

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

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 protec-

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.)

tion 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.

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®

Dimensions standard program

DN	BL*	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

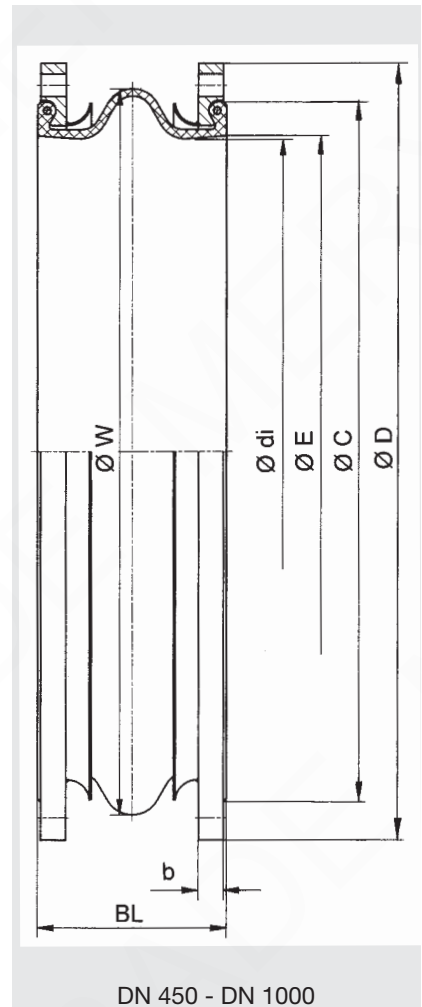
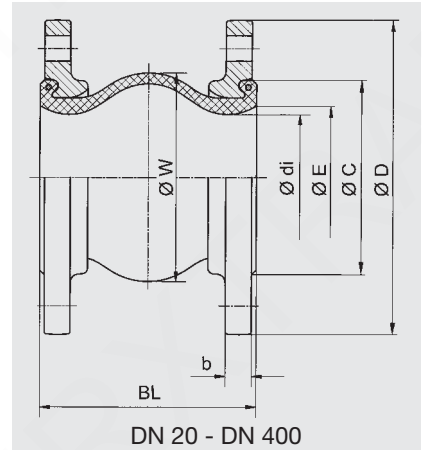
*DN 25 to DN 300 also available in BL 130 mm as type R
From DN 200 pressure rate 16 bar also available with flanges PN 16

Movement compensation/bellows cross sectional area

DN	Δ ax Axial movement		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
	Compression - mm	Elongation + mm					
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.

Versions



Type A-1
Universal expansion joint, without restraint