

BELLEVILLE SPRING WASHERS

Belleville spring washers are especially suited for applications requiring high loads in small spaces. By combining them in varying sequences, each size gives numerous load-carrying possibilities. These washers have had all set removed during the manufacturing process.

MATERIAL

Spring steel
Commercial 1074 - certified to ASTM A684

Stainless steel (parts with suffix 'S')
Thickness (t) up to and including 1.83mm
Commercial - Type 302
Government AMS 5906 type 302

Thickness (t) over 1.83mm
Commercial - Type 17-7PH certified to AMS 5528

LOAD & DEFLECTION

Typical load-deflection curves for three characteristics proportions of washers listed are shown Figure 1 below. From them, loads at intermediate heights may be estimated. The nominal amount of dish or cone (h) is found by subtracting 't' from 'Lo'.

These typical curves are shown with dotted lines beyond 75% of deflection to indicate that load characteristics in this area are not reliable because of partial bottoming of the washers. Load at 75% deflection is approximately 87% of the load at flat position.

KEY TO MEASUREMENTS

Do = Outside diameter (max)
Di = Inside diameter (min)
t = Thickness
Lo = Approximate Free Height
L₁ = Loaded Height
P₁ = Load at deflection F (min/max)
F = Deflection Lo-L₁
Dh = Free fit in hole diameter
Dr = Free fit over rod diameter
Pf = Load at flat position

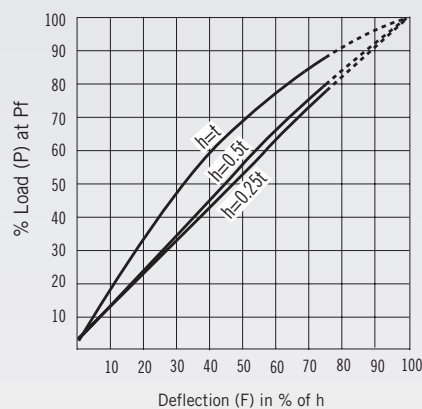
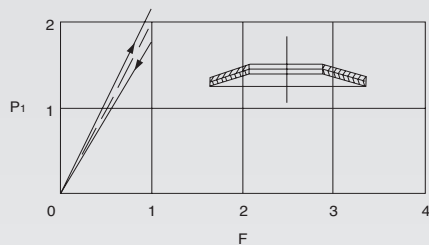
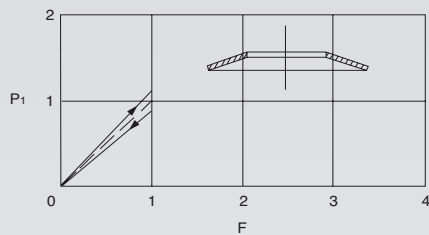
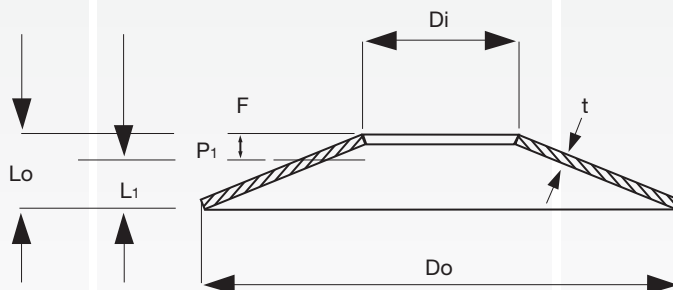


Fig. 1



STOCK BELLEVILLE SPRING WASHERS

Part Number	Dr (mm)	Di (mm)	Do (mm)	Dh (mm)	t (mm)	Lo (mm)	L ₁ (mm)	P ₁ (N)	Pf (N)
B0187-007					0.17	0.33	0.25	25.4-34.7	44
B0187-007-S	2.36	2.36	4.75	4.76	0.17	0.33	0.25	25.4-34.7	44
B0187-010					0.25	0.38	0.32	57.8-78.3	124
B0187-010-S					0.25	0.38	0.32	57.8-78.3	124
B0250-009					0.22	0.44	0.33	44-60.1	75
B0250-009-S					0.22	0.44	0.33	44-60.1	75
B0250-013	3.18	3.18	6.35	6.35	0.34	0.51	0.43	97.9-133.5	214
B0250-013-S					0.34	0.51	0.43	97.9-133.5	214
B0375-019			9.53	9.53	0.47	0.71	0.58	156.7-211.8	325
B0281-010					0.25	0.51	0.38	56.8-76.8	102
B0281-013					0.33	0.53	0.43	92.5-125.4	191
B0281-015	3.51	3.51	7.14	7.14	0.38	0.58	0.48	124.3-173.2	276
B0281-015-S					0.38	0.58	0.48	126.8-171.2	276
B0437-022			11.10	11.13	0.56	0.81	0.69	208.2-281.6	440
B0312-011					0.27	0.55	0.41	70.3-95.2	120
B0312-011-S	3.97	3.96	7.92	7.95	0.27	0.55	0.41	70.3-95.2	120
B0312-017					0.42	0.64	0.53	155.7-214	334
B0312-017-S					0.42	0.64	0.53	155.7-214	334
B0343-013					0.33	0.61	0.46	94.6-127.9	169
B0343-016					0.41	0.66	0.53	136.1-184.1	289
B0343-019	4.17	4.17	8.71	8.74	0.47	0.71	0.58	191.3-302.5	414
B0343-019-S					0.47	0.71	0.58	191.3-302.5	414
B0499-025			12.70	12.70	0.64	0.94	0.79	274-371	583
B0375-015					0.38	0.69	0.53	129-177.9	245
B0375-015-S					0.38	0.69	0.53	129-177.9	245
B0375-018					0.44	0.71	0.58	173-236	360
B0375-020	4.78	4.83	9.53	9.53	0.51	0.76	0.64	227-307	489
B0375-020-S					0.51	0.76	0.64	227-307	489
B0375-030					0.76	0.91	0.84	471.5-640.6	1036
B0562-019			14.27	14.30	0.48	0.94	0.71	169-231	298
B0562-028					0.71	1.07	0.89	329-445	725
B0437-016					0.41	0.79	0.58	151.2-205	267
B0437-016-S					0.41	0.79	0.58	151.2-205	267
B0437-020	5.49	5.59	11.10	11.13	0.51	0.81	0.66	213-393	436
B0437-023					0.58	0.86	0.74	289-396	618
B0687-034			17.45	17.48	0.86	1.27	1.07	471-641	1019
B0500-018					0.46	0.86	0.66	169-231	311
B0500-018-S					0.46	0.86	0.66	169-231	311
B0500-022					0.55	0.91	0.74	245-343	512
B0500-022-S			12.70	12.70	0.55	0.91	0.74	245-343	512
B0500-025					0.64	0.97	0.79	356-489	712
B0500-025-S	6.35	6.48			0.64	0.97	0.79	356-489	712
B0500-038					0.97	1.19	1.09	716-974	1779
B0500-038-S					0.97	1.19	1.09	716-974	1779
B0637-032			16.18	16.28	0.81	1.22	1.02	444-605	988
B0750-025					0.64	1.24	0.94	289-395	507
B0750-036			19.05	19.05	0.91	1.37	1.14	555-750	1161
B0750-052					1.32	1.65	1.47	1174-1592	2491
B0625-022					0.56	1.07	0.81	262-360	467
B0625-022-S					0.56	1.07	0.81	262-360	467
B0625-032			15.88	15.88	0.81	1.22	1.02	547-743	1157
B0625-032-S	7.94	8.05			0.81	1.22	1.02	547-743	1157
B0625-047					1.19	1.50	1.35	1134-1535	2669
B0625-047-S					1.19	1.50	1.35	1134-1535	2669
B0937-030					0.76	1.52	1.14	415.9-564.9	707
B0937-045			23.80	23.83	1.14	1.70	1.42	823-1117	1757
B0937-045-S					1.14	1.70	1.42	823-1117	1757
B0750-028					0.71	1.30	0.99	414-565	778
B0750-028-S					0.71	1.30	0.99	414-565	778
B0750-034					0.86	1.40	1.12	627-850	1254
B0750-034-S			19.05	19.05	0.86	1.40	1.12	627-850	1254
B0750-040					1.02	1.50	1.24	885-1205	1846
B0750-040-S	9.53	9.65			1.02	1.50	1.24	885-1205	1846
B0750-056					1.42	1.78	1.60	1624-2202	3759
B0750-056-S					1.42	1.78	1.60	1624-2202	3759
B0950-047			24.13	24.21	1.19	1.78	1.47	986-1334	2060
B1125-053					1.35	2.03	1.68	1128-1530	2380
B1125-053-S			28.58	28.58	1.35	2.03	1.68	1128-1530	2380
B1125-078					1.98	2.46	2.24	2251-3056	5494
B0875-031	11.11	11.23	22.23	22.23	0.79	1.50	1.14	507-694	912
B0875-031-S					0.79	1.50	1.14	507-694	912
B0875-045	11.11	11.23	22.23	22.23	1.14	1.70	1.42	1018-1383	2202
B0875-045-S					1.14	1.70	1.42	1018-1383	2202



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Part Number	Dr (mm)	Di (mm)	Do (mm)	Dh (mm)	t (mm)	Lo (mm)	L ₁ (mm)	P ₁ (N)	Pf (N)
B1000-035					0.89	1.70	1.30	658-899	1157
B1000-035-S					0.89	1.70	1.30	658-899	1157
B1000-043					1.09	1.80	1.45	943-1281	1917
B1000-043-S			25.40	25.40	1.09	1.80	1.45	943-1281	1917
B1000-050					1.27	1.91	1.57	1286-1739	2669
B1000-050-S	12.70	12.83			1.27	1.91	1.57	1286-1739	2669
B1000-073					1.85	2.31	2.08	2549-3456	5938
B1000-073-S					1.85	2.31	2.08	2549-3456	5938
B1262-060			32.05	32.16	1.52	2.31	1.91	1548-2091	3252
B1500-047					1.19	2.36	1.78	947-1285	1628
B1500-070			38.10	38.10	1.78	2.64	2.21	1868-2535	3986
B1500-070-S					1.78	2.64	2.21	1868-2535	3986
B1500-102					2.59	3.25	2.92	3928-5316	9163
B1125-038					0.97	1.85	1.40	733-1001	1268
B1125-038-S	14.29	14.40	28.58	28.58	0.97	1.85	1.40	733-1001	1268
B1125-056					1.42	2.13	1.78	1530-2073	3269
B1125-056-S					1.42	2.13	1.78	1530-2073	3269
B1250-040					1.02	2.08	1.55	867-1179	1468
B1250-040-S					1.02	2.08	1.55	867-1179	1468
B1250-051					1.30	2.21	1.75	1361-1664	2589
B1250-062			31.75	31.75	1.57	2.34	1.96	1793-2433	3870
B1250-062-S					1.57	2.34	1.96	1793-2433	3870
B1250-089	15.88	16.00			2.26	2.82	2.54	3705-5013	8514
B1250-089-S					2.26	2.82	2.54	3705-5013	8514
B1875-057					1.45	2.92	2.16	1481-1810	2322
B1875-086			47.63	47.63	2.18	3.28	2.72	2758-3737	5867
B1875-086-S					2.18	3.28	2.72	2758-3737	5867
B1875-127					3.23	4.01	3.61	5223-8420	13812
B1375-044					1.12	2.24	1.65	1001-1357	1668
B1375-044-S	17.46	17.58	34.93	34.93	1.12	2.24	1.65	1001-1357	1668
B1375-067					1.70	2.57	2.13	2260-2767	4559
B1500-045					1.14	2.36	1.75	1072-1450	1779
B1500-045-S					1.14	2.36	1.75	1072-1450	1779
B1500-060					1.52	2.59	2.06	1721-2326	3443
B1500-062-S					1.57	2.72	2.06	1618-2428	3443
B1500-072			38.10	38.10	1.83	2.72	2.26	2513-3403	5249
B1500-072-S	19.05	19.18			1.83	2.72	2.26	2513-3403	5249
B1500-107					2.72	3.40	3.07	5293-7162	12602
B1500-107-S					2.72	3.40	3.07	5293-7162	12602
B2250-068					1.73	3.48	2.62	2059-2460	3256
B2250-102			57.15	57.15	2.59	3.89	3.23	4048-4951	8105
B2250-150					3.81	4.78	4.29	8242-11161	19105
B1750-057					1.45	2.90	2.16	1699-2304	2891
B1750-057-S	22.23	22.23	44.45	44.45	1.45	2.90	2.16	1699-2304	2891
B1750-085					2.16	3.25	2.69	3180-4915	7251
B1750-085-S					2.16	3.25	2.69	2668-5427	7251
B2000-065					1.65	3.30	2.49	2233-3020	3825
B2000-065-S					1.65	3.30	2.49	2233-3020	3825
B2000-084					2.13	3.45	2.79	3322-4372	6619
B2000-097	25.40	25.40	50.80	50.80	2.46	3.68	3.07	4457-6041	9519
B2000-097-S					2.46	3.68	3.07	4457-6041	9519
B2000-142					3.61	4.50	4.06	9110-12330	21458
B3000-090			76.20	76.20	2.29	4.57	3.43	3234-4372	5534
B3000-135					3.43	5.13	4.27	6886-8420	13870
B2250-073					1.85	3.76	2.87	2762-3736	4893
B2250-111	28.58	28.58	57.15	57.15	2.82	4.19	3.53	5520-7468	12366
B2250-159					4.04	5.03	4.55	11343-15390	26569
B2500-080					2.03	4.06	3.05	3287-4448	5605
B2500-080-S					2.03	4.06	3.05	3287-4448	5605
B2500-120	31.75	31.75	63.50	63.50	3.05	4.57	3.81	6655-9003	14234
B2500-120-S					3.05	4.57	3.81	6655-9003	14234
B2500-175					4.45	5.56	5.00	13722-18571	31800
B3750-168			95.25	95.25	4.27	6.38	5.31	10444-12766	21147
B2750-087	34.93	34.93	69.85	69.85	2.21	4.39	3.35	3630-4911	6405
B2750-132					3.35	4.98	4.19	7375-9977	14279
B3000-093	38.10	38.10	76.20	76.20	2.36	4.80	3.63	4199-5681	7251
B3000-143					3.63	5.41	4.57	9127-11156	19483
B4000-125	50.80	50.80	101.60	101.60	3.18	6.35	4.75	7602-10284	12944
B4000-187					4.75	7.11	5.92	15163-20514	32383

