

# STEEL-EXPANSION JOINT TYPE SF-10

## AXIAL EXPANSION JOINT DN 15 – DN 2800



### STRUCTURE TYPE SF-10 STEEL BELLOWS PN 2,5, PN 6, PN 10, PN 16

- Vacuum-proof, short-length axial expansion joint, consisting of a stainless steel bellows and rotatable flanges
- Multiple convolution bellows in various stainless steel grades
- Single ply or multi-ply structure
- DN 15 – DN 500 with flared ends
- DN 600 – DN 2800 with pre-welded flared ends

Material grade*	Material No. as per DIN EN	Temperature**	Possible uses
Stainless steel	1.4541	-196 °C up to +550 °C	Low temperature, acids, lyes, gases, fertilizers
	1.4404 1.4571	+550 °C	Media containing chloride, oil, soap, drinking water, food stuff, petrol
Heat-resistant steel	1.4828 1.4878	+900 °C +800 °C	Hot gases, steam, air
Nickel-based alloy	2.4858 (Incoloy 825)	+450 °C	Sulphuric acid, phosphoric acid, petrol, oil, gases

\* Check or inquire about the resistance of material grades to temperature and medium.

\*\* Check or inquire about reduction in pressure by temperature.

### FLANGES / VERSIONS

- Rotable flanges
- Flange drilling for through bolts

	Standard		Others
Dimensions	EN 1092		ANSI, BS etc. Connection dimensions see technical annex page 213 – 215
Materials	1.0038 (S235JR), 1.4541, 1.4404		stainless steel etc.
Corrosion protection	DN 32 – DN 250 electro- galvanized	DN 300 – DN 2800 anti-corro- sion primed	hot-dip galvanized, special varnish, special coating etc.

### NOTE

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

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

### APPLICATIONS

- for compensating axial movement
- for reducing tension, damping noise and oscillation in pipes and their system components, e.g.
  - pumps
  - engines
  - machines
- for installation in
  - industrial applications
  - gas and water supply
  - exhaust systems
  - heating installations
  - drinking water systems
- to compensate for installation inaccuracies

### SPECIAL DESIGNS

Other sizes (DN), lengths or pressure ratings on request.

### CERTIFICATES

- CE (PED 2014/68/EU)
- American Bureau of Shipping
- Bureau Veritas
- DVGW (DN 32 – DN 200)
- DNV GL® / DNV®
- RMRS
- RINA

### ACCESSORIES

- Internal guide sleeve
- Protective tube
- Gas sealings for DVGW-application

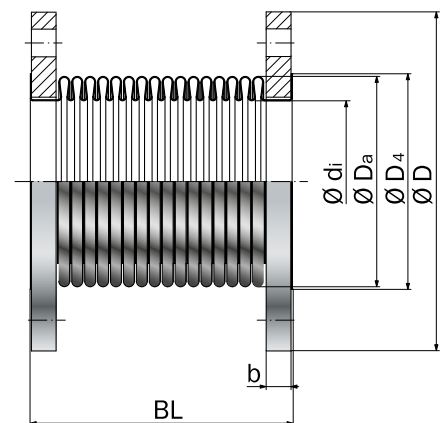
# PRESSURE RATE STANDARD PROGRAM PN 2,5

DN	BL	$\Delta a_{x\text{tot}}^{**}$ Axial move- ment mm	C <sub>ax</sub> Axial spring rate N/mm	$\Delta l_{at\text{tot}}$ Lateral move- ment mm	C <sub>lat</sub> Lateral spring rate N/mm	A* Effective bellows cross sectional area cm <sup>2</sup>	Ø d <sub>4</sub> Flared end Ø mm	Ø D <sub>a</sub> Bellows outer Ø mm	PN Flange connection EN1092	Ø D Flange outer Ø mm	b Flange thick- ness mm	Weight approx. kg
25	105	25	28	13	10	10	68	42	16	115	16	3.9
32	135	30	15	26	8	15	56	51	16	140	18	3.8
40	135	30	17	20	15	22	65	61	16	150	18	3.9
50	160	44	16	34	12	34	80	76	16	165	18	5.3
65	175	56	25	26	18	55	95	96	16	185	18	7.0
80	190	68	20	28	18	78	110	114	16	200	20	7.9
100	195	70	19	26	22	114	140	136	16	220	20	10.0
125	200	72	26	21	49	174	165	168	16	250	22	12.3
150	220	80	28	21	62	246	200	197	16	285	24	16.1
200	230	86	36	19	118	424	254	253	10	340	24	20.7
250	245	96	50	19	208	622	310	302	10	395	26	26.1
300	180	48	119	-	-	990	364	386	6	440	24	27.0
300	265	98	60	14	399	990	364	386	6	440	24	30.0
350	185	48	129	-	-	1176	396	418	6	490	26	38.0
350	270	96	65	14	515	1176	396	418	6	490	26	40.0
400	185	46	146	-	-	1507	452	469	6	540	28	44.0
400	270	94	73	12	744	1507	452	469	6	540	28	47.0
450	190	46	162	-	-	1878	498	520	6	595	30	54.0
450	275	92	81	10	1032	1878	498	520	6	595	30	57.0
500	190	44	178	-	-	2282	548	570	6	645	30	58.0
500	275	90	89	8	1378	2282	548	570	6	645	30	62.0
600	195	44	212	-	-	3227	670	672	6	755	32	77.0
600	280	88	106	7	2315	3227	670	672	6	755	32	81.0
700	210	44	246	-	-	4336	775	774	6	860	40	111.0
700	295	88	123	-	-	4336	775	774	6	860	40	116.0
800	220	42	279	-	-	5595	875	875	6	975	44	150.0
800	305	86	140	-	-	5595	875	875	6	975	44	156.0
900	225	42	313	-	-	7014	975	976	6	1075	48	182.0
900	310	86	156	-	-	7014	975	976	6	1075	48	188.0
1000	235	42	346	-	-	8610	1080	1078	6	1175	52	212.0
1000	320	86	173	-	-	8610	1080	1078	6	1175	52	220.0
1200	210	42	413	-	-	12291	1262	1282	2.5	1375	30	152.0
1200	295	84	207	-	-	12291	1262	1282	2.5	1375	30	160.0
1400	210	42	478	-	-	16536	1462	1482	2.5	1575	30	175.0
1400	295	84	239	-	-	16536	1462	1482	2.5	1575	30	185.0
1600	210	42	543	-	-	21408	1662	1682	2.5	1790	30	219.0
1600	295	84	271	-	-	21408	1662	1682	2.5	1790	30	231.0
1800	210	42	607	-	-	26909	1862	1882	2.5	1990	30	245.0
1800	295	84	304	-	-	26909	1862	1882	2.5	1990	30	258.0
2000	210	42	672	-	-	33039	2062	2082	2.5	2190	30	271.0
2000	295	84	336	-	-	33039	2062	2082	2.5	2190	30	285.0
2200	210	42	736	-	-	39796	2262	2282	2.5	2405	35	365.0
2200	295	84	368	-	-	39796	2262	2282	2.5	2405	35	381.0
2400	210	42	800	-	-	47182	2462	2482	2.5	2605	35	387.0
2400	295	84	400	-	-	47182	2462	2482	2.5	2605	35	414.0
2800	210	42	928	-	-	63839	2862	2882	2.5	3030	35	520.0
2800	295	84	464	-	-	63839	2862	2882	2.5	3030	35	540.0

Table values refer to +20 °C, bellows material 1.4541, 1000 cycles. Please inquire for deviating values. For pure axial movement: inner diameter of internal guide sleeve mentioned in tables PN 6, PN 10, PN 16. If  $\Delta a_x$  and  $\Delta l_{at}$  occur simultaneously, the table values must be reduced accordingly. The sum of all shares must not exceed 100 %.

\*Effective bellows cross sectional area is a theoretical value.

\*\*This value represents the total possible movement. Example:  $\Delta a_{x\text{tot}} = 28\text{mm}$ . This means that the expansion joint has a total movement value of 28 mm (= +/- 14 mm).



Type SF-10

# STEEL EXPANSION JOINT TYPE SF-10

## AXIAL EXPANSION JOINT DN 15 – DN 2800

### PRESSURE RATE STANDARD PROGRAM PN 6

DN	BL	$\Delta a_{x\text{tot}}^{**}$ Axial move- ment mm	C <sub>ax</sub> Axial spring rate N/mm	A* Effective bellows cross sectional area cm <sup>2</sup>	Ø d <sub>4</sub> Flared end Ø mm	Ø D <sub>a</sub> Bellows outer Ø mm	Ø d <sub>i</sub> Internal guide sleeve Ø mm	PN Flange connection  EN1092	Ø D Flange outer Ø mm	b Flange thick- ness mm	Weight  approx. kg
300	195	28	455	993	364	387	310	6	440	24	29.0
300	290	58	228	993	364	387	310	6	440	24	33.0
350	200	28	496	1180	396	419	342	6	490	26	40.0
350	295	58	248	1180	396	419	342	6	490	26	44.0
400	200	28	564	1511	452	470	393	6	540	28	47.0
400	300	56	282	1511	452	470	393	6	540	28	51.0
450	205	28	632	1883	498	521	444	6	595	30	57.0
450	305	56	316	1883	498	521	444	6	595	30	62.0
500	205	28	699	2287	548	571	494	6	645	30	62.0
500	305	56	350	2287	548	571	494	6	645	30	68.0
600	210	28	835	3233	670	673	596	6	755	32	81.0
600	310	56	418	3233	670	673	596	6	755	32	88.0
700	230	27	970	4343	775	775	698	6	860	40	116.0
700	325	54	485	4343	775	775	698	6	860	40	124.0
800	225	27	1104	5603	857	876	795	6	975	30	112.0
800	320	55	552	5603	857	876	795	6	975	30	121.0
900	225	27	1236	7023	958	977	896	6	1075	30	125.0
900	320	54	618	7023	958	977	896	6	1075	30	135.0
1000	225	27	1369	8619	1060	1079	998	6	1175	30	135.0
1000	320	54	685	8619	1060	1079	998	6	1175	30	147.0
1200	225	27	1634	12303	1264	1283	1202	6	1405	30	186.0
1200	320	54	817	12303	1264	1283	1202	6	1405	30	200.0
1400	225	27	1894	16549	1464	1483	1402	6	1630	35	275.0
1400	320	54	947	16549	1464	1483	1402	6	1630	35	291.0
1600	225	27	2152	21424	1664	1683	1602	6	1830	35	312.0
1600	320	54	1076	21424	1664	1683	1602	6	1830	35	331.0
1800	225	27	2410	26927	1864	1883	1802	6	2045	35	371.0
1800	320	54	1205	26927	1864	1883	1802	6	2045	35	392.0
2000	225	27	2667	33058	2064	2083	2002	6	2265	35	444.0
2000	320	54	1334	33058	2064	2083	2002	6	2265	35	467.0

Table values refer to +20 °C, bellows material 1.4541, 1000 cycles. Please inquire for deviating values.

\*Effective bellows cross sectional area is a theoretical value.

\*\*This value represents the total possible movement. Example:  $\Delta a_{x\text{tot}} = 28\text{mm}$ . This means that the expansion joint has a total movement value of 28 mm (= +/- 14 mm).

## PRESSURE RATE STANDARD PROGRAM PN 10

DN	BL	$\Delta a_{x\text{tot}}^{**}$ Axial movement mm	C <sub>ax</sub> Axial spring rate N/mm	A* Effective bellows cross sectional area cm <sup>2</sup>	Ø d <sub>4</sub> Flared end Ø mm	Ø D <sub>a</sub> Bellows outer Ø mm	Ø d <sub>i</sub> Internal guide sleeve Ø mm	PN Flange connection EN1092	Ø D Flange outer Ø mm	b Flange thickness mm	Weight approx. kg
15	108	17	21	7	45	38	18	16	95	14	1.5
20	108	17	21	7	58	38	18	16	105	16	2.1
25	125	26	49	16	54	54	25	16	115	16	2.4
32	135	26	49	16	54	54	32	16	140	18	4.0
40	135	30	111	25	68	66	38	16	150	18	4.5
50	155	36	177	34	75	79	49	16	165	18	5.5
65	165	40	199	54	95	96	63	16	185	18	7.4
80	175	46	148	78	110	115	76	16	200	20	8.4
100	180	46	175	115	140	137	96	16	220	20	10.1
125	200	50	79	173	165	168	123	16	250	22	13.2
150	230	50	160	243	200	197	148	16	285	24	17.3
200	230	38	219	422	254	253	198	10	340	24	22.1
250	245	38	624	620	310	302	249	10	395	26	28.6
300	200	28	455	993	364	387	310	10	445	26	33.0
300	295	56	288	993	364	387	310	10	445	26	36.0
350	205	27	496	1180	396	419	342	10	505	30	50.0
350	305	54	248	1180	396	419	342	10	505	30	54.0
400	210	27	564	1511	452	470	393	10	565	32	62.0
400	310	54	282	1511	452	470	393	10	565	32	67.0
450	220	27	632	1883	498	521	444	10	615	36	76.0
450	315	54	316	1883	498	521	444	10	615	36	81.0
500	225	26	699	2287	548	571	494	10	670	38	90.0
500	320	53	350	2287	548	571	494	10	670	38	96.0
600	225	26	835	3233	654	673	596	10	780	30	90.0
600	320	52	418	3233	654	673	596	10	780	30	97.0
700	225	26	970	4343	756	775	698	10	895	30	112.0
700	320	52	485	4343	756	775	698	10	895	30	120.0
800	225	25	1104	5603	857	876	795	10	1015	30	140.0
800	320	51	552	5603	857	876	795	10	1015	30	149.0
900	225	25	1236	7023	958	977	896	10	1115	30	154.0
900	320	51	618	7023	958	977	896	10	1115	30	164.0
1000	225	25	1369	8619	1060	1078	998	10	1230	35	205.0
1000	320	50	685	8619	1060	1078	998	10	1230	35	217.0

## PRESSURE RATE STANDARD PROGRAM PN 16

DN	BL	$\Delta a_{x\text{tot}}^{**}$ Axial movement mm	C <sub>ax</sub> Axial spring rate N/mm	A* Effective bellows cross sectional area cm <sup>2</sup>	Ø d <sub>4</sub> Flared end Ø mm	Ø D <sub>a</sub> Bellows outer Ø mm	Ø d <sub>i</sub> Internal guide sleeve Ø mm	PN Flange connection EN1092	Ø D Flange outer Ø mm	b Flange thickness mm	Weight approx. kg
15	108	17	21	7	45	38	18	16	14	14	1.5
20	108	17	21	7	58	38	18	16	105	16	2.1
25	125	26	49	16	54	54	25	16	115	16	2.4
32	135	26	49	16	54	54	32	16	140	18	4.0
40	135	30	111	25	68	66	38	16	150	18	4.5
50	155	36	177	34	75	79	49	16	165	18	5.5
65	165	40	199	54	95	96	63	16	185	18	7.4
80	175	46	148	78	110	115	76	16	200	20	8.4
100	180	46	175	115	140	137	96	16	220	20	10.1
125	200	50	79	173	165	168	123	16	250	22	13.2
150	230	50	160	243	200	197	148	16	285	24	17.3
200	230	38	219	422	254	253	198	16	340	26	23.1
250	245	38	624	620	310	302	249	16	405	29	33.3
300	220	22	863	995	364	388	310	16	460	32	44.0
300	320	44	432	995	364	388	310	16	460	32	49.0
350	225	21	946	1182	396	420	342	16	520	35	63.0
350	325	43	473	1182	396	420	342	16	520	35	68.0
400	230	21	1078	1514	452	471	393	16	580	38	80.0
400	330	43	539	1514	452	471	393	16	580	38	85.0
450	240	21	1210	1886	498	522	444	16	640	42	101.0
450	340	43	605	1886	498	522	444	16	640	42	108.0
500	245	21	1338	2290	548	572	494	16	715	46	140.0
500	345	42	669	2290	548	572	494	16	715	46	148.0

Table values refer to +20 °C, bellows material 1.4541, 1000 cycles. Max. allowable pressure pulsation of 1.0 bar (brief periods). Please inquire for deviating values. \*Effective bellows cross sectional area is a theoretical value. \*\*This value represents the total possible movement. Example:

$\Delta a_{x\text{tot}} = 28\text{mm}$ . This means that the expansion joint has a total movement value of 28 mm (= +/- 14 mm).

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