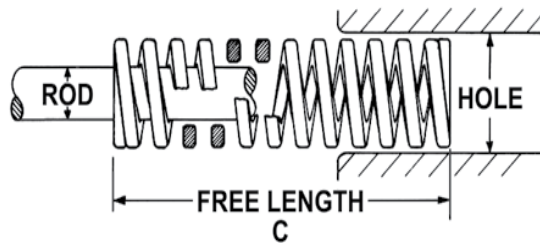


# Medium Duty Die Springs



Color coded **BLUE STRIPE**



Hole Diam. (in)	Rod Diam. (in)	Free Length (in)	Wire Size (in)	CATALOG NUMBER	Pounds @ 1/10 inch defl.	Total Deflection Recommended For Long Life (25% of C)		Total Deflection Recommended For Avg. Life (35% of C)		Maximum Operating Deflection (40% of C)		* Max. Comp. Length (in)
						Load lbs.	Defl. in.	Load lbs.	Defl. in.	Load lbs.	Defl. in.	
3/8	3/16	1.00	0.040 X 0.070	M100L	6.2	15.5	0.25	21.7	0.35	24.8	0.40	0.48
		1.25		M100AL	5.3	16.6	0.31	23.2	0.44	26.5	0.50	0.56
		1.50		M101L	4.2	15.6	0.38	21.8	0.53	24.9	0.60	0.68
		1.75		M101AL	3.5	15.3	0.44	21.4	0.61	24.5	0.70	0.78
		2.00		M102L	2.9	14.5	0.50	20.3	0.70	23.2	0.80	0.94
		2.50		M103L	2.4	15.3	0.63	21.4	0.88	24.4	1.00	1.12
		3.00		M104L	2.1	15.8	0.75	22.1	1.05	25.2	1.20	1.40
		12.00		M105L	0.6	16.8	3.00	23.5	4.20	26.9	4.80	5.11
1/2	9/32	1.00	0.052 X 0.095	M110L	10.7	26.8	0.25	37.5	0.35	42.8	0.40	0.45
		1.25		M110AL	8.2	25.6	0.31	35.9	0.44	41.0	0.50	0.55
		1.50		M111L	6.8	25.5	0.38	35.7	0.53	40.8	0.60	0.66
		1.75		M111AL	6.0	26.3	0.44	36.8	0.61	42.0	0.70	0.73
		2.00		M112L	5.3	26.5	0.50	37.1	0.70	42.4	0.80	0.82
		2.50		M113L	4.3	26.9	0.63	37.6	0.88	43.0	1.00	1.02
		3.00		M114L	3.4	25.5	0.75	35.7	1.05	40.8	1.20	1.25
		3.50		M115L	2.9	25.4	0.88	35.5	1.23	40.6	1.40	1.42
		4.50		M115AL	2.4	27.0	1.13	37.8	1.58	43.2	1.80	1.82
		5.50		M115BL	2.0	27.5	1.38	38.5	1.93	44.0	2.20	2.22
		6.50		M115CL	1.4	22.8	1.63	31.9	2.28	36.4	2.60	2.65
		7.50		M115DL	1.2	22.5	1.88	31.5	2.63	36.0	3.00	3.27
12.00	M116L	0.7	21.0	3.00	29.4	4.20	33.6	4.80	5.24			
5/8	11/32	1.00	0.068 X 0.117	M120L	17.0	42.5	0.25	59.5	0.35	68.0	0.40	0.50
		1.25		M120AL	13.0	40.6	0.31	56.9	0.44	65.0	0.50	0.62
		1.50		M121L	11.1	41.6	0.38	58.3	0.53	66.6	0.60	0.69
		1.75		M121AL	9.6	42.0	0.44	58.8	0.61	67.2	0.70	0.80
		2.00		M122L	8.8	44.0	0.50	61.6	0.70	70.4	0.80	0.89
		2.50		M123L	6.3	39.4	0.63	55.1	0.88	63.0	1.00	1.16
		3.00		M124L	5.6	42.0	0.75	58.8	1.05	67.2	1.20	1.27
		3.50		M125L	4.8	42.0	0.88	58.8	1.23	67.2	1.40	1.46
		4.00		M126L	4.4	44.0	1.00	61.6	1.40	70.4	1.60	1.65
		12.00		M127L	1.5	45.6	3.00	63.8	4.20	73.0	4.80	4.83
		3/4		3/8	1.00	0.085 X 0.155	M1L	31.8	79.5	0.25	111.3	0.35
1.25	M1AL		25.6		80.0		0.31	112.0	0.44	128.0	0.50	0.65
1.50	M2L		20.0		75.0		0.38	105.0	0.53	120.0	0.60	0.77
1.75	M2AL		17.6		77.0		0.44	107.8	0.61	123.2	0.70	0.88
2.00	M3L		14.4		72.0		0.50	100.8	0.70	115.2	0.80	1.03
2.50	M4L		12.0		75.0		0.63	105.0	0.88	120.0	1.00	1.28
3.00	M5L		9.6		72.0		0.75	100.8	1.05	115.2	1.20	1.49
3.50	M6L		8.0		70.0		0.88	98.0	1.23	112.0	1.40	1.74
4.00	M7L		7.2		72.0		1.00	100.8	1.40	115.2	1.60	1.99
4.50	M8L		6.4		72.0		1.13	100.8	1.58	115.2	1.80	2.24
5.00	M9L		6.0		75.0		1.25	105.0	1.75	120.0	2.00	2.48
5.50	M10L		5.5		75.6		1.38	105.9	1.93	121.0	2.20	2.72
6.00	M11L		5.0		75.0		1.50	105.0	2.10	120.0	2.40	2.97
6.50	M11BL		4.5		73.1		1.63	102.4	2.28	117.0	2.60	3.20
7.50	M11CL		3.8		71.3		1.88	99.8	2.63	114.0	3.00	3.64
12.00	M11AL		2.4		72.0		3.00	100.8	4.20	115.2	4.80	5.84

\* NOTE: For design purposes only. We do not recommend deflecting a spring to maximum deflection.

# Inch Standard

Hole Diam. (in)	Rod Diam. (in)	Free Length (in)	Wire Size (in)	CATALOG NUMBER	Pounds @ 1/10 inch defl.	Total Deflection Recommended For Long Life (25% of C)		Total Deflection Recommended For Avg. Life (35% of C)		Maximum Operating Deflection (40% of C)		* Max. Comp. Length (in)
						Load lbs.	Defl. in.	Load lbs.	Defl. in.	Load lbs.	Defl. in.	
1	1/2	1.00	0.105 X 0.212	M12L	55.0	137.5	0.25	192.5	0.35	220.0	0.40	0.51
		1.25		M12AL	45.0	140.6	0.31	196.9	0.44	225.0	0.50	0.66
		1.50		M13L	35.4	132.8	0.38	185.9	0.53	212.4	0.60	0.78
		1.75		M13AL	30.0	131.3	0.44	183.8	0.61	210.0	0.70	0.90
		2.00		M14L	26.0	130.0	0.50	182.0	0.70	208.0	0.80	1.02
		2.50		M15L	20.2	126.3	0.63	176.8	0.88	202.0	1.00	1.27
		3.00		M16L	16.5	123.8	0.75	173.3	1.05	198.0	1.20	1.50
		3.50		M17L	15.0	131.3	0.88	183.8	1.23	210.0	1.40	1.75
		4.00		M18L	12.0	120.0	1.00	168.0	1.40	192.0	1.60	2.00
		4.50		M19L	10.5	118.1	1.13	165.4	1.58	189.0	1.80	2.25
		5.00		M20L	9.6	120.0	1.25	168.0	1.75	192.0	2.00	2.49
		5.50		M21L	8.8	121.0	1.38	169.4	1.93	193.6	2.20	2.74
		6.00		M22L	8.0	120.0	1.50	168.0	2.10	192.0	2.40	2.96
		7.00		M23L	7.2	126.0	1.75	176.4	2.45	201.6	2.80	3.48
		8.00		M24L	6.0	120.0	2.00	168.0	2.80	192.0	3.20	3.86
		12.00		M24AL	4.0	120.0	3.00	168.0	4.20	192.0	4.80	5.76
1-1/4	5/8	1.50	0.125 X 0.270	M36L	51.0	191.3	0.38	267.8	0.53	306.0	0.60	0.75
		1.75		M36AL	42.4	185.5	0.44	259.7	0.61	296.8	0.70	0.88
		2.00		M37L	36.0	180.0	0.50	252.0	0.70	288.0	0.80	1.05
		2.50		M38L	28.8	180.0	0.63	252.0	0.88	288.0	1.00	1.25
		3.00		M39L	24.0	180.0	0.75	252.0	1.05	288.0	1.20	1.46
		3.50		M40L	20.0	175.0	0.88	245.0	1.23	280.0	1.40	1.70
		4.00		M41L	17.6	176.0	1.00	246.4	1.40	281.6	1.60	1.95
		4.50		M42L	16.0	180.0	1.13	252.0	1.58	288.0	1.80	2.20
		5.00		M43L	13.6	170.0	1.25	238.0	1.75	272.0	2.00	2.44
		5.50		M44L	12.8	176.0	1.38	246.4	1.93	281.6	2.20	2.72
		6.00		M45L	12.0	180.0	1.50	252.0	2.10	288.0	2.40	2.98
		7.00		M46L	10.4	182.0	1.75	254.8	2.45	291.2	2.80	3.50
		8.00		M47L	8.8	176.0	2.00	246.4	2.80	281.6	3.20	3.98
		10.00		M48L	7.2	180.0	2.50	252.0	3.50	288.0	4.00	4.98
12.00	M48AL	6.0	180.0	3.00	252.0	4.20	288.0	4.80	5.98			
1-1/2	3/4	2.00	0.158 X 0.315	M49L	54.7	273.5	0.50	382.9	0.70	437.6	0.80	1.03
		2.50		M50L	44.7	279.4	0.63	391.1	0.88	447.0	1.00	1.27
		3.00		M51L	36.0	270.0	0.75	378.0	1.05	432.0	1.20	1.52
		3.50		M52L	30.0	262.5	0.88	367.5	1.23	420.0	1.40	1.74
		4.00		M53L	27.0	270.0	1.00	378.0	1.40	432.0	1.60	1.99
		4.50		M54L	23.0	258.8	1.13	362.3	1.58	414.0	1.80	2.22
		5.00		M55L	21.0	262.5	1.25	367.5	1.75	420.0	2.00	2.46
		5.50		M55AL	18.5	254.4	1.38	356.1	1.93	407.0	2.20	2.72
		6.00		M56L	17.0	255.0	1.50	357.0	2.10	408.0	2.40	2.96
		7.00		M56AL	14.5	253.8	1.75	355.3	2.45	406.0	2.80	3.40
		8.00		M57L	12.8	256.0	2.00	358.4	2.80	409.6	3.20	3.90
		10.00		M58L	10.0	250.0	2.50	350.0	3.50	400.0	4.00	4.86
		12.00		M58AL	8.2	246.0	3.00	344.4	4.20	393.6	4.80	5.86
		2		1	2.50	0.215 X 0.445	M70L	100.0	625.0	0.63	875.0	0.88
3.00	M71L		83.0		622.5		0.75	871.5	1.05	996.0	1.20	1.58
3.50	M72L		65.8		575.8		0.88	806.1	1.23	921.2	1.40	1.84
4.00	M73L		60.0		600.0		1.00	840.0	1.40	960.0	1.60	2.08
4.50	M74L		53.0		596.3		1.13	834.8	1.58	954.0	1.80	2.20
5.00	M75L		47.0		587.5		1.25	822.5	1.75	940.0	2.00	2.58
5.50	M76L		39.8		547.3		1.38	766.2	1.93	875.6	2.20	2.88
6.00	M77L		39.0		585.0		1.50	819.0	2.10	936.0	2.40	3.03
7.00	M79L		31.6		553.0		1.75	774.2	2.45	884.8	2.80	3.58
8.00	M80L		28.5		570.0		2.00	798.0	2.80	912.0	3.20	4.05
10.00	M82L		20.8		520.0		2.50	728.0	3.50	832.0	4.00	5.00
12.00	M83L		17.5		525.0		3.00	735.0	4.20	840.0	4.80	6.17

\* NOTE: For design purposes only. We do not recommend deflecting a spring to maximum deflection.

## Die Spring Basics

A die spring is a highly engineered mechanical spring with specific wire designs that stores energy elastically by resisting movement when pressure is applied. The desired wire segment is selected to produce the maximum amount of force within a minimal amount of space.

**Altering Die Springs** Each die spring is carefully engineered to perform within specific applications. Under no circumstances should you alter a die spring. Altering a die spring will change its designed characteristics and allows additional stresses to occur causing early failure. Grinding on the die spring not only changes the spring's original properties, but the heat from grinding can change the temper of the material and negatively affect the spring's performance.

**Compressed Length** The sum of the preload travel and operating travel.

**Corrosion** Frequently, die spring failure can be traced to corrosive elements which affect the surface of the spring's material, causing premature failure. Be aware of conditions that may affect the spring's surface such as rust, lubricants, soaps, and chemicals. Clean, protected die springs provide the best performance.

**Cycle Rate** The more rapidly a spring is cycled, the greater the need to operate in the recommended long life deflections from the catalog.

**Die Spring Guidance** Make sure that the hole size and/or rod size match the die spring's operating dimensions.

**Duty Ranges** We offer 4 separate duty ranges to best suit your applications – Medium Duty, Medium Heavy Duty, Heavy Duty, and Extra Heavy Duty. Do not mix springs of different duties.

**Free Length** The length of the spring without any load or force applied.

**Hole Diameter** Die springs are designed to be used in a hole dimension as indicated in the catalog. The actual O.D. will be somewhat smaller to prevent interference.

**Material** In our case, the spring material is High Tensile Strength Chrome Silicon Material. We use an optimal rectangular wire design. The maximum rated service temperature is 425°F.

**Operating Travel** Operating travel is the deflection of the spring where it is operating between the preload and the total travel of the spring during operation. This is the area where the actual work is performed.

**Preload** The initial force which is applied to a die spring. Preload is recommended to compress the first coils at each end where additional stresses are present because of the turn-down of the end coils. Applying a preload will extend the life of the spring.

**Quality** Our die springs are manufactured in an ISO9001-2008 facility.

**Rates** Die spring rates are normally listed as *Pounds per Inch of deflection* (i.e. 60 pounds load per inch.) As a die spring is deflected, the loads will increase for the amount of travel it is deflected. That is, a spring with a 60lb/inch rate will produce 60 lbs of resistance at 1" of travel, 120 lbs. at 2" of travel, etc. For purposes of simplification, the loads in our catalog are shown in pounds needed to deflect a spring 1/10<sup>th</sup> of an inch. Simply multiply the rates given by 10 to determine the actual spring rate.

**Rod Diameter** Die springs are designed to fit over a rod for guidance and the actual I.D. of the spring is actually somewhat larger to fit over a rod without interference.

**Solid Height** Solid height is the height of the spring when all of the coils are totally collapsed to solid. You never want to operate a die spring close to this condition.



## DieMax<sup>™</sup> L Die Springs

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