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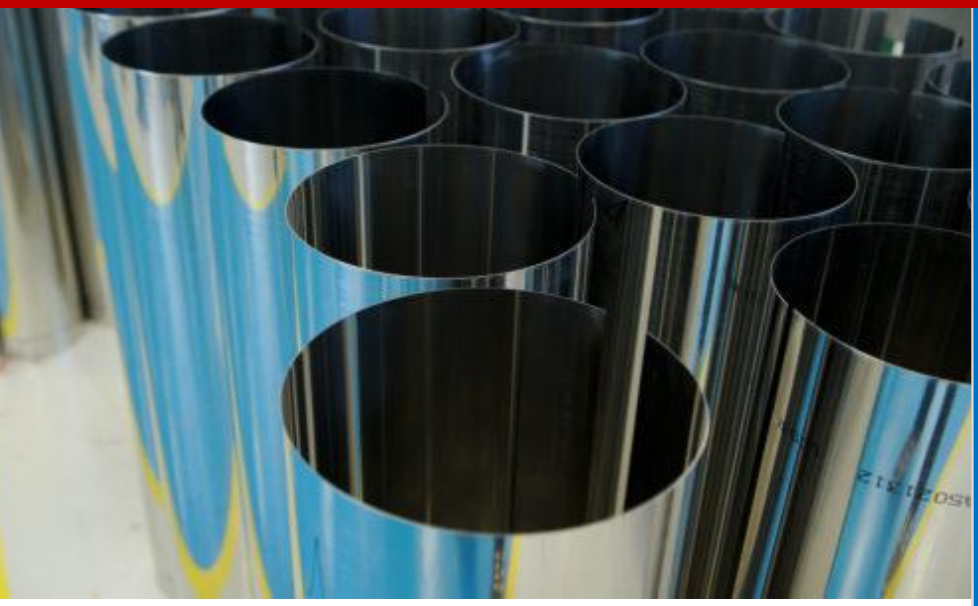
Tuyaux Flexibles Rudolph is a world leader for flexible metallic tubes for standard and special industrial application.

Technical guide for bellows and expansion joints



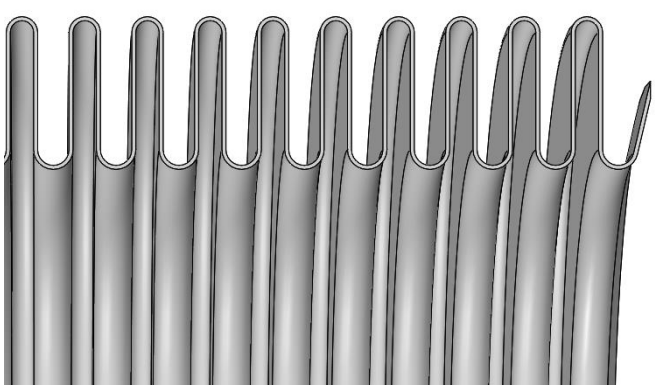
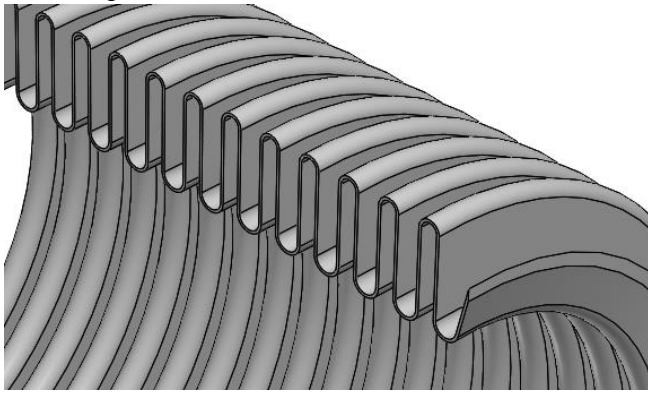
afaq ISO 9001 Qualité AFNOR CERTIFICATION

afaq EN/AS/JISQ 9100 Aéronautique AFNOR CERTIFICATION

Edition 2021

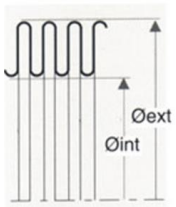
Content

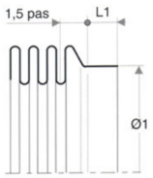
I. SFT 104 : Mechanical formed bellow

	SFT 104
	 
Features	ND : 6 to 100 mm Materials : AISI 316L / AFNOR Z2 CND 17-12, Monel, Inconel, Astelloy…. Temperature : -196 to 600°C
Applications	Axial and lateral expansion joints Vibration absorption Chemical and nuclear industry
Connections	Weld end Flanges or flasks TIG welding on special components (TFR or customer product supply) Silver and tin brazing
Additional services	Tests and controls : Dye penetrant inspection, leaking test (under alcohol nitrogen, helium), pressure test
Example of product identification	SFT 104 INOX 316L ND 25 - L : 0,5 m - Qty : 10 According to NF EN 14917 

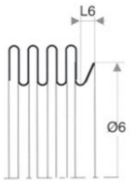
Stainless steel

Diameter ø inn. (mm)	Diameter ø out. (mm)	Cross section at average ø (cm²)	th. (mm)	Δx/conv. (±mm)	ND (mm)	1 plie Step (mm)	1 plie Deflection under 1 kg load (mm/onde)	1 plie Pressure inn. (bar)	1 plie Pressure out. (bar)	2 plies Step (mm)	2 plies Deflection under 1 kg load (mm/onde)	2 plies Pressure inn. (bar)	2 plies Pressure out. (bar)	3 plies Step (mm)	3 plies Deflection under 1 kg load (mm/onde)	3 plies Pressure inn. (bar)	3 plies Pressure out. (bar)
6,5	9,5	0,50	0,08	0,13	5	1,10	0,048	23	62	1,26	0,024	40	108	1,42	0,016	57	155
10	14,5	1,18	0,10	0,17	10	1,20	0,042	17	44	1,40	0,021	29	77	1,60	0,014	42	110
13	19	2,01	0,12	0,41	12	1,70	0,067	17	44	1,94	0,034	29	77	2,18	0,022	42	110
14	22	2,54	0,13	0,54	15	2,00	0,095	15	37	2,26	0,048	26	64	2,52	0,032	37	92
15	23,5	2,91	0,16	0,66	15	2,30	0,095	18	46	2,60	0,048	31	80	2,90	0,032	45	115
17	27	3,80	0,15	0,50	18	2,30	0,095	15	37	2,60	0,048	26	65	2,90	0,032	37	92
21	31,5	5,41	0,15	0,50	20	2,40	0,083	14	34	2,70	0,042	24	59	3,00	0,028	35	85
23	32	5,94	0,15	0,54	25	2,40	0,051	14	35	2,70	0,026	24	61	3,00	0,017	35	87
26	38	8,04	0,17	0,83	25	2,90	0,083	12	30	3,24	0,042	21	52	3,58	0,028	30	75
30	42,5	10,32	0,18	1,24	30	3,50	0,089	12	30	3,86	0,045	21	52	4,22	0,030	30	75
31	45	11,34	0,18	0,74	30	3,00	0,083	10	25	3,36	0,042	17	43	3,72	0,028	25	62
32	50	13,20	0,20	1,07	32	4,00	0,089	10	25	4,40	0,045	17	43	4,80	0,030	25	62
42	60	20,43	0,20	1,24	40	4,00	0,103	9	22	4,40	0,052	16	38	4,80	0,034	22	55
47	66	25,07	0,25	1,24	50	4,00	0,103	9	22	4,50	0,052	16	38	5,00	0,034	22	55
55	77	34,21	0,27	1,40	60	5,00	0,061	9	23	5,54	0,031	16	40	6,08	0,020	22	57
65	90	47,12	0,30	1,40	65	5,00	0,046	9	23	5,60	0,023	16	40	6,20	0,015	22	57
76	102	62,21	0,35	1,40	80	5,00	0,023	9	22	5,70	0,012	16	38	6,40	0,008	22	57
86	110	75,43	0,40	1,48	90	5,00	0,008	9	22	5,80	0,004	16	38	6,60	0,003	22	57
95	121	91,61	0,40	1,65	100	5,50	0,022	8	20	6,30	0,011	14	35	7,10	0,007	20	50

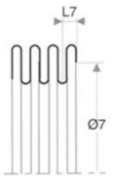




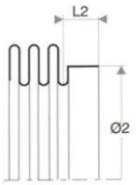
Collars n°1
for 1P, 2P, 3P
on flange
TIG welding



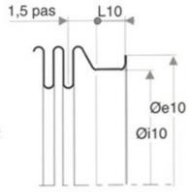
Collars n°6
for 1P, 2P, 3P
on flange or end
TIG welding



Collars n°7
for 1P, 2P, 3P
on flask
TIG welding



Collars n°2
for 1P, 2P
silver brazing or
tin welding



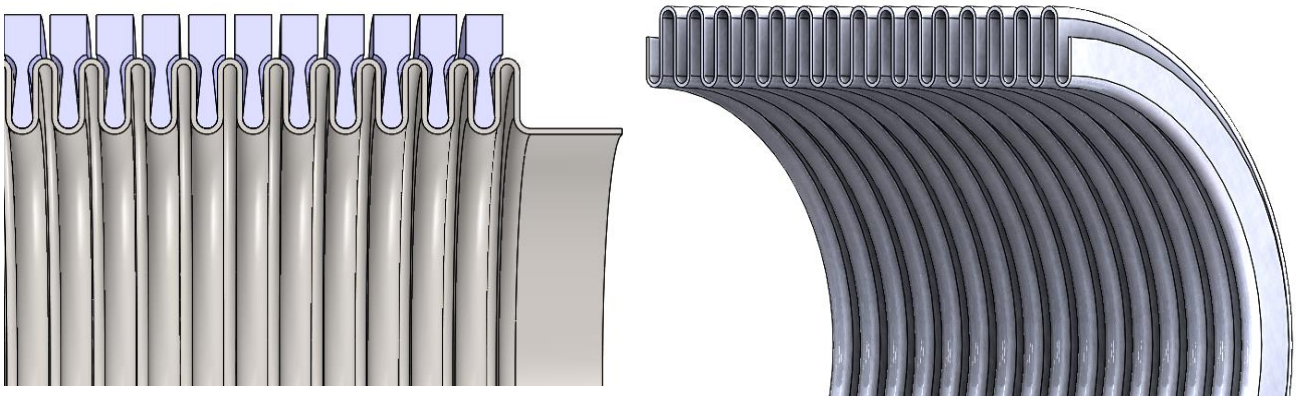
Collars n°10
for SP
on flange or end
TIG welding

Diameter ø inn. (mm)	Diameter ø out. (mm)	ND (mm)	Collars n°1 L1 (mm)	Collars n°1 Ø1 1P (mm)	Collars n°1 Ø1 2P (mm)	Collars n°1 Ø1 3P (mm)	Collars n°6 L6 1P (mm)	Collars n°6 L6 2P (mm)	Collars n°6 L6 3P (mm)	Collars n°6 Ø6 (mm)	Collars n°7 L7 1P (mm)	Collars n°7 L7 2P (mm)	Collars n°7 L7 3P (mm)	Collars n°7 Ø7 (mm)	Collars n°2 L2 1P (mm)	Collars n°2 L2 2P (mm)	Collars n°2 Ø2 (mm)	Collars n°10 L10 (mm)	Collars n°10 Øi10 (mm)	Collars n°10 Øe10 (mm)
6,5	9,5	5	8	7,86	8,12	8,38	0,55	0,63	0,71	9	0,8	0,9	1,1	7,9	2,4	2,5	8,0	2	7,7	9
10	14,5	10	10	12,20	12,50	12,80	0,60	0,70	0,80	13	0,9	1,1	1,2	12,2	3,4	3,6	12,5	4	12	13,5
13	19	12	10	15,24	15,58	15,92	0,85	0,97	1,09	16	1,3	1,5	1,6	15,2	4,0	4,4	16,0	3	15	17,5
14	22	15	10	18,26	18,62	18,98	1,00	1,13	1,26	18	1,5	1,7	1,9	18,3	4,1	4,7	20,0	4	18	19,5
15	23,5	15	10	18,32	18,74	19,16	1,15	1,31	1,47	21	1,7	2,0	2,2	18,3	4,2	4,9	20,0	5	18	19,5
17	27	18	10	21,30	21,70	22,10	1,15	1,30	1,45	22	1,7	2,0	2,2	21,3	4,7	5,2	24,0	5	21	25
21	31,5	20	10	26,30	26,75	27,20	1,20	1,35	1,50	26	1,8	2,0	2,3	26,3	4,7	5,2	28,0	6	26	29
23	32	25	10	26,30	26,75	27,20	1,20	1,35	1,50	28	1,8	2,0	2,3	26,3	4,7	5,3	28,0	5	26	29
26	38	25	10	32,34	32,83	33,32	1,45	1,62	1,79	34	2,2	2,4	2,7	32,3	4,9	5,7	36,0	6	32	35
30	42,5	30	10	36,36	36,87	37,38	1,75	1,93	2,11	38	2,6	2,9	3,2	36,4	5,0	6,3	40,0	7	36	40
31	45	30	10	36,36	36,87	37,38	1,50	1,98	1,86	38	2,3	2,5	2,8	36,4	4,9	5,6	40,0	6	36	40
32	50	32	10	40,40	40,95	41,50	2,00	2,20	2,40	42	3,0	3,3	3,6	40,4	6,1	7,2	45,0	9	40	46
42	60	40	10	50,40	51,00	51,60	2,00	2,20	2,40	52	3,0	3,3	3,6	50,4	7,1	8,4	55,0	8	50	56
47	66	50	10	55,50	56,20	56,90	2,00	2,25	2,50	60	3,0	3,4	3,8	55,5	7,2	8,4	58,0	9	55	61
55	77	60	10	62,54	63,28	64,02	2,50	2,77	3,04	65	3,8	4,2	4,6	62,5	9,4	10,8	70,0	7	62	70
65	90	65	10	76,60	77,40	78,20	2,50	2,80	3,10	75	3,8	4,2	4,7	76,6	9,4	10,8	80,0	10	76	84
76	102	80	10	86,70	87,60	88,50	2,50	2,85	3,20	88	3,8	4,3	4,8	86,7	9,5	10,9	90,0	9	86	96
86	110	90	10	96,80	97,80	98,80	2,50	2,90	3,30	98	3,8	4,4	5,0	96,8	9,5	11,0	100,0	9	96	104
95	121	100	10	102,80	103,80	104,80	2,75	3,15	3,55	108	4,1	4,7	5,3	102,8	11,6	13,3	110,0	7	102	114

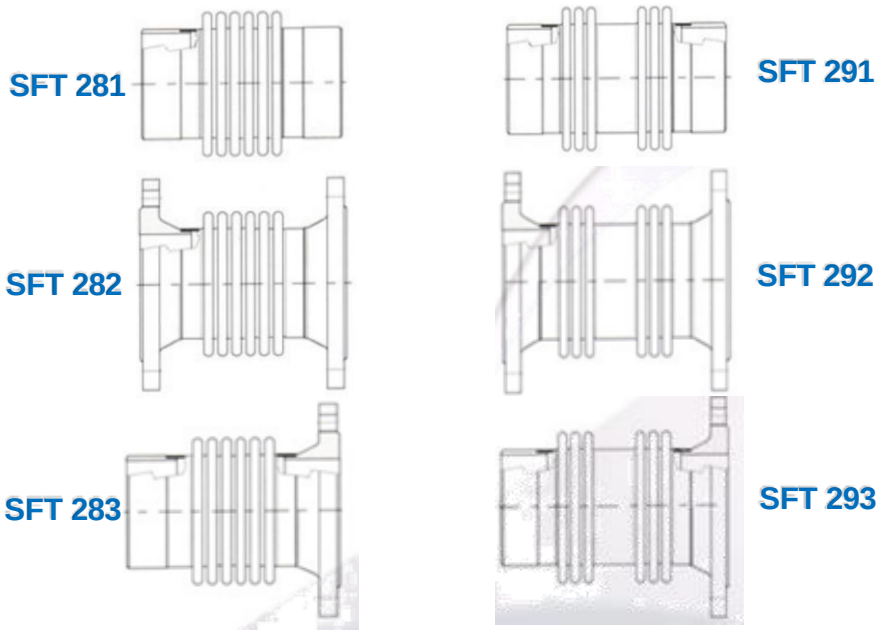
Subject to technical modification

For any special request (ND, material or connection mode), please call us.

II. SFT 222 : Hydroformed bellow

	SFT 222
	
Features	ND : 50 to 300 mm Materials : AISI 316L / AFNOR Z2 CND 17-12, Monel, Inconel, Astelloy…. Temperature : -196 to 600°C **With or without convolution reinforcements**
Applications	Axial and lateral expansion joints Vibration absorption Chemical and nuclear industry
Connections	Weld end Flanges or flasks TIG welding on special components (TFR or customer product supply) Silver and tin brazing
Additional services	Tests and controls : Dye penetrant inspection, leaking test (under alcohol nitrogen, helium), pressure test
Example of product identification	SFT 222 INOX 316L ND 50 - L : 0,5 m - Qty : 10 According to NF EN 14917

III. SFT Série 280 / 290 : Bellows equipped with connections



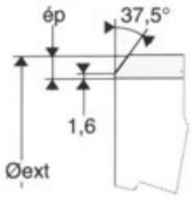
	SFT Serie 280	SFT Serie 290
Features	ND 20 to 300 mm NP 1 Max. temperature 650°C Stainless steel bellows AISI 321 Other materials on request (316L, etc…)	
	Anti-vibration	One-piece expansion joint with 2 convolution waves
Applications	For exhaust systems	
	Those bellows could be assemby in pairs with or without intermediate ferrule. It will considerably increase the allowable axial and lateral displacements	Those bellows allow axial and lateral displacements
Connections	Steel weld ends Fixed steel flanges Weld end and fixed steel flange Special connections on request	
Example of product identification	SFT 281 ND300 Qty 20 Double SFT 281 ND200 Qty 15 Double SFT 283 with intermediate ferrule lg 1000 ND150 Qty 5	

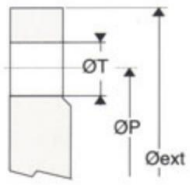
INOX 321 Bellow
Steel ends and flanges

NP 1 bar
Max. temperature 650°C

axial (Δx) or lateral (Δy) stroke

NH = number of holes

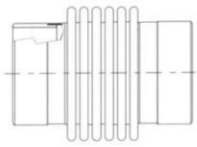




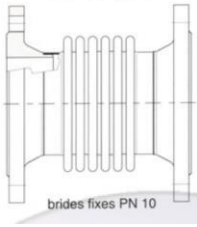
Stainless steel			Geared bellow					End		Flange			
ND	**Diameter Ø**		**OL**	**OL**	**OL**	**Δx**	**Δy**	**Ø out.**	**th.**	**Ø out.**	**ØP**	**NH**	**ØT**
	inn.	**out.**	**281**	**282**	**283**								
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
20	21	31	150			14	5	26,7	2,9	105	75	4	14
25	26	38	150			15	5	33,7	3,2	115	85	4	14
32	32	50	150			16	5	42,4	3,2	140	100	4	18
40	42	60	150	160	155	16	5	48,3	3,3	150	110	4	18
50	47	66	155	165	160	18	5	60,3	3,0	165	125	4	18
65	61	85	160	170	165	20	7	76,1	3,0	185	145	4	18
80	76	102	180	190	185	20	8	88,9	3,2	200	160	8	18
100	95	121	200	210	205	23	8	108,0	3,6	220	180	8	18
125	140	184	270	280	275	25	10	139,7	4,5	250	210	8	18
150	168	220	270	280	275	25	10	168,3	4,5	285	240	8	22
175	194	254	280	290	285	26	10	193,7	5,4	315	270	8	22
200	219	587	320	330	325	32	12	219,1	5,9	340	295	8	22
250	269	337	320	330	325	32	12	273,0	6,3	395	350	12	22
300	319	387	320	330	325	32	12	323,9	7,1	445	400	12	22

OL = Overall Length

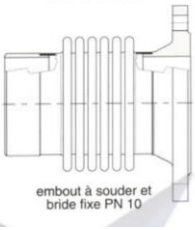
SFT 281

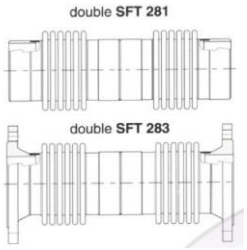


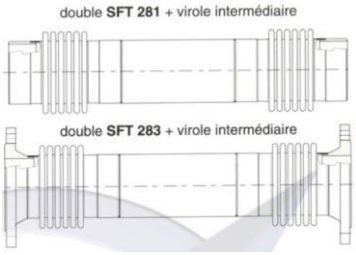
SFT 282



SFT 283







	Double **SFT 281/283**				Double **SFT 281/283** with intermediate ferrule lg 500				Double **SFT 281/283** with intermediate ferrule lg 1000				Double **SFT 281/283** with intermediate lg 1500			
ND	**OL 281**	**OL 283**	**Δx±**	**Δy±**	**LHT 281**	**LHT 283**	**Δx±**	**Δy±**	**LHT 281**	**LHT 283**	**Δx±**	**Δy±**	**LHT 281**	**LHT 283**	**Δx±**	**Δy±**
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
20	300		28	150	800		28	570								
25	300		30	150	800		30	520								
32	300		32	135	800		32	470								
40	300	310	32	125	800	810	32	420								
50	310	320	36	115	810	820	36	370	1310	1320	36	700				
65	320	330	40	90	820	830	40	320	1320	1330	40	650				
80	360	370	40	80	860	870	40	270	1360	1370	40	600				
100	400	410	46	75	900	910	46	220	1400	1410	46	550				
125	540	550	50	60	1040	1050	50	170	1540	1550	50	280	2040	2050	50	400
150	540	550	50	60	1040	1050	50	165	1540	1550	50	265	2040	2050	50	375
175	560	570	56	60	1060	1070	56	160	1560	1570	56	260	2060	2070	56	350
200	640	650	64	60	1140	1150	64	150	1640	1650	64	250	2140	2150	64	325
250	640	650	64	60	1140	1150	64	140	1640	1650	64	225	2140	2150	64	300
300	640	650	64	55	1140	1150	64	125	1640	1650	64	200	2140	2150	64	270

INOX 321 Bellow
Steel ends and flanges

NP 1 bar
Max. temperature 650°C

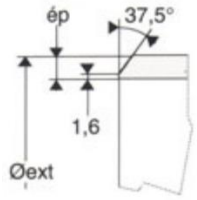
axial (Δx) or lateral (Δy) stroke

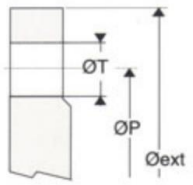
INOX 321 Bellow
Steel ends and flanges

NP 1 bar
Max. temperature 650°C

axial (Δx) or lateral (Δy) stroke

NH = number of holes





Stainless steel			Geared bellow					End		Flange			
ND	**Diameter Ø**		**OL**	**OL**	**OL**	**Δx**	**Δy**	**Ø out.**	**th.**	**Ø out.**	**ØP**	**NH**	**ØT**
	inn.	**out.**	**291**	**292**	**293**								
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
20	21	31	180			14	40	26,7	2,9	105	75	4	14
25	26	38	180			15	40	33,7	3,2	115	85	4	14
32	32	50	180			16	40	42,4	3,2	140	100	4	18
40	42	60	180	190	185	16	40	48,3	3,3	150	110	4	18
50	47	66	205	215	210	18	40	60,3	3,0	165	125	4	18
65	61	85	230	240	235	20	35	76,1	3,0	185	145	4	18
80	76	102	250	260	255	20	35	88,9	3,2	200	160	8	18
100	95	121	300	310	305	23	35	108,0	3,6	220	180	8	18
125	140	184	490	500	495	28	35	139,7	4,5	250	210	8	18
150	168	220	490	500	495	28	30	168,3	4,5	285	240	8	22
175	194	254	490	500	495	28	30	193,7	5,4	315	270	8	22
200	219	587	550	560	555	28	28	219,1	5,9	340	295	8	22
250	269	337	550	560	555	28	22	273,0	6,3	395	350	12	22
300	319	387	550	560	555	28	18	323,9	7,1	445	400	12	22

OL = Overall Length

NOTES