

## 6.3 | HYDRA stainless steel bellows



Preferred  
dimensions

HYDRA metal bellows feature a high degree of flexibility and pressure resistance with minimal installation length. The standard material for metal bellows made of a longitudinally welded tube is 1.4571. Other materials are available on request. Bellows with a small diameter are made from seamless tubes made with 1.4541 material.

### Bellows description

The bellows description describes the bellows profile, i.e. diameter, number of layers and thickness of individual layers, corrugations and material used. The first letters indicate whether the bellows described concerns a bellows without connecting parts (BAO) or a bellows with connecting parts (BAT).

### Bellows description (example):

BAT	60.0	x	82.0	x	6	x	0.3	15W	1.4571
BAT: Bellows with connecting parts	Inside diameter $d_i = 60 \text{ mm}$		Outside diameter $D_A = 82 \text{ mm}$		Number of single layers $n_L = 6$		Single layer thickness $s = 0.3 \text{ mm}$	15 corruga- tions acc. to Section 6.1	Material 1.4571

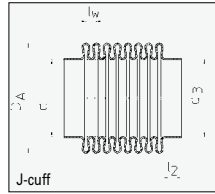
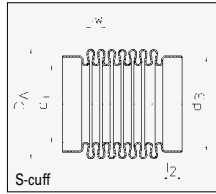
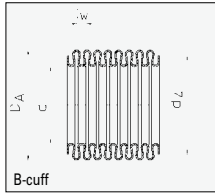
### 6.3 | Hydra stainless steel bellows

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Reference diameter	Nominal pressure P <sub>N</sub> *	Bellows profile					Material	Corrugation length l <sub>w</sub>	Max. number of corrugations	Ø Tolerances		B-cuff Ø d <sub>4</sub>	S-cuff		J-cuff		Nominal deflection per corrugation (for 10,000 load cycles)			Spring rate per corrugation (± 30%)			Effective cross-section A	Weight per corrugation g
		d <sub>1</sub>	D <sub>A</sub>	r <sub>L</sub>	s	d <sub>1</sub>				D <sub>A</sub>	Ø d <sub>3</sub>		Length l <sub>2</sub>	Ø d <sub>3</sub>	Length l <sub>2</sub>	axial 2δ <sub>n,0</sub>	angular 2α <sub>n,0</sub>	lateral 2l <sub>n,0</sub>	axial c <sub>0</sub>	angular c <sub>α</sub>	lateral c <sub>l</sub>			
mm	bar	mm	mm	mm	mm	-	mm	-	mm	mm	mm	mm	mm	mm	mm	mm	mm	Degree	mm	N/mm	Nm/degree	N/mm	cm <sup>2</sup>	g
3	400	3.35 x 4.7	2 x 0.06	1.4541**	1.00	10	-0.1/+0.1	±0.1	-	-	4.2	2	-	-	±0.025	±0.50	-	-	1475	0.052	-	0.12	0.02	
4	90	4.06 x 6.0	1 x 0.07	1.4541**	0.80	37	-0.4/+0.1	±0.3	5.5	-	-	-	4.06	5	±0.040	±0.70	±0.002	260	0.016	15500	0.21	0.02		
5	65	5.3 x 8.0	1 x 0.08	1.4541**	0.95	63	-0.4/+0.1	±0.3	7.0	-	-	-	5.34	5	±0.065	±1.10	±0.003	180	0.020	13500	0.36	0.04		
	100	5.3 x 8.0	1 x 0.10	1.4541**	0.85	70	-0.4/+0.1	±0.3	7.0	-	-	-	5.30	5	±0.045	±0.75	-	420	0.050	-	0.36	0.05		
	150	5.3 x 8.5	1 x 0.15	1.4541**	1.10	45	-0.4/+0.1	±0.3	7.0	-	-	-	5.30	5	±0.035	±0.55	-	830	0.080	-	0.37	0.08		
	200	5.3 x 8.5	1 x 0.20	1.4541**	1.20	41	-0.4/+0.1	±0.3	7.0	-	-	-	5.30	5	±0.025	±0.40	-	1850	0.19	-	0.38	0.11		
	500	5.3 x 8.5	2 x 0.20	1.4541**	1.20	42	-0.4/+0.1	±0.3	7.0	-	-	-	5.30	5	±0.017	±0.20	-	6300	0.65	-	0.37	0.19		
6	55	6.2 x 9.7	1 x 0.10	1.4541**	1.20	63	-0.4/+0.1	±0.3	8.5	-	8.5	1.8	6.30	5	±0.090	±1.00	±0.004	160	0.022	11100	0.51	0.07		
8	26	8.0 x 13.0	1 x 0.10	1.4571	1.40	235	-0.4/+0.1	±0.3	11.0	11.6	1.8	8.00	6	±0.17	±1.30	±0.006	120	0.028	10500	0.87	0.13			
	68	8.0 x 13.0	2 x 0.10	1.4571	1.60	277	-0.4/+0.1	±0.4	11.0	11.6	1.8	8.00	6	±0.15	±1.20	±0.006	245	0.058	15800	0.87	0.26			
	115	8.0 x 13.0	3 x 0.10	1.4571	1.80	242	-0.4/+0.1	±0.5	11.0	11.6	1.8	8.00	6	±0.13	±1.10	±0.005	385	0.092	19700	0.87	0.39			
	150	8.0 x 13.5	4 x 0.10	1.4571	2.00	150	-0.5/+0.1	±0.5	11.0	-	-	8.00	6	±0.13	±1.00	±0.004	460	0.116	19900	0.91	0.44			
9	22	9.0 x 14.5	1 x 0.10	1.4571	1.35	234	-0.4/+0.1	±0.3	13.4	13.1	2.0	9.00	6	±0.21	±1.60	±0.008	75	0.022	8500	1.08	0.17			
	55	9.0 x 14.5	2 x 0.10	1.4571	1.75	233	-0.4/+0.1	±0.4	13.0	13.1	2.0	9.00	6	±0.19	±1.40	±0.008	160	0.048	10600	1.08	0.34			
	90	9.0 x 14.5	3 x 0.10	1.4571	1.85	198	-0.4/+0.1	±0.5	13.0	13.1	2.0	9.00	6	±0.17	±1.30	±0.008	260	0.080	15000	1.08	0.52			
	250	9.0 x 13.0	4 x 0.10	1.4571	1.50	258	-0.5/+0.1	±0.5	13.0	-	-	9.00	6	±0.07	±0.50	±0.003	1230	0.32	98000	0.94	0.43			
10	16	10.0 x 16.5	1 x 0.10	1.4571	1.65	189	-0.4/+0.1	±0.3	14.5	14.3	2.5	10.0	6	±0.25	±1.70	±0.010	60	0.023	5800	1.38	0.22			
	38	10.0 x 16.5	2 x 0.10	1.4571	1.90	216	-0.4/+0.1	±0.4	14.5	14.3	2.5	10.0	6	±0.23	±1.60	±0.010	120	0.045	8700	1.38	0.44			
	60	10.0 x 17.0	3 x 0.10	1.4571	2.00	208	-0.4/+0.1	±0.5	14.5	15.1	2.5	10.0	6	±0.22	±1.50	±0.010	170	0.070	11600	1.43	0.66			
	90	10.0 x 17.0	4 x 0.10	1.4571	2.40	125	-0.5/+0.1	±0.5	14.5	-	-	10.0	6	±0.21	±1.30	±0.008	250	0.10	11900	1.43	0.88			
	130	10.0 x 17.0	5 x 0.10	1.4571	2.70	111	-0.5/+0.1	±0.5	14.5	-	-	10.0	6	±0.19	±1.10	±0.007	310	0.12	11600	1.43	1.10			
12	13	12.0 x 19.0	1 x 0.10	1.4571	1.90	168	-0.4/+0.1	±0.4	18.0	16.8	2.5	12.0	6	±0.30	±1.70	±0.010	65	0.038	6300	1.89	0.30			

\* outside pressure; in the event of inside pressure loads, column stability must also be guaranteed (buckle resistance)

\*\* seamless tube 1.4571 or 1.4541

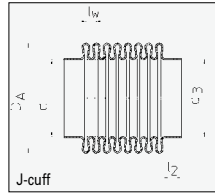
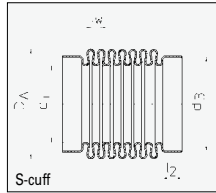
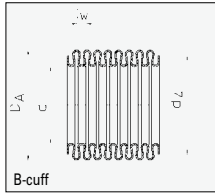
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Reference diameter	Nominal pressure P <sub>N</sub> *	Bellows profile				Material	Corrugation length l <sub>w</sub>	Max. number of corrugations	Ø Tolerances		B-cuff Ø d <sub>4</sub>	S-cuff		J-cuff		Nominal deflection per corrugation (for 10,000 load cycles)			Spring rate per corrugation (±30%)			Effective cross-section A	Weight per corrugation g
		d <sub>1</sub>	D <sub>A</sub>	n <sub>L</sub>	s				d <sub>1</sub>	D <sub>A</sub>		Ø inside d <sub>3</sub>	Length l <sub>2</sub>	Ø inside d <sub>3</sub>	Length l <sub>2</sub>	axial 2δ <sub>n,0</sub>	angular 2α <sub>n,0</sub>	lateral 2λ <sub>n,0</sub>	axial c <sub>0</sub>	angular c <sub>α</sub>	lateral c <sub>λ</sub>		
mm	bar	mm	mm	-	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Degree	mm	N/mm	Nm/degree	N/mm	cm <sup>2</sup>	g
12	26	12.0 x 20.0 x 2 x 0.10	1.4571	2.10	178	-0.4/+0.1	±0.5	18.0	17.6	2.5	12.0	6	±0.33	±1.70	±0.011	95	0.053	7500	2.01	0.60			
	40	12.0 x 20.0 x 3 x 0.10	1.4571	2.45	163	-0.4/+0.1	±0.5	18.0	17.6	2.5	12.0	6	±0.30	±1.50	±0.011	135	0.075	8600	2.01	0.90			
	60	12.0 x 20.0 x 2 x 0.15	1.4571	2.40	166	-0.4/+0.1	±0.5	18.0	17.6	2.5	12.0	6	±0.24	±1.40	±0.011	300	0.17	20000	2.01	0.92			
	90	12.0 x 20.0 x 3 x 0.15	1.4571	2.40	166	-0.4/+0.1	±0.5	18.0	-	-	12.0	6	±0.20	±1.30	±0.010	560	0.32	37000	2.01	1.39			
	260	12.4 x 18.5 x 4 x 0.15	1.4571	2.50	144	-0.5/+0.1	±0.5	16.3	-	-	12.4	6	±0.12	±1.20	±0.008	1745	0.90	100000	1.86	1.39			
	360	12.8 x 18.5 x 5 x 0.15	1.4571	2.50	155	-0.5/+0.1	±0.5	16.3	-	-	12.8	6	±0.09	±0.65	±0.006	3400	1.80	199900	1.92	1.73			
	385	12.4 x 19.0 x 6 x 0.15	1.4571	3.00	137	-0.5/+0.1	±0.5	16.3	-	-	12.4	6	±0.08	±0.55	±0.005	4000	2.15	164000	1.94	2.20			
13	20	13.0 x 19.0 x 1 x 0.10	1.4571	1.80	153	-0.4/+0.1	±0.5	16.3	16.8	2.5	13.0	6	±0.26	±1.60	±0.008	74	0.040	8800	2.01	0.24			
	45	13.0 x 19.0 x 2 x 0.10	1.4571	1.85	204	-0.4/+0.1	±0.5	16.3	16.8	2.5	13.0	6	±0.24	±1.50	±0.008	160	0.090	18000	2.01	0.48			
	110	13.2 x 19.0 x 2 x 0.15	1.4571	2.15	186	-0.4/+0.1	±0.5	16.3	16.8	2.5	13.2	6	±0.17	±1.20	±0.007	600	0.34	50500	2.04	0.72			
	165	13.2 x 19.0 x 3 x 0.15	1.4571	2.20	155	-0.4/+0.1	±0.5	16.3	16.8	2.5	13.2	6	±0.13	±1.00	±0.006	900	0.51	72000	2.04	1.10			
14	17	14.6 x 21.0 x 1 x 0.10	1.4571	1.90	145	-0.4/+0.1	±0.5	19.0	18.3	4.0	14.6	6	±0.28	±1.40	±0.011	85	0.065	11200	2.51	0.30			
	30	14.6 x 22.0 x 2 x 0.10	1.4571	2.15	196	-0.4/+0.1	±0.5	20.0	18.3	4.0	14.6	6	±0.30	±1.40	±0.010	130	0.093	14100	2.63	0.66			
	55	14.2 x 22.0 x 2 x 0.15	1.4571	2.30	170	-0.5/+0.1	±0.5	20.0	18.8	4.0	14.2	6	±0.22	±1.20	±0.009	330	0.24	30600	2.57	1.01			
	110	14.6 x 22.0 x 3 x 0.15	1.4571	2.75	151	-0.4/+0.1	±0.5	20.0	-	-	14.6	6	±0.17	±1.00	±0.008	720	0.55	48000	2.63	1.35			
	150	14.2 x 22.0 x 4 x 0.15	1.4571	2.80	142	-0.5/+0.1	±0.5	20.0	-	-	14.2	6	±0.14	±0.70	±0.007	800	0.57	50000	2.57	1.70			
	220	14.2 x 21.2 x 5 x 0.15	1.4571	2.80	149	-0.5/+0.1	±0.5	18.5	-	-	14.2	6	±0.12	±0.60	±0.006	1300	0.88	77900	2.46	2.00			
	280	14.2 x 22.0 x 6 x 0.15	1.4571	3.40	88	-0.5/+0.1	±0.5	20.0	-	-	14.2	6	±0.14	±0.50	±0.005	1500	1.070	63800	2.57	2.50			
16	14	16.6 x 24.0 x 1 x 0.10	1.4571	2.00	138	-0.4/+0.1	±0.5	21.5	21.1	4.0	16.6	6	±0.33	±1.60	±0.011	60	0.05	9000	3.25	0.37			
	28	16.6 x 24.0 x 2 x 0.10	1.4571	2.00	179	-0.4/+0.1	±0.5	21.5	21.1	4.0	16.6	6	±0.32	±1.50	±0.011	126	0.11	19200	3.25	0.73			
	70	16.8 x 24.0 x 2 x 0.15	1.4571	2.30	155	-0.4/+0.1	±0.5	21.5	21.1	4.0	16.8	6	±0.20	±1.00	±0.009	420	0.38	49600	3.25	1.10			
	110	16.4 x 24.0 x 3 x 0.15	1.4571	2.50	160	-0.4/+0.1	±0.5	21.5	21.1	3.5	16.4	6	±0.20	±1.00	±0.009	680	0.60	66600	3.20	1.70			

\* outside pressure; in the event of inside pressure loads, column stability must also be guaranteed (buckle resistance)

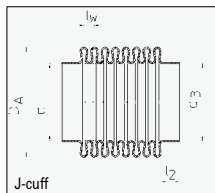
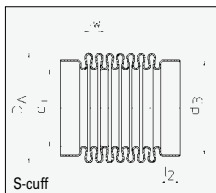
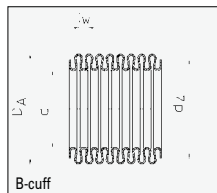
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		d <sub>1</sub>	D <sub>A</sub>	n <sub>L</sub>	s	d <sub>1</sub>				D <sub>A</sub>	Ø d <sub>3</sub>		Length l <sub>2</sub>	Ø d <sub>3</sub>	Length l <sub>2</sub>	axial 2δ <sub>n,0</sub>	angular 2α <sub>n,0</sub>	lateral 2λ <sub>n,0</sub>	axial c <sub>0</sub>	angular c <sub>α</sub>	lateral c <sub>λ</sub>				
mm	bar	mm	mm	-	mm	-	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Degree	mm	N/mm	Nm/degree	N/mm	cm <sup>2</sup>	g
16	185	16.4 x 24.0	24.0	4 x 0.15	1.4571	3.00	140	-0.5/+0.1	±0.5	21.5	-	-	16.4	6	±0.18	±0.80	±0.009	1000	0.89	68000	3.20	2.36			
	250	16.4 x 24.0	5 x 0.15	1.4571	3.50	85	-0.5/+0.1	±0.5	21.5	-	-	16.4	6	±0.16	±0.70	±0.008	1420	1.26	71000	3.20	2.80				
	300	16.0 x 24.5	4 x 0.20	1.4571	3.80	105	-0.5/+0.1	±0.5	21.5	-	-	16.0	6	±0.13	±0.50	±0.007	2150	1.92	91600	3.22	3.30				
	370	16.0 x 24.5	5 x 0.20	1.4571	4.10	73	-0.5/+0.1	±0.5	21.5	-	-	16.0	6	±0.12	±0.40	±0.006	2800	2.50	102500	3.22	3.80				
18	16	18.0 x 28.0	1 x 0.15	1.4571	2.40	130	-0.4/+0.1	±0.5	25.0	25.2	3.0	18.0	6	±0.36	±1.50	±0.014	90	0.11	12400	4.10	0.83				
	38	18.0 x 28.0	2 x 0.15	1.4571	2.70	143	-0.3/+0.2	±0.5	25.0	25.2	3.0	18.0	6	±0.34	±1.30	±0.013	185	0.21	20100	4.05	1.73				
	70	18.0 x 28.0	3 x 0.15	1.4571	3.20	137	-0.3/+0.2	±0.5	25.0	25.2	3.0	18.0	6	±0.32	±1.10	±0.013	310	0.36	24000	4.15	2.63				
	75	18.0 x 28.0	2 x 0.20	1.4571	3.10	137	-0.3/+0.2	±0.5	25.0	25.2	3.0	18.0	6	±0.28	±1.00	±0.012	600	0.69	49500	4.15	2.40				
	105	18.0 x 28.0	4 x 0.15	1.4571	3.50	118	-0.3/+0.2	±0.5	25.0	-	-	18.0	6	±0.27	±0.90	±0.013	485	0.56	31400	4.15	3.52				
	125	18.0 x 28.0	3 x 0.20	1.4571	3.50	120	-0.4/+0.2	±0.5	25.0	-	-	18.0	6	±0.24	±0.80	±0.012	1000	1.15	64800	4.15	3.50				
	200	18.0 x 28.0	3 x 0.25	1.4571	3.80	115	-0.3/+0.2	±0.5	25.0	25.2	3.0	18.0	6	±0.17	±0.70	±0.009	1700	1.96	93400	4.15	4.30				
	260	18.0 x 28.5	4 x 0.25	1.4571	4.00	100	-0.4/+0.2	±0.5	25.0	-	-	18.0	6	±0.16	±0.60	±0.008	2400	2.83	121600	4.15	6.00				
	375	18.0 x 26.5	4 x 0.25	1.4571	3.40	115	-0.4/+0.2	±0.5	23.5	-	-	18.0	6	±0.11	±0.50	±0.005	4580	4.92	293000	3.87	4.50				
	450	18.0 x 27.0	5 x 0.25	1.4571	4.00	75	-0.4/+0.2	±0.5	22.5	-	-	18.0	6	±0.09	±0.40	±0.005	5400	6.00	256300	3.98	5.90				
20	14	19.7 x 30.0	1 x 0.15	1.4571	2.40	119	-0.4/+0.1	±0.5	24.5	26.0	3.0	19.7	8	±0.40	±1.50	±0.012	120	0.16	19200	4.85	1.20				
	50	19.8 x 28.0	2 x 0.15	1.4571	2.60	153	-0.3/+0.2	±0.5	24.5	25.0	3.0	19.8	8	±0.30	±1.20	±0.010	430	0.53	54500	4.41	1.65				
	90	19.0 x 28.0	3 x 0.15	1.4571	3.30	125	-0.3/+0.2	±0.5	24.5	25.0	3.0	19.0	6	±0.28	±0.90	±0.013	650	0.78	49400	4.35	2.40				
	165	19.0 x 27.0	4 x 0.15	1.4571	2.90	137	-0.4/+0.2	±0.5	24.5	-	-	19.0	6	±0.18	±0.70	±0.007	1100	1.27	103800	4.15	2.80				
	190	19.3 x 29.0	3 x 0.25	1.4571	3.50	114	-0.4/+0.2	±0.5	24.5	-	-	19.3	6	±0.16	±0.60	±0.006	2000	2.54	142800	4.58	4.30				
	315	19.3 x 28.0	4 x 0.25	1.4571	3.40	107	-0.4/+0.2	±0.5	24.5	-	-	19.3	6	±0.11	±0.50	±0.005	4600	5.60	332000	4.39	4.90				
	410	19.1 x 28.0	5 x 0.25	1.4571	3.80	80	-0.4/+0.2	±0.5	24.5	-	-	19.3	6	±0.09	±0.40	±0.004	6500	7.93	377000	4.39	5.90				
21	15	21.0 x 31.5	1 x 0.15	1.4571	2.70	102	-0.3/+0.2	±0.5	29.0	27.9	4.0	21.0	8	±0.42	±1.60	±0.014	116	0.18	16500	5.40	1.02				

\* outside pressure; in the event of inside pressure loads, column stability must also be guaranteed (buckle resistance)

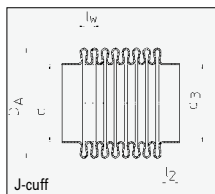
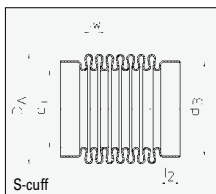
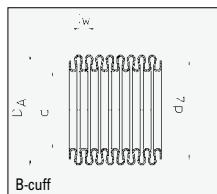
### 6.3 | Hydra stainless steel bellows

Preferred dimensions



### 6.3 | Hydra stainless steel bellows

Preferred dimensions



Reference diameter	Nominal pressure P <sub>N</sub> *	Bellows profile					Material	Corrugation length l <sub>w</sub>	Max. number of corrugations	Ø Tolerances		B-cuff Ø d <sub>4</sub>	S-cuff		J-cuff		Nominal deflection per corrugation (for 10,000 load cycles)			Spring rate per corrugation (± 30%)			Effective cross-section A	Weight per corrugation g	
		d <sub>1</sub>	D <sub>A</sub>	n <sub>L</sub>	s	d <sub>1</sub>				D <sub>A</sub>	Ø inside d <sub>3</sub>		Length l <sub>2</sub>	Ø inside d <sub>3</sub>	Length l <sub>2</sub>	axial 2δ <sub>n,0</sub>	angular 2α <sub>n,0</sub>	lateral 2λ <sub>n,0</sub>	axial c <sub>0</sub>	angular c <sub>α</sub>	lateral c <sub>λ</sub>				
mm	bar	mm	mm	-	mm	-	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Degree	mm	N/mm	Nm/degree	N/mm	cm <sup>2</sup>	g
21	32	21.0 x 31.5 x 2 x 0.15	1.4571	2.70	138	-0.3/+0.2	±0.5	29.0	27.9	4.0	21.0	8	±0.37	±1.40	±0.012	214	0.32	30000	5.40	1.98					
22	11	22.0 x 34.0 x 1 x 0.15	1.4571	2.80	111	-0.4/+0.1	±0.5	30.0	30.2	4.0	22.0	8	±0.52	±1.65	±0.015	84	0.14	12600	6.16	1.21					
	25	22.0 x 34.0 x 2 x 0.15	1.4571	2.90	118	-0.3/+0.2	±0.5	30.0	30.2	4.0	22.0	8	±0.46	±1.55	±0.015	170	0.30	23000	6.16	2.42					
	45	22.0 x 34.0 x 2 x 0.20	1.4571	3.50	117	-0.3/+0.2	±0.5	30.0	30.2	4.0	22.0	8	±0.38	±1.30	±0.015	390	0.66	37400	6.16	3.30					
	75	22.0 x 34.0 x 3 x 0.20	1.4571	3.60	116	-0.3/+0.2	±0.5	30.0	30.2	4.0	22.0	8	±0.33	±1.15	±0.014	600	1.02	54500	6.16	4.90					
	125	22.0 x 34.0 x 4 x 0.20	1.4571	4.20	96	-0.4/+0.2	±0.8	30.0	-	-	22.0	8	±0.32	±1.05	±0.015	900	1.54	60000	6.16	6.60					
	150	22.0 x 35.0 x 4 x 0.25	1.4571	4.60	96	-0.4/+0.2	±0.8	30.0	-	-	22.0	8	±0.25	±1.00	±0.013	1415	2.50	81200	6.36	8.70					
	250	22.0 x 35.0 x 4 x 0.30	1.4571	5.00	82	-0.4/+0.2	±0.8	30.0	-	-	22.0	8	±0.20	±0.70	±0.010	2500	4.43	121800	6.38	10.90					
320	22.0 x 35.0 x 5 x 0.30	1.4571	4.85	61	-0.6/+0.2	±0.8	30.0	-	-	22.0	8	±0.17	±0.60	±0.009	3400	6.02	176000	6.38	13.70						
24	11	24.2 x 36.5 x 1 x 0.15	1.4571	3.40	81	-0.4/+0.1	±0.6	34.0	32.7	4.0	24.2	8	±0.52	±1.65	±0.018	70	0.14	8700	7.20	1.3					
	25	24.2 x 36.5 x 2 x 0.15	1.4571	3.15	118	-0.3/+0.2	±0.6	34.0	32.2	4.0	24.2	8	±0.48	±1.50	±0.015	150	0.30	20800	7.20	2.6					
	40	24.2 x 36.5 x 2 x 0.20	1.4571	3.20	118	-0.3/+0.2	±0.6	34.0	32.2	4.0	24.2	8	±0.38	±1.30	±0.013	360	0.72	48600	7.20	4.0					
	65	24.0 x 36.5 x 2 x 0.25	1.4571	3.30	111	-0.3/+0.2	±0.5	34.0	32.2	3.0	24.0	8	±0.35	±1.20	±0.012	590	1.17	74400	7.20	4.8					
	110	24.0 x 36.5 x 3 x 0.25	1.4571	4.00	98	-0.3/+0.2	±0.5	34.0	32.2	3.0	24.0	8	±0.30	±1.00	±0.012	860	1.72	73800	7.20	7.2					
	180	24.0 x 36.5 x 4 x 0.25	1.4571	4.60	86	-0.4/+0.2	±0.8	34.0	-	-	24.0	8	±0.25	±0.90	±0.010	1200	2.40	77800	7.15	9.0					
	220	24.0 x 36.5 x 5 x 0.25	1.4571	4.90	61	-0.4/+0.2	±0.8	33.0	-	-	24.0	8	±0.20	±0.75	±0.008	2200	4.40	126000	7.15	11.4					
	320	24.0 x 36.5 x 6 x 0.25	1.4571	5.30	80	-0.6/+0.2	±0.8	33.0	-	-	24.0	8	±0.19	±0.60	±0.006	3700	7.39	180800	7.15	13.6					
27	7	27.0 x 41.0 x 1 x 0.15	1.4571	3.10	99	-0.4/+0.1	±0.5	37.5	37.2	4.0	27.0	8	±0.65	±1.60	±0.019	52	0.13	9400	9.10	1.7					
	20	27.0 x 41.0 x 2 x 0.15	1.4571	3.40	100	-0.3/+0.2	±0.5	37.5	37.2	4.0	27.0	8	±0.60	±1.50	±0.019	110	0.27	16500	9.10	3.5					
	32	27.0 x 41.0 x 2 x 0.20	1.4571	3.70	100	-0.3/+0.2	±0.5	37.5	37.2	4.0	27.0	8	±0.46	±1.30	±0.016	260	0.65	32900	9.10	5.2					
	50	27.0 x 41.0 x 2 x 0.25	1.4571	4.10	99	-0.3/+0.2	±0.5	37.5	36.0	4.0	27.0	8	±0.36	±1.00	±0.014	520	1.31	53600	9.10	7.0					
	60	27.0 x 41.0 x 3 x 0.20	1.4571	4.30	100	-0.3/+0.2	±0.5	37.5	37.2	4.0	27.0	8	±0.40	±1.00	±0.013	430	1.10	40300	9.10	7.0					

\* outside pressure; in the event of inside pressure loads, column stability must also be guaranteed (buckle resistance)

### 6.3 | Hydra stainless steel bellows

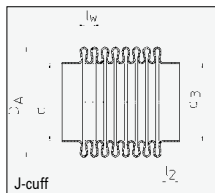
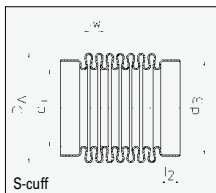
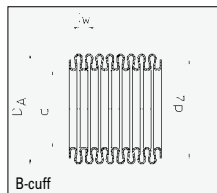
Preferred dimensions

HYDRA

### 6.3 | Hydra stainless steel bellows

Preferred dimensions

HYDRA



Reference diameter	Nominal pressure P <sub>N</sub> *	Bellows profile					Material	Corrugation length l <sub>w</sub>	Max. number of corrugations	Ø Tolerances		B-cuff Ø d <sub>4</sub>	S-cuff		J-cuff		Nominal deflection per corrugation (for 10,000 load cycles)			Spring rate per corrugation (±30%)			Effective cross-section A	Weight per corrugation
		d <sub>1</sub>	D <sub>A</sub>	n <sub>L</sub>	s	d <sub>1</sub>				D <sub>A</sub>	Ø inside d <sub>3</sub>		Length l <sub>2</sub>	Ø inside d <sub>3</sub>	Length l <sub>2</sub>	axial 2δ <sub>n,0</sub>	angular 2α <sub>n,0</sub>	lateral 2λ <sub>n,0</sub>	axial c <sub>0</sub>	angular c <sub>α</sub>	lateral c <sub>l</sub>			
mm	bar	mm	mm	-	mm	-	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Degree	mm	N/mm	Nm/degree	N/mm	cm <sup>2</sup>	g
27	70	27.0	41.0	2	x 0.30	1.4571	3.55	99	-0.3/+0.2	±0.5	37.5	36.0	4.0	27.0	8	±0.30	±0.90	±0.011	900	2.26	123800	9.10	8.0	
	90	27.0	40.0	4	x 0.20	1.4571	4.30	93	-0.4/+0.2	±0.8	36.5	-	-	27.0	8	±0.32	±0.80	±0.012	700	1.71	63700	8.80	8.7	
	110	27.0	41.0	3	x 0.30	1.4571	4.40	90	-0.3/+0.2	±0.5	37.5	36.0	4.0	27.0	8	±0.26	±0.80	±0.011	1500	3.80	134000	9.10	12.0	
	160	27.0	41.0	4	x 0.30	1.4571	5.20	76	-0.3/+0.2	±0.5	37.5	-	-	27.0	8	±0.23	±0.70	±0.011	2200	5.54	141100	9.10	16.0	
29	10	29.5	42.0	1	x 0.15	1.4571	3.10	97	-0.4/+0.1	±0.5	39.0	38.5	4.0	29.5	8	±0.55	±1.50	±0.018	70	0.19	14000	10.0	2.0	
	18	29.0	43.0	1	x 0.25	1.4571	3.70	73	-0.4/+0.1	±0.5	39.0	39.0	4.0	29.0	8	±0.48	±1.40	±0.018	210	0.61	29800	10.2	3.2	
	36	29.0	43.0	2	x 0.20	1.4571	3.80	101	-0.3/+0.2	±0.5	39.0	39.0	4.0	29.0	8	±0.50	±1.30	±0.017	260	0.74	35000	10.2	4.9	
	50	29.0	43.0	2	x 0.25	1.4571	4.20	101	-0.3/+0.2	±0.5	39.0	39.0	4.0	29.0	8	±0.44	±1.20	±0.017	510	1.44	56200	10.2	6.3	
	90	29.0	43.0	3	x 0.25	1.4571	4.70	94	-0.3/+0.2	±0.5	39.0	-	-	29.0	8	±0.40	±1.10	±0.017	920	2.60	81000	10.2	9.5	
	140	29.0	43.0	4	x 0.25	1.4571	5.00	88	-0.4/+0.2	±0.8	39.0	-	-	29.0	8	±0.35	±1.00	±0.016	1360	3.85	106000	10.2	12.6	
	180	29.0	44.0	4	x 0.30	1.4571	5.50	73	-0.4/+0.2	±0.8	38.0	-	-	29.0	8	±0.35	±0.90	±0.015	2100	6.10	138000	10.5	17.0	
	240	29.0	44.0	6	x 0.25	1.4571	6.20	70	-0.6/+0.2	±0.8	38.0	-	-	29.0	8	±0.26	±0.75	±0.014	2320	6.80	122000	10.6	19.6	
	280	29.0	44.5	7	x 0.25	1.4571	6.80	61	-0.6/+0.2	±0.8	38.0	-	-	29.0	8	±0.24	±0.60	±0.031	2900	8.50	127000	10.6	23.5	
	350	29.0	44.5	7	x 0.30	1.4571	6.00	50	-0.6/+0.2	±0.8	38.0	-	-	29.0	8	±0.17	±0.50	±0.011	5200	15.30	293000	10.6	29.0	
30	10	30.2	43.5	1	x 0.15	1.4571	3.60	111	-0.3/+0.2	±0.5	39.0	39.0	4.0	30.2	8	±0.65	±1.60	±0.020	55	0.16	8600	10.7	2.2	
	20	30.2	43.5	2	x 0.15	1.4571	3.70	101	-0.3/+0.2	±0.5	39.0	39.0	4.0	30.2	8	±0.55	±1.50	±0.018	135	0.40	20000	10.7	4.4	
34	6	34.0	50.0	1	x 0.15	1.4571	3.40	74	-0.3/+0.2	±0.5	47.0	45.3	5.0	34.0	10	±0.80	±1.70	±0.022	46	0.18	10500	13.9	2.5	
	11	34.0	50.0	1	x 0.20	1.4571	3.50	74	-0.3/+0.2	±0.5	47.0	45.3	5.0	34.0	10	±0.65	±1.50	±0.018	95	0.36	20500	13.9	3.4	
	25	34.0	50.0	2	x 0.20	1.4571	4.20	73	-0.3/+0.2	±0.6	47.0	45.3	5.0	34.0	10	±0.63	±1.45	±0.018	200	0.77	30000	13.9	6.9	
	40	34.0	50.0	2	x 0.25	1.4571	4.40	73	-0.3/+0.2	±0.6	47.0	45.3	5.0	34.0	10	±0.53	±1.25	±0.018	390	1.50	53300	13.9	8.6	
	55	34.0	50.0	2	x 0.30	1.4571	4.60	73	-0.3/+0.2	±0.5	47.0	45.3	5.0	34.0	10	±0.46	±1.00	±0.016	700	2.70	87500	13.9	10.0	
	100	34.0	50.0	3	x 0.30	1.4571	5.10	72	-0.3/+0.2	±0.5	46.0	-	-	34.0	10	±0.40	±1.00	±0.016	1200	4.57	122000	13.9	16.0	

\* outside pressure; in the event of inside pressure loads, column stability must also be guaranteed (buckle resistance)

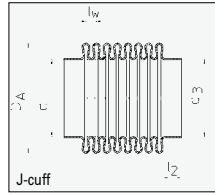
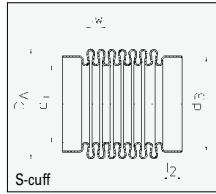
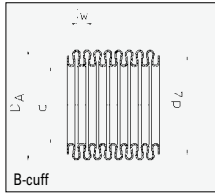
### 6.3 | Hydra stainless steel bellows

Preferred dimensions



### 6.3 | Hydra stainless steel bellows

Preferred dimensions



Reference diameter	Nominal pressure P <sub>N</sub> *	Bellows profile					Material	Corrugation length l <sub>w</sub>	Max. number of corrugations	Ø Tolerances		B-cuff Ø d <sub>4</sub>	S-cuff		J-cuff		Nominal deflection per corrugation (for 10,000 load cycles)			Spring rate per corrugation (±30%)			Effective cross-section A	Weight per corrugation
		d <sub>1</sub>	D <sub>A</sub>	n <sub>L</sub>	s	-				d <sub>1</sub>	D <sub>A</sub>		Ø inside d <sub>3</sub>	Length l <sub>2</sub>	Ø inside d <sub>3</sub>	Length l <sub>2</sub>	axial 2δ <sub>n,0</sub>	angular 2α <sub>n,0</sub>	lateral 2λ <sub>n,0</sub>	axial c <sub>0</sub>	angular c <sub>α</sub>	lateral c <sub>λ</sub>		
34	130	34.0 x 51.0 x 4 x 0.30	1.4571	5.50	72	-0.4/+0.2	±0.8	46.0	-	-	34.0	10	±0.38	±0.95	±0.016	1500	5.90	134400	14.2	21.8				
	250	34.0 x 48.0 x 5 x 0.30	1.4571	5.60	72	-0.4/+0.2	±0.8	46.0	-	-	34.0	10	±0.28	±0.75	±0.015	3500	12.80	281400	13.2	28.5				
	260	34.0 x 50.0 x 6 x 0.30	1.4571	6.50	46	-0.4/+0.2	±0.8	46.0	-	-	34.0	10	±0.30	±0.75	±0.014	3300	12.70	206700	13.9	34.0				
	300	34.0 x 51.0 x 7 x 0.30	1.4571	7.40	40	-0.6/+0.2	±0.8	45.0	-	-	34.0	10	±0.26	±0.60	±0.013	4400	17.30	217700	14.2	38.0				
	370	34.0 x 51.0 x 8 x 0.30	1.4571	8.00	37	-0.6/+0.2	±0.8	45.0	-	-	34.0	10	±0.22	±0.50	±0.011	6000	23.60	254000	14.2	44.0				
38	8	38.8 x 56.0 x 1 x 0.20	1.4571	4.00	68	-0.3/+0.2	±0.8	47/52.5	51.3	5.0	38.8	10	±0.80	±1.50	±0.022	80	0.39	16900	17.6	3.9				
	22	38.8 x 56.0 x 2 x 0.20	1.4571	4.50	66	-0.3/+0.2	±0.8	47/52.5	51.3	5.0	38.8	10	±0.70	±1.40	±0.022	170	0.83	28300	17.6	7.9				
	35	38.8 x 56.0 x 2 x 0.25	1.4571	5.00	65	-0.3/+0.2	±0.8	47/52.5	51.3	5.0	38.8	10	±0.62	±1.25	±0.020	330	1.60	44500	17.6	9.9				
	50	39.0 x 56.0 x 2 x 0.30	1.4571	4.80	69	-0.3/+0.2	±0.8	52.5	51.3	5.0	39.0	10	±0.50	±1.05	±0.012	615	3.00	91000	17.7	11.8				
	70	38.2 x 56.0 x 3 x 0.30	1.4571	5.00	67	-0.3/+0.2	±0.8	47/52.5	-	-	38.2	10	±0.47	±1.00	±0.016	980	4.74	130400	17.4	16.0				
	120	38.2 x 56.0 x 4 x 0.30	1.4571	5.50	54	-0.6/+0.2	±0.8	49.0	-	-	38.2	10	±0.41	±0.90	±0.016	1400	6.80	154000	17.4	21.0				
	170	38.2 x 56.0 x 5 x 0.30	1.4571	6.00	50	-0.6/+0.2	±0.8	49.0	-	-	38.2	10	±0.38	±0.65	±0.016	2050	9.80	189500	17.4	26.0				
	215	38.2 x 56.0 x 6 x 0.30	1.4571	6.60	45	-0.6/+0.2	±0.8	49.0	-	-	38.2	10	±0.34	±0.58	±0.015	3100	15.00	237000	17.4	32.0				
	320	38.2 x 54.0 x 7 x 0.30	1.4571	6.90	43	-0.6/+0.2	±0.8	49.0	-	-	38.2	10	±0.23	±0.50	±0.011	5300	24.50	355000	16.7	36.5				
	360	38.2 x 54.0 x 8 x 0.30	1.4571	7.10	42	-0.6/+0.2	±0.8	49.0	-	-	38.2	10	±0.22	±0.45	±0.009	6300	29.20	398400	16.7	42.0				
42	9	42.0 x 60.0 x 1 x 0.20	1.4571	4.25	61	-0.3/+0.2	±0.8	50.5/57	56.3	5.0	42.0	10	±0.75	±1.50	±0.019	90	0.52	19300	20.4	4.2				
	25	42.0 x 60.0 x 2 x 0.20	1.4571	5.25	62	-0.3/+0.2	±0.8	50.5/57	56.0	5.0	42.0	10	±0.75	±1.40	±0.024	180	1.10	25400	20.4	8.5				
	32	42.0 x 60.0 x 2 x 0.25	1.4571	5.00	63	-0.3/+0.2	±0.8	50.5/57	56.0	5.0	42.0	10	±0.67	±1.30	±0.021	380	2.20	59300	20.4	10.7				
	40	42.0 x 60.0 x 2 x 0.30	1.4571	5.10	65	-0.3/+0.2	±0.5	57.0	56.3	5.0	42.0	10	±0.56	±1.05	±0.018	520	3.30	78000	20.4	12.7				
	70	42.0 x 60.0 x 3 x 0.30	1.4571	5.70	67	-0.3/+0.2	±0.8	50.5/57	-	-	42.0	10	±0.48	±1.00	±0.017	1000	5.60	120000	20.4	20.0				
	115	42.0 x 60.0 x 4 x 0.30	1.4571	6.20	67	-0.4/+0.2	±0.8	50.5/57	-	-	42.0	10	±0.45	±0.90	±0.018	1500	8.50	152000	20.4	26.0				
	140	42.0 x 61.0 x 5 x 0.30	1.4571	7.00	42	-0.4/+0.2	±0.8	55.0	-	-	42.0	10	±0.42	±0.90	±0.018	2000	11.60	162400	20.8	34.0				

\* outside pressure; in the event of inside pressure loads, column stability must also be guaranteed (buckle resistance)

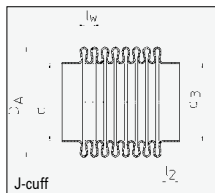
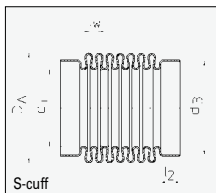
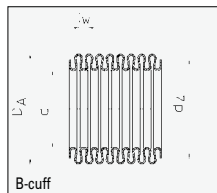
### 6.3 | Hydra stainless steel bellows

Preferred dimensions



### 6.3 | Hydra stainless steel bellows

Preferred dimensions



Reference diameter	Nominal pressure P <sub>N</sub> *	Bellows profile					Material	Corrugation length l <sub>w</sub>	Max. number of corrugations	Ø Tolerances		B-cuff Ø d <sub>4</sub>	S-cuff		J-cuff		Nominal deflection per corrugation (for 10,000 load cycles)			Spring rate per corrugation (±30%)			Effective cross-section A	Weight per corrugation g
		d <sub>1</sub>	d <sub>A</sub>	n <sub>L</sub>	s	d <sub>1</sub>				d <sub>3</sub>	Ø inside d <sub>3</sub>		Length l <sub>2</sub>	Ø inside d <sub>3</sub>	Length l <sub>2</sub>	axial 2δ <sub>n,0</sub>	angular 2α <sub>n,0</sub>	lateral 2λ <sub>n,0</sub>	axial c <sub>0</sub>	angular c <sub>α</sub>	lateral c <sub>λ</sub>			
mm	bar	mm	mm	-	mm	-	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	N/mm	Nm/degree	N/mm	cm <sup>2</sup>	g	
42	165	42.0 x 62.0 x 6 x 0.30					1.4571	7.60	39	-0.6/+0.2	±0.8	55.0	-	-	42.0	10	±0.40	±0.85	±0.018	2200	13.00	154500	21.2	43.0
	210	42.0 x 62.5 x 7 x 0.30					1.4571	8.20	36	-0.6/+0.2	±0.8	55.0	-	-	42.0	10	±0.38	±0.80	±0.016	2600	15.50	158400	21.4	51.0
	290	42.0 x 61.0 x 8 x 0.30					1.4571	8.40	35	-0.6/+0.2	±0.8	55.0	-	-	42.0	10	±0.30	±0.65	±0.014	4000	23.20	225500	20.8	58.0
47	8	47.6 x 66.0 x 1 x 0.20					1.4571	4.30	62	-0.3/+0.2	±0.8	62.5	61.3	5.0	47.6	10	±0.80	±1.50	±0.021	86	0.65	22500	25.3	4.9
	17	47.6 x 66.0 x 2 x 0.20					1.4571	4.70	62	-0.3/+0.2	±0.8	62.5	61.0	5.0	47.6	10	±0.77	±1.40	±0.021	178	1.40	39000	25.3	9.9
	28	47.8 x 66.0 x 2 x 0.25					1.4571	5.10	63	-0.3/+0.2	±0.8	62.5	61.0	5.0	47.8	10	±0.70	±1.20	±0.020	320	2.30	59800	25.4	12.5
	40	47.4 x 66.0 x 2 x 0.30					1.4571	5.20	63	-0.3/+0.2	±0.8	62.5	61.0	5.0	47.4	10	±0.56	±1.00	±0.017	610	4.40	108800	25.2	14.9
	65	47.4 x 66.0 x 3 x 0.30					1.4571	5.70	52	-0.3/+0.2	±0.8	62.5	-	-	47.4	10	±0.51	±0.90	±0.017	1240	8.60	184000	25.2	22.4
	95	47.4 x 66.0 x 4 x 0.30					1.4571	6.60	45	-0.6/+0.2	±0.8	62.5	-	-	47.4	10	±0.48	±0.80	±0.015	1850	12.90	204000	25.2	30.8
	130	47.4 x 66.0 x 5 x 0.30					1.4571	6.70	44	-0.6/+0.2	±0.8	57.0	-	-	47.4	10	±0.44	±0.70	±0.015	2550	17.80	274000	25.2	38.0
	200	47.4 x 64.0 x 6 x 0.30					1.4571	7.10	42	-0.6/+0.2	±0.8	57.0	-	-	47.4	10	±0.32	±0.60	±0.013	4400	29.80	406200	24.3	42.0
270	47.4 x 64.0 x 8 x 0.30					1.4571	7.70	38	-0.6/+0.2	±0.8	57.0	-	-	47.4	10	±0.22	±0.40	±0.010	7000	47.00	549400	24.3	57.0	
51	10	51.4 x 71.0 x 1 x 0.25					1.4571	4.20	59	-0.3/+0.2	±0.8	61.0	65.0	5.0	51.4	10	±0.80	±1.40	±0.018	160	1.30	51000	29.4	7.9
	22	51.4 x 71.0 x 2 x 0.25					1.4571	4.90	58	-0.3/+0.2	±0.8	67.5	65.0	5.0	51.4	10	±0.75	±1.20	±0.020	330	2.70	77200	29.4	15.3
	32	51.4 x 71.0 x 2 x 0.30					1.4571	5.20	60	-0.3/+0.2	±0.8	67.5	65.0	5.0	51.4	10	±0.66	±1.10	±0.018	530	4.30	110100	29.4	18.8
	50	51.4 x 71.0 x 3 x 0.30					1.4571	5.80	58	-0.3/+0.2	±0.8	65.0	65.0	5.0	51.4	10	±0.60	±1.00	±0.018	950	7.80	158500	29.4	27.6
	75	51.4 x 71.0 x 4 x 0.30					1.4571	6.50	61	-0.6/+0.2	±0.8	65.0	-	-	51.4	10	±0.50	±0.90	±0.017	1270	10.00	168900	29.4	31.7
	110	51.4 x 71.5 x 5 x 0.30					1.4571	7.30	41	-0.6/+0.2	±0.8	65.0	-	-	51.4	10	±0.47	±0.80	±0.016	1630	13.50	173300	29.6	46.5
	145	51.4 x 72.0 x 6 x 0.30					1.4571	7.70	38	-0.6/+0.2	±0.8	65.0	-	-	51.4	10	±0.45	±0.70	±0.014	2100	17.50	202300	29.9	56.0
56	9	56.1 x 77.0 x 1 x 0.25					1.4571	4.90	55	-0.6/+0.2	±0.8	68/73	72.3	5.0	56.1	10	±0.95	±1.40	±0.023	140	1.35	38800	34.8	8.5
	22	56.1 x 77.0 x 2 x 0.25					1.4571	5.70	53	-0.6/+0.2	±0.8	68/73	72.3	5.0	56.1	10	±0.90	±1.35	±0.025	270	2.70	55200	34.8	16.8
	30	56.1 x 77.0 x 2 x 0.30					1.4571	5.80	55	-0.6/+0.2	±0.8	68/73	72.3	5.0	56.2	10	±0.72	±1.20	±0.021	480	4.60	94800	34.8	20.3

\* outside pressure; in the event of inside pressure loads, column stability must also be guaranteed (buckle resistance)

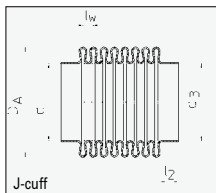
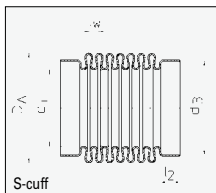
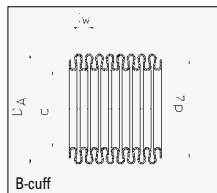
### 6.3 | Hydra stainless steel bellows

Preferred dimensions



### 6.3 | Hydra stainless steel bellows

Preferred dimensions



Reference diameter	Nominal pressure P <sub>N</sub> * bar	Bellows profile					Material	Corrugation length l <sub>w</sub> mm	Max. number of corrugations	Ø Tolerances		B-cuff Ø d <sub>4</sub> mm	S-cuff		J-cuff		Nominal deflection per corrugation (for 10,000 load cycles)			Spring rate per corrugation (±30%)			Effective cross-section A cm <sup>2</sup>	Weight per corrugation g
		d <sub>1</sub> mm	D <sub>A</sub> mm	n <sub>L</sub> -	s mm	-				d <sub>1</sub> mm	D <sub>A</sub> mm		Ø inside d <sub>3</sub> mm	Length l <sub>2</sub> mm	Ø inside d <sub>3</sub> mm	Length l <sub>2</sub> mm	axial 2δ <sub>n,0</sub> mm	angular 2α <sub>n,0</sub> Degree	lateral 2λ <sub>n,0</sub> mm	axial c <sub>0</sub> N/mm	angular c <sub>α</sub> Nm/degree	lateral c <sub>l</sub> N/mm		
56	50	56.1 x 77.0 x 3 x 0.30	1.4571	6.20	56	-0.6/+0.2	±0.8	68/73	-	-	56.2	10	±0.65	±1.10	±0.020	880	8.50	152300	34.7	30.5				
	65	56.1 x 77.0 x 4 x 0.30	1.4571	6.70	58	-0.6/+0.2	±0.8	73.0	-	-	56.2	10	±0.62	±1.00	±0.015	1200	11.50	178000	34.7	40.6				
	83	56.1 x 77.0 x 5 x 0.30	1.4571	7.20	41	-0.6/+0.2	±1.0	73.0	-	-	56.2	10	±0.57	±0.90	±0.013	1600	15.50	205000	34.7	51.5				
60	8	60.0 x 82.0 x 1 x 0.25	1.4571	5.20	52	-0.6/+0.2	±0.8	78.0	77.3	5.0	60.0	10	±1.10	±1.50	±0.025	125	1.40	35000	39.6	9.1				
	18	60.0 x 82.0 x 2 x 0.25	1.4571	5.90	52	-0.6/+0.2	±0.8	78.0	77.3	5.0	60.0	10	±1.00	±1.40	±0.025	250	2.80	54300	39.6	18.2				
	22	60.0 x 82.0 x 2 x 0.30	1.4571	6.00	52	-0.6/+0.2	±0.8	78.0	77.3	5.0	60.0	10	±0.80	±1.10	±0.022	440	4.70	92400	39.6	22.0				
	42	60.0 x 82.0 x 3 x 0.30	1.4571	6.00	54	-0.6/+0.2	±0.8	78.0	-	-	60.0	10	±0.65	±0.90	±0.018	700	7.60	147000	39.6	33.0				
	65	60.0 x 82.0 x 4 x 0.30	1.4571	6.70	59	-0.6/+0.2	±0.8	78.0	-	-	60.0	10	±0.60	±0.80	±0.016	1100	12.10	185300	39.6	44.0				
	110	60.0 x 82.0 x 6 x 0.30	1.4571	7.70	38	-0.6/+0.2	±0.8	76.0	-	-	60.0	10	±0.50	±0.65	±0.014	1800	19.80	229600	39.6	44.0				
	220	60.8 x 79.0 x 7 x 0.30	1.4571	7.20	41	-0.6/+0.2	±0.8	73.0	-	-	60.8	10	±0.35	±0.60	±0.012	4000	42.50	565500	38.4	64.0				
66	6	65.5 x 90.0 x 1 x 0.25	1.4571	5.30	47	-0.6/+0.2	±0.8	85.0	84.3	5.0	65.5	10	±1.10	±1.40	±0.024	90	1.20	29100	47.5	11.2				
	15	65.5 x 90.0 x 2 x 0.25	1.4571	6.00	48	-0.6/+0.2	±0.8	85.0	84.3	5.0	65.5	10	±1.00	±1.35	±0.024	190	2.50	47900	47.5	22.4				
	20	65.4 x 90.0 x 2 x 0.30	1.4571	6.10	51	-0.6/+0.2	±0.8	85.0	84.3	5.0	65.4	10	±0.95	±1.20	±0.024	330	4.50	80300	47.4	26.9				
	32	65.4 x 90.0 x 3 x 0.30	1.4571	6.60	60	-0.6/+0.2	±0.8	82.0	-	-	65.4	10	±0.85	±1.10	±0.023	540	7.20	112300	47.4	40.4				
	55	65.4 x 86.0 x 3 x 0.30	1.4571	6.40	63	-0.6/+0.2	±0.8	78.0	-	-	65.4	10	±0.60	±0.85	±0.016	1075	13.40	225300	44.9	35.8				
	90	65.4 x 90.0 x 6 x 0.30	1.4571	8.20	36	-0.6/+0.2	±1.0	82.0	-	-	65.4	10	±0.65	±0.80	±0.018	1400	18.00	188500	47.4	81.0				
	165	65.4 x 85.0 x 6 x 0.30	1.4571	7.10	36	-0.6/+0.2	±1.0	78.0	-	-	65.4	10	±0.40	±0.60	±0.012	3300	41.00	554500	44.4	65.2				
70	7	72.0 x 95.0 x 1 x 0.25	1.4571	4.50	52	-0.6/+0.1	±1.0	85.0	84.3	5.0	72.0	10	±1.00	±1.35	±0.017	150	2.30	77500	54.8	19				
	18	70.5 x 95.0 x 2 x 0.30	1.4571	5.90	46	-0.6/+0.2	±1.0	85.0	84.3	5.0	70.5	10	±1.00	±1.35	±0.023	360	5.40	106000	53.8	28				
	45	70.5 x 92.0 x 3 x 0.30	1.4571	6.10	55	-0.5/+0.3	±1.0	85.0	-	-	70.5	10	±0.70	±0.90	±0.017	900	12.80	239500	51.8	37				
	60	70.5 x 92.0 x 4 x 0.30	1.4571	7.00	53	-0.5/+0.3	±1.0	85.0	-	-	70.5	10	±0.67	±0.80	±0.012	1800	26.00	363000	51.8	50				
77	7	77.5 x 101.0 x 1 x 0.25	1.4571	5.50	48	-0.6/+0.2	±1.0	95.0	95.3	5.0	77.5	10	±1.20	±1.30	±0.024	120	2.10	47400	62.5	13				

\* outside pressure; in the event of inside pressure loads, column stability must also be guaranteed (buckle resistance)

### 6.3 | Hydra stainless steel bellows

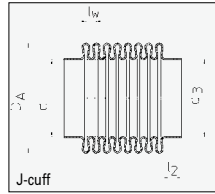
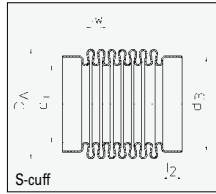
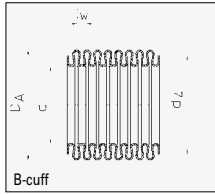
Preferred dimensions

HYDRA

### 6.3 | Hydra stainless steel bellows

Preferred dimensions

HYDRA



Reference diameter	Nominal pressure P <sub>N</sub> *	Bellows profile				Material	Corrugation length l <sub>w</sub>	Max. number of corrugations	Ø Tolerances		B-cuff Ø d <sub>4</sub>	S-cuff		J-cuff		Nominal deflection per corrugation (for 10,000 load cycles)			Spring rate per corrugation (±30%)			Effective cross-section A	Weight per corrugation
		d <sub>1</sub>	D <sub>A</sub>	n <sub>L</sub>	s				d <sub>1</sub>	D <sub>A</sub>		Ø inside d <sub>3</sub>	Length l <sub>2</sub>	Ø inside d <sub>3</sub>	Length l <sub>2</sub>	axial 2δ <sub>n,0</sub>	angular 2α <sub>n,0</sub>	lateral 2λ <sub>n,0</sub>	axial c <sub>0</sub>	angular c <sub>α</sub>	lateral c <sub>l</sub>		
mm	bar	mm	mm	-	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Degree	mm	N/mm	Nm/degree	N/mm	cm <sup>2</sup>	g
77	16	77.5	101.0	2 x 0.25	1.4571	6.30	49	-0.6/+0.2	±1.0	95.0	95.3	5.0	77.5	10	±1.10	±1.20	±0.025	250	4.60	75300	62.5	26	
	20	77.4	101.0	2 x 0.30	1.4571	6.40	48	-0.6/+0.2	±1.0	95.0	95.3	5.0	77.4	10	±0.95	±1.10	±0.023	425	7.40	123800	62.5	31	
	30	76.5	101.0	3 x 0.30	1.4571	7.20	48	-0.5/+0.3	±1.0	95.0	-	-	76.5	10	±0.90	±0.95	±0.022	610	11.50	139000	61.7	46	
85	3	85.0	114.5	1 x 0.20	1.4571	7.00	38	-0.6/+0.2	±1.0	104.0	-	-	85.1	10	±1.90	±1.40	±0.030	45	1.00	13800	78.2	10	
	8	85.0	110.0	1 x 0.30	1.4571	6.60	45	-0.6/+0.2	±1.0	104.0	103.5	5.0	85.0	10	±1.20	±1.20	±0.027	200	4.10	65500	74.6	10	
	25	85.0	106.0	2 x 0.30	1.4571	6.00	54	-0.6/+0.2	±1.0	101.0	99.0	5.0	85.0	10	±0.90	±1.00	±0.021	710	14.00	268500	71.3	34	
	45	85.0	106.0	3 x 0.30	1.4571	6.50	54	-0.5/+0.3	±1.0	101.0	-	-	85.0	10	±0.70	±0.80	±0.020	1150	22.50	370000	71.1	51	
	65	85.0	106.0	4 x 0.30	1.4571	6.90	52	-0.5/+0.3	±1.0	101.0	-	-	85.0	10	±0.60	±0.70	±0.017	1600	32.00	460000	71.6	68	
	80	85.0	108.0	5 x 0.30	1.4571	7.60	52	-0.5/+0.3	±1.0	101.0	-	-	85.0	10	±0.55	±0.60	±0.012	1700	34.50	411000	73.0	85	
93	18	93.0	120.0	2 x 0.30	1.4571	9.00	40	-0.6/+0.2	±1.0	110.0	113.0	5.0	93.0	10	±1.40	±1.00	±0.035	360	9.00	75600	89.0	50	
96	8	96.0	122.0	1 x 0.30	1.4571	7.10	43	-0.8/+0.2	±1.0	113.0	115.4	5.0	96.0	10	±1.20	±1.10	±0.026	180	4.70	63600	93.3	23	
	12	96.0	122.0	2 x 0.25	1.4571	6.50	45	-0.8/+0.2	±1.0	113.0	115.4	5.0	96.0	10	±1.25	±1.05	±0.024	220	5.70	92800	93.3	37	
	18	96.0	122.0	2 x 0.30	1.4571	6.70	44	-0.8/+0.2	±1.0	113.0	115.4	5.0	96.0	10	±1.00	±0.90	±0.020	385	10.00	152800	93.3	45	
	30	96.0	122.0	3 x 0.30	1.4571	7.40	45	-0.7/+0.3	±1.0	113.0	115.4	5.0	96.0	10	±0.90	±0.80	±0.020	620	16.00	202000	93.3	66	
	45	96.0	122.0	4 x 0.30	1.4571	7.80	43	-0.7/+0.3	±1.0	113.0	-	-	96.0	10	±0.90	±0.80	±0.019	1100	28.50	322000	93.3	86	
105	5	105.3	132.0	1 x 0.25	1.4571	6.80	42	-0.8/+0.2	±1.0	126.0	124.0	5.0	105.3	10	±1.50	±1.30	±0.028	150	4.60	68500	111	21	
	8	105.2	132.0	1 x 0.30	1.4571	6.30	42	-0.8/+0.2	±1.0	126.0	124.0	5.0	105.2	10	±1.20	±1.10	±0.021	240	7.40	127500	111	25	
	16	105.2	132.0	2 x 0.30	1.4571	7.30	50	-0.8/+0.2	±1.2	126.0	124.0	5.0	104.9	10	±1.20	±1.00	±0.024	465	14.20	183600	110	50	
	25	105.2	132.0	3 x 0.30	1.4571	8.00	46	-0.8/+0.2	±1.2	126.0	124.0	5.0	105.2	10	±1.10	±0.90	±0.024	760	23.20	250500	111	75	
110	5	110.3	138.0	1 x 0.25	1.4571	7.20	52	-0.8/+0.2	±1.5	132.0	132.4	8.0	110.3	10	±1.70	±1.30	±0.032	140	4.70	62400	121	23	
	12	110.2	130.0	1 x 0.30	1.4571	5.50	55	-0.8/+0.2	±1.5	125.0	124.4	8.0	110.2	10	±0.75	±0.80	±0.013	460	14.70	329000	113	18	
	25	110.2	130.0	2 x 0.30	1.4571	6.20	50	-0.8/+0.2	±1.5	125.0	124.4	8.0	110.2	10	±0.75	±0.70	±0.012	950	30.00	535000	113	37	

\* outside pressure; in the event of inside pressure loads, column stability must also be guaranteed (buckle resistance)

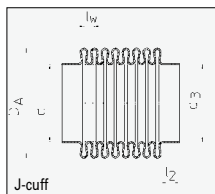
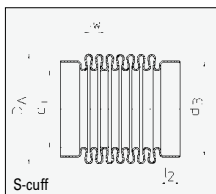
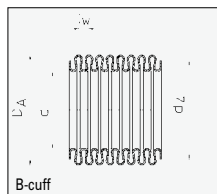
### 6.3 | Hydra stainless steel bellows

Preferred dimensions



### 6.3 | Hydra stainless steel bellows

Preferred dimensions



Reference diameter	Nominal pressure P <sub>N</sub> *	Bellows profile					Material	Corrugation length l <sub>w</sub>	Max. number of corrugations	Ø Tolerances		B-cuff Ø d <sub>4</sub>	S-cuff		J-cuff		Nominal deflection per corrugation (for 10,000 load cycles)			Spring rate per corrugation (±30%)			Effective cross-section A	Weight per corrugation
		d <sub>i</sub>	D <sub>A</sub>	n <sub>L</sub>	s					d <sub>i</sub>	D <sub>A</sub>		Ø inside d <sub>3</sub>	Length l <sub>2</sub>	Ø inside d <sub>3</sub>	Length l <sub>2</sub>	axial 2δ <sub>n,0</sub>	angular 2α <sub>n,0</sub>	lateral 2λ <sub>n,0</sub>	axial c <sub>0</sub>	angular c <sub>α</sub>	lateral c <sub>l</sub>		
110	40	110.2 x 130.0 x 3 x 0.30	1.4571	7.00	48	-0.7/+0.3	±1.5	125.0	-	-	110.2	10	±0.70	±0.60	±0.012	1600	50.00	706000	113	55				
	60	110.2 x 132.0 x 4 x 0.30	1.4571	7.50	42	-0.7/+0.3	±1.5	125.0	-	-	110.2	10	±0.65	±0.55	±0.010	2050	65.00	802000	115	72				
	70	110.2 x 134.0 x 5 x 0.30	1.4571	8.00	40	-0.7/+0.3	±1.5	125.0	-	-	110.2	10	±0.60	±0.50	±0.008	2200	71.00	769000	117	90				
115	10	115.0 x 140.0 x 1 x 0.30	1.4571	6.80	38	-0.5/+1.5	-1.5/+0.5	132.0	-	-	115.0	10	±1.00	±0.80	±0.017	330	11.70	174000	128	26.0				
	18	115.0 x 133.0 x 1 x 0.30	1.4571	5.10	52	-0.5/+1.5	-1.5/+0.5	127.5	-	-	115.0	10	±0.50	±0.40	±0.006	780	26.20	692000	121	19.0				
	40	115.0 x 133.0 x 2 x 0.30	1.4571	5.30	40	-0.5/+1.5	-1.5/+0.5	127.5	-	-	115.0	10	±0.45	±0.40	±0.006	1550	52.00	1273000	121	37.4				
135	10	135.0 x 174.0 x 2 x 0.30	1.4571	13.00	42	-0.5/+1.5	-1.5/+0.5	158.0	-	-	135.0	16.5	±3.00	±2.00	±0.080	210	11.00	44500	188	95				
	18	135.0 x 171.0 x 3 x 0.30	1.4571	14.00	39	-0.5/+1.5	-1.5/+0.5	157.0	-	-	135.0	16.5	±2.20	±1.50	±0.065	440	22.50	78800	184	131				
	32	135.0 x 172.0 x 5 x 0.30	1.4571	14.00	39	-0.5/+1.5	-1.5/+0.5	157.0	-	-	135.0	16.5	±2.00	±1.40	±0.060	725	37.30	131000	185	222				
	55	135.0 x 174.0 x 8 x 0.30	1.4571	16.00	34	-0.5/+1.5	-1.5/+0.5	158.0	-	-	135.0	16.5	±1.70	±1.20	±0.055	2500	130.00	350000	188	366				
164	10	164.0 x 203.0 x 2 x 0.30	1.4571	13.00	42	-0.5/+1.5	-1.5/+0.5	-	-	-	164.0	16.4	±3.00	±1.80	±0.070	250	18.40	74700	265	114				
	16	164.0 x 202.0 x 3 x 0.30	1.4571	14.00	39	-0.5/+1.5	-1.5/+0.5	-	-	-	164.0	16.7	±2.60	±1.60	±0.065	425	31.00	109000	263	167				
	25	164.0 x 203.0 x 5 x 0.30	1.4571	15.00	36	-0.5/+1.5	-1.5/+0.5	-	-	-	164.0	16.6	±2.40	±1.40	±0.065	750	33.00	168000	265	282				
	40	164.0 x 205.0 x 8 x 0.30	1.4571	16.00	34	-0.5/+1.5	-1.5/+0.5	-	-	-	164.0	16.3	±2.10	±1.30	±0.060	1210	90.00	241000	267	466				
214	8	214.0 x 255.0 x 2 x 0.30	1.4571	15.00	36	-0.5/+1.5	-1.5/+0.5	-	-	-	214.0	17	±3.30	±1.60	±0.070	275	33.00	100800	432	158				
	12	214.0 x 256.0 x 3 x 0.30	1.4571	16.00	34	-0.5/+1.5	-1.5/+0.5	-	-	-	214.0	17.2	±3.10	±1.50	±0.070	415	50.00	134000	434	241				
	20	214.0 x 257.0 x 5 x 0.30	1.4571	17.00	32	-0.5/+1.5	-1.5/+0.5	-	-	-	214.0	17.2	±3.00	±1.40	±0.070	685	83.00	197000	436	407				
	32	214.0 x 260.0 x 8 x 0.30	1.4571	18.00	30	-0.5/+1.5	-1.5/+0.5	-	-	-	214.0	16.8	±2.80	±1.30	±0.070	1075	132.00	280000	441	685				

\* outside pressure; in the event of inside pressure loads, column stability must also be guaranteed (buckle resistance)