire cord reinforcement
- ☐ Wire-reinforced self-sealing rubber rim
- ☐ Electrical impendance < 100 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Color code	Possible uses
EPDM	**orange/blue**	**Hot water, acids, lyes**
NBR	**red/blue**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+130 °C**
Bursting pressure	≥ **50 bar**
Vacuum operation	**DN 25-50 without vacuum supporting ring,**
	DN 65-300 with vacuum supporting ring

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Flanges with stabilizing collar and ears to carry the tie rods
- ☐ Flange drilling for through bolts, DN 25 with Drill holes
- ☐ Special turned groove for rubber rim

Dimensions

Standard: DN 25 - DN 150 (PN 16)
DN 200 - DN 300 (PN 10)
DN 25 - DN 300 (PN 6)
according to EN 1092

Others: DIN EN, ANSI, BS etc.

Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)

Others: 1.4541, 1.4571 etc.

Corrosion protection

Standard: electrogalvanized

Others: hot-dip galvanized, special varnish, special coating, etc.

Tie rod restraints

- ☐ DN 25 – DN 150 Tie rods carried on silencing rubber sockets
- ☐ DN 200 – DN 300 Tie rods carried on spherical washers and conical seats

Materials

Standard: tie rods 8.8

Others: stainless steel

Corrosion protection

Standard: electrogalvanized

Others: hot-dip galvanized

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve
- ☐ Flame-proof protective cover
- ☐ Protective tube

Certificates

- ☐ CE (PED 97/23/EC)
- ☐ Bureau Veritas
- ☐ Germanischer Lloyd
- ☐ Lloyd's Register of Shipping
- ☐ TÜV/DIN 4809 (DN 25-200)
- ☐ Det Norske Veritas
- ☐ MED

Dimensions standard program

DN	BL mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm	H Flange height mm
25	130	16	31±3	72	39	88	16	115	16	210
32	130	16	31±3	72	39	88	16	140	16	220
40	130	16	39±3	81	45	96	16	150	16	230
50	130	16	49±3	95	56	107	16	165	16	240
65	130	16	65±3	115	72	123	16	185	18	260
80	130	16	77±3	127	84	135	16	200	20	300
100	130	16	100±3	151	109	160	16	220	20	350
125	130	16	127±3	178	133	184	16	250	22	385
150	130	16	153±3	206	161	212	16	285	22	420
200	130	10	202±3	260	209	260	10	340	25	465
250	130	10	252±3	313	262	313	10	395	25	520
300	130	10	303±3	363	312	363	10	445	25	570

From DN 200 pressure rate 16 bar also available with flanges PN 16.

Movement compensation

DN	Δ lat Lateral movement ± mm	Permissible vacuum without supporting ring for length bar absolute	Weight approx. kg
25	15	–	4.9
32	15	0	5.1
40	15	0.2	5.6
50	15	0.2	6.3
65	15	0.4	7.7
80	15	0.4	10.4
100	15	0.4	12.4
125	15	0.4	16.5
150	15	0.4	19.2
200	15	0.4	22.0
250	15	0.5	30.0
300	15	0.6	37.0

Note

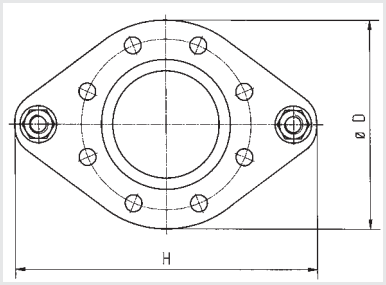
Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

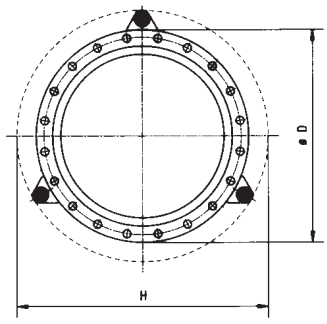
Chemicals used for water treatment (particularly in heating systems and coolant systems) can corrode the materials of the rubber expansion joint.

According to VDI Directive 2035, and VGB R 455, the manufacturer of the chemicals must state the data indicating that the materials used in the expansion joint, especially for the rubber bellows, will not be damaged by the chemicals.

Flange versions



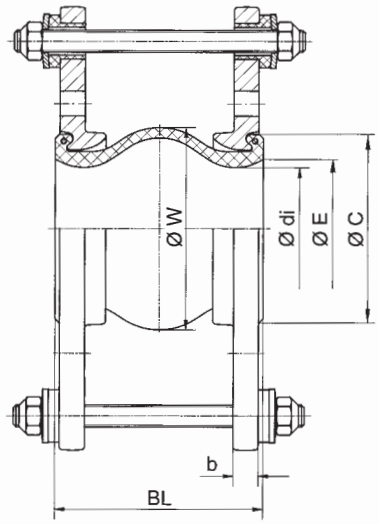
DN 25 - DN 150



DN 200 - DN 300

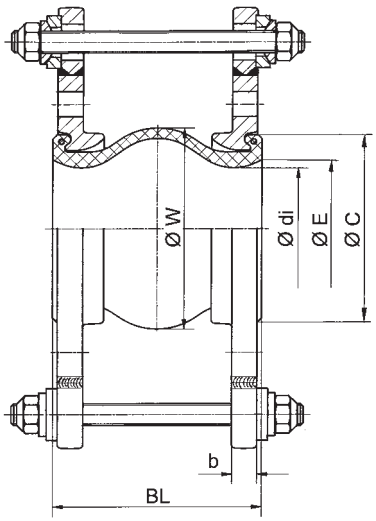
Number of tie rods depending on pressure

Versions



DN 25 - DN 150

Type RS-2
Tie rods, outer restraints, carried on silencing rubber sockets



DN 200 - DN 300

Type RS-2
Tie rods, outer restraints, carried on spherical washers and conical seats

Rubber expansion joint ▪ Type A-3

Angular expansion joint DN 32 – DN 1000

Structure type A-3

☐ Angular expansion joint consisting of a rubber bellows and flanges

☐ Welded hinge restraints to absorb reaction force from internal pressure or vacuum

Rubber bellows PN 16

☐ Highly elastic molded bellows in various rubber grades
☐ Synthetic fibre reinforcement
☐ Wire-reinforced self-sealing rubber rim
☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Hot water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+100 °C**
Bursting pressure	≥ **48 bar**
Vacuum operation	**DN 32-50 without vacuum supporting ring,** **DN 65-1000 with vacuum supporting ring**

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

☐ Oval flanges with stabilizing collar and hinge restraints
☐ Flange drilling for through bolts
☐ Special turned groove for rubber rim

Dimensions

Standard: DN 32 - DN 175 (PN 16)
DN 200 - DN 1000 (PN 10)
DN 32 - DN 400 (PN 6)
according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: stainless steel, etc.

Corrosion protection

Standard: DN 32 - DN 175 electrogalvanized
DN 200 - DN 1000 anti-corrosion primed
Others: hot-dip galvanized, special varnish, special coating, etc.

Applications

- **for compensating angular movement**
- **as double or triple joint compensation system for large movements**
  - **for ground and foundation settlement**
  - **for tank settlement during filling**
  - **in plastic pipe systems**
  - **apparatus engineering and tank construction**
  - **power station technology**

Hinge restraints

☐ Pivot of joint bars at center of bellows
☐ Hinge restraints control bellows movement

Materials

Standard: 1.0038 (S235JR), 1.0577 (S355J2)
Others: stainless steel, etc.

Corrosion protection

Standard: DN 32 - DN 175 electrogalvanized
DN 200 - DN 1000 anti-corrosion primed
Others: hot-dip galvanized, special varnish and coating, etc

Accessories

☐ Vacuum supporting ring
☐ Internal guide sleeve
☐ Flame-proof protective cover
☐ Protective hood

Certificates

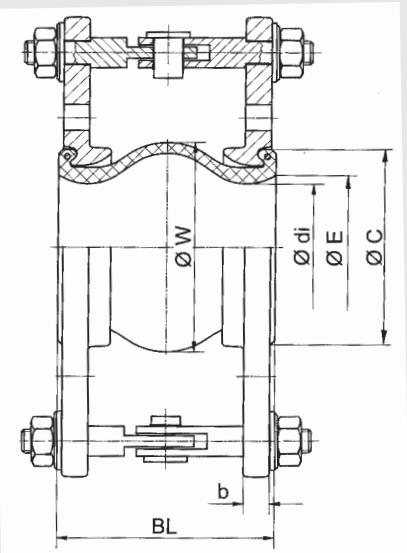
☐ CE (DGR 97/23/EC)
☐ Bureau Veritas
☐ Det Norske Veritas
☐ Lloyd´s Register of Shipping
☐ Drinking water
☐ TÜV (KTA)
Others see technical annex

Dimensions standard program

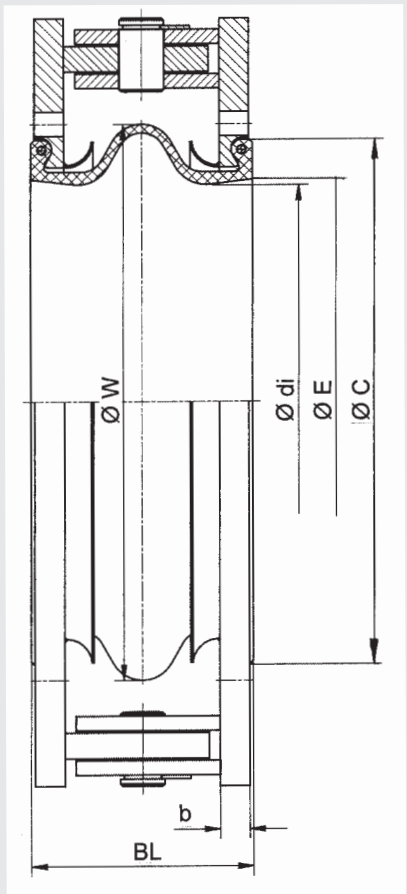
DN	BL* mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm	H Flange height mm
32	125	16	31±3	72	39	78	16	140	16	220
40	125	16	39±3	81	45	86	16	150	16	230
50	125	16	49±3	95	56	97	16	165	16	240
65	125	16	65±3	115	72	113	16	185	18	260
80	150	16	77±3	127	84	135	16	200	20	300
100	150	16	100±3	151	109	160	16	220	20	350
125	150	16	127±3	178	133	184	16	250	22	385
150	150	16	153±3	206	161	212	16	285	22	420
175	150	16	176±3	230	185	236	16	315	22	445
200	175	10	202±3	260	209	265	10	340	25	470
250	175	10	252±3	313	262	318	10	395	25	530
300	200	10	303±3	363	312	373	10	445	25	550
350	200	10	344±3	423	360	420	10	505	28	645
400	200	10	396±3	474	410	460	10	565	32	740
450	250	10	435±8	532	450	575	10	615	40	845
500	250	10	485±8	584	500	625	10	670	40	895
600	250	10	585±8	684	600	725	10	780	45	1020
700	275	6	690±10	800	700	850	10	895	45	1140
800	275	6	790±10	900	800	950	10	1015	45	1285
900	300	4	890±10	1008	900	1050	10	1115	50	1385
1000	300	4	990±10	1108	1000	1150	10	1230	55	1485

From DN 200 higher pressure rate available on request.
*The measure BL (length) for DN 400 - 1000 is approx. 6 mm shorter when fitted.

Versions



DN 32 - DN 150

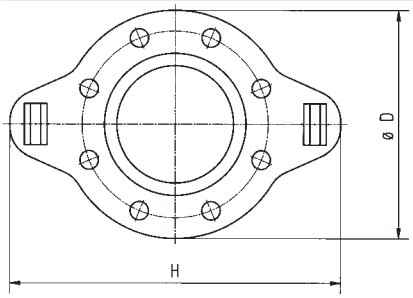


DN 175 - DN 1000

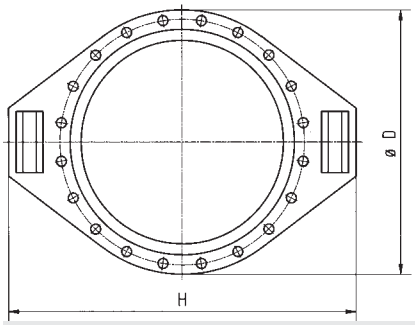
Movement compensation

DN	Δ ang Angular movement ± ∢ degrees*	Weight approx. kg
32	25	6.0
40	25	6.5
50	25	7.2
65	25	8.6
80	20	12.1
100	15	14.0
125	15	17.6
150	12	20.4
175	10	23.1
200	8	34.5
250	7	39.6
300	6	45.2
350	5	70.0
400	5	95.0
450	8	155.0
500	7	190.0
600	6	250.0
700	5	290.0
800	4,5	360.0
900	4	425.0
1000	3,5	550.0

Flange versions



DN 32 - DN 150



DN 175 - DN 1000

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Type A-3
Angular expansion joint with hinge restraints

Rubber expansion joint ▪ Type AS-3

Angular expansion joint DN 32 – DN 400

flame-proof

Structure type AS-3

☐ Angular expansion joint consisting of a rubber bellows and flanges

☐ Welded hinge restraints to absorb reaction force from internal pressure or vacuum

Rubber bellows PN 16

☐ Highly elastic molded bellows in various rubber grades
☐ Steel wire cord reinforcement
☐ Wire-reinforced self-sealing rubber rim
☐ Electrical impedance < 100 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange/blue**	**Hot water, acids, lyes**
NBR	**red/blue**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design	
Max. perm. operating pressure	**16 bar***
Max. perm. temperature	**+130 °C**
Bursting pressure	**≥ 50 bar**
Vacuum operation	**DN 32-50 without vacuum supporting ring, DN 65-400 with vacuum supporting ring**

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

☐ Oval flanges with stabilizing collar and hinge restraints
☐ Flange drilling for through bolts
☐ Special turned groove for rubber rim

Dimensions

Standard: DN 32 - DN 175 (PN 16)
DN 200 - DN 400 (PN 10)
DN 32 - DN 400 (PN 6)
according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
Others: stainless steel, etc.

Corrosion protection

Standard: DN 32 - DN 175 electrogalvanized
DN 200 - DN 400 anti-corrosion primed
Others: hot-dip galvanized, special varnish and coating, etc

Applications

- **for compensating angular movement**
- **as double or triple joint compensation system for large movements**
  - **for tank settlement during filling**
  - **in plastic pipe systems**
- **to meet fire protection regulations**
  - **in shipbuilding industry**
  - **in chemical industry**

Hinge restraints

☐ Pivot of joint bars at center of bellows
☐ Hinge restraints control bellows movement

Materials

Standard: 1.0038 (S235JR), 1.0577 (S355J2)
Others: stainless steel, etc.

Corrosion protection

Standard: DN 32 - DN 175 electrogalvanized
DN 200 - DN 400 anti-corrosion primed
Others: hot-dip galvanized, special varnish and coating, etc

Accessories

☐ Vacuum supporting ring
☐ Internal guide sleeve
☐ Protective hood

Certificates

☐ CE (DGR 97/23/EC)
☐ American Bureau of Shipping
☐ Bureau Veritas
☐ Det Norske Veritas
☐ Germanischer Lloyd
☐ Lloyd´s Register of Shipping
☐ TÜV/DIN 4809
Others see technical annex

Dimensions standard program

DN	BL* mm	Pressure rate bar	ø di Bellows inner ø mm	ø C Raised face outer ø mm	ø E Raised face inner ø mm	ø W Convolution ø unpressurized mm	PN Flange connection EN 1092	ø D Flange outer ø mm	b Flange thickness mm	H Flange height mm
32	125	16	31±3	72	39	78	16	140	16	220
40	125	16	39±3	81	45	86	16	150	16	230
50	125	16	49±3	95	56	97	16	165	16	240
65	125	16	65±3	115	72	113	16	185	18	260
80	150	16	77±3	127	84	135	16	200	20	300
100	150	16	100±3	151	109	160	16	220	20	350
125	150	16	127±3	178	133	184	16	250	22	385
150	150	16	153±3	206	161	212	16	285	22	420
175	150	16	176±3	230	185	236	16	315	22	450
200	175	10	202±3	260	209	265	10	340	25	440
250	175	10	252±3	313	262	318	10	385	25	505
300	200	10	303±3	363	312	373	10	445	25	560
350	200	10	344±3	423	360	425	10	505	34	620
400	200	10	396±3	474	410	470	10	565	38	680

From DN 200 higher pressure rate available on request.
*The measure BL (length) for DN 400 is approx. 6 mm shorter when fitted.

Movement compensation

DN	Δ ang Angular movement ± ∢ degrees*	Weight approx. kg
32	25	6.0
40	25	6.5
50	25	7.2
65	25	8.6
80	20	12.1
100	15	14.0
125	15	17.6
150	12	20.4
175	10	23.1
200	8	34.5
250	7	39.6
300	6	45.2
350	5	67.0
400	5	93.0

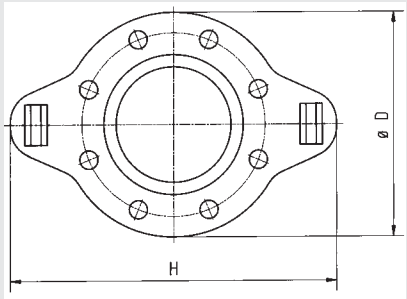
Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

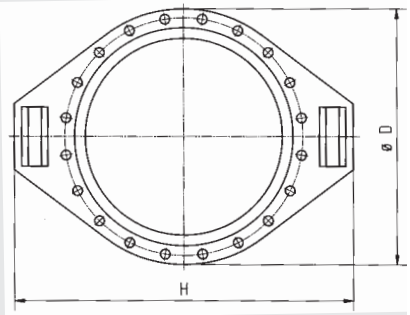
Subject to technical alterations and deviations resulting from the manufacturing process.

Chemicals used for water treatment (particularly in heating systems and coolant systems) can corrode the materials of the rubber expansion joint. According to VDI Directive 2035, DIN 4809 part 1 and VGB R 455P, the manufacturer of the chemicals must state that the materials used in the expansion joint, especially for the rubber bellows, will not be damaged by the chemicals.

Flange versions

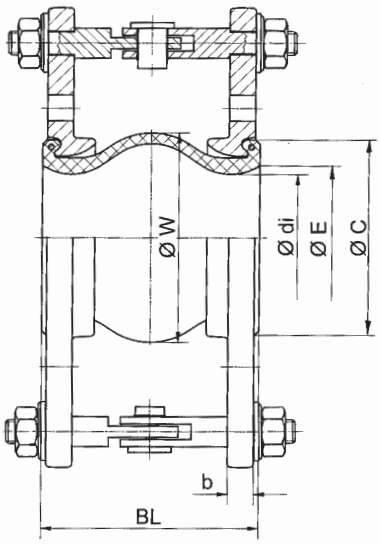


DN 32 - DN 150

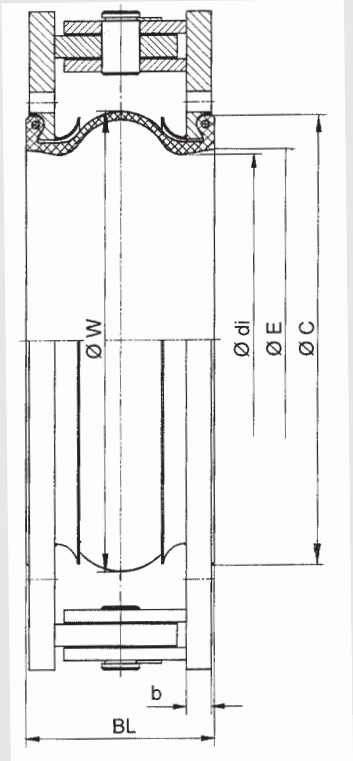


DN 175 - DN 400

Versions



DN 32 - DN 150



DN 175 - DN 400

Type AS-3
Angular expansion joint with hinge restraints

Rubber expansion joint ▪ Type C-41

Angular expansion joint DN 300 – DN 3600

Customized production

Structure type C-41

- ☐ Angular expansion joint consisting of a rubber bellows and press-on retaining flanges
- ☐ Welded hinge restraints to absorb reaction force from internal pressure or vacuum
- ☐ Various bellows geometries

Rubber bellows PN 4 / PN 10

- ☐ Elastic, robust bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Full-faced, self-sealing rubber flanges with drilling for through bolts
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Cooling, sea, brackish water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design		
DN	DN 300 - 3600	DN 300 - 2800
Pressure rate	PN 4	PN 10
Max. perm. operating pressure	**4 bar***	**10 bar***
Max. perm. temperature	**+100 °C**	**+100 °C**
Bursting pressure	**≥ 15 bar**	**≥ 30 bar**
Vacuum operation	**with vacuum supporting ring at permanent vacuum**	

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Oval press-on retaining flanges with stabilizing collar and hinge restraints
- ☐ Flange drilling for through bolts

Dimensions

Standard: PN 10 according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR), 1.0577 (S355J2)
Others: stainless steel etc.

Corrosion protection

Standard: anti-corrosion primed
Others: hot-dip galvanized, special varnish, special coating, etc.

Applications

- **for compensating angular movement**
- **as double or triple joint compensation system for large movements**
- **restraints to absorb reaction forces**
- **power station technology**
- **process plant engineering**

Hinge restraints

- ☐ Pivot of joint bars at center of bellows
- ☐ Hinge restraints control bellows movement

Materials

Standard: 1.0038 (S235JR), 1.0577 (S355J2)
Others: stainless steel, etc.

Corrosion protection

Standard: anti-corrosion primed
Others: hot-dip galvanized, special varnish, special coating, etc.

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve

Certificates

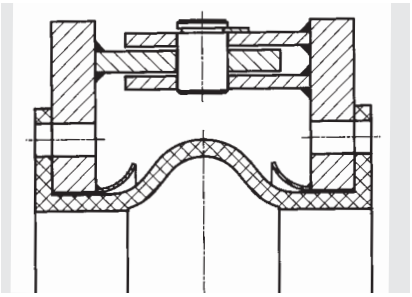
- ☐ CE (DGR 97/23/EC)
- ☐ Drinking water
- ☐ TÜV (KTA)
- ☐ crecep

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Version



Type C-41
Angular expansion joint
Dimensions and movement compensation on request

Rubber expansion joint ▪ Type C-42

Angular expansion joint DN 300 – DN 3600

Customized production

Applications

- **for compensating angular movement**
- **as double or triple joint compensation system for large movements**
- **restraints to absorb reaction forces**
- **power station technology**
- **process plant engineering**

Structure type C-42

- ☐ Angular expansion joint consisting of a rubber bellows and press-on retaining flanges
- ☐ Restrainer flanges as mating flange to be welded on the pipe at site, with hinge restraints
- ☐ Welded hinge restraints to absorb reaction force from internal pressure or vacuum
- ☐ Various bellows geometries

Rubber bellows PN 4 / PN 10

- ☐ Elastic robust bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Full-faced self-sealing rubber flanges with drilling for through bolts
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Cooling, sea, brackish water, acids, lyes**
NBR	**red**	**Oil**
CIIR	**white**	**Drinking water**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design		
DN	DN 300 - 3600	DN 300 - 2800
Pressure rate	PN 4	PN 10
Max. perm. operating pressure	**4 bar***	**10 bar***
Max. perm. temperature	**+100 °C**	**+100 °C**
Bursting pressure	**≥ 15 bar**	**≥ 30 bar**
Vacuum operation	**with vacuum supporting ring at permanent vacuum**	

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version

- ☐ Press-on retaining flanges with stabilizing collar
- ☐ Mating flanges with hinge restraints
- ☐ Flange drilling for through bolts

Dimensions

Standard: PN 10
according to EN 1092
Others: DIN EN, ANSI, BS etc.
Connection dimensions see technical annex

Materials

Standard: 1.0038 (S235JR)
1.0577 (S355J2)
Others: stainless steel, etc.

Corrosion protection

Standard: anti-corrosion primed
Others: hot-dip galvanized, special varnish, special coating, etc.

Hinge restraints

- ☐ Pivot of joint bars at center of bellows
- ☐ Hinge restraints control bellows movement

Materials

Standard: 1.0038 (S235JR),
1.0577 (S355J2)
Others: stainless steel, etc.

Corrosion protection

Standard: anti-corrosion primed

Accessories

- ☐ Vacuum supporting ring
- ☐ Internal guide sleeve

Certificates

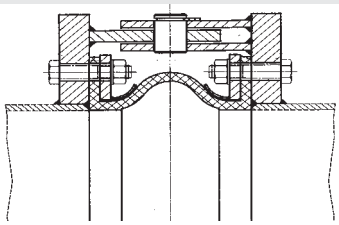
- ☐ CE (DGR 97/23/EC)
- ☐ Drinking water
- ☐ TÜV (KTA)

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

Version



Type C-42
Angular expansion joint
Dimensions and movement compensation on request

Rubber expansion joint Type W-1 and W-2

Wall-sealing expansion joint DN 80 – DN 3400

Structure type W-1

Wall-sealing expansion joint consisting of a flat-convoluted rubber bellows with press-on retaining flanges

Structure type W-2

Wall-sealing expansion joint consisting of a deep-convoluted rubber bellows with press-on retaining flanges. Suitable for large movements

Rubber bellows PN 1 / PN 2,5

- ☐ Elastic robust bellows in various rubber grades
- ☐ Synthetic fibre reinforcement
- ☐ Bellows with flat convolution (type W-1) or deep convolution (type W-2)
- ☐ Full-faced self-sealing rubber flanges with drilling for through bolts
- ☐ Electrical impedance 10^3 to 10^6 Ohm (DIN IEC 93, VDE 0303-30)

Rubber grade*	Colour code	Possible uses
EPDM	**orange**	**Cooling, sea, brackish water, acids, lyes**
NBR	**red**	**Oil**

*Check or inquire about the resistance of the rubber grade to temperature and medium.

Technical design Type	W-1	W-1 and W-2
Pressure rate	PN 1	PN 2,5
Max. perm. operating pressure	**1 bar***	**2.5 bar***
Max. perm. temperature	**+90 °C**	**+90 °C**
Bursting pressure	**≥ 6 bar**	**≥ 10 bar**
Vacuum operation	**with vacuum supporting ring (type W-1 only)**	

Max. operating pressure to be set 30 % lower for shock loads.
*Please consider a decrease of pressure due to temperature (see technical annex).

Flanges

Version
- ☐ Press-on retaining flanges
- ☐ Flange drilling for through bolts

Dimensions
Standard: see tables

Materials
Standard: 1.0038 (S235JR)
Others: stainless steel, etc.

Corrosion protection
Standard: anti-corrosion primed
Others: hot-dip galvanized, special varnish, special coating, etc.

Applications

- **to seal ducts on**
  - **vessels, or containers**
  - **wall ducts**
- **for compensating axial and lateral movement between pipe and wall duct**
- **for reliable sealing against groundwater**
- **process plant engineering**
- **power station technology**
- **cement industry**

Special version

Split version for retroactive installation on a closed pipe system.

Accessories

- ☐ Vacuum supporting ring (type W-1)

Certificates

- ☐ CE (DGR 97/23/EG)

STENFLEX® type W-2 in a power plant

Dimensions standard program type W-1 / BL 150

DN Pipeline	DN Wall duct	Pressure rate bar	Bellows ø D Bellows inner ø mm	Bellows h Rubber flange thickness mm	Wall duct ø da Flange outer ø mm	Wall duct ø K_1 K1 PCD ø mm	Wall duct n_1 x ø d_1 Drilling mm	Pipeline ø di Flange inner ø mm	Pipeline ø K_2 PCD ø mm	Pipeline n_2 x ø d_2 Drilling mm	Pipeline b Flange thickness mm	Δ ax Axial movement ± mm	Δ lat Lateral movement ± mm	Weight approx. kg
80	250	1/2.5	290	8	430	380	8x14	120	160	8x14	10	20	30	10.0
100	250	1/2.5	290	8	430	380	8x14	140	190	8x14	10	20	30	11.5
150	300	1/2.5	440	12	640	560	12x23	185	265	8x23	10	20	30	23.5
200	400	1/2.5	495	12	695	615	12x23	240	320	12x23	10	20	30	26.5
250	450	1/2.5	570	12	770	690	12x23	315	395	12x23	10	20	30	29.5
250	500	1/2.5	570	12	770	690	12x23	285	365	12x23	10	20	30	29.5
300	500	1/2.5	570	12	770	690	12x23	350	430	12x23	10	20	30	31.5
400	600	1/2.5	665	12	865	785	16x23	430	510	16x23	10	20	30	36.5
500	700	1/2.5	770	12	970	890	16x23	535	615	16x23	10	20	30	43.0
600	800	1/2.5	870	12	1070	990	16x23	635	715	16x23	10	20	30	48.5
700	900	1/2.5	975	12	1175	1095	24x23	730	810	24x23	15	20	30	64.5
800	1000	1/2.5	1050	12	1280	1200	24x23	840	920	24x23	15	20	30	73.5
900	1100	1/2.5	1180	12	1380	1300	24x23	940	1020	24x23	15	20	30	73.5
1000	1200	1/2.5	1280	12	1480	1400	24x23	1040	1120	24x23	15	20	30	95.0
1100	1300	1/2.5	1380	12	1580	1500	24x23	1140	1220	24x23	15	20	30	105.0
1200	1400	1/2.5	1490	12	1690	1610	24x23	1250	1330	24x23	15	20	30	114.5
1400	1600	1/2.5	1636	12	1880	1800	24x23	1440	1520	24x23	15	20	30	161.5
1600	1800	1/2.5	1880	15	2080	2000	28x23	1640	1720	28x23	15	20	30	148.5
1800	2000	1/2.5	2080	15	2280	2200	32x23	1840	1920	32x23	15	20	30	165.0
2000	2200	1/2.5	2280	15	2480	2400	36x23	2060	2140	36x23	15	20	30	179.0
2200	2400	1/2.5	2480	15	2680	2600	36x23	2260	2340	36x23	15	20	30	196.0
2400	2600	1/2.5	2665	15	2880	2780	48x23	2460	2540	48x23	15	20	30	210.0
2500	2700	1/2.5	2785	15	2980	2900	48x23	2560	2640	36x23	15	20	30	220.0
3000	3200	1/2.5	3280	15	3490	3410	48x23	3050	3130	48x23	15	20	30	270.0
3400	3600	1/2.5	3610	20	3830	3750	108x23	3450	3530	108x23	15	20	30	330.0

Dimensions standard program type W-1 / BL 280

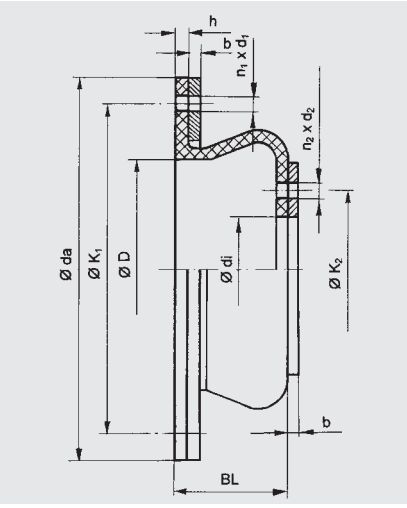
2200	2400	1/2,5	2480	15	2680	2600	36x23	2260	2340	36x23	15	40	60	226

Dimensions standard program type W-2

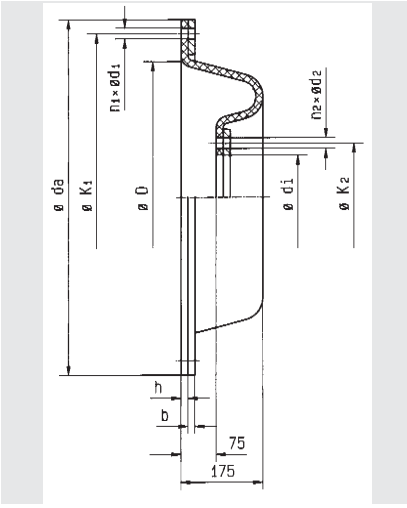
DN Pipeline	DN Wall duct	Pressure rate bar	Bellows ø D Bellows inner ø mm	Bellows h Rubber flange thickness mm	Wall duct ø da Flange outer ø mm	Wall duct ø K_1 K1 PCD ø mm	Wall duct n_1 x ø d_1 Drilling mm	Pipeline ø di Flange inner ø mm	Pipeline ø K_2 PCD ø mm	Pipeline n_2 x ø d_2 Drilling mm	Pipeline b Flange thickness mm	Δ ax Axial movement ± mm	Δ lat Lateral movement ± mm	Weight approx. kg
200	450	2.5	610	10	740	680	12x23	240	290	12x18	10	80	80	19.5
400	800	2.5	890	12	1025	965	16x23	490	550	16x23	10	80	80	34.0
500	900	2.5	1020	12	1175	1115	24x23	620	680	24x23	12	80	80	48.0
800	1300	2.5	1260	15	1480	1420	24x23	850	910	24x23	15	80	90	93.0

Please inquire for simultaneous (different) movement. Other dimensions on request.

Versions



Type W-1
Wall-sealing expansion joint, flat-convoluted

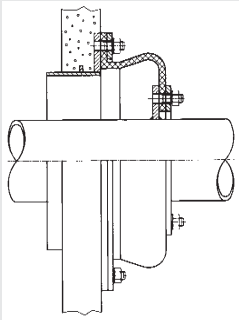


Type W-2
Wall-sealing expansion joint, deep-convoluted, for large movements

Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions etc.

Subject to technical alterations and deviations resulting from the manufacturing process.



Installation drawing type W-1