Smalley®
Steel Ring Company

Linear Springs

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- Over 200 sizes

SPECIALS
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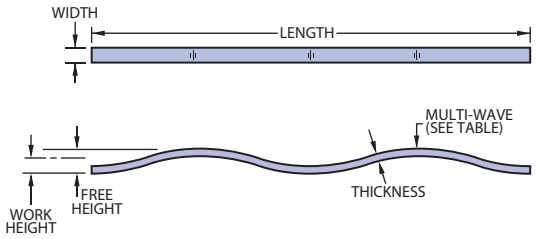


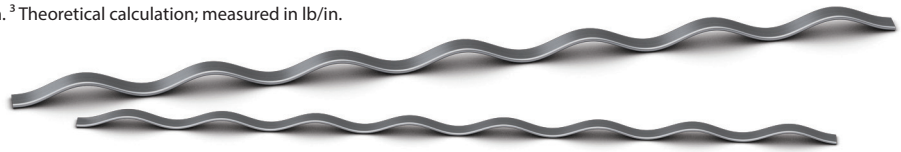
Smalley Linear Springs

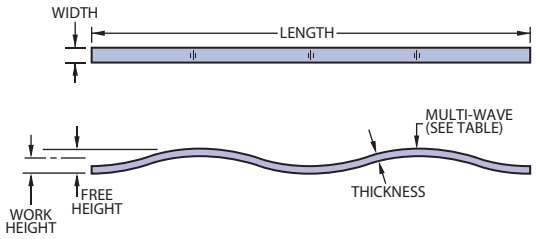
Smalley Linear Springs are a continuous wave formed (marcelled) wire length produced from spring tempered materials. They act as a load bearing device having approximately the same load/deflection characteristics as a wave spring. Axial pressure is obtained by laying the expander flat in a straight line.

All dimensions in inches unless otherwise specified.

Smalley Part Number[1]	Number of Waves	Thickness	Width	Length	Free Height[2]	Load (lb)	Work Height	Spring Rate[3]
LS12188-1	1	0.012	0.188	1.500	0.225	1.5	0.125	11
LS12188-2	2	0.012	0.188	3.000	0.225	5.6	0.125	91
LS12188-3	3	0.012	0.188	4.500	0.225	10.4	0.125	136
LS12188-4	4	0.012	0.188	6.000	0.225	14.8	0.125	182
LS12250-1	1	0.012	0.250	1.500	0.225	2.2	0.125	15
LS12250-2	2	0.012	0.250	3.000	0.225	7.8	0.125	121
LS12250-3	3	0.012	0.250	4.500	0.225	13.9	0.125	181
LS12250-4	4	0.012	0.250	6.000	0.225	19.8	0.125	242
LS12312-1	1	0.012	0.312	1.500	0.225	2.9	0.125	19
LS12312-2	2	0.012	0.312	3.000	0.225	10.2	0.125	151
LS12312-3	3	0.012	0.312	4.500	0.225	17.6	0.125	226
LS12312-4	4	0.012	0.312	6.000	0.225	26.0	0.125	302
LS12375-1	1	0.012	0.375	1.500	0.225	3.5	0.125	23
LS12375-2	2	0.012	0.375	3.000	0.225	11.3	0.125	181
LS12375-3	3	0.012	0.375	4.500	0.225	20.1	0.125	272
LS12375-4	4	0.012	0.375	6.000	0.225	25.2	0.125	362
LS20188-1	1	0.020	0.188	1.875	0.250	3.0	0.150	27
LS20188-2	2	0.020	0.188	3.750	0.250	11.4	0.150	215
LS20188-3	3	0.020	0.188	5.625	0.250	23.5	0.150	323
LS20188-4	4	0.020	0.188	7.500	0.250	32.5	0.150	431
LS20250-1	1	0.020	0.250	1.875	0.250	5.6	0.150	36
LS20250-2	2	0.020	0.250	3.750	0.250	17.6	0.150	286
LS20250-3	3	0.020	0.250	5.625	0.250	31.7	0.150	430
LS20250-4	4	0.020	0.250	7.500	0.250	44.9	0.150	573
LS20312-1	1	0.020	0.312	1.875	0.250	6.0	0.150	45
LS20312-2	2	0.020	0.312	3.750	0.250	20.5	0.150	357
LS20312-3	3	0.020	0.312	5.625	0.250	34.9	0.150	536
LS20312-4	4	0.020	0.312	7.500	0.250	50.8	0.150	715
LS20375-1	1	0.020	0.375	1.875	0.250	6.4	0.150	54
LS20375-2	2	0.020	0.375	3.750	0.250	23.3	0.150	430
LS20375-3	3	0.020	0.375	5.625	0.250	52.0	0.150	644
LS20375-4	4	0.020	0.375	7.500	0.250	74.5	0.150	859
LS25188-1	1	0.025	0.188	2.250	0.275	3.5	0.175	30
LS25188-2	2	0.025	0.188	4.500	0.275	15.4	0.175	243
LS25188-3	3	0.025	0.188	6.750	0.275	27.9	0.175	365
LS25188-4	4	0.025	0.188	9.000	0.275	42.5	0.175	487
LS25250-1	1	0.025	0.250	2.250	0.275	6.5	0.175	40
LS25250-2	2	0.025	0.250	4.500	0.275	21.7	0.175	324
LS25250-3	3	0.025	0.250	6.750	0.275	34.7	0.175	486
LS25250-4	4	0.025	0.250	9.000	0.275	50.5	0.175	647
LS25312-1	1	0.025	0.312	2.250	0.275	6.6	0.175	51
LS25312-2	2	0.025	0.312	4.500	0.275	24.0	0.175	404
LS25312-3	3	0.025	0.312	6.750	0.275	43.2	0.175	606
LS25312-4	4	0.025	0.312	9.000	0.275	62.0	0.175	808
LS25375-1	1	0.025	0.375	2.250	0.275	7.7	0.175	61
LS25375-2	2	0.025	0.375	4.500	0.275	29.4	0.175	486
LS25375-3	3	0.025	0.375	6.750	0.275	53.8	0.175	728
LS25375-4	4	0.025	0.375	9.000	0.275	76.9	0.175	971

[1] Add suffix "-S17" for 17-7 stainless steel. [2] Reference dimension. [3] Theoretical calculation; measured in lb/in.





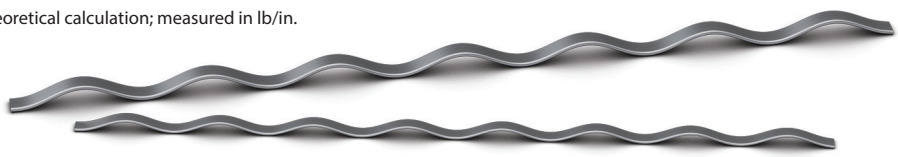
Smalley Linear Springs

Smalley Linear Springs are a continuous wave formed (marcelled) wire length produced from spring tempered materials. They act as a load bearing device having approximately the same load/deflection characteristics as a wave spring. Axial pressure is obtained by laying the expander flat in a straight line.

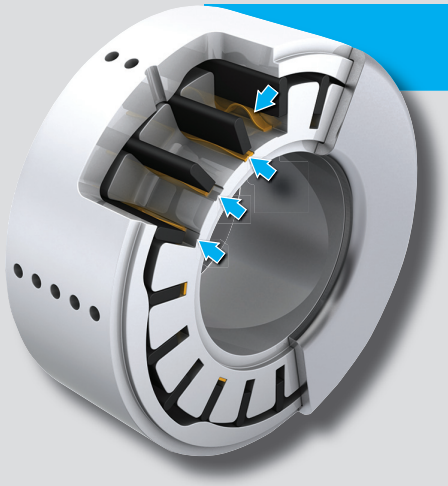
All dimensions in inches unless otherwise specified.

Smalley Part Number[1]	Number of Waves	Thickness	Width	Length	Free Height[2]	Load (lb)	Work Height	Spring Rate[3]
LS38188-1	1	0.038	0.188	2.625	0.300	7.5	0.200	67
LS38188-2	2	0.038	0.188	5.250	0.300	25.0	0.200	538
LS38188-3	3	0.038	0.188	7.875	0.300	61.0	0.200	808
LS38188-4	4	0.038	0.188	10.500	0.300	90.0	0.200	1077
LS38250-1	1	0.038	0.250	2.625	0.300	11.9	0.200	89
LS38250-2	2	0.038	0.250	5.250	0.300	45.7	0.200	716
LS38250-3	3	0.038	0.250	7.875	0.300	74.3	0.200	1074
LS38250-4	4	0.038	0.250	10.500	0.300	111.5	0.200	1432
LS38312-1	1	0.038	0.312	2.625	0.300	9.9	0.200	112
LS38312-2	2	0.038	0.312	5.250	0.300	49.3	0.200	893
LS38312-3	3	0.038	0.312	7.875	0.300	88.0	0.200	1340
LS38312-4	4	0.038	0.312	10.500	0.300	160.7	0.200	1787
LS38375-1	1	0.038	0.375	2.625	0.300	16.9	0.200	134
LS38375-2	2	0.038	0.375	5.250	0.300	61.7	0.200	1074
LS38375-3	3	0.038	0.375	7.875	0.300	105.0	0.200	1611
LS38375-4	4	0.038	0.375	10.500	0.300	153.0	0.200	2148
LS45188-1	1	0.045	0.188	3.000	0.325	9.0	0.225	75
LS45188-2	2	0.045	0.188	6.000	0.325	36.0	0.225	599
LS45188-3	3	0.045	0.188	9.000	0.325	65.0	0.225	898
LS45188-4	4	0.045	0.188	12.000	0.325	89.0	0.225	1198
LS45250-1	1	0.045	0.250	3.000	0.325	12.5	0.225	100
LS45250-2	2	0.045	0.250	6.000	0.325	42.5	0.225	797
LS45250-3	3	0.045	0.250	9.000	0.325	83.0	0.225	1195
LS45250-4	4	0.045	0.250	12.000	0.325	120.5	0.225	1593
LS45312-1	1	0.045	0.312	3.000	0.325	14.7	0.225	124
LS45312-2	2	0.045	0.312	6.000	0.325	60.3	0.225	994
LS45312-3	3	0.045	0.312	9.000	0.325	108.9	0.225	1491
LS45312-4	4	0.045	0.312	12.000	0.325	131.0	0.225	1988
LS45375-1	1	0.045	0.375	3.000	0.325	20.4	0.225	149
LS45375-2	2	0.045	0.375	6.000	0.325	73.1	0.225	1195
LS45375-3	3	0.045	0.375	9.000	0.325	133.5	0.225	1792
LS45375-4	4	0.045	0.375	12.000	0.325	190.0	0.225	2390
LS62188-1	1	0.062	0.188	3.375	0.350	14.3	0.250	138
LS62188-2	2	0.062	0.188	6.750	0.350	67.5	0.250	1100
LS62188-3	3	0.062	0.188	10.125	0.350	105.5	0.250	1650
LS62188-4	4	0.062	0.188	13.500	0.350	159.5	0.250	2200
LS62250-1	1	0.062	0.250	3.375	0.350	22.5	0.250	183
LS62250-2	2	0.062	0.250	6.750	0.350	104.0	0.250	1463
LS62250-3	3	0.062	0.250	10.125	0.350	161.0	0.250	2195
LS62250-4	4	0.062	0.250	13.500	0.350	234.0	0.250	2926
LS62312-1	1	0.062	0.312	3.375	0.350	27.8	0.250	228
LS62312-2	2	0.062	0.312	6.750	0.350	104.0	0.250	1826
LS62312-3	3	0.062	0.312	10.125	0.350	174.5	0.250	2739
LS62312-4	4	0.062	0.312	13.500	0.350	262.5	0.250	3652
LS62375-1	1	0.062	0.375	3.375	0.350	42.0	0.250	274
LS62375-2	2	0.062	0.375	6.750	0.350	139.5	0.250	2195
LS62375-3	3	0.062	0.375	10.125	0.350	240.0	0.250	3292
LS62375-4	4	0.062	0.375	13.500	0.350	353.0	0.250	4389

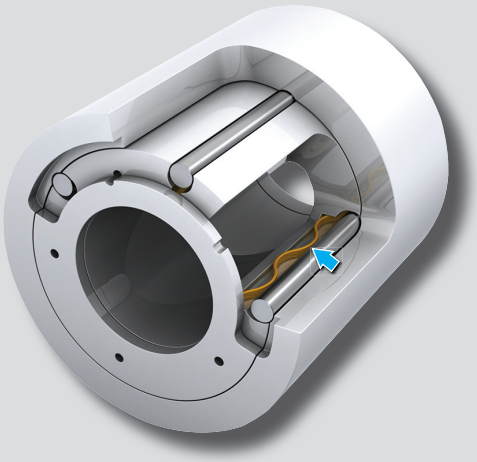
[1] Add suffix "-S17" for 17-7 stainless steel. [2] Reference dimension. [3] Theoretical calculation; measured in lb/in.



Linear Spring Applications

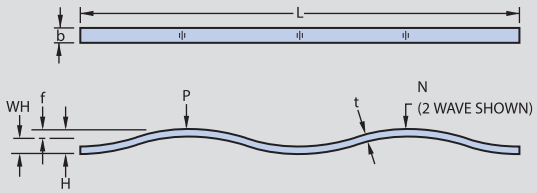


Rotary Vane Pump
Smalley Linear Springs are used to radially load the bottom of the vanes in the pump. The springs energize the vanes against the bore for better sealing.



Detent Preload
Smalley Linear Springs are used to load pins that are positioned inside grooves so a rotating element can detent to specific positions. The springs are designed to exert a precise load to give the rotation a desired resistance.

Engineering



Smalley Linear Springs are a continuous wave formed (marcelled) wire length produced from spring tempered materials. They act as a load bearing device having approximately the same load/deflection characteristics as a wave spring.

Formula: Single wave Linear Spring where N=1

$$\text{Deflection} = f = \frac{P L^3}{4 E b t^3}$$

$$\text{Operating Stress} = S = \frac{3 P L}{2 b t^2}$$

Formula: 2 or more wave Linear Spring where N>1

$$\text{Deflection} = f = \frac{P L^3}{16 E b t^3 N^4}$$

$$\text{Operating Stress} = S = \frac{3 P L}{4 b t^2 N^2}$$

Nomenclature

b	Width of Material, in
E	Modulus of Elasticity, psi
f	Deflection, in
H	Free Height, in
L	Free Length, in
N	Number of Waves
P	Load, lb
S	Operating Stress, psi
t	Thickness of Material, in
WH	Work Height, in