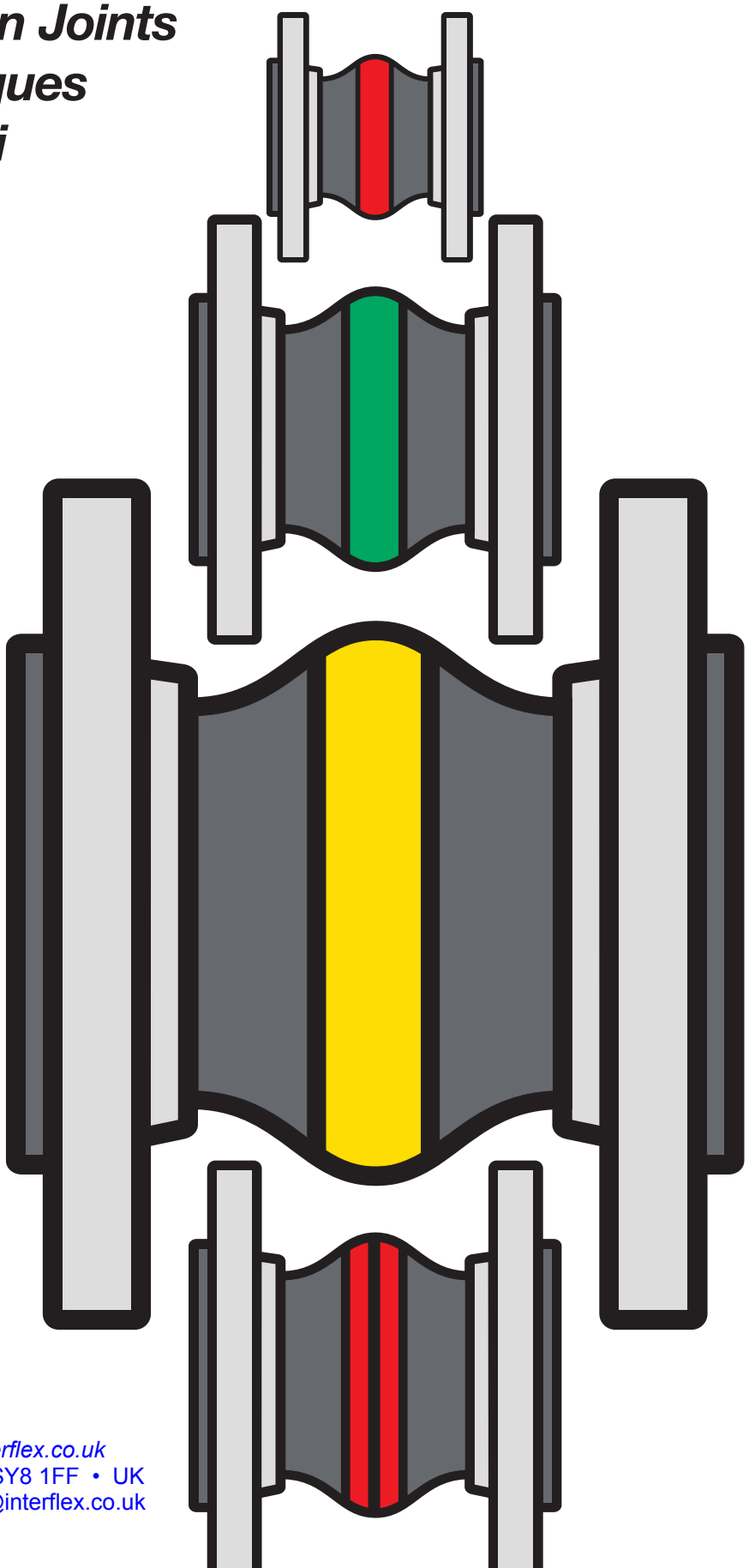
Gummi- 4

Kompensatoren

Rubber Expansion Joints
Manchons élastiques
Giunti antivibranti



Further Information:

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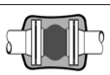
ELAFLEX

Type	Innen / *Liner*	Hauptmerkmal / *Key Feature*	Seite / *Page*
Wasser und Abwasser · *Water and Waste Water*			
ERV-R	Butyl (IIR) / EPDM	Mit Trinkwasserzulassung *With drinking water approval*	407
ROTEX	EPDM	TÜV-geprüft für Heizungsanlagen *TÜV approved for heating systems*	411
ERV-CR	CR	Die preisgünstige Alternative *The economical option*	415
ERV-BR	BR	Für abrasive Medien *For abrasive media*	417
ERP	Butyl (IIR) / EPDM	Hoch flexibel *Extra flexible*	419
Mineralöl- und Flüssiggase · *Petroleum Based Products, Liquied Petroleum Gas*			
ERV-G	NBR	Für Tankfahrzeuge, Raffinerien und Tankstellen *For tank trucks, refineries and petrol stations*	423
ERV-GS	NBR	Flammbeständig für 30 Minuten bei 800° C *Fire resistant for 30 minutes at 800° C*	427
ERV-GS HNBR	HNBR	Für besonders anspruchsvolle Einsätze: -35° C bis 120° C *For extremely demanding conditions: -35° C to 120° C*	431
ERV-G LT	NBR	Für Tieftemperaturen bis -40° C *For low temperatures up to -40° C*	435
ERV-OR	NBR	Für LPG und andere Gase bis 25 bar *For LPG and other gases up to 25 bar*	439
Chemie und Lebensmittel · *Chemistry and Foodstuff*			
ERV-GR	CSM	Für aggressive Säuren, Laugen und Chemikalien *For aggressive acids, lyes and chemicals*	443
ERV-W	NBR hell *NBR light grey*	Konform zu Lebensmittelstandards *Confirming to foodstuff standards*	451
ERV-TA	PTFE	Höchste chemische Beständigkeit, FDA-konform *Extensive chemical resistance, FDA conform*	467
Einsätze, Zubehör und Hinweise · *Flanges, Accessories and Hints*			
	Flansche *Flanges*	DIN, ASA, SAE, BS, VG, TW, JIS	461
ZS / ZSS RG	Zubehör *Accessories*	Zugstangen, Schubbegrenzungen, Gelenkverspannung *Tie rods, axial and angular limiters*	464
SR TA / TAS		Innenschutzrohre, PTFE-Auskleidungen, PTFE-Vakuum-Stützringe *Inner protection sleeves, PTFE linings, PTFE vacuum support rings*	467
VSD / VSR VSRV		Vakuum-Stützdrahtspiralen, -Stützringe *Vaccum support spirals, -support rings*	468
 FSH		Flammschutzhüllen *Flame protection covers*	471
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Hinweise für den Konstrukteur / *Hints for the Pipework Designer*			475
ERV-Montagehinweise / *Installation Hints for ERV Expansion Joints*			479
Informationen zur Druckgeräterichtlinie / *Information concerning the Pressure Equipment Directive*			483

TECHNISCHE ÄNDERUNGEN VORBEHALTEN · NACHDRUCK UND KOPIEN NUR MIT UNSEREM EINVERSTÄNDNIS · *Specifications subject to change without notice*

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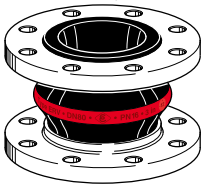
Rubber Expansion Joints

ERV high quality expansion joints DN 25–1000, by ELAFLEX / ContiTech. With swiveling flanges (various types and materials).

ERV-R

RED BAND expansion joint for water, drinking water, waste water, seawater, cooling water, chemical waste water (without oil), chemicals, acids and alkalis, salt solutions, alcohols. Temperature range -40°C up to 100°C, temporarily up to 120°C. Lining Butyl/EPDM.

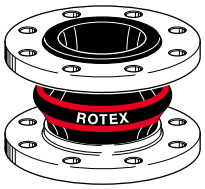
Type ERV-R



ROTEX

ROTEX expansion joint for permanent service with hot heating water, cooling water and hot air. W.P. 10 bar up to 100°C, 6 bar up to 110°C. Temperature range -40° up to 130° Celsius, temporarily up to 150°C. TÜV approved, DIN 4809. Lining EPDM.

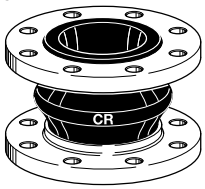
Type ROTEX



ERV-CR

CR expansion joint for cold and warm water, seawater (also oil containing), various waste water, lube oils and greases, air, compressed air. Temperature range -25°C up to 90°C, temporarily up to 100° C. Lining Chloroprene.

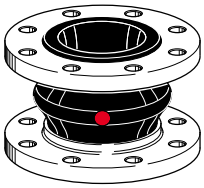
Type ERV-CR



ERP

RED SPOT expansion joint for sanitary facilities, cold/warm water, swimming pool water, seawater, drinking water. Highly flexible + low own resistance. W.P. max. 10 bar. Temperature range -40°C up to 90°C, temporarily up to 120°C. Lining Butyl/EPDM.

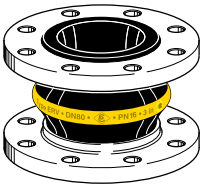
Type ERP



ERV-G

YELLOW BAND expansion joint for petroleum based products up to 50% aromatics, also town gas and natural gas, cooling water emulsions with corrosion preventing oil. Temperature range -20°C up to 90°C, temporarily up to 100°C. Lining NBR.

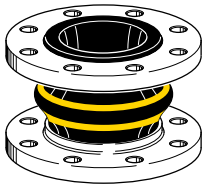
Type ERV-G



ERV-GS

YELLOW STEEL expansion joint. Similar to type ERV-G, but fire resistant acc. to ISO 15540 (type approved). Temperature range -20° C up to 90° C, temporarily up to 100° C. Lining NBR.

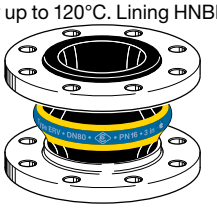
Type ERV-GS



ERV-GS HNBR

YELLOW STEEL HNBR expansion joint for petroleum based products up to 50% aromatics and hydraulic oil. Very good ageing, weathering + ozone resistance. Temperature range -35°C up to 100°C, temporarily up to 120°C. Lining HNBR.

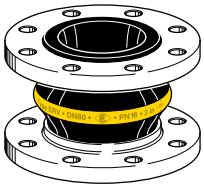
Type ERV-GS HNBR



ERV-G LT

YELLOW BAND LT expansion joint designed for low temperature applications for petroleum based products. Temperature range -40° C up to 90° C, temporarily up to 100° C. Lining NBR.

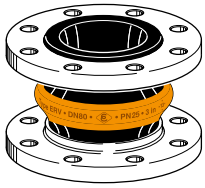
Type ERV-G LT



ERV-OR

ORANGE BAND expansion joint for Liquid Petroleum Gas (LPG) according to EN 589. Temperature range -20°C up to 90°C, temporarily up to 100°C. Lining NBR.

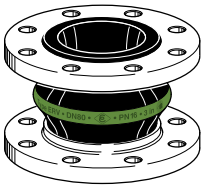
Type ERV-OR



ERV-GR

GREEN BAND expansion joint for acids, alkalis, chemicals and aggressive chemical waste water. Temperature range -20°C up to 100°C, temporarily up to 110°C. For oil contaminated compressor air up to 90°C. Lining Hypalon®.

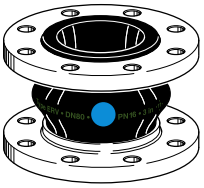
Type ERV-GR



ERV-BR

BLU E SPOT expansion joint for abrasive sludges, solid/liquid mixtures, dusty & powdery products. Temperature range -50° C to 7 0 °C, temporarily to 90° C. Lining BR/NR.

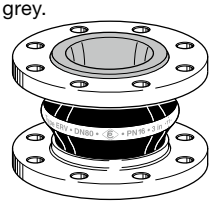
Type ERV-BR



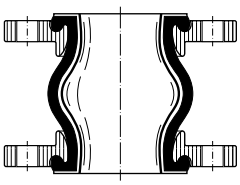
ERV-W

WHITE BAND expansion joint for foodstuffs, also oils and fat containing food. Liner conforms to German foodstuff regulations. Temperature range -20°C up to 90°C, temporarily up to 100°C. Lining NBR, light grey.

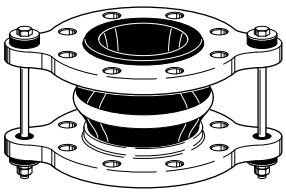
Type ERV-W



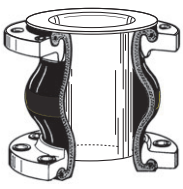
Accessories



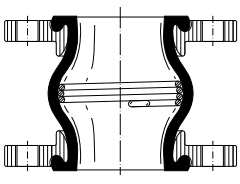
With additional PTFE liner (ERV...TA)



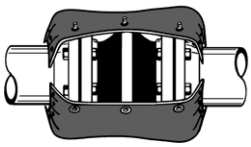
With tie rods as limiters (ERV... ZS)



With inner protection sleeve of stainless steel, e.g. for granulates (ERV... SR)



With vacuum support spiral (ERV... VSD) or ring (ERV... VSR)



Flame protection cover (FSH)

Available Elaflex ERV Rubber Expansion Joints: Types and Lengths

ELAFLEX

DN	ERP	Blue	CR					Yellow Band								LT	Green				Yellow Steel					
	ERP 130	ERV-BR 130	ERV-CR 130	ERV-CR 200	ERV-CR 250	ERV-CR 260	ERV-CR 300	ERV-G 130	ERV-G 150	ERV-G 160	ERV-G 175	ERV-G 200	ERV-G 250	ERV-G 260	ERV-G 300	ERV-GLT 130	ERV-GR 130	ERV-GR 200	ERV-GR 250	ERV-GR 260	ERV-GS 130	ERV-GS 150	ERV-GS 175	ERV-GS 200	ERV-GS 250
25	●	●	●					●								●	●				●				
32	●	●	●					●		●						●	●				●				
40	●	●	●					●		●						●	●				●				
50	●	●	●					●	●	●						●	●				●				
65	●	●	●					●	●	●						●	●				●				
80	●	●	●					●	●	●						●	●				●	●			
100	●	●	●					●	●	●						●	●				●	●			
125	●	●	●					●	●	●						●	●				●	●			
150	●	●	●					●	●	●						●	●				●	●			
200		●	●					●	●	●	●					●	●				●		●		
250		●	●					●			●	●				●	●				●		●		
300		●	●					●				●				●	●				●			●	
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400				●								●						●						●	
450				●	●							●	●					●	●					●	●
500				●								●						●						●	
600				●								●						●						●	
700						●								●						●					
800					●								●												
900							●								●										
1000							●								●										

DN	Yellow Steel HNBR					Orange	Red Band								White			Rotex								
	ERV-GSHNBR 130	ERV-GSHNBR 150	ERV-GSHNBR 175	ERV-GSHNBR 200	ERV-GSHNBR 250	ERV-OR 130	ERV-R 130	ERV-R 150	ERV-R 160	ERV-R 175	ERV-R 200	ERV-R 250	ERV-R 260	ERV-R 300	ERV-W 130	ERV-W 200	ERV-W 250	ROTEX 130	ROTEX 150	ROTEX 160	ROTEX 175	ROTEX 200	ROTEX 250	ROTEX 260	ROTEX 300	
25	●					●	●								●			●								
32	●					●	●		●						●			●		●						
40	●					●	●		●						●			●		●						
50	●					●	●	●	●						●			●		●						
65	●					●	●	●	●						●			●		●						
80	●	●				●	●	●	●						●			●	●	●						
100	●	●				●	●	●	●						●			●	●	●						
125	●	●				●	●	●	●						●			●	●	●						
150	●	●				●	●	●	●						●			●	●	●						
200	●		●				●	●	●	●					●			●	●	●	●					
250	●		●				●			●	●				●			●			●	●				
300	●			●			●				●				●			●				●				
350				●							●					●						●				
400				●							●					●						●				
450				●	●						●	●				●	●					●	●			
500				●							●					●						●				
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700													●											●		
800												●											●			
900														●											●	
1000														●											●	

Checklist for Expansion Joints

1. ***Medium***
   - *Chemical composition*
   - *Gaseous, liquid, paste-like*
   - *Abrasion*

2. ***Operation conditions***
   - *Minimum and maximum temperature*
   - *Maximum pressure*
   - *Vacuum*
   - *Axial range of movement (elongation / compression)*
   - *Angular load*
   - *Lateral offset*
   - *Dynamic load*

3. ***Installation Site***
   - *Indoor or outdoor installation*
   - *Exposure to sunlight (UV)*
   - *Salt-containing atmosphere*

4. ***Classification acc. to Pressure Equipment Directive?***
   The requirements of the Pressure Equipment Directive may apply, especially when gaseous media are used.

Temperature depending range of movement and pressure

The following list shows the dependencies of overpressure, range of movement and temperature for ERV expansion joints.

Type	Working Temperature max.	Temperature depending range of movement*	Temperature depending working pressure Bellow PN 10	PN 16	PN 25
ERV-R / ERV-CR / ERV-G	**50°C**	**100%**	**10 bar**	**16 bar**	**-**
ERV-G LT / ERV-GR	70°C	80%	8 bar	12 bar	-
ERV-W	100°C	60%	6 bar	10 bar	-
ERV-BR	**50°C**	**100%**	**10 bar**	**16 bar**	**-**
	70°C	80%	8 bar	12 bar	-
ERV-OR	**50°C**	**100%**	**-**	**-**	**25 bar**
	70°C	80%	-	-	20 bar
	100°C	60%	-	-	15 bar
ERP	**50°C**	**100%**	**10 bar**	**-**	**-**
	70°C	80%	8 bar	-	-
	100°C	60%	6 bar	-	-
ROTEX	**70°C**	**100%**	**10 bar**	**16 bar**	**-**
	100°C	75%	7,5 bar	12 bar	-
	130°C	50%	5 bar	8 bar	-
ERV-GS / ERV-GS HNBR	**60°C**	**100%**	**10 bar**	**16 bar**	-
	100°C	60%	6 bar	10 bar	-

**) For type specific range of movement see data sheets.*
Depending on media, a reduction of working conditions may be necessary. Please ask our sales team in case of questions.

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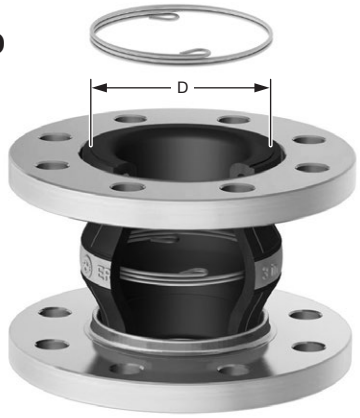
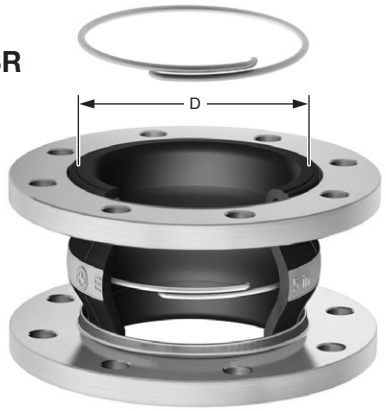
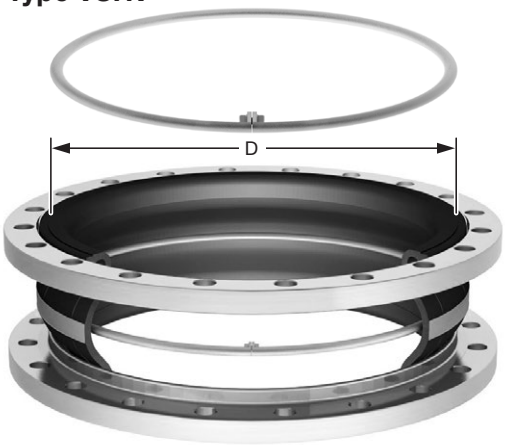
Vakuum-Stützdrahtspiralen und Stützringe für ERV · *Vacuum Support Spiral and Ring for ERV*

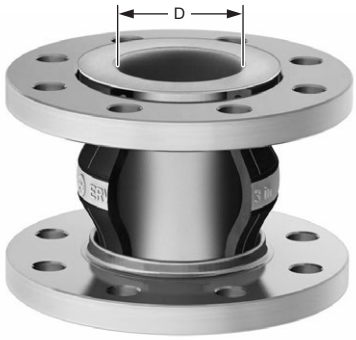
	DN *Diam. Nom.* mm	D ≈ mm	BESTELLNUMMER *Part Number* Type	
Lieferbar für alle ERV-Typen DN 50–300. Windungszahl und Drahtstärke entsprechend der Belastung bei den einzelnen Nennweiten. Die Stützspiralen können auch leichtnachträglich montiert werden. Keine Einschränkung der Druckbelastbarkeit des ERV. Der Bewegungsbereich wird um ca. 50 % eingeschränkt. — *Available for DN 50–300. Number of turns and material thickness vary with DN. The vacuum support spiral can be easily mounted sub-sequently. No restriction of admissible pressure for ERV. Movement range restricted by approximately 50 %.*	50	85	ERV… 50…**VSD**	**ERV mit Vakuum-Stützdrahtspirale**. Bei nicht ausreichender Vakuum-Beständigkeit *) eines gewählten ERV. Spirale aus Edelstahl 1.4571. **Type VSD**  ***ERV with vacuum support spiral**. Spiral of AISI 316 Ti, used when the vacuum resistance *) of the chosen ERV is not sufficient.*
	65	110	ERV… 65…**VSD**	
	80	130	ERV… 80…**VSD**	
	100	180	ERV…100…**VSD**	
	125	230	ERV…125…**VSD**	
	150	270	ERV…150…**VSD**	
	200	320	ERV…200…**VSD**	
	250	420	ERV…250…**VSD**	
	300	500	ERV…300…**VSD**	
Lieferbar für alle ERV-Typen DN 125–600. Die Stützringe können auch leicht nachträglich montiert werden. Keine Einschränkung der Druckbelastbarkeit des ERV. Der Bewegungsbereich wird um ca. 50 % eingeschränkt. — *Available for DN 125–600. The vacuum support rings can be easily mounted subsequently. No restriction of admissable pressure for ERV. Movement range restricted by approx. 50 %*	125	175	ERV…125…**VSR**	**ERV Vakuum-Stützring**. Bei nicht ausreichender Vakuum-Beständigkeit *) eines gewählten ERV. Offener Ring aus Edelstahl 1.4571. **Type VSR**  ***ERV with vacuum support ring**. Ring of AISI 316 Ti, used when the vacuum resistance *) of the chosen ERV is not sufficient.*
	150	190	ERV…150…**VSR**	
	200	260	ERV…200…**VSR**	
	250	300	ERV…250…**VSR**	
	300	350	ERV…300…**VSR**	
	350	410	ERV…350…**VSR**	
	400	480	ERV…400…**VSR**	
	450	540	ERV…450…**VSR**	
	500	580	ERV…500…**VSR**	
	600	680	ERV…600…**VSR**	
Lieferbar für alle ERV-Typen DN 500–1000. Die Stützringe können auch leicht nachträglich montiert werden. Keine Einschränkung der Druckbelastbarkeit des ERV. Der Bewegungsbereich wird um ca. 50 % eingeschränkt. — *Available for DN 500–1000. The vacuum support rings can be easily mounted subsequently. No restriction of admissable pressure for ERV. Movement range restricted by approx. 50 %*	450	520	ERV…450…**VSRV**	**ERV Vakuum-Stützring in verschraubter Ausführung**. Für maximale Vakuum-Beständigkeit *) eines gewählten ERV. Verschraubter Ring aus Edelstahl 1.4571. **Type VSRV**  ***ERV with bolted vacuum support ring**. For maximal vacuum resistance *) of the selected ERV. Bolted ring in stainless steel AISI 316 Ti.*
	500	545	ERV…500…**VSRV**	
	600	640	ERV…600…**VSRV**	
	700	780	ERV…700…**VSRV**	
	800	850	ERV…800…**VSRV**	
	900	1000	ERV…900…**VSRV**	
	1000	1085	ERV..1000… **VSRV**	

*) Zulässige Vakuumbeanspruchung siehe typenspezifische ERV-Datenblätter.
Admissible vacuum see catalogue pages type specific ERV data sheets.

GRUPPE 4 *Section*	AUSFÜHRUNG · WERKSTOFFE *Construction Details Materials* *Specification*	DN *Diam. Nom.* mm	D ≈ mm	BESTELL-NUMMER *Part Number* Type
	Lieferbar für alle ERV-Typen DN 25–600. Nennweitenabhängige Wandstärke des Edelstahlblechs zwischen 1 und 3 mm. Laterale und angulare Bewegungen sind nur sehr eingeschränkt möglich. Konische Schutzrohre auf Anfrage. Hinweis: Zwischen dem Kragen des Innenschutzrohres und dem Gegenflansch ist der Einsatz einer zusätzlichen Dichtung erforderlich. — *Available for all ERV types DN 25–600. Wall thickness of stainless steel sleeve depen-ding on DN, between 1 and 3 mm. Lateral and angular movements are significantly reduced.* *Conical sleeves available on request.* *Please note: Between the bead (flange surface) of the inner protection sleeve and the counter flange an additional seal must be used.*	25	22	ERV… 25…**SR** *)
		32	22	ERV… 32…**SR**
		40	30	ERV… 40…**SR**
		50	38	ERV… 50…**SR**
		65	53	ERV… 65…**SR**
		80	72	ERV… 80…**SR**
		100	88	ERV…100…**SR**
		125	112	ERV…125…**SR**
		150	138	ERV…150…**SR**
		200	190	ERV…200…**SR**
		250	235	ERV…250…**SR**
		300	290	ERV…300…**SR**
		350	320	ERV…350…**SR**
		400	390	ERV…400…**SR**
		450	440	ERV…450…**SR**
		500	490	ERV…500…**SR**
		600	590	ERV…600…**SR**
	Lieferbar für alle ERV-Typen DN 25–300. Nahtlose Konstruktion mit Dichtbunden, aus PTFE, ca. 1 mm dick. Die Produktion erfolgt nur im kompletten Gummikompensator. Lieferung loser Auskleidungen ist nicht möglich. Einschränkung des zulässigen Bewegungsbereichs um ca. 50 %. FDA konform. — *Available for DN 25–300. Seamless lining with sealing surface, PTFE, approx. 1 mm thickness. Delivered only as complete factory mounted unit with flanges. Un-mounted lining not available. The allow movement range of the ERV is restricted by approximately 50 %.* *FDA conform.*	25	26	ERV… 25…**TA** *)
		32	26	ERV… 32…**TA**
		40	34	ERV… 40…**TA**
		50	44	ERV… 50…**TA**
		65	59	ERV… 65…**TA**
		80	72	ERV… 80…**TA**
		100	92	ERV…100…**TA**
		125	115	ERV…125…**TA**
		150	138	ERV…150…**TA**
		200	187	ERV…200…**TA**
		250	235	ERV…250…**TA**
		300	285	ERV…300…**TA**
	Lieferbar für alle ERV-Typen DN 50 – 300. Nahtlose PTFE-Auskleidung wie 'TA', jedoch zusätzlich mit werksseitig eingepresstem Stützring aus massivem PTFE. Der zulässige Bewegungsbereich der Gummikompensatoren wird um ca. 50 % eingeschränkt. FDA konform. — *Available for DN 50–300. Seamless PTFE lining as 'TA' but additionally with factory mounted support ring of solid PTFE. The allowable movement range is restricted by approximately 50 %.* *FDA conform.*	50	44	ERV…50…**TAS**
		65	59	ERV…65…**TAS**
		80	72	ERV…80…**TAS**
		100	92	ERV…100…**TAS**
		125	115	ERV…125…**TAS**
		150	138	ERV…150…**TAS**
		200	187	ERV…200…**TAS**
		250	235	ERV…250…**TAS**
		300	285	ERV…300…**TAS**

ERV mit Innenschutzrohr (Leitrohr) aus Edelstahl 1.4571 zur Vermeidung von Abrieb des Innengummis, z. B. für Medien mit abrasiven Bestandteilen oder zur Vermeidung von Kavitation. Bitte beachten: Die lichte Weite wird reduziert.

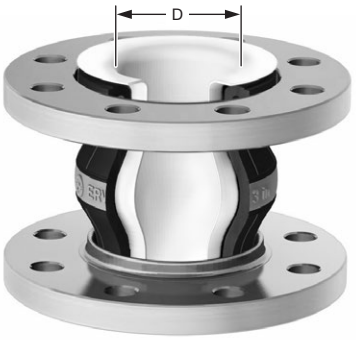
Type SR



ERV with inner protection sleeve *of stainless steel AISI 316 Ti to prevent abrasion of the rubber liner, i. e. for mediacontaining abrasive components or to avoid cavitation.*
Please note: The nominal bore is reduced.

ERV mit weißer PTFE-Auskleidung. Bei nicht ausreichender chemischer Beständigkeit des gewählten ERV-Types. Geeignet für alle gebräuchlichen Flüssigkeiten.
Elektrisch isolierend, daher nicht für brennbare Flüssigkeiten in Ex-Zonen geeignet. Die Temperaturbeständigkeit des Gummibalges muss beachtet werden. Für Druckbeanspruchung bis 6 bar – nicht geeignet für Vakuum.

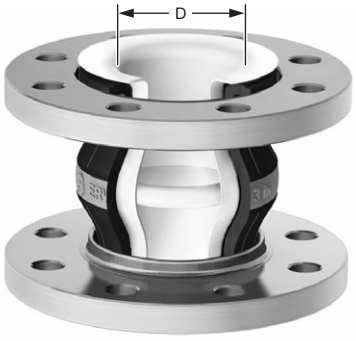
Type TA



ERV with white PTFE lining*. Used when the chemical resistance of the chosen ERV type is insufficient. Resistant to all commonly used liquids.*
Electrically isolating, therefore not suitable for flammable liquids in Ex-Zones. Admissible working temperature of expansion joint has to be observed. For maximum pressure of 6 bar – not suitable for vacuum.

ERV mit PTFE-Auskleidung und PTFE-Vakuum-Stützring. Wie Type **TA**, jedoch zusätzlich geeignet für Vakuumbeanspruchung. Einsatz bis max. 70° C.

Type TAS



ERV with PTFE lining and PTFE vacuum support ring*. Properties like type **TA**, but also suitable for vacuum service, up to 70° C.*

*) Für Gummikompensatoren DN 25 werden Bälge DN 32 verwendet.
For rubber expansion joints DN 25 bellows DN 32 are used.

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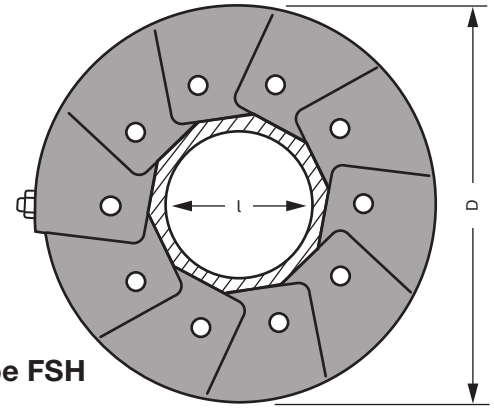
GRUPPE 4 *Section*	DN mm	l mm	D mm	Länge L *Length L* mm	BESTELL-NUMMER *Part Number* Type
Ausführung für ERV mit Flanschen nach DIN PN 10/16 ***Type for ERV with flanges according to DIN PN 10/16***					
	25	30	170	260	FSH für / *for* ERV 25x130
	32	40	190		FSH für / *for* ERV 32x130
	40	45	195		FSH für / *for* ERV 40x130
	50	60	210		FSH für / *for* ERV 50x130
	65	75	225		FSH für / *for* ERV 65x130
	80	90	240		FSH für / *for* ERV 80x130
	100	110	260		FSH für / *for* ERV 100x130
	125	135	285		FSH für / *for* ERV 125x130
	150	160	330		FSH für / *for* ERV 150x130
	200	220	385		FSH für / *for* ERV 200x130
	250	265	435		FSH für / *for* ERV 250x130
	300	315	485		FSH für / *for* ERV 300x130
	25	30	170	300	FSH für / *for* ERV 25x160
	32	40	190		FSH für / *for* ERV 32x160
	40	45	195		FSH für / *for* ERV 40x160
	50	60	210		FSH für / *for* ERV 50x160
	65	75	225		FSH für / *for* ERV 65x160
	80	90	240		FSH für / *for* ERV 80x160
	100	110	260		FSH für / *for* ERV 100x160
	125	135	285		FSH für / *for* ERV 125x160
	150	160	330		FSH für / for ERV 150x160
	200	220	385		FSH für / *for* ERV 200x160
	250	265	435	340	FSH für / *for* ERV 250x200
	300	315	485		FSH für / *for* ERV 300x200
Ausführung für ERV mit Flanschen nach VG 95959-1 (Marine-Norm) ***Type for ERV with flanges according to VG 95959-1 (German Naval Standard)***					
	32	40	150	260	FSH-M für / *for* ERV 32x130
	40	45	155		FSH-M für / *for* ERV 40x130
	50	60	170		FSH-M für / *for* ERV 50x130
	65	75	185		FSH-M für /*for* ERV 65x130
	80	90	200		FSH-M für / *for* ERV 80x130
	100	110	220		FSH-M für / *for* ERV 100x130
	125	135	245		FSH-M für / for ERV 125x130
	150	160	270		FSH-M für / *for* ERV 150x130
	200	215	345		FSH-M für / *for* ERV 200x130
	250	265	395		FSH-M für / *for* ERV 250x13
	32	40	150	300	FSH-M für / *for* ERV 32x160
	40	45	155		FSH-M für / *for* ERV 40x160
	50	60	170		FSH-M für / *for* ERV 50x160
	65	75	185		FSH-M für / *for* ERV 65x160
	80	90	200		FSH-M für / *for* ERV 80x160
	100	110	220		FSH-M für / *for* ERV 100x160
	125	135	245		FSH-M für / *for* ERV 125x160
	150	160	270		FSH-M für / *for* ERV 150x160
	200	215	345		FSH-M für / *for* ERV 200x160
	250	265	395	340	FSH-M für / *for* ERV 250x200

Flammschutzhülle für ERV-Gummikompensatoren, aus mehreren Lagen Glasfilamentgewebe mit Oberflächenbeschichtung aus silberfarbenem, hochtemperaturbeständigem Silikon-Aluglasgewebe (zertifiziert nach MED A1/3.13). Schrauben, Muttern und Unterlegscheiben aus Messing. Die Flammschutzhülle schützt den Gummikompensator zuverlässig gegen Strahlungshitze und direkte Flammeneinwirkung bis +800°C für 30 Minuten (ISO 15540) und ist unempfindlich gegenüber Öl- und Chemikalieneinflüssen sowie alterungs- und witterungsbeständig.

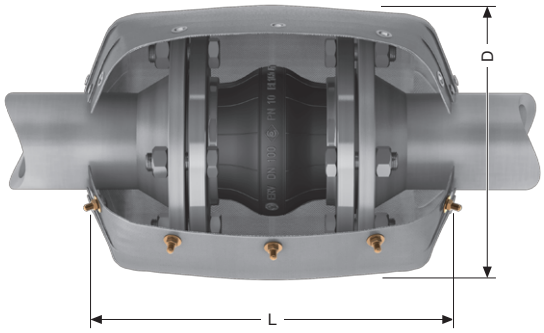
Auf Grund ihrer geteilten Form kann die Flammschutzhülle nachträglich montiert und wieder geöffnet werden. Die Abmessungen wurden so gewählt, dass auch die Gegenflansche vollkommen abgedeckt sind. Der zulässige Bewegungsbereich wird nicht eingeschränkt.



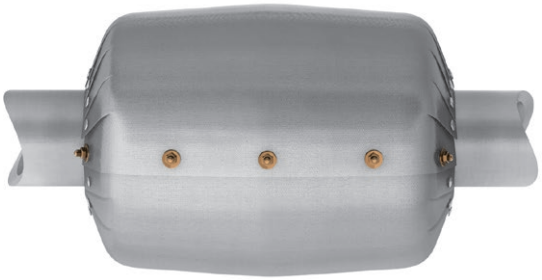
Type FSH

Flame protection cover *for ERV rubber expansion joints, made of several layers of glass fiber fabric with a surface cover of silver-coloured high temperature resistant silicone-aluminium-glas fabric (certified acc. MED A1/3.13). Screws, nuts and washers of brass. It reliably protects the expansion joint against radiation heat and direct flames up to +800°C for 30 minutes (ISO 15540). The flame protection cover is resistant against oil and chemical influences as well as against ageing and weathering.*

Because of its split design the flame protection cover can be mounted subsequently or re-opened. The dimensions have been chosen in such a way that also the counter flanges are completely covered. The allowed range of movement is not restricted.



geöffnet / *open*



geschlossen / *closed*

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ERV Zugstangen und Angularverspannung · *ERV Tie Rods and Angular Limiters*

Längenbegrenzungsflansche – Type ZS

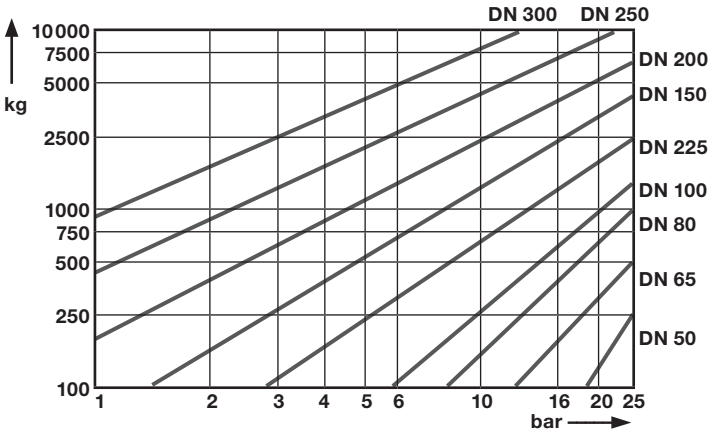
Aus der nebenstehenden Tabelle ergibt sich, dass die Reaktionskräfte bei den kleinen ERV-Dimensionen bis DN 50 so gering sind, dass Längenbegrenzer normalerweise nicht erforderlich sind. Längenbegrenzer sind nur dann nötig, wenn es nicht möglich ist, das Rohrleitungssystem mit ausreichenden Festpunkten zu sichern oder eine Teilentlastung der Festpunkte gewünscht wird.

Die erforderlichen Zugstangen werden so bemessen, dass sie auch die aus dem Prüfdruck resultierenden Reaktionskräfte aufnehmen können.

Für die hauptsächlich erforderliche Axialbegrenzung haben sich die abgebildeten Ausführungen mit integrierter Verspannung sehr gut bewährt. Die Zugstangen mit hoher Festigkeit (Stahl 8.8) sind axial auf die tatsächlichen Einbaumaße einstellbar. Sie sind elastisch gelagert in geräuschdämmenden Gummibuchsen aus witterungsbeständigem Kunstkautschuk. Ab DN 350 sind die Zugstangen grundsätzlich in Kugelscheiben und Kegelpfannen gelagert.

Bei der Montage der ERV ZS/ZSS ist darauf zu achten, dass die Muttern an den Gewindestangen gekontert sind. Dabei ist das in den ELAFLEX-Katalogseiten vorgegebene Maximalmaß für die Auslängung zu berücksichtigen.

Reaktionskräfte von ERV-Gummikompensatoren
(Einbaulänge = 130 mm)



Pressure thrust forces of ERV Expansion Joints
(installation length = 130 mm)

Nennweite DN mm	Anzahl der Zugstangen *Number tie rods*	BESTELL-NUMMER *Part Number* Type
25	2	ERV 25 … **ZS**
32	2	ERV 32 … **ZS**
40	2	ERV 40 … **ZS**
50	2	ERV 50 … **ZS**
65	2	ERV 65 … **ZS**
80	2	ERV 80 … **ZS**
100	2	ERV 100 … **ZS**
125	2	ERV 125 … **ZS**
150	2	ERV 150 … **ZS**
200	2	ERV 200 … **ZS**
250	2	ERV 250 … **ZS**
300	4	ERV 300 … **ZS**
350	4	ERV 350 … **ZS**
400	4	ERV 400 … **ZS**
450	4	ERV 450 … **ZS**
500	4	ERV 500 … **ZS**
600	4	ERV 600 … **ZS**

Angaben für Flansche DIN PN 10, Änderungen der Zugstangenanzahl bei anderen Flanschnormen vorbehalten.

Values for flanges DIN PN 10, number of tie rods may change with different flange standards.

Außenverspannung
mit Gummibuchsen

Type ... ZS

(PN16 bis/*up to* DN 200)
(PN10 bis/*up to* DN 300)

Tie rods with outer limitation in rubber bushings

Außenverspannung
mit Kugelscheiben
und Kegelpfannen

Type ... ZS

(PN16 ab/*from* DN 250)
(PN10 ab/*from* DN 350)

Tie rods with outer limitation in spherical discs and conical seats

Sonderausführungen · *Special Designs*

Innen- und
Außenverspannung

Type ... ZSS

(bis/*up to* DN 300)

Tie rods with inner and outer limitation

Angular-
Innenverspannung

Type ... RG

(bis/*up to* DN 300)

Angular limiter

Tied Flanges – Type ZS

The table shows that the pressure thrust forces in small ERV dimensions up to DN 50 are this low that limiters normally are not necessary. Limiters are recommended when it is not possible to secure the pipe system with sufficient fixed points or when a part relief of the fixed points is desired.

The required limiters are measured to absorb also the reaction forces resulting from the test pressure.

For the mainly required axial limitation the shown types with integrated tie bars have proved well. The tie bars with high stability (steel 8.8) can be adjusted to the actual installation measurements. The tie bars lie elastically in noise reducing rubber bushes of weatherproof rubber. From DN 350 the tie rods lie in prinicipal in conical seats and spherical washers.

When assembling ERV ZS/ZSS ensure that the nuts on the threaded rods are fixed with locking nuts. Please observe the Maximum admissible (L max) elongation of the bellows stated on our catalogue.

Hints for the Pipework Designer

ERV rubber expansion joints are delivered ready for installation. The swiveling flanges can be fitted in any desired position and have stabilising rims to ease the assembly. Flanges with stabilising rim (collar) also help to maintain a safety gap between screw ends and the bellows throughout the whole range of movement and avoid injuries.

Correct Mating Flanges

Gaskets are not required if the sealing surface of the pipework mating flanges are designed as shown on the right hand side. Gaskets should only be used in order to prevent damage to the rubber sealing surface, for example if the mating flanges show sharp inner edges or irregularities e. g. welding beads. If the internal diameter of the mating flanges is too large (sealing surface of the expansion joint not fully covered), install a gasket ***and*** *an additional disc (fig. E).*

Pressure Resistance

The maximum operating pressure and test pressure not only depend on the burst pressure of the rubber bellow but can also be affected by operating temperature and design pressure / nominal pressure of the used flanges. For full details please see catalogue page 404. The burst pressure (at room temperature) is at least 3 - 4 times the nominal pressure (PN). Pressure test certificates can be issued upon request.

Vacuum Resistance

The maximum vacuum depends on size, operating temperature, length of installation and the installation of vacuum support rings (page 468). Please see type specific data sheets for details. The vacuum resistance can be slightly increased even without vacuum support rings if the installation length is shortened (e. g. by 20 mm). The vacuum resistance decreases if a longer installation length is chosen, or the expansion joint is lengthened during operation.

Weather and Heat Resistance

The outer rubber (cover) is resistant against weathering and protects the reinforcements against ageing, abrasion and corrosion. For the permitted temperature range please see type specific data sheets. For permanently warm operating conditions including external radiation heat please see page 404.

ERV types with an outer rubber of CR or CSM are (within limits) oil proof and flame resistant. An additional flame protection can be achieved by using our flame protection cover conforming to ISO 15540 standard (certificate 'DNV·GL') – see catalogue pages 471 and 472.

Pressure Loss

The internal design of the ERV bellows allows a high flow with little turbulence. Therefore the pressure loss is usually negligible, even when dealing with high flowrates.

Maximum Flow Velocity

Flow velocity should not exceed 7 m/s. For flammable fluids, the maximum flow velocity should be further reduced depending on the electrical conductivity of the fluid. For non conductive and flammable fluids such as toluene a value of 2 m/s should not be exceeded.

Noise Reduction

Due to their construction, ERV rubber expansion expansion joints are well suited to absorb vibrations and noise. An ERV installed within a piping system achieves a partial decoupling of vibration and noise transmission. The degree of this effect is dependent on the layout of the piping system and the assembly situation of the expansion joint. The pipework and the installed expansion joint may be seen as spring-mass system; its natural frequency is determined by the spring rigidity as well as by the oscillating mass. In comparison to the piping system, the mass of an ERV has a neglectable influence on the natural frequency of the piping system.

Installation Length / Installation Gap

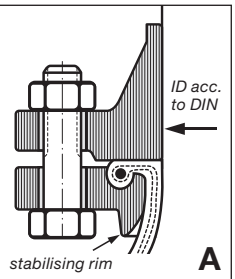
For the allowable range of movement please see type specific data sheets. If possible, the length of the installation gap is designed to be equal to the recommended installation length, or slightly shorter. The low inherent resistance of ERV makes fitting into smaller gaps easy.

For larger installation gaps or lateral offset, not more than 50 % of the maximum area of movement should be used up in order to leave a reserve for operation. If the bellows is lengthened during operation, a jolted (compressed) installation is recommended. The position of installation must be accessible for visual inspection. When installing the unit, installation hints (catalogue page 479) must be observed.

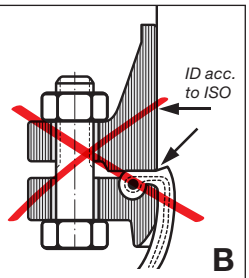
Anchor Load / Tie Rods (Limiters)

The inherent resistance of an ERV is small and can be disregarded for anchor force calculation. But when pressurised, the bellows expands and generates an axial force. Therefore, especially for larger expansion joints, fixed points (anchors) should be provided. Since the ERV construction absorbs part of these reaction forces, anchor points may be designed correspondingly weaker. If anchor points cannot be provided, or if the stability of the piping system or other fittings is insufficient, reaction forces have to limited by tie rods – available types see catalogue catalogue page 464.

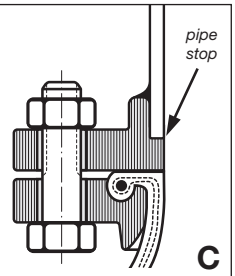
right:
Flanges with correct ID help prevent damage to rubber.



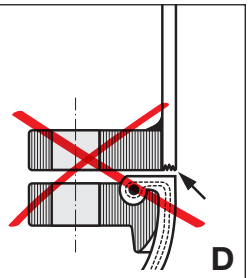
wrong:
Flanges with too large diameter can damage rubber.



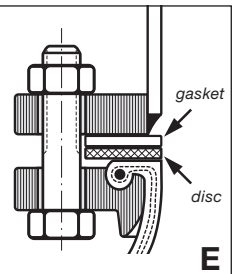
right:
Weld neck flanges with correct ID prevent damage to rubber.



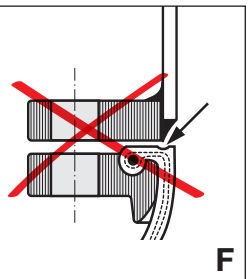
wrong:
Uneven end of pipe can cause damage to rubber.



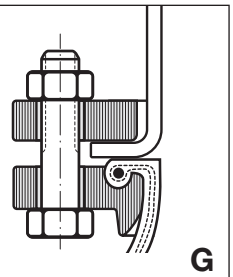
right:
In case of B, D or F an additional gasket can be used to prevent damage to rubber.



wrong:
Inner edge of flanges damages rubber.



right:
Well rounded smooth egde prevents damage to rubber.



Installation and Operation Hints for ERV Expansion Joints

ELAFLEX expansion joints are provided ready for installation. The standard flanges can be turned into any desired position. Additional sealings usually are not necessary. For installation please observe the following:

1) *Prior to the installation of the expansion joint ensure that the mating flanges have satisfactory sealing surfaces. Check that the sealing surface of the rubber bellows is completely covered by the mating flange. Mating flanges with too large inner diameter or protruding pipe ends, grooves and tongues can destroy the sealing surface of the bellows (see hints for the pipework designer, page 476) .*

   ***Attention**: When using slip-on flanges the outside diameter must be larger than the sealing surface of the expansion joint.*

2) ***Pay attention to the correct installation length**: The pulling of expansion joints into installation gaps which are too large will lengthen the rubber bellow and might lead to the collar being drawn out of the flange groove (see picture). During the subsequent tightening of the screws the collar of the bellows would be crushed asymmetrically.*

   ***Please note**: A considerable lengthening during installation decreases the allowable range of movement during operation. To shorten installation gaps, distance flanges are available.*

3) *If possible install the expansion joints in such way that the date of production is visible.*

4) *Screws should be inserted from the expansion joint side. If this is not feasible, it must be assured that the bellows may not touch the screws in all operating conditions.*

5) *We recommend to use bolts of ISO grade 8.8 or higher. The bolts have to be fastened crosswise in 3 uniform steps.*

   When using a torque wrench:

   1st step:
   Tighten bolts equally by hand
   (pay attention to parallel sealing surfaces!).

   2nd step:
   Fasten crosswise with torque 50 Nm.

   3rd step:
   Fasten crosswise

	approx. torque
up to DN 80	max. 80 Nm
up to DN 300	max. 100 Nm
up to DN 500	max. 130 Nm
DN 600	190 Nm
DN 700	250 Nm
DN 800	300 Nm
DN 900	310 Nm
DN 1000	340 Nm

Do not use any sharp-edged tools which might damage the rubber bellow in case the tool slips.

6) *If no torque wrench can be used during installation, the screws may be tightened to an extent that between the metal flanges a distance 'y' of at least 1 mm remains (see picture).*

7) *The test pressure of a bellow or flange is 1.5 x PN. This value depends on which component is weaker.*

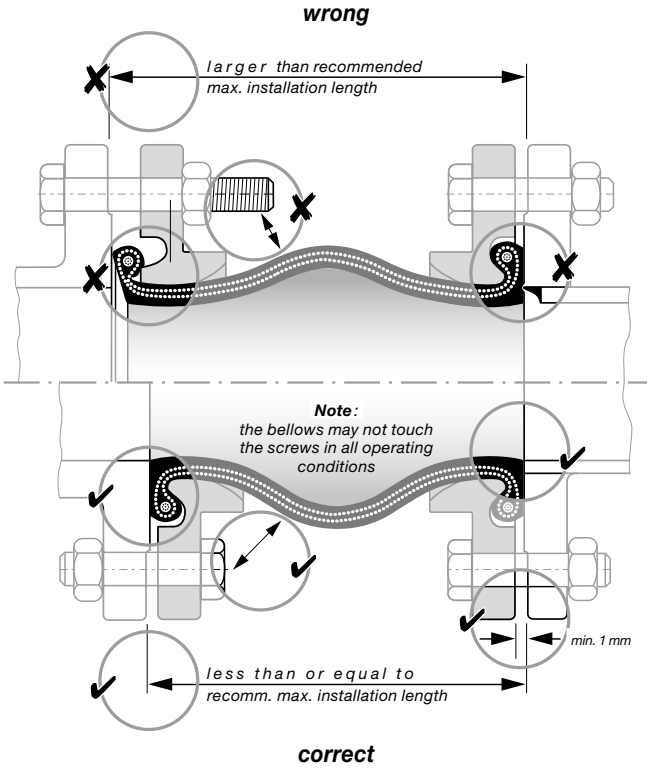
8) ***The rubber bellow of the expansion joint must not be painted!** Solvents can damage the rubber cover, furthermore the colour coat impedes a proper visual inspection.*

9) *When welding and cutting, the rubber bellow must be protected against heat by all means. For electric welding it must be insured that the electric current does not pass through the bellows.*

10) *Permanent radiation heat above 90°C must be avoided. If necessary flame protection covers should be used (see page 471).*

11) *Rubber expansion joints are subject to wear and must be included to routine inspection of the pipe system (visual inspection of the expansion joint regarding damages as well as inspection for hardening by pushing in with a thumb).*

12) *Expansion joints with pull rods (tied flanges) are supplied in neutral position, with pre-installed countered nuts. During installation the required permissable length has to be set/ determined by the pipeline fitter, nuts have to be countered. After installation, the pull rods shall be firmly connected with the flanges.*



We recommend ring wrenches instead of open-end wrench for higher job safety and less risk of accidents

Further Information:

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