Rubber expansion joints

HKS rubber expansion joints are manufactured from high-quality materials and have proven their suitability in decades of practical application. The continuous new and further development of our rubber expansion joints ensures the constant adaptation to the current requirements of our customers. This results in powerful, reliable rubber expansion joints with excellent properties and a long service life. Our development and design department is available for technical consultation for our customers, engineering and solutions for project-oriented challenges.

Areas of application

The excellent material properties of rubber bellows allow for the absorption of high levels of deformation and vibrations. Application examples for HKS rubber expansion joints are therefore very versatile and flexible. The movement options with large expansions in all directions with a very compact design are recommended for use in many industries with a variety of different media and temperatures. The use of PTFE linings additionally achieves resistance against very aggressive media. Our highquality rubber expansion joints are used in many sectors of the food processing and chemical industries, plant engineering and mechanical engineering, engine and ship building, process engineering, pipeline construction and technical building systems.

The main tasks are

› Absorbing expansions

› Absorbing movement

› Damping vibrations, oscillations or noise

› Reduction of tensions

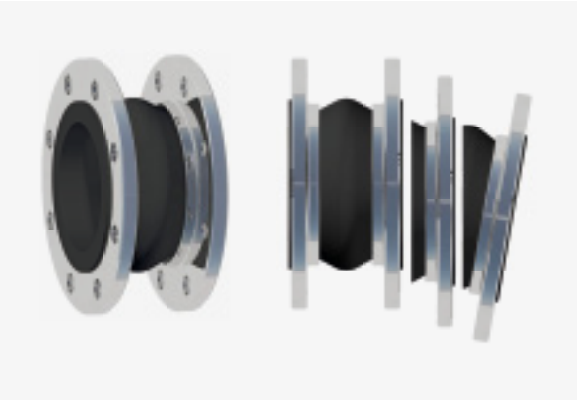
› Compensating for installation inaccuracies, and compensating for settling of buildings

In addition to the ISO 9001 quality management system, we have achieved a number of product approvals through recognised notified bodies and certification bodies such as DNV, GL, BV, ABS, LRS, RINA and RMRS. These are continuously adapted to the current market requirements with type approvals and flame resistance approvals to continue meeting the highest requirements in future.

Model variants

HKS rubber expansion joints are available in different models (**universal, lateral and angular expansion joints**), rubber bellows qualities (depending on medium) and the bellows design (depending on pressure and temperature).

Universal rubber expansion joints



Design:

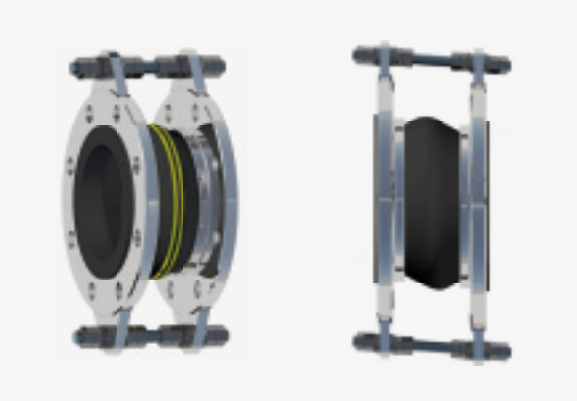
Rubber bellows with flange or threaded connection.

Movement absorption:

Absorbing axial, lateral and angular movement as well as combinations of all three movement types.

The universal rubber expansion joint absorbs the heat-cold expansion of a pipe section in all planes between two fixpoints. These have to be designed to withstand the pressure and spring forces of the universal rubber expansion joint, the friction forces of the guides and the flow forces.

Lateral rubber expansion joint



Design:

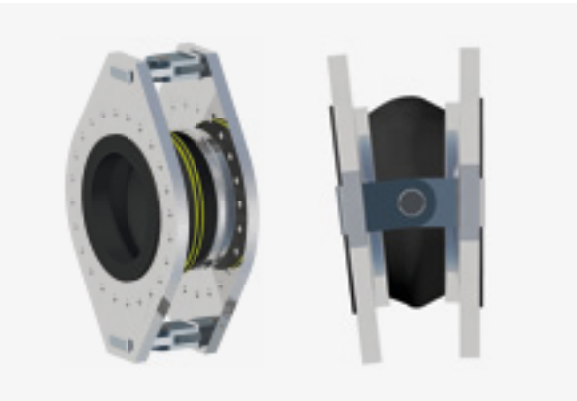
Rubber bellows with laterally movable tensioning (joints or threaded rods) and flange connection.

Movement absorption:

Absorption of lateral movement all around for threaded rods and unilateral for hinged tensioners.

Axial reaction forces are absorbed by the tie rods and the anchors are relieved. Lighter fixpoints than for universal expansion joints are required for absorbing adjustment and reaction forces. A much larger lateral movement absorption is possible with two bellows, one intermediate pipe and tensioners.

Angular rubber expansion joint



Design:

Rubber bellows with angular moving hinged tensioner and flange connection.

Movement absorption:

Absorption of angular movement Unilateral movement possible through single joint and all-around movement with cardan joint.

Axial reaction forces are absorbed by the hinged tensioners and the anchors are relieved. Lighter fixpoints than for universal expansion joints are required for absorbing adjustment and reaction forces.

Rubber bellows

The rubber bellows, the heart of the rubber expansion joint, is crucial to the movability. Reinforced with support liners (casing) and a barrelshaped bellows, axial, lateral and angular movements can be implemented even with small sizes. Pressurebearing fabric layers are vulcanised in between an inner and outer rubber layer. Depending on the application, a variety of different natural and synthetic rubber compounds (elastomers) are used for the rubber layer. To provide resistance to pressure and temperature, nylon, aramid and steel cord are used as support liners. In individual cases, additional PTFE liners are used to improve resistance to media. The rubber bellows are marked with a colour coding according to the rubber compound and support lining used.

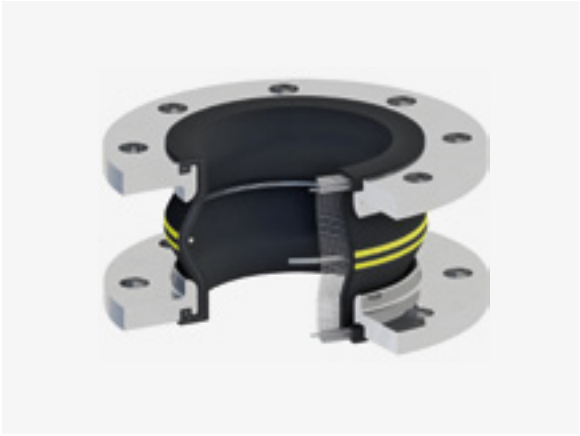
Material qualities

The actual elastomer materials listed in the table are the primary products for manufacturing a rubber compound. Vulcanised into a rubber bellows with strength support, filler materials and additives, the stated properties may differ. The permitted application and temperature ranges are stated in the detailed data sheets.

Designation	Properties and areas of application
CSM Chlorosulfonyl polyethylene rubber Hypalon®	› Very good chemical resistance, especially to many oxidising media, acids, bases, lyes and aggressive chemical wastewater › Good resistance to mineral oils and greases, even at higher temperatures › Good ozone, ageing and weather resistance › Temperature range (depending on media) -20 °C to +100 °C, briefly up to +110 °C
CR Chloroprene rubber Neoprene®, Bayprene®	› Good mechanical properties and elasticity › Resistant to different inorganic and organic chemicals, cold and hot water (swimming pool water), seawater, wastewater (lightly acidic or alkaline), also with low oil content, and cooling water with corrosion protection agents containing oil; impermeable to gas for hydrocarbons › Very good ozone, ageing and weather resistance › Temperature range (depending on media) -25 °C to +90 °C, briefly up to +100 °C
NBR Nitrile butadiene rubber Perbunan®, Buna-N®, Nipol®	› Very good resistance to fuels, mineral oils, lubricants, plant and animal fat as well as hydrocarbons › Resistance, elasticity and cold flexibility depends on acrylonitrile content › Impermeable to gas for hydrocarbons › Satisfactory ageing and weather resistance › Temperature range (depending on media) -20 °C to +90 °C, briefly up to +100 °C
HNBR Hydrogenated nitrile butadiene rubber Therban®, Zetpol®	› Very good resistance to oil and petrol, comparable to NBR › Hydrogenated form of NBR is less responsive and has better ageing and weather resistance as well as higher temperature resistance › Temperature range (depending on media) -35 °C to +100 °C, briefly up to +120 °C
IIR Isobutylene isoprene rubber (butyl rubber) Butyl, Bucar®	› Very good resistance to weak acids and lyes, saline solutions and suitable for drinking water according to German KTW guideline › No resistance to oil and grease › Very good ozone, ageing and weather resistance › Good elastic behaviour at very low temperatures › Temperature range (depending on media) -40 °C to +100 °C, briefly up to +120 °C
EPDM Ethylene propylene diene monomer rubber Keltan®, Nordel®, Vistalon®	› Good heat resistance even under constant stress from hot heating or cooling water, hot air or steam, alkaline wastewater and some oil-free chemicals; good gastight properties except hydrocarbons › Very good ozone, ageing and weather resistance › Temperature range (depending on media) -40 °C to +130 °C, briefly up to +150 °C
FPM Fluoro rubber Viton®	› Very high resistance to heat and chemicals as well as low gas permeability, also suitable for aggressive media › Very good resistance to oils, benzene, xylene, toluene, fuels with an aromatics content over 50 %, bio diesel, aromatic/chlorinated hydrocarbons and mineral acids. › Excellent ozone, ageing and weather resistance › Temperature range (depending on media) -20 °C to +180 °C, briefly up to +200 °C
CO (ECO) Chlorohydrin rubber (polyepichlorohydrin, possibly copolymer with ethylene oxide) Hydrin®	› High resistance to hydrocarbon compounds, oil, grease and bio fuel › Electrically dissipative › Good ozone and weather resistance › Temperature range (depending on media) -40 °C to +125 °C, briefly up to +150 °C

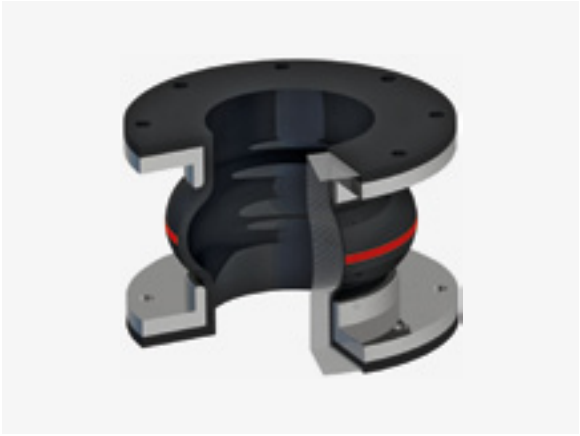
Connection types

Flanges are used for connection to pipes, pumps or containers, screw fittings only for small Nominal diameters. Flange connections are divided into two connection types. On the first type, the rubber bellows surrounds the flange into a continuous recess (groove) to form a rubber sealing collar. An additional seal is therefore not required for the connection with the counter flange. The second type is used for larger Nominal diameters: The rubber bellows ends are moulded into flat flanges and backed with steel flanges. On both connection types, moulded beads or welded-on support collars (brims) are included for stabilising.



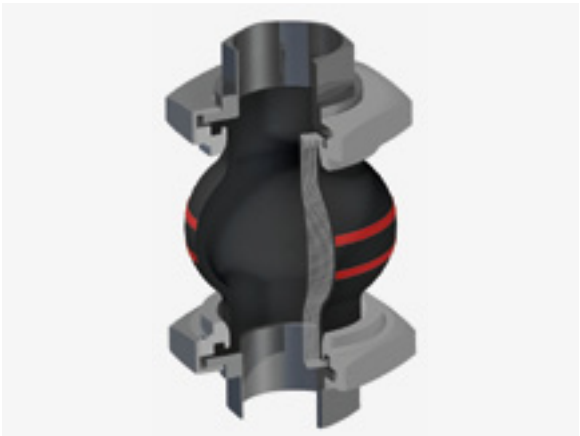
Design of a type 1 model GS

Inner layer:	NBR (nitrile butadiene rubber)
Pressure support liner:	Galvanised steel wire cord
Outer layer:	CR (chloroprene rubber)
Flange:	Rotating flange with rubber sealing collar
Identification:	2 yellow rings, ERV DN.., PN.., date of manufacture
Accessories:	vacuum support ring



Design of a type 2 model R

Inner layer:	EPDM
Pressure support liner:	Nylon cord
Outer layer:	EPDM
Flange:	Backing flange with solid rubber flat flange
Identification:	1 red ring, DN.., PN.., date of manufacture



Design of a type 3 model HZR

Inner layer:	EPDM
Pressure support liner:	Aramid cord
Outer layer:	EPDM
Screw fitting:	PR internal thread (right), cylindrical
Identification:	2 red rings, DN.., PN.., date of manufacture

Flanges

Flanges for rubber expansion joints of type 1 and type 2 can be manufactured to all common international standards such as DIN, EN, ANSI, AWWA, BS, JIS or special dimensions. Flange holes can be produced as through holes or threaded holes. As a standard, flanges are made of unalloyed steel, galvanised or coated with a corrosion protection primer. To meet higher corrosion protection requirements, high-alloy stainless CrNi steel is used. Special materials such as aluminium or special surface coatings (two pack epoxy, two component PUR) in line with customer specifications are also possible.

Material group	Material designation
Standard (unalloyed steel)	1.0038 (S235JR)
Stainless steel	1.4301 (X5CrNi18-10) 1.4541 (X6CrNiTi18-10) 1.4571 (X6CrNiMoTi17-12-2)
Aluminium	3.3535 (AlMg3) 3.3547 (AlMg4.5Mn)

Flange versions for type 1 rubber expansion joints

Universal expansion joint
Standard flange with groove and support collar

Lateral expansion joint
Oval flange with tabs for 2 tension rods (small Nominal diameter)

Lateral expansion joint
Flange with additional pitch circle for tension rods

Angular expansion joint
Flange with tabs for joint connections

Flange versions for type 2 rubber expansion joints

Universal expansion joint
Backing flange with support collar

Lateral expansion joint
Flange with several tabs or additional pitch circle for tension rods

Angular expansion joint
Flange with tabs for joint connections

Tie rods

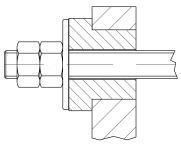
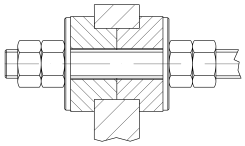
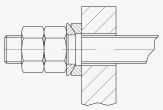
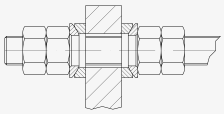
Rubber expansion joints under pressure (operating or test conditions) develop an axial reaction force across the effective bellows cross section area which acts on adyescent plain and fixed bearings. This bearing stress in the pipe system is drastically reduced by using lateral and/or angular expansion joints with tie rods. Only the adjustment forces and moments from the lateral or angular movement are introduced into the pipe system and absorbed by lightweight fixed points.

External tie rods

External and internal tie rods

Tension rods

This type of tensioning is used for lateral expansion joints or can be used to limit the element length on universal expansion joints. Threaded rods are placed symmetrically around the circumference and supported either with rubber bushes or with spherical washers, conical washers and nuts. Using rubber bushes creates a noise absorbing connection to the flange; this is done up to a Nominal diameter of maximum DN 300. For absorbing excess pressure (internal pressure), only external tensioning is required and additional internal tensioning for negative pressure (vacuum). All metal components such as threaded rod, nut, spherical washer and conical washer are galvanised as a standard. Versions mode from corrosion resistant materials or with hot galvanising are available on customer request.

Bearing type	External Tensioning	External and internal Tensioning
Rubber bush		
Spherical and conical washers		

Material group	Material designation		
	Moulded parts/tabs	Spherical/conical washers	Tension rods/nuts
Standard (unalloyed steel)	1.0038 (S235JR)	1.0401 (C15)	5.6, 8.8 / 5, 8
Stainless steel	1.4301 (X5CrNi18-10) 1.4541 (X6CrNiTi18-10) 1.4571 (X6CrNiMoTi17-12-2)	1.4305 (X8CrNiS18-9)	A2, A4

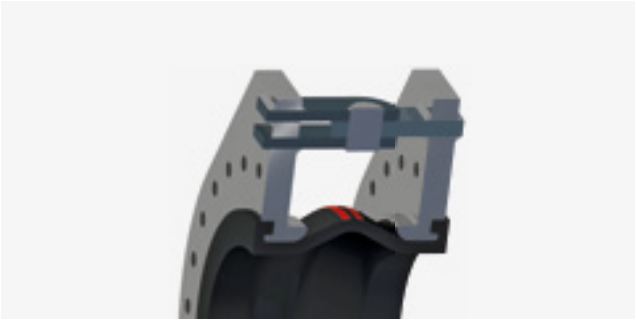
Single joint tensioners

Cardan joint tensioners with ring

Cardan joint tensioners with frame

Hinged tensioners

Single joint or cardan joint tensioners are installed on angular rubber expansion joints for transferring axial reaction forces. The link joints are placed at the centre of the bellows axis in pairs and can absorb unilateral or all-around rotations. Single joint tensioners use an oval flange with connected tabs and bolts to form a two-shear connection which allows angular rotation only around the centre bolt axis. On cardan joint tensioners, the oval flanges are placed with tabs offset by 90° and connected with a gimbal ring or box. This allows an angular rotation around the bellows centre point in all directions. All metal, unalloyed components are galvanised or treated with a corrosion protection primer. Versions mode from corrosion resistant materials or with special coatings are available on customer request.



Detail of single joint tensioner

Detail of cardan joint tensioner

Material group	Material designation	
	Moulded parts/tabs	Bolts
Standard (unalloyed steel)	1.0038 (S235JR)	1.0038 (S235JR) 1.0401 (C15)
Stainless steel	1.4301 (X5CrNi18-10) 1.4541 (X6CrNiTi18-10) 1.4571 (X6CrNiMoTi17-12-2)	

Vacuum support rings

Rubber bellows resist small to medium levels of negative pressure, depending on Nominal diameter, design and application. For higher levels of negative pressure or full vacuum it is usually necessary to install vacuum support rings. These support the inner surface of the bellows curve and are made of stainless steel as a standard. Different designs are available, from a single open support ring and support rings with lock to a ring which is vulcanised into the bellows during production. The latter design is only available for type 2 rubber expansion joints. As a rule, the permitted movement absorption is reduced by approx. 50 % Precise data for vacuum stability can be found in the tables or supplied on request.

VSD – vacuum support ring

VSD+S – vacuum support ring with lock

Vacuum support ring
(type 2 only)

PTFE lining

If no resistant rubber compound is available due to aggressive media or combination of chemical media components, a seamless inner PTFE lining can be installed to increase the chemical resistance. This lining is approx. 1 mm thick, protects the inside of the rubber bellows against media contact and can be used for almost all media without limitations. A PTFE lining can only be installed at the factory, retrofitting is not possible. Heat resistance usually depends on the rubber bellows material. The permitted pressure load is usually reduced to approx. 6 bar and the permitted movement absorption is decreased by approx. 50 %. For use with vacuum, the PTFE lining is only suitable in connection with a PTFE support ring.

PTFE lining

PTFE lining with vacuum support ring

Inner sleeves

Rubber expansion joints feature a flow-optimised convolution geometry on the inside to reduce flow-related resistance (pressure loss) and turbulences. They can normally be used without an inner sleeve. An inner sleeve or guide pipe is required for abrasive media or high flow rates. The rubber bellows is not in direct contact with the flowing medium. It is therefore protected and sediment in the bellows convolution is reduced. The straight shape of the inner sleeve lets the medium flow with more direction, developing less turbulence. As a standard, inner sleeves are made from stainless steel and consist of a cylindrical or conical pipe with a collar which is welded or moulded on. An additional seal has to be used between inner sleeve collar and counter flange.

Cylindrical inner sleeve
(axial movement absorption)

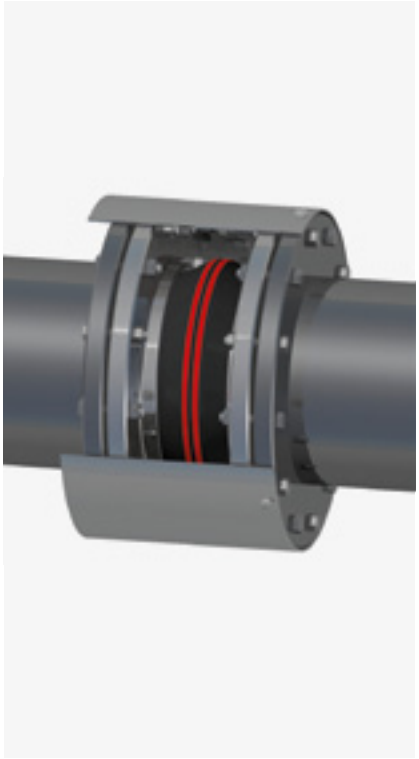
Conical inner sleeve
(lateral and angular movement absorption)

Telescopic inner sleeve (large axial movement absorption and full bellows protection)

External protection systems

Extremely rough operating conditions, weather influence such as strong UV radiation or risk of damage from external mechanical influence require protection of the rubber expansion joint. Suitable products are available, starting with a simple flame protection cover made of a glass fabric with an insulating insert for flame impact up to 800 °C to robust protection for placement in the ground.

Flame protection cover



External tube

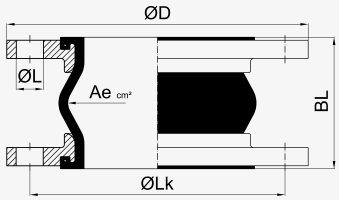
Soil protection cover

RUBBER EXPANSION JOINTS

Type 1 MODEL CR

TYPE 1 MODEL CR

TYPE 1 MODEL CR



Version

The HKS rubber expansion joint of **type 1 model CR** consists of a rubber bellows and two rotating flanges.

Design of rubber bellows:

Inner layer:	Chloroprene CR, seamless, abrasion-resistant
Pressure support:	PA textile cord
Outer layer:	Chloroprene CR
Identification:	White „CR“ print, DN.., PN.., date of manufacture

Flange design:

Rotating steel flanges made of material S235JR, galvanised, DIN PN 10, with integrated rubber bead (self-sealing), additional seals are not required.

Properties and areas of application:

The HKS rubber expansion joint **type 1 model CR** is suitable for cold and warm water, swimming pool water, seawater, wastewater (lightly acidic or alkaline), also with low oil content, cooling water with corrosion protection agents containing oil, lubricant, grease, air and compressed air. Electrically dissipative.

Temperature-dependent pressure and movement ranges

Max. operating temperature	Max. movement range	Temperature-dependent operating pressure for bellows	
		PN 10	PN 16
50 °C	100 %	10 bar	16 bar
70 °C	80 %	8 bar	12 bar
100 °C	60 %	6 bar	10 bar

Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction
- Water supply and building technology
- Wastewater technology
- Steel, printing, paper and chemical industry

Additional equipment:

- PTFE linings
- Vacuum support rings
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves
- Flame protection covers
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, ASA, JIS, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables. DN 32 bellows are used for DN 25 rubber expansion joints.

Subject to technical modifications

Nominal diameter		Length	Bellows		Permitted movement absorption nominal [5]				Permitted negative pressure (vacuum stability)			Flange					Weight
			Nominal pressure	Effective diameter	Axial [4]		Lateral	Angular	Without VSD	With VSD [2]	With VSD+S [3]	Outside diameter	Borehole pattern acc. to EN 1092	Pitch circle diameter	No. of holes	Hole diameter	
DN		BL	PN	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$				D	PN	Lk	n	L	G
mm	in	mm	bar	cm²	mm	mm	mm	Degrees	mbar	mbar	mbar	mm	-	mm	-	mm	kg
25 [1]	1“	130	16	15	-30	+20	±30	±30	max. -1000	max. -1000	max. -1000	115	40	85	4	14	1.9
32	1 1/4“	130	16	15	-30	+20	±30	±30				140	40	100	4	18	3.4
40	1 1/2“	130	16	20	-30	+20	±30	±30				150	40	110	4	18	4.0
50	2“	130	16	30	-30	+20	±30	±30				165	16	125	4	18	4.6
65	2 1/2“	130	16	50	-30	+20	±30	±30	-700			185	16	145	4	18	5.3
80	3“	130	16	85	-30	+20	±30	±30	-600			200	16	160	8	18	6.9
100	4“	130	16	125	-30	+20	±30	±20	-400			220	16	180	8	18	8.0
125	5“	130	16	185	-30	+20	±30	±20	-300			250	16	210	8	18	9.9
150	6“	130	16	250	-30	+20	±30	±20	-300			285	16	240	8	22	12.3
200	8“	130	16	400	-25	+30	±30	±10	-300			340	10	295	8	22	16.5
250	10“	130	16	600	-10	+30	±15	±5	-200			395	10	350	12	22	21.6
300	12“	130	16	800	-10	+30	±15	±5	-100			445	10	400	12	22	29.3
350	14“	200	16	1000	-40	+35	±30	±8	-			505	10	460	16	22	43.0
400	16“	200	16	1375	-40	+35	±30	±8	-			565	10	515	16	26	46.0
450	18“	200	10	1780	-40	+35	±30	±8	-	-700		615	10	565	20	26	50.0
450	18“	250	10	1780	-40	+35	±35	±10	-	-700		615	10	565	20	26	53.0
500	20“	200	10	2185	-40	+35	±30	±8	-	-700		670	10	620	20	26	57.0
600	24“	200	10	3080	-40	+35	±30	±8	-	-700		780	10	725	20	30	70.0
700	28“	260	10	4800	-40	+30	±30	±5	-	-		895	10	840	24	30	117.0
800	32“	250	10	5440	-40	+35	±35	±5	-	-	-700	1015	10	950	24	33	129.5
900	36“	300	10	7100	-40	+40	±40	±5	-	-	-700	1115	10	1050	28	33	184.0
1000	40“	300	10	8700	-40	+40	±40	±5	-	-	-700	1230	10	1160	28	36	245.0

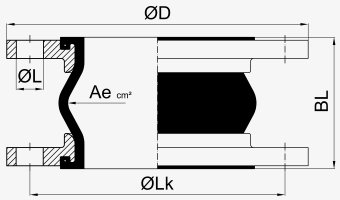
1) DN 32 bellows are used for DN 25 rubber expansion joints.
2) VSD … vacuum support ring made of material 1.4571
3) VSD+S ... vacuum support ring with lock (screw fitting) made of 1.4571
4) Axial movement absorption Δx_c … compression and Δx_e … extension
5) $\Delta x_c/\Delta x_e$, Δy and $\Delta\alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

RUBBER EXPANSION JOINTS

Type 1 MODEL G

TYPE 1 MODEL G

TYPE 1 MODEL G



Version

The HKS rubber expansion joint of **type 1 model G** consists of a rubber bellows and two rotating flanges.

Design of rubber bellows:

Inner layer:	NBR (nitrile), seamless, abrasion-resistant
Pressure support:	PA textile cord
Outer layer:	Chloroprene CR
Identification:	Yellow ring, DN.., PN.., date of manufacture

Flange design:

Rotating steel flanges made of material S235JR, galvanised, DIN PN 10, with integrated rubber bead (self-sealing), additional seals are not required.

Properties and areas of application:

The HKS rubber expansion joint **type 1 model G** is suitable for mineral oil products, fuel-ethanol mixtures and EN fuels, municipal and natural gas except liquid gas. Electrically conductive.

Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction and ship building
- Gas supply and building technology
- Energy and offshore technology
- Steel, printing, paper and chemical industry

Additional equipment:

- PTFE linings
- Vacuum support rings
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves
- Flame protection covers
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, ASA, JIS, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables. DN 32 bellows are used for DN 25 rubber expansion joints.

Temperature-dependent pressure and movement ranges

Max. operating temperature	Max. movement range	Temperature-dependent operating pressure for bellows	
		PN 10	PN 16
50 °C	100 %	10 bar	16 bar
70 °C	80 %	8 bar	12 bar
100 °C	60 %	6 bar	10 bar

1) DN 32 bellows are used for DN 25 rubber expansion joints.
2) VSD … vacuum support ring made of material 1.4571
3) VSD+S ... vacuum support ring with lock (screw fitting) made of 1.4571
4) Axial movement absorption Δx_c … compression and Δx_e … extension
5) $\Delta x_c/\Delta x_e$, Δy and $\Delta \alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

Subject to technical modifications

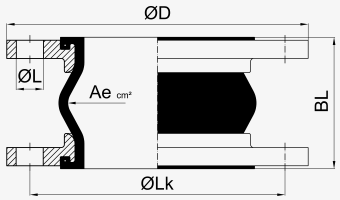
Nominal diameter		Length	Bellows		Permitted movement absorption nominal [5]				Permitted negative pressure (vacuum stability)			Flange					Weight
			Nominal pressure	Effective diameter	Axial [4]		Lateral	Angular	Without VSD	With VSD [2]	With VSD+S [3]	Outside diameter	Borehole pattern acc. to EN 1092	Pitch circle diameter	No. of holes	Hole diameter	
DN		BL	PN	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$				D	PN	Lk	n	L	G
mm	in	mm	bar	cm²	mm	mm	mm	Degrees	mbar	mbar	mbar	mm	-	mm	-	mm	kg
25 [1]	1“	130	16	15	-30	+20	±30	±30				115	40	85	4	14	1.9
32	1 1/4“	130	16	15	-30	+20	±30	±30				140	40	100	4	18	3.4
32	1 1/4“	160	16	15	-30	+35	±35	±15				140	40	100	4	18	3.6
40	1 1/2“	130	16	20	-30	+20	±30	±30	max. -1000			150	40	110	4	18	4.0
40	1 1/2“	160	16	20	-30	+35	±35	±15				150	40	110	4	18	4.2
50	2“	130	16	30	-30	+20	±30	±30				165	16	125	4	18	4.6
50	2“	150	16	30	-35	+30	±30	±15				165	16	125	4	18	4.7
50	2“	160	16	30	-30	+35	±35	±15				165	16	125	4	18	4.8
65	2 1/2“	130	16	50	-30	+20	±30	±30	-700			185	16	145	4	18	5.3
65	2 1/2“	150	16	50	-35	+30	±30	±15	-700			185	16	145	4	18	5.4
65	2 1/2“	160	16	50	-30	+35	±35	±15	-700			185	16	145	4	18	5.5
80	3“	130	16	85	-30	+20	±30	±30	-600			200	16	160	8	18	6.9
80	3“	150	16	85	-35	+30	±30	±15	-600			200	16	160	8	18	7.0
80	3“	160	16	85	-30	+35	±35	±15	-600			200	16	160	8	18	7.1
100	4“	130	16	125	-30	+20	±30	±20	-400			220	16	180	8	18	8.0
100	4“	150	16	125	-35	+30	±30	±15	-400	max. -1000		220	16	180	8	18	8.1
100	4“	160	16	125	-30	+35	±35	±15	-400			220	16	180	8	18	8.2
125	5“	130	16	185	-30	+20	±30	±20	-300			250	16	210	8	18	9.9
125	5“	150	16	185	-35	+30	±30	±15	-300			250	16	210	8	18	10.1
125	5“	160	16	185	-30	+35	±35	±15	-300			250	16	210	8	18	10.2
150	6“	130	16	250	-30	+20	±30	±20	-300			285	16	240	8	22	12.3
150	6“	150	16	250	-35	+30	±30	±15	-300			285	16	240	8	22	12.4
150	6“	160	16	250	-30	+35	±35	±15	-300			285	16	240	8	22	12.5
200	8“	130	16	400	-25	+30	±30	±10	-300			340	10	295	8	22	16.5
200	8“	150	16	400	-35	+30	±30	±15	-300			340	10	295	8	22	16.6
200	8“	160	16	400	-30	+35	±35	±15	-300			340	10	295	8	22	16.7
200	8“	175	16	400	-15	+35	±10	±5	-300			340	10	295	8	22	16.8
250	10“	130	16	600	-10	+30	±15	±5	-200			395	10	350	12	22	21.6
250	10“	175	16	600	-15	+35	±10	±5	-200			395	10	350	12	22	21.9
250	10“	200	10	600	-40	+35	±30	±10	-200			395	10	350	12	22	22.1
300	12“	130	16	800	-10	+30	±15	±5	-100			445	10	400	12	22	29.3
300	12“	200	10	800	-40	+35	±30	±10	-100			445	10	400	12	22	29.8
350	14“	200	16	1000	-40	+35	±30	±8	-			505	10	460	16	22	43.0
400	16“	200	16	1375	-40	+35	±30	±8	-			565	10	515	16	26	46.0
450	18“	200	10	1780	-40	+35	±30	±8	-	-700		615	10	565	20	26	50.0
450	18“	250	10	1780	-40	+35	±30	±8	-	-700		615	10	565	20	26	53.0
500	20“	200	10	2185	-40	+35	±30	±8	-	-700		670	10	620	20	26	57.0
600	24“	200	10	3080	-40	+35	±30	±8	-	-700		780	10	725	20	30	70.0
700	28“	260	10	4800	-40	+30	±30	±5	-	-		895	10	840	24	30	117.0
800	32“	250	10	5440	-40	+35	±35	±5	-	-	-700	1015	10	950	24	33	129.5
900	36“	300	10	7100	-40	+40	±40	±5	-	-	-700	1115	10	1050	28	33	184.0
1000	40“	300	10	8700	-40	+40	±40	±5	-	-	-700	1230	10	1160	28	36	245.0

RUBBER EXPANSION JOINTS

Type 1 MODEL GR

TYPE 1 MODEL GR

TYPE 1 MODEL GR



Version

The HKS rubber expansion joint **type 1 model GR** consists of a rubber bellows and two rotating flanges.

Design of rubber bellows:

Inner layer:	Hypalon® (CSM), seamless, highly abrasion-resistant
Pressure support:	PA textile cord
Outer layer:	Hypalon® (CSM)
Identification:	Green ring, DN.., PN.., date of manufacture

Flange design:

Rotating steel flanges made of material S235JR, galvanised, DIN PN 10, with integrated rubber bead (self-sealing), additional seals are not required.

Properties and areas of application:

The HKS rubber expansion joint type 1 model GR is suitable for chemicals, acids, lyes and aggressive chemical wastewater. For compressor air containing oil, it is suitable up to a temperature of +90 °C. Electrically dissipative.

Temperature-dependent pressure and movement ranges

Max. operating temperature	Max. movement range	Temperature-dependent operating pressure for bellows	
		PN 10	PN 16
50 °C	100 %	10 bar	16 bar
70 °C	80 %	8 bar	12 bar
100 °C	60 %	6 bar	10 bar

Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction
- Gas supply
- Energy and offshore technology
- Steel, printing, paper and chemical industry

Additional equipment:

- PTFE linings
- Vacuum support rings
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves
- Flame protection covers
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, ASA, JIS, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables. DN 32 bellows are used for DN 25 rubber expansion joints.

Subject to technical modifications

Nominal diameter		Length	Bellows		Permitted movement absorption nominal [5]				Permitted negative pressure (vacuum stability)			Flange					Weight
			Nominal	Effective diameter	Axial		Lateral	Angular	Without VSD	With VSD [2]	With VSD+S [3]	Outside diameter	Borehole pattern acc. to EN 1092	Pitch circle diameter	No. of holes	Hole diameter	
DN		BL	PN	Ae	Δx_c	Δx_e	Δy	$\Delta \alpha$				D	PN	Lk	n	L	G
mm	in	mm	bar	cm²	mm	mm	mm	Degrees	mbar	mbar	mbar	mm	-	mm	-	mm	kg
25 [1]	1“	130	16	15	-30	+20	±30	±30	max. -1000	max. -1000	max. -1000	115	40	85	4	14	1.9
32	1 1/4“	130	16	15	-30	+20	±30	±30				140	40	100	4	18	3.4
40	1 1/2“	130	16	20	-30	+20	±30	±30				150	40	110	4	18	4.0
50	2“	130	16	30	-30	+20	±30	±30				165	16	125	4	18	4.6
65	2 1/2“	130	16	50	-30	+20	±30	±30	-700			185	16	145	4	18	5.3
80	3“	130	16	85	-30	+20	±30	±30	-600			200	16	160	8	18	6.9
100	4“	130	16	125	-30	+20	±30	±20	-400			220	16	180	8	18	8.0
125	5“	130	16	185	-30	+20	±30	±20	-300			250	16	210	8	18	9.9
150	6“	130	16	250	-30	+20	±30	±20	-300			285	16	240	8	22	12.3
200	8“	130	16	400	-25	+30	±30	±10	-300			340	10	295	8	22	16.5
250	10“	130	16	600	-10	+30	±15	±5	-200			395	10	350	12	22	21.6
300	12“	130	16	800	-10	+30	±15	±5	-100			445	10	400	12	22	29.3
350	14“	200	16	1000	-40	+35	±30	±8	-			505	10	460	16	22	43.0
400	16“	200	16	1375	-40	+35	±30	±8	-			565	10	515	16	26	46.0
450	18“	200	10	1780	-40	+35	±30	±8	-	-700		615	10	565	20	26	50.0
450	18“	250	10	1780	-45	+35	±35	±10	-	-700		615	10	565	20	26	53.0
500	20“	200	10	2185	-40	+35	±30	±8	-	-700		670	10	620	20	26	57.0
600	24“	200	10	3080	-40	+35	±30	±8	-	-700		780	10	725	20	30	70.0
700	28“	260	10	4800	-40	+30	±30	±5	-	-		895	10	840	24	30	117.0

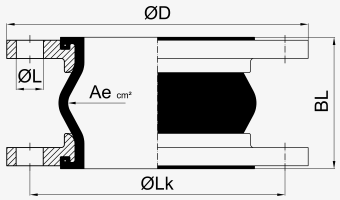
1) DN 32 bellows are used for DN 25 rubber expansion joints.
2) VSD … vacuum support ring made of material 1.4571
3) VSD+S ... vacuum support ring with lock (screw fitting) made of 1.4571
4) Axial movement absorption Δx_c … compression and Δx_e … extension
5) $\Delta x_c/\Delta x_e$, Δy and $\Delta \alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

RUBBER EXPANSION JOINTS

Type 1 MODEL GS

TYPE 1 MODEL GS

TYPE 1 MODEL GS



Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction and ship building
- Energy and offshore technology

Version

The HKS rubber expansion joint **type 1 model GS** consists of a rubber bellows and two rotating flanges.

Design of rubber bellows:

Inner layer:	NBR (nitrile), seamless, abrasion-resistant
Pressure support:	Galvanised steel wire cord
Outer layer:	Chloroprene CR
Identification:	2 yellow rings, DN.., PN.., date of manufacture

Flange design:

Rotating steel flanges made of material S235JR, galvanised, DIN PN 10, with integrated rubber bead (self-sealing), additional seals are not required.

Additional equipment:

- PTFE linings
- Vacuum support rings
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves
- Flame protection covers
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, ASA, JIS, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables. DN 32 bellows are used for DN 25 rubber expansion joints.

Properties and areas of application:

The HKS rubber expansion joint **type 1 model GS** is suitable for mineral oil products, DIN fuels, cooling water with corrosion protection containing oil, lubricating oils, hydraulic oils and seawater. Electrically conductive.

Temperature-dependent pressure and movement ranges

Max. operating temperature	Max. movement range	Temperature-dependent operating pressure for bellows	
		PN 10	PN 16
60 °C	100 %	10 bar	16 bar
100 °C	60 %	6 bar	10 bar

Subject to technical modifications

Nominal diameter		Length	Bellows		Permitted movement absorption nominal [5]				Permitted negative (vacuum stability)			Flange					Weight
			Nominal pressure	Effective diameter	Axial [4]		Lateral	Angular	Without VSD	With VSD [2]	With VSD+S [3]	Outside diameter	Borehole pattern acc. to EN 1092	Pitch circle diameter	No. of holes	Hole diameter	
DN		BL	PN	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$				D	PN	Lk	n	L	G
mm	in	mm	bar	cm²	mm	mm	mm	Degrees	mbar	mbar	mbar	mm	-	mm	-	mm	kg
25 [1]	1“	130	16	10	-30	+15	±15	±20	max. -1000	max. -1000	max. -1000	115	40	85	4	14	2.0
32	1 1/4“	130	16	15	-30	+15	±15	±20				140	40	100	4	18	3.5
40	1 1/2“	130	16	20	-30	+15	±15	±20				150	40	110	4	18	4.0
50	2“	130	16	30	-30	+15	±15	±20				165	16	125	4	18	5.0
65	2 1/2“	130	16	50	-30	+15	±15	±20				185	16	145	4	18	5.5
80	3“	130	16	85	-30	+15	±15	±20				200	16	160	8	18	7.1
80	3“	150	16	85	-35	+20	±15	±15				200	16	160	8	18	7.2
100	4“	130	16	125	-30	+15	±15	±15	-800			220	16	180	8	18	8.3
100	4“	150	16	125	-35	+20	±15	±15	-800			220	16	180	8	18	8.4
125	5“	130	16	185	-30	+15	±15	±15	-700			250	16	210	8	18	10.1
125	5“	150	16	185	-35	+20	±15	±15	-700			250	16	210	8	18	10.2
150	6“	130	16	250	-30	+15	±15	±15	-700			285	16	240	8	22	12.6
150	6“	150	16	250	-35	+20	±15	±15	-700			285	16	240	8	22	12.7
200	8“	130	16	400	-15	+20	±10	±5	-700			340	10	295	8	22	16.9
200	8“	175	16	400	-25	+20	±15	±5	-700			340	10	295	8	22	17.2
250	10“	130	16	600	-15	+20	±10	±5	-700			395	10	350	12	22	22.3
250	10“	175	16	600	-25	+20	±15	±5	-700			395	10	350	12	22	22.6
300	12“	130	16	800	-15	+20	±10	±5	-600			445	10	400	12	22	29.9
300	12“	200	16	800	-40	+30	±25	±10	-600			445	10	400	12	22	30.4
350	14“	200	16	1000	-40	+30	±25	±10	-400			505	10	460	16	22	44.0
400	16“	200	16	1375	-40	+30	±25	±5	-400			565	10	515	16	26	47.5
450	18“	200	10	1780	-40	+30	±25	±5	-300	-800		615	10	565	20	26	51.0
450	18“	250	10	1780	-40	+30	±30	±5	-300	-800		615	10	565	20	26	54.0
500	20“	200	10	2185	-40	+30	±25	±5	-300	-800		670	10	620	20	26	57.5
600	24“	200	10	3080	-40	+30	±25	±5	-200	-700		780	10	725	20	30	70.0

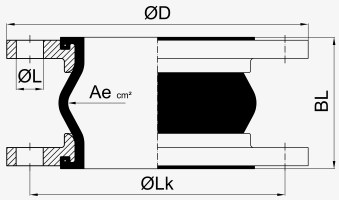
1) DN 32 bellows are used for DN 25 rubber expansion joints.
2) VSD … vacuum support ring made of material 1.4571
3) VSD+S ... vacuum support ring with lock (screw fitting) made of 1.4571
4) Axial movement absorption Δx_c … compression and Δx_e … extension
5) $\Delta x_c/\Delta x_e$, Δy and $\Delta\alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

RUBBER EXPANSION JOINTS

Type 1 MODEL R

TYPE 1 MODEL R

TYPE 1 MODEL R



Version

The HKS rubber expansion joint **type 1 model R** consists of a rubber bellows and two rotating flanges.

Design Gummibalg:

Inner layer:	Butyl (IIR) / EPDM, seamless, low diffusion
Pressure support:	PA textile cord, butyl rubber coating
Outer layer:	EPDM, ozone-resistant, heat-resistant
Identification:	Red ring, DN.., PN.., date of manufacture

Flange design:

Rotating steel flanges made of material S235JR, galvanised, DIN PN 10, with integrated rubber bead (self-sealing), additional seals are not required.

Properties and areas of application:

The HKS rubber expansion joint type 1 model R is suitable for water, drinking water (certifications DVGW W 270 as well as ACS), cold and hot wastewater, seawater, cooling water (also with chemical additives for water processing), weak acids and lyes, saline solutions, technical alcohol, ester and ketones. It can be used in a temperature range (depending on media) from -40 °C to +100 °C (briefly up to +120) and is electrically dissipative.

Areas of application in industry and trade:

- Absorbing axial, lateral and angular movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction and ship building
- Water supply and building technology
- Energy and offshore technology
- Steel, printing, paper and chemical industry

Additional equipment:

- PTFE linings
- Vacuum support rings
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves
- Flame protection covers
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, ASA, JIS, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables. DN 32 bellows are used for DN 25 rubber expansion joints.

Temperature-dependent pressure and movement ranges

Max. operating temperature	Max. movement range	Temperature-dependent operating pressure for bellows	
		PN 10	PN 16
50 °C	100 %	10 bar	16 bar
70 °C	80 %	8 bar	12 bar
100 °C	60 %	6 bar	10 bar

1) DN 32 bellows are used for DN 25 rubber expansion joints.
2) VSD … vacuum support ring made of material 1.4571
3) VSD+S ... vacuum support ring with lock (screw fitting) made of 1.4571
4) Axial movement absorption Δx_c … compression and Δx_e … extension
5) $\Delta x_c/\Delta x_e$, Δy and $\Delta \alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

Subject to technical modifications

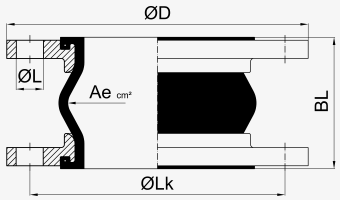
Nominal diameter		LGTH	Bellows		Permitted movement absorption nominal [5]				Permitted negative pressure (vacuum stability)			Flange					Weight
			Nominal pressure	Effective diameter	Axial [4]		Lateral	Angular	Without VSD	With VSD [2]	With VSD+S [3]	Outside diameter	Bore-hole pattern acc. to EN 1092	Pitch circle diameter	No. of holes	Hole diameter	
DN		BL	PN	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$				D	PN	Lk	n	L	G
mm	in	mm	bar	cm²	mm	mm	mm	Degrees	mbar	mbar	mbar	mm	-	mm	-	mm	kg
25 [1]	1“	130	16	15	-30	+20	±30	±30				115	40	85	4	14	1.9
32	1 1/4“	130	16	15	-30	+20	±30	±30				140	40	100	4	18	3.4
32	1 1/4“	160	16	15	-30	+35	±35	±15				140	40	100	4	18	3.6
40	1 1/2“	130	16	20	-30	+20	±30	±30	max. -1000			150	40	110	4	18	4.0
40	1 1/2“	160	16	20	-30	+35	±35	±15				150	40	110	4	18	4.2
50	2“	130	16	30	-30	+20	±30	±30				165	16	125	4	18	4.6
50	2“	150	16	30	-35	+30	±30	±15				165	16	125	4	18	4.7
50	2“	160	16	30	-30	+35	±35	±15				165	16	125	4	18	4.8
65	2 1/2“	130	16	50	-30	+20	±30	±30	-700			185	16	145	4	18	5.3
65	2 1/2“	150	16	50	-35	+30	±30	±15	-700			185	16	145	4	18	5.4
65	2 1/2“	160	16	50	-30	+35	±35	±15	-700			185	16	145	4	18	5.5
80	3“	130	16	85	-30	+20	±30	±30	-600			200	16	160	8	18	6.9
80	3“	150	16	85	-35	+30	±30	±15	-600			200	16	160	8	18	7.0
80	3“	160	16	85	-30	+35	±35	±15	-600			200	16	160	8	18	7.1
100	4“	130	16	125	-30	+20	±30	±20	-400	max. -1000		220	16	180	8	18	8.0
100	4“	150	16	125	-35	+30	±30	±15	-400			220	16	180	8	18	8.1
100	4“	160	16	125	-30	+35	±35	±15	-400			220	16	180	8	18	8.2
125	5“	130	16	185	-30	+20	±30	±20	-300		max. -1000	250	16	210	8	18	9.9
125	5“	150	16	185	-35	+30	±30	±15	-300			250	16	210	8	18	10.1
125	5“	160	16	185	-30	+35	±35	±15	-300			250	16	210	8	18	10.2
150	6“	130	16	250	-30	+20	±30	±20	-300			285	16	240	8	22	12.3
150	6“	150	16	250	-35	+30	±30	±15	-300			285	16	240	8	22	12.4
150	6“	160	16	250	-30	+35	±35	±15	-300			285	16	240	8	22	12.5
200	8“	130	16	400	-25	+30	±30	±10	-300			340	10	295	8	22	16.5
200	8“	150	16	400	-35	+30	±30	±15	-300			340	10	295	8	22	16.6
200	8“	160	16	400	-30	+35	±35	±5	-300			340	10	295	8	22	16.7
200	8“	175	16	400	-15	+35	±15	±5	-300			340	10	295	8	22	16.8
250	10“	130	16	600	-10	+30	±15	±5	-200			395	10	350	12	22	21.6
250	10“	175	16	600	-15	+35	±10	±5	-200			395	10	350	12	22	21.9
250	10“	200	10	600	-40	+35	±30	±10	-200			395	10	350	12	22	22.1
300	12“	130	16	800	-10	+30	±15	±5	-100			445	10	400	12	22	29.3
300	12“	200	10	800	-40	+35	±30	±10	-100			445	10	400	12	22	29.8
350	14“	200	16	1000	-40	+35	±30	±8	-			505	10	460	16	22	43.0
400	16“	200	16	1375	-40	+35	±30	±8	-			565	10	515	16	26	46.0
450	18“	200	10	1780	-40	+35	±30	±8	-	-700		615	10	565	20	26	50.0
450	18“	250	10	1780	-40	+35	±35	±10	-	-700		615	10	565	20	26	53.0
500	20“	200	10	2185	-40	+35	±30	±8	-	-700		670	10	620	20	26	57.0
600	24“	200	10	3080	-40	+35	±30	±8	-	-700		780	10	725	20	30	70.0
700	28“	260	10	4800	-40	+30	±30	±5	-	-		895	10	840	24	30	117.0
800	32“	250	10	5440	-40	+35	±35	±5	-	-	-700	1015	10	950	24	33	129.5
900	36“	300	10	7100	-40	+40	±40	±5	-	-	-700	1115	10	1050	28	33	184.0
1000	40“	300	10	8700	-40	+40	±40	±5	-	-	-700	1230	10	1160	28	36	245.0

RUBBER EXPANSION JOINTS

Type 1 MODEL RS

TYPE 1 MODEL RS

TYPE 1 MODEL RS



Version

The HKS rubber expansion joint **type 1 model RS** consists of a rubber bellows and two rotating flanges.

Design of rubber bellows:

Inner layer:	EPDM, resistant to hot water, seamless, highly abrasion-resistant
Pressure support:	Polymer textile cord, resistant to hot water and hydrolysis
Outer layer:	EPDM, ozone-resistant, heat-resistant
Identification:	2 red rings, DN.., PN.., date of manufacture

Flange design:

Rotating steel flanges made of material S235JR, galvanised, DIN PN 10, with integrated rubber bead (self-sealing), additional seals are not required.

Properties and areas of application:

The HKS rubber expansion joint **type 1 model RS** is suitable for continuous duty with hot heating and cooling water as well as hot air. It is DIN certified up to 100 °C at 10 bar and up to 110 °C at 6 bar pressure. Electrically dissipative.

Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction, ship building and heating systems
- Water supply and building technology

Additional equipment:

- PTFE linings
- Vacuum support rings
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves
- Flame protection covers
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, ASA, JIS, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables. DN 32 bellows are used for DN 25 rubber expansion joints.

Temperature-dependent pressure and movement ranges

Max. operating temperature	Max. movement range	Temperature-dependent operating pressure for bellows	
		PN 10	PN 16
70 °C	100 %	10 bar	16 bar
100 °C	75 %	7.5 bar	12 bar
130 °C	50 %	5 bar	8 bar

1) DN 32 bellows are used for DN 25 rubber expansion joints.
2) VSD … vacuum support ring made of material 1.4571
3) VSD+S ... vacuum support ring with lock (screw fitting) made of 1.4571
4) Axial movement absorption Δx_c … compression and Δx_e … extension
5) $\Delta x_c/\Delta x_e$, Δy and $\Delta \alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

Subject to technical modifications

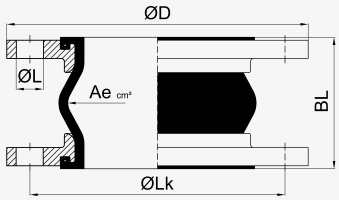
Nominal diameter		LGTH	Bellows		Permitted movement absorption nominal [5]				Permitted negative pressure (vacuum stability)			Flange					Weight
			Nominal pressure	Effective diameter	Axial [4]		Lateral	Angular	Without VSD	With VSD [2]	With VSD+S [3]	Outside diameter	Bore-hole pattern acc. to EN 1092	Pitch circle diameter	No. of holes	Hole diameter	
DN		BL	PN	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$				D	PN	Lk	n	L	G
mm	in	mm	bar	cm²	mm	mm	mm	Degrees	mbar	mbar	mbar	mm	-	mm	-	mm	kg
25 [1]	1“	130	16	15	-30	+20	±30	±30	max. -1000	max. -1000	max. -1000	115	40	85	4	14	1.9
32	1 1/4“	130	16	15	-30	+20	±30	±30				140	40	100	4	18	3.4
32	1 1/4“	160	16	15	-30	+25	±25	±15				140	40	100	4	18	3.6
40	1 1/2“	130	16	20	-30	+20	±30	±30				150	40	110	4	18	4.0
40	1 1/2“	160	16	20	-30	+25	±25	±15				150	40	110	4	18	4.2
50	2“	130	16	30	-30	+20	±30	±30				165	16	125	4	18	4.6
50	2“	160	16	30	-30	+25	±25	±15				165	16	125	4	18	4.8
65	2 1/2“	130	16	50	-30	+20	±30	±30	-700			185	16	145	4	18	5.3
65	2 1/2“	160	16	50	-30	+25	±25	±15	-700			185	16	145	4	18	5.5
80	3“	130	16	85	-30	+20	±30	±30	-600			200	16	160	8	18	6.9
80	3“	150	16	85	-30	+20	±30	±15	-600			200	16	160	8	18	7.0
80	3“	160	16	85	-30	+25	±25	±15	-600			200	16	160	8	18	7.1
100	4“	130	16	125	-30	+20	±30	±20	-400			220	16	180	8	18	8.0
100	4“	150	16	125	-30	+20	±30	±15	-400			220	16	180	8	18	8.1
100	4“	160	16	125	-30	+25	±25	±15	-400			220	16	180	8	18	8.2
125	5“	130	16	185	-30	+20	±30	±20	-300			250	16	210	8	18	9.8
125	5“	150	16	185	-30	+20	±30	±15	-300			250	16	210	8	18	9.9
125	5“	160	16	185	-30	+25	±25	±15	-300			250	16	210	8	18	10.0
150	6“	130	16	250	-30	+20	±30	±20	-300			285	16	240	8	22	12.3
150	6“	150	16	250	-30	+20	±30	±15	-300			285	16	240	8	22	12.4
150	6“	160	16	250	-30	+25	±25	±15	-300			285	16	240	8	22	12.5
200	8“	130	16	400	-25	+30	±25	±10	-300			340	10	295	8	22	16.5
200	8“	150	16	400	-30	+20	±30	±15	-300			340	10	295	8	22	16.6
200	8“	160	16	400	-30	+25	±25	±15	-300			340	10	295	8	22	16.7
200	8“	175	16	400	-30	+30	±30	±10	-300			340	10	295	8	22	16.8
250	10“	130	16	600	-15	+30	±25	±5	-200			395	10	350	12	22	21.6
250	10“	175	16	600	-30	+30	±30	±10	-200			395	10	350	12	22	21.9
250	10“	200	10	600	-30	+25	±25	±10	-200			395	10	350	12	22	22.1
300	12“	130	16	800	-15	+30	±25	±5	-100			445	10	400	12	22	29.3
300	12“	200	10	800	-30	+25	±25	±10	-100			445	10	400	12	22	29.7
350	14“	200	10	1000	-40	+25	±25	±8	-			505	10	460	16	22	43.0
400	16“	200	10	1375	-40	+25	±25	±8	-			565	10	515	16	26	46.0
450	18“	200	10	1780	-40	+25	±25	±8	-	-700		615	10	565	20	26	50.0
450	18“	250	10	1780	-40	+30	±25	±10	-	-700		615	10	565	20	26	53.0
500	20“	200	10	2185	-40	+25	±25	±8	-	-700		670	10	620	20	26	57.0
600	24“	200	10	3080	-40	+25	±25	±8	-	-700		780	10	725	20	30	70.0
700	28“	260	10	4800	-40	+30	±25	±5	-	-		895	10	840	24	30	117.0
800	32“	250	10	5440	-40	+30	±25	±5	-	-	-700	1015	10	950	24	33	129.5
900	36“	300	10	7100	-40	+35	±30	±5	-	-	-700	1115	10	1050	28	33	184.0
1000	40“	300	10	8700	-40	+35	±30	±5	-	-	-700	1230	10	1160	28	36	245.0

RUBBER EXPANSION JOINTS

Type 1 MODEL V

TYPE 1 MODEL V

TYPE 1 MODEL V



Version

The HKS rubber expansion joint **type 1 model V** consists of a rubber bellows and two rotating flanges.

Design of rubber bellows:

Inner layer:	FPM, seamless, diffusion-proof, electrically insulating
Pressure support:	PA textile cord, special rubber coating
Outer layer:	ECO, electrically conductive
Identification:	White-green-white rings, DN.., PN.., date of manufacture

Flange design:

Rotating steel flanges made of material S235JR, galvanised, DIN PN 10, with integrated rubber bead (self-sealing), additional seals are not required.

Properties and areas of application:

The HKS rubber expansion joint type 1 model V with seamless FPM lining is suitable for petrochemical plants, motors, power plants and flue gas desulphurisation plants with a high resistance to hot oils, benzene, xylene, fuels with an aromatics content over 50 %, bio diesel, aromatic/chlorinated hydrocarbons and mineral acids.

Temperature-dependent pressure and movement ranges

Max. operating temperature	Max. movement range	Temperature-dependent operating pressure for bellows	
		PN 10	PN 16
50 °C	100 %	10 bar	16 bar
70 °C	80 %	8 bar	12 bar
100 °C	60 %	6 bar	10 bar

Subject to technical modifications

Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction
- Steel, printing, paper and chemical industry

Additional equipment:

- PTFE linings
- Vacuum support rings
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves
- Flame protection covers
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, ASA, JIS, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables. DN 32 bellows are used for DN 25 rubber expansion joints.

Nominal diameter		LGTH	Bellows		Permitted movement absorption nominal [5]				Permitted negative pressure (vacuum stability)			Flange					Weight
			Nominal pressure	Effective diameter	Axial [4]		Lateral	Angular	Without VSD	With VSD [2]	With VSD+S [3]	Outside diameter	Bore-hole pattern acc. to EN 1092	Pitch circle diameter	No. of holes	Hole diameter	
DN		BL	PN	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$				D	PN	Lk	n	L	G
mm	in	mm	bar	cm²	mm	mm	mm	Degrees	mbar	mbar	mbar	mm	-	mm	-	mm	kg
25 [1]	1“	130	16	15	-30	+20	±30	±30	max. -1000	max. -1000	max. -1000	115	40	85	4	14	1.9
32	1 1/4“	130	16	15	-30	+20	±30	±30				140	40	100	4	18	3.4
40	1 1/2“	130	16	20	-30	+20	±30	±30				150	40	110	4	18	4.0
50	2“	130	16	30	-30	+20	±30	±30				165	16	125	4	18	4.6
65	2 1/2“	130	16	50	-30	+20	±30	±30	-700			185	16	145	4	18	5.3
80	3“	130	16	85	-30	+20	±30	±30	-600			200	16	160	8	18	6.9
100	4“	130	16	125	-30	+20	±30	±20	-400			220	16	180	8	18	8.0
125	5“	130	16	185	-30	+20	±30	±20	-300			250	16	210	8	18	9.9
150	6“	130	16	250	-30	+20	±30	±20	-300			285	16	240	8	22	12.3
200	8“	130	16	400	-25	+30	±30	±10	-300	-600		340	10	295	8	22	16.5

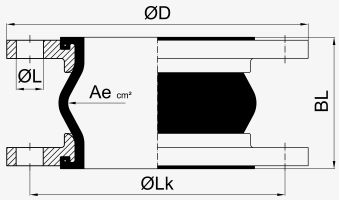
1) DN 32 bellows are used for DN 25 rubber expansion joints.
2) VSD … vacuum support ring made of material 1.4571
3) VSD+S ... vacuum support ring with lock (screw fitting) made of 1.4571
4) Axial movement absorption Δx_c … compression and Δx_e … extension
5) $\Delta x_c/\Delta x_e$, Δy and $\Delta\alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100%.

RUBBER EXPANSION JOINTS

Type 1 MODEL W

TYPE 1 MODEL W

TYPE 1 MODEL W



Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Food processing industry

Additional equipment:

- PTFE linings
- Vacuum support rings
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves
- Flame protection covers
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, ASA, JIS, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables. DN 32 bellows are used for DN 25 rubber expansion joints.

Version

The HKS rubber expansion joint **type 1 model W** consists of a rubber bellows and two rotating flanges.

Design of rubber bellows:

Inner layer:	NBR light, seamless, abrasion-resistant
Pressure support:	PA textile cord
Outer layer:	Chloroprene (CR)
Identification:	White ring, DN.., PN.., date of manufacture

Flange design:

Rotating steel flanges made of material S235JR, galvanised, DIN PN 10, with integrated rubber bead (self-sealing), additional seals are not required.

Properties and areas of application:

The HKS rubber expansion joint **type 1 model W** is suitable for food, including food containing oil and fat. It is not approved for drinking water. The inner rubber complies with the German Food Safety Act. Electrically dissipative.

Temperature-dependent pressure and movement ranges

Max. operating temperature	Max. movement range	Temperature-dependent operating pressure for bellows	
		PN 10	PN 16
50 °C	100 %	10 bar	16 bar
70 °C	80 %	8 bar	12 bar
100 °C	60 %	6 bar	10 bar

Subject to technical modifications

Nominal diameter		LGTH	Bellows		Permitted movement absorption nominal [5]				Permitted negative pressure (vacuum stability)			Flange					Weight
			Nominal pressure	Effective diameter	Axial [4]		Lateral	Angular	Without VSD	With VSD [2]	With VSD+S [3]	Outside diameter	Borehole pattern acc. to EN 1092	Pitch circle diameter	No. of holes	Hole diameter	
DN		BL	PN	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$				D	PN	Lk	n	L	G
mm	in	mm	bar	cm²	mm	mm	mm	Degrees	mbar	mbar	mbar	mm	-	mm	-	mm	kg
25 [1]	1“	130	16	15	-30	+20	±30	±30	max. -1000	max. -1000	max. -1000	115	40	85	4	14	1.9
32	1 1/4“	130	16	15	-30	+20	±30	±30				140	40	100	4	18	3.4
40	1 1/2“	130	16	20	-30	+20	±30	±30				150	40	110	4	18	4.0
50	2“	130	16	30	-30	+20	±30	±30				165	16	125	4	18	4.6
65	2 1/2“	130	16	50	-30	+20	±30	±30	-700			185	16	145	4	18	5.3
80	3“	130	16	85	-30	+20	±30	±30	-600			200	16	160	8	18	6.9
100	4“	130	16	125	-30	+20	±30	±20	-400			220	16	180	8	18	8.0
125	5“	130	16	185	-30	+20	±30	±20	-300			250	16	210	8	18	9.9
150	6“	130	16	250	-30	+20	±30	±20	-300			285	16	240	8	22	12.3
200	8“	130	16	400	-25	+30	±30	±10	-300			340	10	295	8	22	16.5
250	10“	130	16	600	-10	+30	±15	±5	-200			395	10	350	12	22	21.6
300	12“	130	16	800	-10	+30	±15	±5	-100			445	10	400	12	22	29.3
350	14“	200	16	1000	-40	+35	±30	±8	-			505	10	460	16	22	43.0
400	16“	200	16	1375	-40	+35	±30	±8	-			565	10	515	16	26	46.0
450	18“	200	10	1780	-40	+35	±30	±8	-	-700		615	10	565	20	26	50.0
450	18“	250	10	1780	-45	+35	±35	±10	-	-700		615	10	565	20	26	53.0
500	20“	200	10	2185	-40	+35	±30	±8	-	-700		670	10	620	20	26	57.0
600	24“	200	10	3080	-40	+35	±30	±8	-	-700		780	10	725	20	30	70.0

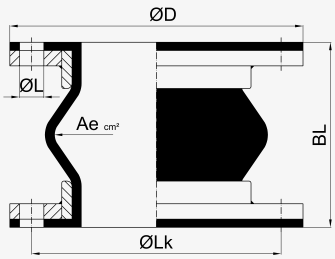
1) DN 32 bellows are used for DN 25 rubber expansion joints.
2) VSD … vacuum support ring made of material 1.4571
3) VSD+S ... vacuum support ring with lock (screw fitting) made of 1.4571
4) Axial movement absorption Δx_c … compression and Δx_e … extension
5) $\Delta x_c/\Delta x_e$, Δy and $\Delta\alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

RUBBER EXPANSION JOINTS

Type 2 MODEL R

TYPE 2 MODEL R

TYPE 2 MODEL R



Version

The HKS rubber expansion joint **type 2 model R** is individually tailored based on customer requirements. It consists of a rubber bellows with pressure-reinforced solid rubber flanges attached to both sides and backing steel flanges made from material S235JR.

Design of rubber bellows:

Inner layer:	EPDM, seamless, low diffusion
Pressure support:	Nylon cord (polyamide cord PA6)
Outer layer:	EPDM, resistant to ageing, ozone and weather
Pressure:	Max. 18 bar [1]
Temperature:	Max. 100 °C
Identification:	Red ring, DN.., PN.., date of manufacture

Flange design:

The backing steel flanges are manufactured with or without a support collar depending on operating pressure. As a standard they consist of material S235JR, are hot galvanised and feature a standard hole pattern (standard PN10). The connections are self-sealing so no additional seals are required.

Properties and areas of application:

The HKS rubber expansion joint **type 2 model R** is suitable for water, cold and hot wastewater, seawater, cooling water (also with chemical additives for water processing), weak acids and lyes, saline solutions, technical alcohol, ester and ketones.

Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction, ship building and heating systems
- Water supply and building technology
- Energy and offshore technology
- Steel, printing, paper and chemical industry

Additional equipment:

- PTFE linings
- Vacuum support rings [2]
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves, protective pipes
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, EN, ASA, AWWA, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables.

Temperature-dependent pressure and movement absorption

Max. operating temperature	Max. movement range	Temperature-dependent operating pressure for bellows		
		PN 6	PN 10	PN 16
50 °C	100 %	6 bar	10 bar	16 bar
70 °C	80 %	5 bar	8 bar	12 bar
100 °C	60 %	2.5 bar	4 bar	7 bar

1) The value stated is the maximum value and depends on length, Nominal diameter and operating temperature. The table values were determined for an ambient temperature of 20 °C. Pressure derating has to be taken into account for deviating operating temperatures.

2) Vacuum support rings can be vulcanised into the rubber bellows on customer request to achieve improved media resistance.

Subject to technical modifications

Nominal diameter		LGTH	Rubber bellows with nominal pressure PN6			Permitted movement absorption nominal [3]				Permitted negative pressure (vacuum stability)		Flange with hole pattern PN10 acc. to EN 1092-1					Weight
			Rubber flange thickness	Inner diameter of convolution	Effective diameter	Axial [2]		Lateral	Angular	Without VSD	With VSD [1]	Outside diameter	Sheet thickness	Pitch circle diameter	No. of holes	Hole diameter	
DN		BL	F	A	Ae	Δx_c	Δx_e	Δy	$\Delta \alpha$			D	C_1	L_k	n	L	G
mm	in	mm	mm	mm	cm²	mm	mm	mm	Degrees	mbar	mbar	mm	mm	mm	-	mm	kg
450	18“	250	13	532	1978	-44	+20	±27	±5.1			615	15	565	20	26	51.0
500	20“	250	13	585	2418	-44	+20	±27	±4.6			670	15	620	20	26	57.5
600	24“	250	13	685	3368	-44	+20	±27	±3.8			780	15	725	20	30	72.5
700	28“	250	13	786	4487	-44	+20	±26	±3.3			895	15	840	24	30	88.5
800	32“	300	13	917	6176	-53	+31	±34	±4.4			1015	15	950	24	33	115
900	36“	300	13	1017	7647	-53	+31	±33	±3.9			1115	15	1050	28	33	128
1000	40“	300	13	1117	9275	-53	+31	±33	±3.5			1230	15	1160	28	36	146
1100	44“	300	13	1217	11060	-53	+31	±33	±3.2			1345	15	1270	32	36	168
1200	48“	300	13	1317	13003	-43	+41	±32	±3.9			1455	15	1380	32	39	196
1300	52“	300	13	1417	15102	-53	+31	±32	±2.7			1565	15	1485	32	42	219
1400	56“	300	13	1517	17358	-53	+31	±31	±2.5			1675	15	1590	36	42	241
1500	60“	300	13	1617	19771	-53	+31	±31	±2.4	max. -200	max. -950	1795	15	1705	36	48	261
1600	64“	300	13	1717	22341	-53	+31	±31	±2.2			1915	15	1820	40	48	291
1700	68“	300	13	1817	24788	-53	+31	±30	±2.1			2015	20	1920	44	48	380
1800	72“	300	13	1917	27657	-53	+31	±30	±2.0			2115	20	2020	44	48	401
1900	76“	300	13	2017	30682	-53	+31	±29	±1.9			2220	20	2125	48	48	428
2000	80“	300	13	2117	33864	-53	+31	±29	±1.8			2325	20	2230	48	48	455
2100	84“	350	13	2255	38514	-69	+43	±38	±2.3			2440	20	2335	48	56	505
2200	88“	350	13	2355	42070	-69	+43	±37	±2.2			2550	20	2440	52	56	539
2400	96“	350	13	2555	49653	-69	+43	±36	±2.1			2760	20	2650	56	56	600
2500	100“	350	13	2655	53680	-69	+43	±36	±2.0			2860	20	2750	56	56	624
2600	104“	350	13	2755	57864	-69	+43	±35	±1.9			2960	20	2850	60	56	646
2800	112“	350	13	2955	66703	-69	+43	±34	±1.8			3180	20	3070	64	56	726
3000	120“	350	13	3155	76170	-69	+43	±33	±1.6			3405	20	3290	68	62	807

1) VSD … vacuum support ring made of material 1.4571, placed internally or vulcanised in

2) Axial movement absorption Δx_c … compression and Δx_e **…** extension

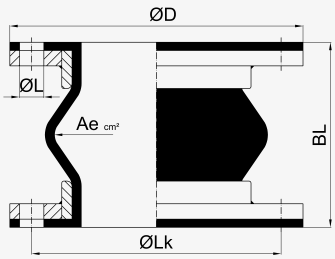
3) $\Delta x_c/\Delta x_e$, Δy and $\Delta \alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

RUBBER EXPANSION JOINTS

Type 2 MODEL RS

TYPE 2 MODEL RS

TYPE 2 MODEL RS



Version

The HKS rubber expansion joint **type 2 model RS** is individually tailored based on customer requirements. It consists of a rubber bellows with pressure-reinforced solid rubber flanges attached to both sides and backing steel flanges made from material S235JR.

Design of rubber bellows:

Inner layer:	EPDM, seamless, low diffusion
Pressure support:	Aramid cord (AR) Nomex®, Kevlar®
Outer layer:	EPDM, resistant to ageing, ozone and weather
Pressure:	max. 27 bar [1]
Temperature:	max. 100 °C
Identification:	2 red rings, DN.., PN.., date of manufacture

Flange design:

The backing steel flanges are manufactured with or without a support collar depending on operating pressure. As a standard they consist of material S235JR, are hot galvanised and feature a standard hole pattern (standard PN10). The connections are self-sealing so no additional seals are required.

Properties and areas of application:

The HKS rubber expansion joint **type 2 model RS** is suitable for water, cold and hot wastewater, seawater, cooling water (also with chemical additives for water processing), weak acids and lyes, saline solutions, technical alcohol, ester and ketones.

Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction, ship building and heating systems
- Water supply and building technology
- Energy and offshore technology
- Steel, printing, paper and chemical industry

Additional equipment:

- PTFE linings
- Vacuum support rings [2]
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves, protective pipes
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, EN, ASA, AWWA, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables.

Temperature-dependent pressure and movement absorption

Max. operating temperature	Max. movement range	Temperature-dependent operating pressure for bellows		
		PN 6	PN 10	PN 16
50 °C	100 %	6 bar	10 bar	16 bar
70 °C	80 %	5 bar	8 bar	12 bar
100 °C	60 %	2.5 bar	4 bar	7 bar

Subject to technical modifications

1) The value stated is the maximum value and depends on length, Nominal diameter and operating temperature. The table values were determined for an ambient temperature of 20 °C. Pressure derating has to be taken into account for deviating operating temperatures.

2) Vacuum support rings can be vulcanised into the rubber bellows on customer request to achieve improved media resistance.

Nominal diameter		LGTH	Rubber bellows with nominal pressure PN6			Permitted movement absorption nominal [3]				Permitted negative pressure (vacuum stability)		Flange with hole pattern PN10 acc. to EN 1092-1					Weight
			Rubber flange thick-ness	Inner diame-ter of convo-lution	Effec-tive dia-meter	Axial [2]		La-teral	Angu-lar	Wit-hout VSD	With VSD [1]	Outside diameter	Sheet thick-ness	Pitch circle diame-ter	No. of holes	Hole diame-ter	
DN		BL	F	A	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$			D	C_1	L_k	n	L	G
mm	in	mm	mm	mm	cm²	mm	mm	mm	De-grees	mbar	mbar	mm	mm	mm	-	mm	kg
450	18“	250	13	532	1978	-44	+20	±27	±5.1			615	15	565	20	26	51.0
500	20“	250	13	585	2418	-44	+20	±27	±4.6			670	15	620	20	26	57.5
600	24“	250	13	685	3368	-44	+20	±27	±3.8			780	15	725	20	30	72.5
700	28“	250	13	786	4487	-44	+20	±26	±3.3			895	15	840	24	30	88.5
800	32“	300	13	917	6176	-53	+31	±34	±4.4			1015	15	950	24	33	115
900	36“	300	13	1017	7647	-53	+31	±33	±3.9			1115	15	1050	28	33	128
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1300	52“	300	13	1417	15102	-53	+31	±32	±2.7			1565	15	1485	32	42	219
1400	56“	300	13	1517	17358	-53	+31	±31	±2.5			1675	15	1590	36	42	241
1500	60“	300	13	1617	19771	-53	+31	±31	±2.4	max. -200	max. -950	1795	15	1705	36	48	261
1600	64“	300	13	1717	22341	-53	+31	±31	±2.2			1915	15	1820	40	48	291
1700	68“	300	13	1817	24788	-53	+31	±30	±2.1			2015	20	1920	44	48	380
1800	72“	300	13	1917	27657	-53	+31	±30	±2.0			2115	20	2020	44	48	401
1900	76“	300	13	2017	30682	-53	+31	±29	±1.9			2220	20	2125	48	48	428
2000	80“	300	13	2117	33864	-53	+31	±29	±1.8			2325	20	2230	48	48	455
2100	84“	350	13	2255	38514	-69	+43	±38	±2.3			2440	20	2335	48	56	505
2200	88“	350	13	2355	42070	-69	+43	±37	±2.2			2550	20	2440	52	56	539
2400	96“	350	13	2555	49653	-69	+43	±36	±2.1			2760	20	2650	56	56	600
2500	100“	350	13	2655	53680	-69	+43	±36	±2.0			2860	20	2750	56	56	624
2600	104“	350	13	2755	57864	-69	+43	±35	±1.9			2960	20	2850	60	56	646
2800	112“	350	13	2955	66703	-69	+43	±34	±1.8			3180	20	3070	64	56	726
3000	120“	350	13	3155	76170	-69	+43	±33	±1.6			3405	20	3290	68	62	807

1) VSD … vacuum support ring made of material 1.4571, placed internally or vulcanised in

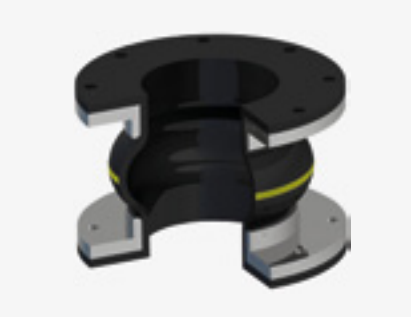
2) Axial movement absorption Δx_c … compression and Δx_e **…** extension

3) $\Delta x_c/\Delta x_e$, Δy and $\Delta\alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

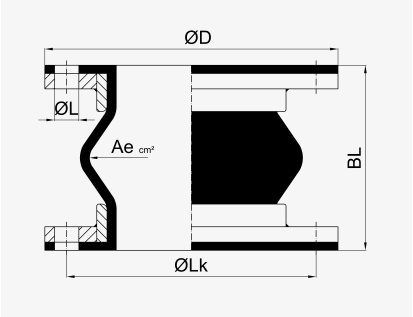
RUBBER EXPANSION JOINTS

Type 2 MODEL G

TYPE 2 MODEL G



TYPE 2 MODEL G



Version

The HKS rubber expansion joint **type 2 model G** is individually tailored based on customer requirements. It consists of a rubber bellows with pressure-reinforced solid rubber flanges attached to both sides and backing steel flanges made from material S235JR.

Design of rubber bellows:

Inner layer:	NBR, seamless, abrasion-resistant
Pressure support:	Nylon cord (polyamide cord PA6)
Outer layer:	NBR
Pressure:	max. 18 bar [1)]
Temperature:	max. 100 °C
Identification:	Yellow ring, DN.., PN.., date of manufacture

Flange design:

The backing steel flanges are manufactured with or without a support collar depending on operating pressure. As a standard they consist of material S235JR, are hot galvanised and feature a standard hole pattern (standard PN10). The connections are self-sealing so no additional seals are required.

Properties and areas of application:

The HKS rubber expansion joint **type 2 model G** is suitable for mineral oil products, fuel-ethanol mixtures and EN fuels, municipal and natural gas except liquid gas.

Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction, ship building and heating systems
- Water supply and building technology
- Energy and offshore technology
- Steel, printing, paper and chemical industry

Additional equipment:

- PTFE linings
- Vacuum support rings [2)]
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves, protective pipes
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, EN, ASA, AWWA, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables.

Temperature-dependent pressure and movement absorption

Max. operating temperature	Movement absorption max.	Temperature-dependent operating pressure of the rubber bellows		
		PN 6	PN 10	PN 16
50 °C	100 %	6 bar	10 bar	16 bar
70 °C	80 %	5 bar	8 bar	12 bar
100 °C	60 %	2.5 bar	4 bar	7 bar

1) The value stated is the maximum value and depends on length, Nominal diameter and operating temperature. The table values were determined for an ambient temperature of 20 °C. Pressure derating has to be taken into account for deviating operating temperatures.

2 Vacuum support rings can be vulcanised into the rubber bellows on customer request to achieve improved media resistance.

Subject to technical modifications

Nominal diameter		LGTH	Rubber bellows with nominal pressure PN6			Permitted movement absorption nominal [3]				Permitted negative pressure (vacuum stability)		Flange with hole pattern PN10 acc. to EN 1092-1					Weight
			Rubber flange thick-ness	Inner diame-ter of convo-lution	Effec-tive diame-ter	Axial [2]		La-teral	Angu-lar	Wit-hout VSD	With VSD [1]	Outside diameter	Sheet thick-ness	Pitch circle diame-ter	No. of holes	Hole diame-ter	
DN		BL	F	A	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$			D	C_1	L_k	n	L	G
mm	in	mm	mm	mm	cm²	mm	mm	mm	De-grees	mbar	mbar	mm	mm	mm	-	mm	kg
450	18“	250	13	532	1978	-44	+20	±27	±5.1			615	15	565	20	26	51.0
500	20“	250	13	585	2418	-44	+20	±27	±4.6			670	15	620	20	26	57.5
600	24“	250	13	685	3368	-44	+20	±27	±3.8			780	15	725	20	30	72.5
700	28“	250	13	786	4487	-44	+20	±26	±3.3			895	15	840	24	30	88.5
800	32“	300	13	917	6176	-53	+31	±34	±4.4			1015	15	950	24	33	115
900	36“	300	13	1017	7647	-53	+31	±33	±3.9			1115	15	1050	28	33	128
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1100	44“	300	13	1217	11060	-53	+31	±33	±3.2			1345	15	1270	32	36	168
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1300	52“	300	13	1417	15102	-53	+31	±32	±2.7			1565	15	1485	32	42	219
1400	56“	300	13	1517	17358	-53	+31	±31	±2.5			1675	15	1590	36	42	241
1500	60“	300	13	1617	19771	-53	+31	±31	±2.4	max. -200	max. -950	1795	15	1705	36	48	261
1600	64“	300	13	1717	22341	-53	+31	±31	±2.2			1915	15	1820	40	48	291
1700	68“	300	13	1817	24788	-53	+31	±30	±2.1			2015	20	1920	44	48	380
1800	72“	300	13	1917	27657	-53	+31	±30	±2.0			2115	20	2020	44	48	401
1900	76“	300	13	2017	30682	-53	+31	±29	±1.9			2220	20	2125	48	48	428
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2100	84“	350	13	2255	38514	-69	+43	±38	±2.3			2440	20	2335	48	56	505
2200	88“	350	13	2355	42070	-69	+43	±37	±2.2			2550	20	2440	52	56	539
2400	96“	350	13	2555	49653	-69	+43	±36	±2.1			2760	20	2650	56	56	600
2500	100“	350	13	2655	53680	-69	+43	±36	±2.0			2860	20	2750	56	56	624
2600	104“	350	13	2755	57864	-69	+43	±35	±1.9			2960	20	2850	60	56	646
2800	112“	350	13	2955	66703	-69	+43	±34	±1.8			3180	20	3070	64	56	726
3000	120“	350	13	3155	76170	-69	+43	±33	±1.6			3405	20	3290	68	62	807

1) VSD … vacuum support ring made of material 1.4571, placed internally or vulcanised in

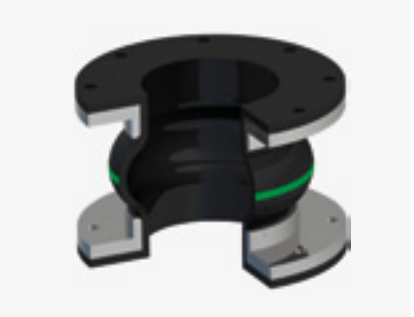
2) Axial movement absorption Δx_c … compression and Δx_e **…** extension

3) $\Delta x_c/\Delta x_e$, Δy and $\Delta\alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

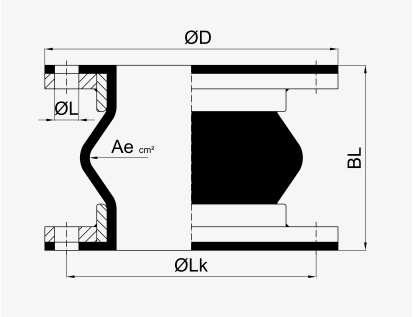
RUBBER EXPANSION JOINTS

Type 2 MODEL GR

TYPE 2 MODEL GR



TYPE 2 MODEL GR



Version

The HKS rubber expansion joint **type 2 model GR** is individually tailored based on customer requirements. It consists of a rubber bellows with pressure-reinforced solid rubber flanges attached to both sides and backing steel flanges made from material S235JR.

Design of rubber bellows:

Inner layer:	CSM (Hypalon®), seamless, highly abrasion-resistant
Pressure support:	Nylon cord (polyamide cord PA6)
Outer layer:	CSM (Hypalon®)
Pressure:	max. 18 bar [1)]
Temperature:	max. 100 °C
Identification:	Green ring, DN.., PN.., date of manufacture

Flange design:

The backing steel flanges are manufactured with or without a support collar depending on operating pressure. As a standard they consist of material S235JR, are hot galvanised and feature a standard hole pattern (standard PN10). The connections are self-sealing so no additional seals are required.

Properties and areas of application:

The HKS rubber expansion joint **type 2 model GR** is suitable for chemicals, acids, lyes and aggressive chemical wastewater as well as compressed air containing oil up to +90 °C.

Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction, ship building and heating systems
- Water supply and building technology
- Energy and offshore technology
- Steel, printing, paper and chemical industry

Additional equipment:

- PTFE linings
- Vacuum support rings [2)]
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves, protective pipes
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, EN, ASA, AWWA, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables.

Temperature-dependent pressure and movement absorption

Max. operating temperature	Movement absorption max.	Temperature-dependent operating pressure of the rubber bellows		
		PN 6	PN 10	PN 16
50 °C	100 %	6 bar	10 bar	16 bar
70 °C	80 %	5 bar	8 bar	12 bar
100 °C	60 %	2.5 bar	4 bar	7 bar

1) The value stated is the maximum value and depends on length, Nominal diameter and operating temperature. The table values were determined for an ambient temperature of 20 °C. Pressure derating has to be taken into account for deviating operating temperatures.

2) Vacuum support rings can be vulcanised into the rubber bellows on customer request to achieve improved media resistance.

Subject to technical modifications

Nominal diameter		LGTH	Rubber bellows with nominal pressure PN6			Permitted movement absorption nominal [3]				Permitted negative pressure (vacuum stability)		Flange with hole pattern PN10 acc. to EN 1092-1					Weight
			Rubber flange thickness	Inner diameter of convolution	Effective diameter	Axial [2]		Lateral	Angular	Without VSD	With VSD [1]	Outside diameter	Sheet thickness	Pitch circle diameter	No. of holes	Hole diameter	
DN		BL	F	A	Ae	Δx_c	Δx_e	Δy	$\Delta \alpha$			D	C_1	L_k	n	L	G
mm	in	mm	mm	mm	cm²	mm	mm	mm	Degrees	mbar	mbar	mm	mm	mm	-	mm	kg
450	18“	250	13	532	1978	-44	+20	±27	±5.1			615	15	565	20	26	51.0
500	20“	250	13	585	2418	-44	+20	±27	±4.6			670	15	620	20	26	57.5
600	24“	250	13	685	3368	-44	+20	±27	±3.8			780	15	725	20	30	72.5
700	28“	250	13	786	4487	-44	+20	±26	±3.3			895	15	840	24	30	88.5
800	32“	300	13	917	6176	-53	+31	±34	±4.4			1015	15	950	24	33	115
900	36“	300	13	1017	7647	-53	+31	±33	±3.9			1115	15	1050	28	33	128
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1600	64“	300	13	1717	22341	-53	+31	±31	±2.2			1915	15	1820	40	48	291
1700	68“	300	13	1817	24788	-53	+31	±30	±2.1			2015	20	1920	44	48	380
1800	72“	300	13	1917	27657	-53	+31	±30	±2.0			2115	20	2020	44	48	401
1900	76“	300	13	2017	30682	-53	+31	±29	±1.9			2220	20	2125	48	48	428
2000	80“	300	13	2117	33864	-53	+31	±29	±1.8			2325	20	2230	48	48	455
2100	84“	350	13	2255	38514	-69	+43	±38	±2.3			2440	20	2335	48	56	505
2200	88“	350	13	2355	42070	-69	+43	±37	±2.2			2550	20	2440	52	56	539
2400	96“	350	13	2555	49653	-69	+43	±36	±2.1			2760	20	2650	56	56	600
2500	100“	350	13	2655	53680	-69	+43	±36	±2.0			2860	20	2750	56	56	624
2600	104“	350	13	2755	57864	-69	+43	±35	±1.9			2960	20	2850	60	56	646
2800	112“	350	13	2955	66703	-69	+43	±34	±1.8			3180	20	3070	64	56	726
3000	120“	350	13	3155	76170	-69	+43	±33	±1.6			3405	20	3290	68	62	807

1) VSD … vacuum support ring made of material 1.4571, placed internally or vulcanised in

2) Axial movement absorption Δx_c … compression and Δx_e **…** extension

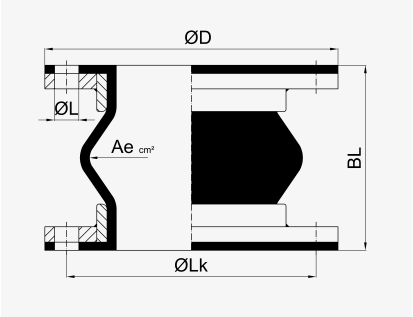
3) $\Delta x_c/\Delta x_e$, Δy and $\Delta \alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

RUBBER EXPANSION JOINTS

Type 2 MODEL CR

TYPE 2 MODEL CR

TYPE 2 MODEL CR



Version

The HKS rubber expansion joint **type 2 model CR** is individually tailored based on customer requirements. It consists of a rubber bellows with pressure-reinforced solid rubber flanges attached to both sides and backing steel flanges made from material S235JR.

Design of rubber bellows:

Inner layer:	CR (Neoprene®), seamless, abrasion-resistant
Pressure support:	Nylon cord (polyamide cord PA6)
Outer layer:	CR (Neoprene®)
Pressure:	max. 18 bar 1)
Temperature:	max. 70 °C
Identification:	Grey ring, DN.., PN.., date of manufacture

Flange design:

The backing steel flanges are manufactured with or without a support collar depending on operating pressure. As a standard they consist of material S235JR, are hot galvanised and feature a standard hole pattern (standard PN10). The connections are self-sealing so no additional seals are required.

Properties and areas of application:

The HKS rubber expansion joint **type 2 model CR** is suitable for cold and warm water, swimming pool water, seawater, wastewater (lightly acidic or alkaline), also with low oil content, cooling water with corrosion protection agents containing oil, lubricant, grease, air and compressed air.

Temperature-dependent pressure and movement absorption

Max. operating temperature	Movement absorption max.	Temperature-dependent operating pressure of the rubber bellows		
		PN 6	PN 10	PN 16
50 °C	100 %	6 bar	10 bar	16 bar
70 °C	80 %	5 bar	8 bar	12 bar

Subject to technical modifications

Areas of application in industry and trade:

- Absorbing axial movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Reducing noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction, ship building and heating systems
- Water supply and building technology
- Energy and offshore technology
- Steel, printing, paper and chemical industry

Additional equipment:

- PTFE linings
- Vacuum support rings [2)]
- Tensioning/tension rod length limiters
- Hinged tensioners
- Inner sleeves, protective pipes
- Soil protection covers

Special versions:

- Flanges: Other materials, flange standards and dimensions according to DIN, EN, ASA, AWWA, etc. are possible.
- Rubber bellows: On request, other expansion joints are available with Nominal diameters, pressure stages and lengths which exceed the standard listed in the tables.

1) The value stated is the maximum value and depends on length, Nominal diameter and operating temperature. The table values were determined for an ambient temperature of 20 °C. Pressure derating has to be taken into account for deviating operating temperatures.

2) Vacuum support rings can be vulcanised into the rubber bellows on customer request to achieve improved media resistance.

Nominal diameter		LGTH	Rubber bellows with nominal pressure PN6			Permitted movement absorption nominal [3]				Permitted negative pressure (vacuum stability)		Flange with hole pattern PN10 acc. to EN 1092-1					Weight
			Rubber flange thick-ness	Inner diame-ter of convo-lution	Effec-tive diame-ter	Axial [2]		La-teral	Angu-lar	Wit-hout VSD	With VSD [1]	Outside diameter	Sheet thick-ness	Pitch circle diame-ter	No. of holes	Hole diame-ter	
DN		BL	F	A	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$			D	C_1	L_k	n	L	G
mm	in	mm	mm	mm	cm²	mm	mm	mm	De-grees	mbar	mbar	mm	mm	mm	-	mm	kg
450	18“	250	13	532	1978	-44	+20	±27	±5.1			615	15	565	20	26	51.0
500	20“	250	13	585	2418	-44	+20	±27	±4.6			670	15	620	20	26	57.5
600	24“	250	13	685	3368	-44	+20	±27	±3.8			780	15	725	20	30	72.5
700	28“	250	13	786	4487	-44	+20	±26	±3.3			895	15	840	24	30	88.5
800	32“	300	13	917	6176	-53	+31	±34	±4.4			1015	15	950	24	33	115
900	36“	300	13	1017	7647	-53	+31	±33	±3.9			1115	15	1050	28	33	128
1000	40“	300	13	1117	9275	-53	+31	±33	±3.5			1230	15	1160	28	36	146
1100	44“	300	13	1217	11060	-53	+31	±33	±3.2			1345	15	1270	32	36	168
1200	48“	300	13	1317	13003	-43	+41	±32	±3.9			1455	15	1380	32	39	196
1300	52“	300	13	1417	15102	-53	+31	±32	±2.7			1565	15	1485	32	42	219
1400	56“	300	13	1517	17358	-53	+31	±31	±2.5			1675	15	1590	36	42	241
1500	60“	300	13	1617	19771	-53	+31	±31	±2.4	max. -200	max. -950	1795	15	1705	36	48	261
1600	64“	300	13	1717	22341	-53	+31	±31	±2.2			1915	15	1820	40	48	291
1700	68“	300	13	1817	24788	-53	+31	±30	±2.1			2015	20	1920	44	48	380
1800	72“	300	13	1917	27657	-53	+31	±30	±2.0			2115	20	2020	44	48	401
1900	76“	300	13	2017	30682	-53	+31	±29	±1.9			2220	20	2125	48	48	428
2000	80“	300	13	2117	33864	-53	+31	±29	±1.8			2325	20	2230	48	48	455
2100	84“	350	13	2255	38514	-69	+43	±38	±2.3			2440	20	2335	48	56	505
2200	88“	350	13	2355	42070	-69	+43	±37	±2.2			2550	20	2440	52	56	539
2400	96“	350	13	2555	49653	-69	+43	±36	±2.1			2760	20	2650	56	56	600
2500	100“	350	13	2655	53680	-69	+43	±36	±2.0			2860	20	2750	56	56	624
2600	104“	350	13	2755	57864	-69	+43	±35	±1.9			2960	20	2850	60	56	646
2800	112“	350	13	2955	66703	-69	+43	±34	±1.8			3180	20	3070	64	56	726
3000	120“	350	13	3155	76170	-69	+43	±33	±1.6			3405	20	3290	68	62	807

1) VSD … vacuum support ring made of material 1.4571, placed internally or vulcanised in

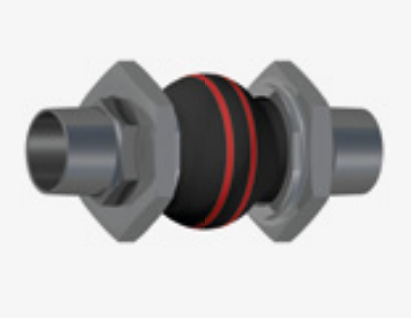
2) Axial movement absorption Δx_c … compression and Δx_e **…** extension

3) $\Delta x_c/\Delta x_e$, Δy and $\Delta\alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

RUBBER EXPANSION JOINTS

Type 3 MODEL HZR

TYPE 3 MODEL HZR AG/AG



TYPE 3 MODEL HZR IG/IG

Areas of application in industry and trade:

- Absorbing axial, lateral and angular movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Sound absorption and reduction of noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Plant engineering, pipeline construction and heating systems
- Water supply and building technology (TGA)

Version

The HKS rubber expansion joint **type 3 model HZR** consists of a rubber bellows with flat convolution with support lining and two threaded screw fittings. Version 1 with external thread (AG) and version 2 with internal thread (IG).

Special versions:

- Screw fitting: Where increased corrosion protection is required, the connecting parts are also available in stainless steel or brass.
- Rubber bellows: On request, other rubber qualities for drinking water, chemical plants, gas, oil and fuel are also available.

Flange design:

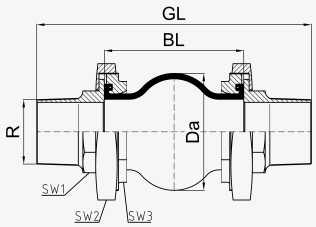
Inner layer:	EPDM, seamless, low diffusion
Pressure support:	Aramid cord (AR) Nomex®, Kevlar®
Outer layer:	EPDM, resistant to ageing, ozone and weather
Perm. pressure:	16 bar at 50 °C, 10 bar at 100 °C, 6 bar at 110 °C
Perm. negative pressure:	Vacuum-resistant to 0.5 bar abs.
Identification:	2 red rings, DN.., PN.., date of manufacture

Flange design:

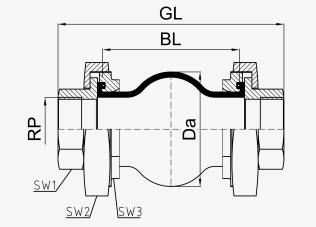
The screw fittings are made of malleable cast iron (EN-GJMW-400-5), are galvanised and include an integrated rubber bead. Internal and external thread connections are standardised pipe threads for conically or metallically sealing connections in the thread according to ISO 7-1 (EN 10226-1, previously DIN 2999).

Version 1:	R external thread (right), conical
Version 2:	Rp internal thread (right), cylindrical

External thread AG/AG



Internal thread IG/IG



Properties and areas of application:

The HKS rubber expansion joint **type 3 model HZR** is suitable for heating systems according to DIN 48091), for continuous duty in warm and hot water heating systems up to 100 °C at 10 bar and 110 °C at 6 bar operating pressure for a duty time of 10 years. Not suitable for media containing oil.

1) TÜV approvals are available for heating systems according to DIN 4809 and PED 97/23/EC.

Nominal diameter		Length		Bellows			Permitted movement absorption nominal [2]				Permitted negative pressure (vacuum stability)	Screw fitting				Weight
		Without screw fitting	With screw fitting	Nominal pressure	Outside diameter	Effective diameter	Axial [1]		Lateral	Angular		Thread connection acc. to ISO7-1	Spanner size			
DN		BL	GL	PN	Da	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$	-	-	SW1	SW2	SW3	G
mm	in	mm	mm	bar	mm	cm²	mm	mm	mm	Degrees	mbar	inches	mm	mm	mm	kg
RUBBER EXPANSION JOINT with external thread AG/AG · **type 3 MODEL HZR** version 1																
20	3/4“	130	228	16	65	12	-30	+15	±10	±30	-500	R 3/4“	36	80	48	0.65
25	1“	130	236	16	65	12	-30	+15	±10	±30	-500	R 1“	40	80	54	0.85
32	1 1/4“	130	246	16	78	18	-30	+15	±10	±30	-500	R 1 1/4“	48	80	66	1.30
40	1 1/2“	130	250	16	90	27	-30	+15	±10	±30	-500	R 1 1/2“	53	90	74	1.50
50	2“	130	256	16	109	42	-30	+15	±10	±30	-500	R 2“	66	110	90	2.25
RUBBER EXPANSION JOINT with internal thread IG/IG · **type 3 MODEL HZR** version 2																
20	3/4“	130	186	16	65	12	-30	+15	±10	±30	-500	Rp 3/4“	36	80	48	0.60
25	1“	130	192	16	65	12	-30	+15	±10	±30	-500	Rp 1“	40	80	54	0.70
32	1 1/4“	130	196	16	78	18	-30	+15	±10	±30	-500	Rp 1 1/4“	48	80	66	1.10
40	1 1/2“	130	202	16	90	27	-30	+15	±10	±30	-500	Rp 1 1/2“	53	90	74	1.30
50	2“	130	215	16	109	42	-30	+15	±10	±30	-500	Rp 2“	66	110	90	1.50

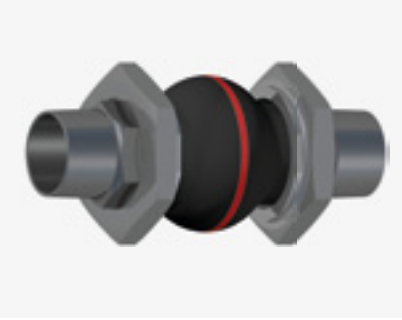
1) Axial movement absorption Δx_c … compression and Δx_e … extension

2) $\Delta x_c/\Delta x_e$, Δy and $\Delta\alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

RUBBER EXPANSION JOINTS

Type 3 MODEL HZB

TYPE 3 MODEL HZB AG/AG



TYPE 3 MODEL HZB IG/IG

Areas of application in industry and trade:

- Absorbing axial, lateral and angular movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Sound absorption and reduction of noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Plant engineering, pipeline construction and heating systems
- Water supply and building technology (TGA)

Version

The HKS rubber expansion joint **type 3 model HZB** consists of a rubber bellows with flat convolution with support lining and two threaded screw fittings. Version 1 with external thread (AG) and version 2 with internal thread (IG).

Special versions:

- Screw fitting: Where increased corrosion protection is required, the connecting parts are also available in stainless steel or brass.
- Rubber bellows: On request, other rubber qualities for drinking water, chemical plants, gas, oil and fuel are also available.

Design of rubber bellows:

Inner layer:	EPDM, seamless, low diffusion
Pressure support:	Nylon cord (polyamide cord PA6)
Outer layer:	EPDM, resistant to ageing, ozone and weather
Perm. pressure:	16 bar at 50 °C, 12 bar at 70 °C, 10 bar at 90 °C
Perm. negative pressure:	Vacuum-resistant to 0.5 bar abs.
Identification:	Red ring, DN.., PN.., date of manufacture

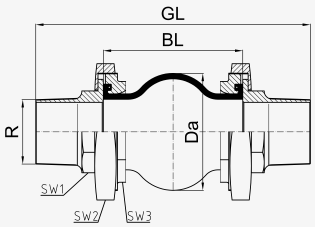
Flange design:

The screw fittings are made of malleable cast iron (EN-GJMW-400-5), are galvanised and include an integrated rubber bead. Internal and external thread connections are standardised pipe threads for conically or metallically sealing connections in the thread according to ISO 7-1 (EN 10226-1, previously DIN 2999).

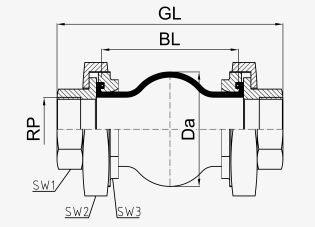
Version 1: R external thread (right), conical

Version 2: Rp internal thread (right), cylindrical

External thread AG/AG



Internal thread IG/IG



Properties and areas of application:

The HKS rubber expansion joint **type 3 model HZB** is suitable for cold and hot water (up to 90 °C), also with added chemicals for water processing, wastewater, acids, lyes, alcohols, ester and ketones. Not suitable for media containing oil.

Subject to technical modifications

Nominal diameter		Length		Bellows			Permitted movement absorption nominal [2]				Permitted negative pressure (vacuum stability)	Screw fitting				Weight
		Without screw fitting	With screw fitting	Nominal pressure	Outside diameter	Effective diameter	Axial [1]		Lateral	Angular		Thread connection acc. to ISO7-1	Spanner size			
DN		BL	GL	PN	Da	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$	-	-	SW1	SW2	SW3	G
mm	in	mm	mm	bar	mm	cm²	mm	mm	mm	Degrees	mbar	inches	mm	mm	mm	kg
RUBBER EXPANSION JOINT with external thread AG/AG · **type 3 MODEL HZB** version 1																
20	3/4“	130	228	16	65	12	-30	+15	±10	±30	-500	R 3/4“	36	80	48	0.65
25	1“	130	236	16	65	12	-30	+15	±10	±30	-500	R 1“	40	80	54	0.85
32	1 1/4“	130	246	16	78	18	-30	+15	±10	±30	-500	R 1 1/4“	48	80	66	1.30
40	1 1/2“	130	250	16	90	27	-30	+15	±10	±30	-500	R 1 1/2“	53	90	74	1.50
50	2“	130	256	16	109	42	-30	+15	±10	±30	-500	R 2“	66	110	90	2.25
RUBBER EXPANSION JOINT with internal thread IG/IG · **type 3 MODEL HZB** version 2																
20	3/4“	130	186	16	65	12	-30	+15	±10	±30	-500	Rp 3/4“	36	80	48	0.60
25	1“	130	192	16	65	12	-30	+15	±10	±30	-500	Rp 1“	40	80	54	0.70
32	1 1/4“	130	196	16	78	18	-30	+15	±10	±30	-500	Rp 1 1/4“	48	80	66	1.10
40	1 1/2“	130	202	16	90	27	-30	+15	±10	±30	-500	Rp 1 1/2“	53	90	74	1.30
50	2“	130	215	16	109	42	-30	+15	±10	±30	-500	Rp 2“	66	110	90	1.50

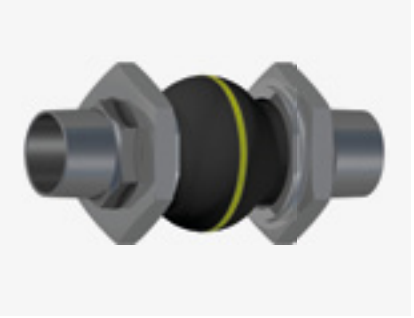
1) Axial movement absorption Δx_c ... compression and Δx_e ... extension

2) $\Delta x_c/\Delta x_e$, Δy and $\Delta\alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.

RUBBER EXPANSION JOINTS

Type 3 MODEL HZG

TYPE 3 MODEL HZG AG/AG



TYPE 3 MODEL HZG IG/IG

Version

The HKS rubber expansion joint **type 3 model HZG** consists of a rubber bellows with flat convolution with support lining and two threaded screw fittings. Version 1 with external thread (AG) and version 2 with internal thread (IG).

Design of rubber bellows:

Inner layer:	NBR, seamless, abrasion-resistant
Pressure support:	Nylon cord (polyamide cord PA6)
Outer layer:	CR (Neoprene®)
Perm. pressure:	16 bar at 50 °C, 12 bar at 70 °C, 10 bar at 90 °C
Perm. negative pressure:	Vacuum-resistant to 0.5 bar abs.
Identification:	Yellow ring, DN.., PN.., date of manufacture

Flange design:

The screw fittings are made of malleable cast iron (EN-GJMW-400-5), are galvanised and include an integrated rubber bead. Internal and external thread connections are standardised pipe threads for conically or metallically sealing connections in the thread according to ISO 7-1 (EN 10226-1, previously DIN 2999).

Version 1: R external thread (right), conical

Version 2: Rp internal thread (right), cylindrical

Properties and areas of application:

The HKS rubber expansion joint **type 3 model HZG** is suitable for oil, fuel and gas. Areas of application are municipal gas and natural gas, fuel, lubricating oil and heating oil, cooling water emulsions as well as seawater with oil residue.

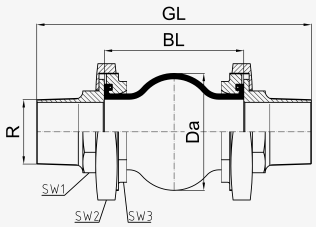
Areas of application in industry and trade:

- Absorbing axial, lateral and angular movements and (heat/cold) expansions
- Vibration-reducing connection of machines and units
- Sound absorption and reduction of noise transfer
- Compensation of installation inaccuracies
- Reduction of forces and moments in connections
- Mechanical engineering, plant engineering, pipeline construction, ship building and heating systems
- Gas and water supply and building technology (TGA)
- Energy and offshore technology

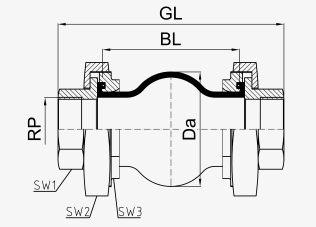
Special versions:

- Screw fitting: Where increased corrosion protection is required, the connecting parts are also available in stainless steel or brass.
- Rubber bellows: On request, other rubber qualities for drinking water, chemical plants, gas, oil and fuel are also available.

External thread AG/AG



Internal thread IG/IG



Subject to technical modifications

Nominal diameter		Length		Bellows			Permitted movement absorption nominal [2]				Permitted negative pressure (vacuum stability)	Screw fitting				Weight
		Without screw fitting	With screw fitting	Nominal pressure	Outside diameter	Effective diameter	Axial [1]		Lateral	Angular		Thread connection acc. to ISO7-1	Spanner size			
DN		BL	GL	PN	Da	Ae	Δx_c	Δx_e	Δy	$\Delta\alpha$	-	-	SW1	SW2	SW3	G
mm	in	mm	mm	bar	mm	cm²	mm	mm	mm	Degrees	mbar	inches	mm	mm	mm	kg
RUBBER EXPANSION JOINT with external thread AG/AG · **type 3 MODEL HZG** version 1																
20	3/4“	130	228	16	65	12	-30	+15	±10	±30	-500	R 3/4“	36	80	48	0.65
25	1“	130	236	16	65	12	-30	+15	±10	±30	-500	R 1“	40	80	54	0.85
32	1 1/4“	130	246	16	78	18	-30	+15	±10	±30	-500	R 1 1/4“	48	80	66	1.30
40	1 1/2“	130	250	16	90	27	-30	+15	±10	±30	-500	R 1 1/2“	53	90	74	1.50
50	2“	130	256	16	109	42	-30	+15	±10	±30	-500	R 2“	66	110	90	2.25
RUBBER EXPANSION JOINT with internal thread IG/IG · **type 3 MODEL HZG** version 2																
20	3/4“	130	186	16	65	12	-30	+15	±10	±30	-500	Rp 3/4“	36	80	48	0.60
25	1“	130	192	16	65	12	-30	+15	±10	±30	-500	Rp 1“	40	80	54	0.70
32	1 1/4“	130	196	16	78	18	-30	+15	±10	±30	-500	Rp 1 1/4“	48	80	66	1.10
40	1 1/2“	130	202	16	90	27	-30	+15	±10	±30	-500	Rp 1 1/2“	53	90	74	1.30
50	2“	130	215	16	109	42	-30	+15	±10	±30	-500	Rp 2“	66	110	90	1.50

1) Axial movement absorption Δx_c ... compression and Δx_e ... extension

2) $\Delta x_c/\Delta x_e$, Δy and $\Delta\alpha$ have to be reduced proportionately for simultaneous movement absorption. The sum of all parts must not exceed 100 %.