

MATIS

STOCK SIZES-Belleville Spring Washers
High-Carbon

Catalog Number	Maximum O.D. Inches	Minimum I.D. Inches	Stock Thickness t Inches	H (approx.) inches	H ¹ Recommend Maximum Deflection Inches	P ¹ Pressure at H ¹ Lbs.	P (calculated load at flat position) Lbs.
187-007	.187	.093	.0065	.013	.010	6.1- 7.5	9.9
187-010	.187	.093	.010	.015	.0125	13.7- 16.9	27.8
250-009	.250	.125	.0086	.0172	.013	10.5- 12.9	16.9
250-013	.250	.125	.0133	.020	.017	23.6- 29.0	48.0
312-011	.312	.156	.0108	.0216	.016	16.7- 20.5	27.0
312-017	.312	.156	.0166	.025	.021	37.2- 45.6	75.0
375-015	.375	.190	.015	.027	.021	31.5- 38.5	55.0
375-020	.375	.190	.020	.030	.025	54.0- 66.0	110.0
500-018	.500	.255	.018	.034	.026	40.5- 49.5	70.0
500-025	.500	.255	.025	.038	.031	85.0- 105.0	160.0
625-022	.625	.317	.022	.042	.032	63.0- 77.0	105.0
625-032	.625	.317	.032	.048	.040	130.0- 160.0	260.0
750-028	.750	.380	.028	.051	.039	99.0- 121.0	175.0
750-040	.750	.380	.040	.059	.049	211.0- 259.0	415.0
1000-035	1.000	.505	.035	.067	.051	157.0- 193.0	260.0
1000-050	1.000	.505	.050	.075	.042	306.0- 374.0	600.0
1250-040	1.250	.630	.040	.082	.061	207.0- 253.0	330.0
1250-062	1.250	.630	.062	.092	.077	427.0- 523.0	870.0
1500-045	1.500	.755	.045	.093	.069	255.0- 313.0	400.0
1500-072	1.500	.755	.072	.107	.089	598.0- 732.0	1180.0
2000-065	2.000	1.000	.065	.130	.098	531.0- 649.0	860.0
2000-097	2.000	1.000	.097	.145	.121	1062.0-1298.0	2140.0
2500-080	2.500	1.250	.080	.160	.120	739.0-1000.0	1260.0
2500-120	2.500	1.250	.120	.180	.150	1584.0-1936.0	3200.0

OTHER SIZES AVAILABLE UPON REQUEST

Stacked Belleville Spring Washers

Since the deflection in a single belleville spring washer is relatively small, it is often necessary to combine a number of washers. Stacking them in series increases the deflection in proportion to the number of washers, the load remaining the same as with a single washer.

In order to increase the load, the washers may be stacked in parallel as shown in Fig. 1. Theoretically, this increases the load in proportion to the number of washers. However, friction between the washers causes an apparent "hysteresis" in the load-deflection curve. Test curves made on laboratory equipment without vibration using part No. 1000-035. The width of the "hysteresis" loop is in the order of 6% for each washer added in parallel, but it may vary

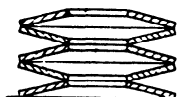
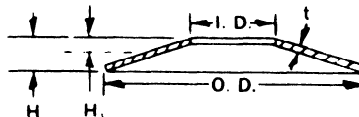
with lubrication and surface finish and may change during the life of the mechanism due to burnishing of adjacent surfaces. The test curve for five in parallel also illustrates the extra deflection which occurs due to imperfect nesting of the washers.

A stack of washers may be installed either on a rod or in a cylinder. For dynamic applications the guides should be hardened to Rockwell C48 minimum. Also hardened flat end plates may be added to prevent indenting adjacent parts.

These belleville spring washers are especially suited to high loads in small space. By combining the washers in varying sequence, each size gives numerous combinations of load-carrying possibilities.

Belleville spring washers have had all set removed during manufacture.

Fig. 1



FIVE IN SERIES



SIX IN PARALLEL



TWO IN PARALLEL
THREE IN SERIES

Material

Spring Steel

Commercial—1075

Government—QQ-S-777 #1075