

# BELLEVILLE SPRING WASHERS

## Guide to using tables

### Outside Diameter

maximum size of outside diameter. If the spring is to be enclosed hole sizes must be greater than this dimension.

### Thickness

of the Spring Section

### Overall Height Unloaded

of a single spring washer

### Price Group

reference to the price list

### Calculated Load at Flat

load when the spring washer is fully compressed

### Lee Stock Number

ordering reference.

### Inside Diameter

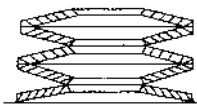
minimum size of hole at centre. Mandrel sizes must be less than this dimension.

**BELLEVILLE SPRING WASHERS**  
● Manufactured from 300 series stainless steel and passivated to ASTM A967

LEE STOCK NUMBER	INSIDE DIAMETER MINIMUM		OUTSIDE DIAMETER MAXIMUM		THICKNESS		OVERALL HEIGHT UNLOADED		CALCULATED LOAD AT FLAT	PRICE GROUP
	MM	IN	MM	IN	MM	IN	MM	IN		
093-005-188	2.25	0.093	4.78	0.188	0.13	0.005	0.36	0.014	25	5.7
093-006-188					0.15	0.006	0.38	0.015	44	9.8
093-007-188					0.18	0.007	0.36	0.014	54	12.2
093-009-188					0.23	0.009	0.36	0.014	82	18.4
093-010-188					0.25	0.010	0.38	0.015	113	25.3
138-005-250	3.18	0.125	6.35	0.250	0.20	0.008	0.41	0.016	52	11.8
138-010-281					0.33	0.013	0.51	0.020	197	44.3
138-013-281	3.51	0.138	7.14	0.281	0.25	0.010	0.51	0.020	100	22.6
138-015-281					0.33	0.013	0.53	0.021	176	39.7
148-015-281					0.38	0.015	0.58	0.023	271	60.9
148-015-281	3.76	0.148	7.14	0.281	0.38	0.015	0.61	0.024	318	71.4
156-009-312	3.96	0.156	7.92	0.312	0.23	0.009	0.51	0.020	66	14.8
156-010-312					0.25	0.010	0.51	0.020	82	18.5
156-011-312					0.28	0.011	0.55	0.022	116	26.1
156-015-312					0.38	0.015	0.58	0.023	222	49.9
156-017-312					0.43	0.017	0.64	0.025	323	72.6
187-012-375	4.75	0.187	9.53	0.375	0.30	0.012	0.61	0.024	118	26.5
187-015-375					0.38	0.015	0.64	0.025	192	43.1
187-017-375					0.43	0.017	0.66	0.026	251	56.5
187-020-375					0.51	0.020	0.74	0.029	409	92.0
187-022-375					0.56	0.022	0.76	0.030	484	108.8
187-030-375					0.76	0.030	0.91	0.036	921	206.9
187-020-562	4.75	0.187	14.27	0.562	0.48	0.020	0.94	0.037	307	69.0
187-028-562					0.71	0.028	1.07	0.042	694	156.0
218-020-437	5.54	0.218	11.10	0.437	0.51	0.020	0.81	0.032	402	90.3
218-023-437					0.58	0.023	0.86	0.034	560	125.9
218-035-687			17.45	0.687	0.86	0.035	1.27	0.050	969	217.7
250-017-500	6.35	0.250	12.70	0.500	0.43	0.017	0.74	0.029	189	42.4
250-018-500					0.46	0.018	0.76	0.030	224	50.4
250-020-500					0.51	0.020	0.81	0.032	307	69.1
250-023-500					0.58	0.023	0.91	0.036	506	113.8
250-024-500					0.61	0.024	0.97	0.038	620	139.3
250-025-500					0.64	0.025	0.99	0.039	700	157.4
250-038-500					0.97	0.038	1.19	0.047	1,581	353.3
250-042-562			14.27	0.562	1.07	0.042	1.40	0.055	2,314	520.0
250-052-687			17.45	0.687	1.32	0.052	1.75	0.069	3,653	820.9
250-025-750			19.05	0.750	0.64	0.025	1.24	0.049	476	106.9
250-052-750					1.32	0.052	1.65	0.065	2,319	521.1
250-070-937			23.80	0.937	1.78	0.070	2.54	0.100	8,316	1,868.9
312-024-625	7.92	0.312	15.88	0.625	0.61	0.024	1.02	0.040	453	101.8
312-030-625					0.76	0.030	1.12	0.044	774	173.9
312-031-625					0.76	0.031	1.22	0.048	1,037	233.0
312-047-674					1.19	0.047	1.50	0.059	1,732	389.2
					0.687	1.32	0.052	1.73		
					0.75	1.02	0.040	1.75		
					0.76	0.030	1.75			

### ADDITIONAL INFORMATION

- 1 Our Belleville Spring Washers are manufactured from 300 series stainless steel and ASTM A967 (supercedes QQ-P-35)
- 2 A Belleville Spring Washer is a washer in the form of a cone, having constant material thickness, and used as a compression spring.
- 3 Unlike compression springs Belleville Spring Washers provide exceptionally high loads in restricted spaces.
- 4 Load flexibility can be varied by stacking the washers in various configurations (see below).
- 5 To minimise friction and optimise load ensure stacks of springs are guided over a shaft or in a cylinder.



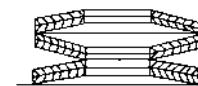
FIVE IN SERIES

**Series**  
Force is equal to that of a single spring washer. Deflection amounts to that of a single spring washer multiplied by the number used.



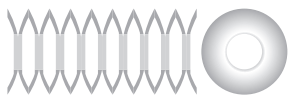
SIX IN PARALLEL

**Parallel**  
Force is equal to that of a single spring washer multiplied by the number of stacked.



COMBINATION OF PARALLEL AND SERIES

**Combination**  
Force is equal to that of a single spring multiplied by the number in each parallel series. Deflection is equal to a single spring washer multiplied by the number of series.

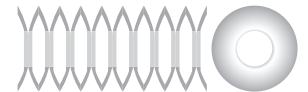


# BELLEVILLE SPRING WASHERS

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LEE STOCK NUMBER	INSIDE DIAMETER MINIMUM		OUTSIDE DIAMETER MAXIMUM		THICKNESS		OVERALL HEIGHT UNLOADED		CALCULATED LOAD AT FLAT		PRICE GROUP		
	MM	IN	MM	IN	MM	IN	MM	IN	N	LB			
093-005-188	2.36	0.093	4.78	0.188	0.13	0.005	0.36	0.014	25	5.7	L		
093-006-188					0.15	0.006	0.38	0.015	44	9.8	L		
093-007-188					0.18	0.007	0.36	0.014	54	12.2	L		
093-009-188					0.23	0.009	0.36	0.014	82	18.4	L		
093-010-188					0.25	0.010	0.38	0.015	113	25.3	L		
125-008-250	3.18	0.125	6.35	0.250	0.20	0.008	0.41	0.016	52	11.8	K		
125-013-250					0.33	0.013	0.51	0.020	197	44.3	K		
138-010-281	3.51	0.138	7.14	0.281	0.25	0.010	0.51	0.020	100	22.6	K		
138-013-281					0.33	0.013	0.53	0.021	176	39.7	K		
138-015-281					0.38	0.015	0.58	0.023	271	60.9	K		
148-015-281	3.76	0.148	7.14	0.281	0.38	0.015	0.61	0.024	318	71.4	K		
156-009-312	3.96	0.156	7.92	0.312	0.23	0.009	0.51	0.020	66	14.8	K		
156-010-312					0.25	0.010	0.51	0.020	82	18.5	K		
156-011-312					0.28	0.011	0.55	0.022	116	26.1	K		
156-015-312					0.38	0.015	0.58	0.023	222	49.9	K		
156-017-312					0.43	0.017	0.64	0.025	323	72.6	K		
187-012-375	4.75	0.187	9.53	0.375	0.30	0.012	0.61	0.024	118	26.5	K		
187-015-375					0.38	0.015	0.64	0.025	192	43.1	K		
187-017-375					0.43	0.017	0.66	0.026	251	56.5	K		
187-020-375					0.51	0.020	0.74	0.029	409	92.0	K		
187-022-375					0.56	0.022	0.76	0.030	484	108.8	K		
187-030-375					0.76	0.030	0.91	0.036	921	206.9	K		
187-020-562	4.75	0.187	14.27	0.562	0.48	0.020	0.94	0.037	307	69.0	K		
187-028-562					0.71	0.028	1.07	0.042	694	156.0	K		
218-020-437	5.54	0.218	11.10	0.437	0.51	0.020	0.81	0.032	402	90.3	K		
218-023-437					0.58	0.023	0.86	0.034	560	125.9	K		
218-035-687					17.45	0.687	0.86	0.035	1.27	0.050	969	217.7	K
250-017-500	6.35	0.250	12.70	0.500	0.43	0.017	0.74	0.029	189	42.4	K		
250-018-500					0.46	0.018	0.76	0.030	224	50.4	K		
250-020-500					0.51	0.020	0.81	0.032	307	69.1	K		
250-023-500					0.58	0.023	0.91	0.036	506	113.8	K		
250-024-500					0.61	0.024	0.97	0.038	620	139.3	K		
250-025-500					0.64	0.025	0.99	0.039	700	157.4	K		
250-038-500					0.97	0.038	1.19	0.047	1,581	355.3	K		
250-042-562					14.27	0.562	1.07	0.042	1.40	0.055	2,314	520.0	K
250-052-687					17.45	0.687	1.32	0.052	1.75	0.069	3,653	820.9	K
250-025-750					19.05	0.750	0.64	0.025	1.24	0.049	476	106.9	L
250-052-750					1.32	0.052	1.65	0.065	2,319	521.1	L		
250-070-937					23.80	0.937	1.78	0.070	2.54	0.100	8,316	1,868.9	L
312-024-625					7.92	0.312	15.88	0.625	0.61	0.024	1.02	0.040	453
312-030-625	0.76	0.030	1.12	0.044					774	173.9	K		
312-031-625	0.76	0.031	1.22	0.048					1,037	233.0	K		
312-047-625	1.19	0.047	1.50	0.059					2,551	573.2	K		
312-052-687	17.45	0.687	1.32	0.052					1.73	0.068	3,646	819.3	K
312-040-875	22.23	0.875	1.02	0.040					1.45	0.057	1,022	229.6	L
312-030-937	23.80	0.937	0.76	0.030					1.52	0.060	658	147.9	L
312-045-937	1.14	0.045	1.70	0.067					1,629	366.1	L		
312-070-937	1.78	0.070	2.39	0.094					6,690	1,503.5	L		
312-080-1000	7.92	0.312	25.40	1.000					2.03	0.080	2.82	0.111	11,275
375-028-750	9.53	0.375	19.05	0.750	0.71	0.028	1.07	0.042	437	98.3	L		
375-030-750					0.76	0.030	1.12	0.044	538	120.9	L		
375-035-750					0.89	0.035	1.40	0.055	1,220	274.2	L		
375-038-750					0.97	0.038	1.22	0.048	781	175.5	L		
375-040-750					1.02	0.040	1.50	0.059	1,730	388.9	L		
375-042-750					1.07	0.042	1.32	0.052	1,054	236.9	L		
375-044-750					1.12	0.044	1.37	0.054	1,212	272.4	L		
375-057-750					1.45	0.057	1.396	0.070	3,426	769.9	L		
375-062-750					1.57	0.062	1.98	0.078	5,426	1,219.4	L		

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LEE STOCK NUMBER	INSIDE DIAMETER MINIMUM		OUTSIDE DIAMETER MAXIMUM		THICKNESS		OVERALL HEIGHT UNLOADED		CALCULATED LOAD AT FLAT		PRICE GROUP		
	MM	IN	MM	IN	MM	IN	MM	IN	N	LB			
375-080-1000	9.53	0.375	25.40	1.000	2.03	0.080	2.77	0.109	10,763	2,418.8	L		
375-078-1125			28.58	1.125	1.98	0.078	2.46	0.097	5,084	1,142.5	N		
437-031-875	11.10	0.437	22.23	0.875	0.79	0.031	1.50	0.059	872	195.9	L		
437-042-875						1.07	0.042	1.57	0.062	1,548	347.9	L	
437-035-1000			25.40	1.000	0.89	0.035	1.70	0.067	1,034	232.5	L		
437-040-1000						1.02	0.040	1.80	0.071	1,496	336.2	L	
437-050-1000						1.27	0.050	2.16	0.085	3,299	741.3	N	
437-080-1000						2.03	0.080	2.69	0.106	10,037	2,255.6	N	
500-033-1000	12.70	0.500	25.40	1.000	0.84	0.033	1.32	0.052	547	122.8	L		
500-035-1000						0.89	0.035	1.45	0.057	755	169.7	L	
500-045-1000						1.14	0.045	1.55	.061	1,167	262.3	N	
500-050-1000						1.27	0.050	1.91	0.075	2,501	562.1	N	
500-073-1000						1.85	0.073	2.31	0.091	5,605	1,259.6	N	
500-080-1000						2.03	0.080	2.62	0.103	9,426	2,118.3	N	
500-030-1375					34.93	1.375	0.76	0.030	1.68	0.066	371	83.3	P
500-032-1375							0.81	0.032	1.78	0.070	475	106.7	P
500-047-1500					38.10	1.500	1.19	0.047	2.36	0.093	1,515	340.4	R
500-070-1500							1.78	0.070	2.64	0.104	3,699	831.2	R
500-080-1500					2.03	0.080	2.49	0.098	2,923	656.9	R		
531-062-1125	13.49	0.531	28.58	1.125	1.57	0.062	2.11	0.083	3,074	690.9	N		
531-062-1250			31.75	1.250	1.57	0.062	2.34	0.092	3,418	768.2	N		
531-078-1250						1.98	0.078	2.62	0.103	5,672	1,274.7	N	
562-038-1125	14.27	0.562	28.58	1.125	0.97	0.038	1.85	0.073	1,214	272.8	N		
562-057-1125						1.45	0.057	2.13	0.084	3,161	710.3	N	
625-050-1125	15.88	0.625	28.58	1.125	1.27	0.050	1.73	0.068	1,527	343.2	P		
625-040-1250			31.75	1.250	1.02	0.040	2.08	0.082	1,377	309.5	P		
625-062-1250						1.57	0.062	2.34	0.092	3,663	823.1	P	
625-050-1375			34.93	1.375	1.27	0.050	2.41	0.095	2,276	511.5	Q		
625-062-1375						1.57	0.062	2.79	0.110	4,629	1,040.3	Q	
625-078-1375						1.98	0.078	2.54	0.100	4,225	949.4	Q	
625-062-1625					41.28	1.625	1.57	0.062	2.13	0.084	1,446	325.0	R
625-057-1875					47.63	1.875	1.45	0.057	2.92	0.115	2,180	490.0	R
750-040-1500			19.05	0.750	38.10	1.500	1.02	0.040	1.73	0.068	637	143.3	R
750-045-1500								1.14	0.045	2.36	0.093	1,556	349.7
875-057-1750	22.23	0.875	44.45	1.750	1.45	0.057	2.90	0.114	2,759	620.0	R		
1000-065-2000	25.40	1.000	50.80	2.000	1.65	0.065	3.30	0.130	3,572	802.7	R		
1000-078-2000						1.98	0.078	3.51	0.138	5,698	1,280.4	R	
1000-078-2375			60.33	2.375	1.98	0.078	3.99	0.157	4,952	1,112.8	W		
1125-073-2250	28.58	1.125	57.15	2.250	1.85	0.073	3.76	0.148	4,613	1,036.7	W		
1250-080-2500	31.75	1.250	63.50	2.500	2.03	0.080	4.06	0.160	5,246	1,178.9	W		