

Spring rates

U110A / D110 non-standard

Axial spring rates (average spring rates from full way and at room temperature in the pipeline*)

Ø mm	Spring rate for					
	0 bar N/mm	1 bar N/mm	2.5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
100	32	50	64	113	161	235
125	35	58	71	121	175	267
150	38	65	77	129	189	298
175	42	72	84	136	202	329
200	45	79	90	144	216	360
250	51	88	107	166	246	405
300	56	98	118	180	269	454
350	73	129	153	239	350	599
400	40	70	83	131	190	322
450	48	85	102	152	235	389
500	55	99	118	171	265	457
550	62	109	127	195	296	501
600	68	119	136	218	326	544
650	69	120	142	223	332	551
700	70	121	147	228	338	557
750	72	126	151	232	346	583
800	73	129	153	239	350	599
850	84	149	178	270	408	685
900	95	169	202	300	466	770
950	116	207	247	361	561	950
1000	136	245	291	422	656	1129
1050	173	322	377	589	893	1497
1100	210	399	462	756	1130	1865
1150	225	429	500	816	1204	2001
1200	240	458	538	876	1277	2136
1250	242	460	537	883	1287	2151
1300	243	461	535	889	1297	2165
1350	244	462	534	896	1307	2179
1400	245	463	532	902	1316	2193
1450	250	478	560	923	1360	2244
1500	255	492	587	944	1403	2295
1600	310	597	685	1138	1668	2821
1650	350	630	752	1303	1905	3195
1700	390	662	818	1468	2142	3569
1800	480	926	1051	1819	2616	4416
1900	550	1064	1216	2050	3021	5049
1950	620	1202	1381	2281	3426	5682
2000	690	1339	1546	2512	3830	6314
2100	835	1607	1879	2998	4676	7690
2200	910	1747	2029	3367	4969	8099
2250	957	1830	2141	3516	5210	8550
2300	1004	1913	2252	3664	5451	9000
2400	1050	1995	2363	3812	5691	9450
2500	1143	2170	2573	4146	6194	10279
2550	1189	2257	2678	4313	6445	10693
2600	1235	2345	2783	4481	6697	11107
2700	1328	2519	2992	4815	7200	11936
2800	1420	2694	3202	5149	7703	12765
2850	1466	2781	3307	5316	7954	13179
2900	1513	2869	3412	5483	8205	13593
3000	1605	3044	3622	5818	8708	14422
3100	1698	3218	3831	6152	9211	15250
3150	1744	3306	3936	6319	9463	15665
3200	1790	3393	4041	6486	9714	16079
3300	1883	3568	4251	6820	10217	16908
3400	1975	3743	4461	7155	10720	17736
3450	2021	3830	4565	7322	10971	18151
3500	2068	3917	4670	7489	11223	18565
3600	2160	4092	4880	7823	11726	19394
4000	2530	4791	5719	9160	13737	22708

Lateral spring rates (average spring rates from full way and at room temperature in the pipeline*)

Ø mm	Spring rate for					
	0 bar N/mm	1 bar N/mm	2.5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
100	100	147	165	196	250	302
125	125	193	216	254	323	381
150	150	239	266	312	395	459
175	175	284	316	370	468	538
200	200	330	366	428	540	616
250	220	370	407	475	605	686
300	250	425	470	545	695	783
350	280	482	529	610	781	882
400	180	315	347	400	513	576
450	190	338	371	420	536	604
500	200	330	366	428	540	616
550	218	359	398	466	588	670
600	235	388	430	503	635	724
650	273	455	502	587	744	846
700	310	521	574	670	853	967
750	310	527	583	676	862	970
800	340	585	643	741	949	1071
850	350	613	673	769	982	1108
900	360	641	702	796	1015	1145
950	370	657	726	876	1049	1181
1000	380	673	749	956	1083	1216
1050	388	643	716	929	1075	1217
1100	395	612	683	901	1067	1217
1150	418	668	733	963	1132	1304
1200	440	724	783	1025	1197	1390
1250	450	734	807	1052	1231	1424
1300	460	744	831	1079	1264	1458
1350	470	754	855	1106	1297	1492
1400	480	763	878	1133	1330	1526
1450	505	824	940	1197	1405	1617
1500	530	885	1002	1261	1479	1707
1600	645	1109	1238	1548	1819	2090
1650	678	1207	1308	1636	1969	2223
1700	710	1304	1378	1723	2118	2355
1800	775	1418	1519	1899	2217	2519
1900	813	1506	1618	2008	2332	2652
1950	852	1594	1717	2117	2448	2786
2000	890	1682	1816	2225	2563	2919
2100	886	1692	1852	2304	2596	2835
2200	1050	2016	2226	2940	3150	3465
2250	1153	2223	2527	3275	3528	3820
2300	1257	2431	2828	3610	3906	4175
2400	1360	2638	3128	3944	4284	4529
2500	1449	2829	3364	4244	4592	4834
2550	1494	2925	3482	4393	4746	4986
2600	1539	3020	3601	4543	4900	5139
2700	1628	3211	3837	4843	5208	5444
2800	1718	3403	4073	5142	5517	5749
2850	1762	3498	4191	5292	5671	5901
2900	1807	3594	4309	5442	5825	6053
3000	1896	3785	4546	5741	6133	6358
3100	1986	3976	4782	6041	6441	6663
3150	2030	4071	4900	6190	6595	6816
3200	2075	4167	5018	6340	6749	6968
3300	2164	4358	5254	6640	7057	7273
3400	2254	4549	5491	6939	7365	7578
3450	2298	4645	5609	7089	7519	7730
3500	2343	4740	5727	7239	7673	7883
3600	2433	4932	5963	7538	7982	8188
4000	2790	5696	6908	8736	9214	9407

*These spring rates should be considered only as approximates which may vary with the elastomers and fabrics used in fabrication and specific construction design. To calculate the approximate spring rate of a multiple arch joint, divide the single arch values by the number of arches.

Spring rates

D110A standard

Axial spring rates (average spring rates from full way and at room temperature in the pipeline*)

Ø mm	Spring rate for					
	0 bar N/mm	1 bar N/mm	2.5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
50	25	42	51	98	134	173
65	24	43	53	100	150	190
80	28	48	58	104	148	185
100	35	59	71	116	206	274
125	36	59	71	137	214	282
150	49	84	102	189	293	390
200	100	153	180	365	568	735
250	105	173	207	388	609	778
300	123	206	248	448	658	883
350	105	153	177	349	567	753
400	154	225	261	516	535	1090
450	167	269	320	581	903	1162
500	196	316	376	686	1060	1364
600	208	264	292	692	1123	1441
700	140	179	198	521	714	954
800	180	240	270	594	975	1258
900	200	320	380	690	1080	1395
1000	225	355	420	742	1248	1568

Lateral spring rates (average spring rates from full way and at room temperature in the pipeline*)

Ø mm	Spring rate for					
	0 bar N/mm	1 bar N/mm	2.5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
50	50	60	65	80	105	145
65	40	65	78	115	150	165
80	35	59	74	136	155	173
100	55	74	88	143	168	192
125	100	162	200	261	293	383
150	120	206	260	309	366	466
200	323	555	723	836	949	1219
250	379	624	806	1022	1173	1479
300	392	647	837	1068	1216	1542
350	305	508	610	762	875	1098
400	338	541	642	817	946	1199
450	342	540	639	821	971	1200
500	426	687	818	1048	1204	1495
600	456	708	834	1062	1295	1586
700	516	798	939	1191	1449	1775
800	558	826	960	1055	1557	1758
900	800	1253	1480	1984	2248	2560
1000	960	1536	1824	2361	2736	2976

D210A standard

Axial spring rates (average spring rates from full way and at room temperature in the pipeline*)

Ø mm	Spring rate for					
	0 bar N/mm	1 bar N/mm	2.5 bar N/mm	3 bar N/mm	6 bar N/mm	10 bar N/mm
32	14	30	56	62	116	180
40	14	30	56	62	116	180
50	12	30	66	76	142	220
65	14	45	87	99	189	286
80	33	75	135	150	258	396
100	28	80	156	176	320	480
125	30	95	186	218	374	580
150	8	68	144	248	320	528
200	42	90	178	204	370	594
250	20	112	224	256	480	768
300	22	108	236	277	520	854
350	28	128	270	310	570	940
400	44	140	296	342	646	1052
500	46	172	354	416	792	1264

Lateral spring rates (average spring rates from full way and at room temperature in the pipeline*)

Ø mm	Spring rate for					
	0 bar N/mm	1 bar N/mm	2.5 bar N/mm	3 bar N/mm	6 bar N/mm	10 bar N/mm
32	11	17	27	30	45	63
40	11	17	27	30	45	63
50	17	35	47	54	79	107
65	21	37	61	61	96	136
80	32	56	92	94	144	204
100	38	77	112	123	180	243
125	45	88	133	150	225	315
150	48	80	116	123	188	265
200	103	155	221	238	343	473
250	126	208	179	308	442	603
300	167	267	337	400	550	750
350	137	263	385	418	587	833
400	187	293	423	457	633	900
500	203	380	536	573	840	1140

*These spring rates should be considered only as approximates which may vary with the elastomers and fabrics used in fabrication and specific construction design. To calculate the approximate spring rate of a multiple arch joint, divide the single arch values by the number of arches.

Guideline values for pressure drop

