



MARSH MELLOW SPRINGS

by
Firestone

IMPERIAL SIZE
SUPPLEMENT

Marsh Mellow Springs

The Lamina Marsh Mellow rubber spring is a proven cost saver for the metal stamping industry. Marsh Mellows can be used as a maintenance free replacement for costly self contained nitrogen cylinders. The unique construction elements are the secret of the spring design flexibility.

The solid rubber core with hollow center and bias-ply fabric wrap are combined to meet special load and performance requirements. When designed into proper applications Marsh Mellows can give up to and greater than 1 million cycles of life.

Marsh Mellow springs may be safely compressed to 30% of their free length. Operating within a 25% compression range will increase the life of the springs.

To select the proper diameter, free length, and quantity of Marsh Mellow springs required for your application, refer to the following examples or contact a Lamina representative.

Cycle Rate

Marsh Mellow Springs may be compressed up to 30% of their free height based upon the following C.P.M. chart.

Maximum Percentage Compression (%)

1 1/8" thru 2 1/2" O.D. C.P.M.	10 200	15 150	20 125	25 100	30 75
3 1/4" thru 6" O.D. C.P.M.	10 100	15 75	20 55	25 45	30 35

Marsh Mellow Selection

Most important in selecting desired diameters, close attention must be given to bulge curve chart. Marsh Mellow springs expand cylindrically and must not come in contact with sharp surfaces (sub plates, etc.) that could cut or tear the bias ply cord. The same attention must be placed upon the surface on which the springs contact top and bottom. Marsh Mellow springs free length should not be more than 2.5 times the diameter. For added length, springs may be used with a guide rod or stacked with locators. (Stacking of springs does not increase pressure). See Fig. 3 and 4 on page 11.

Temperature Range

Marsh Mellow springs should be limited to use in the range: -35°F (-32.5°C) to +140°F (+63°C). Temperatures above 145°F (63°C) will reduce the part life.

Fluid Compatibility

Water Based Lubricants — Marsh Mellow springs are compatible with most water based fluids. Certain additives, however, can attack the compound and shorten life.

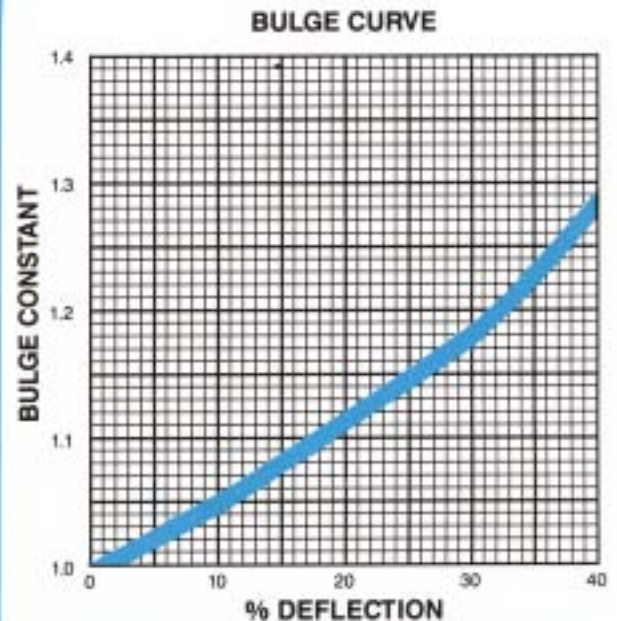
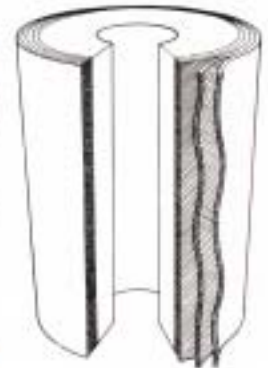
Petroleum Based Lubricants — Marsh Mellows are resistant, but not 100% compatible with petroleum based fluids. Occasional contact should not affect the part.

With either type lubricant, drains should be used to prevent fluids from pooling around parts.

NOTE: A compression set of up to 9% may occur over the life of the part when operated at high deflections and/or cycle rates.

TO DETERMINE MAXIMUM FREE HEIGHT:

- 1 1/8" - 2 1/2" diameter x 2
- 3 1/4" - 6" diameter x 2 1/2



TO USE CHART:

- 1.) FIND MAX. % DEFLECTION
- 2.) READ UP TO CURVE AND OVER TO BULGE CONSTANT.
- 3.) MULTIPLY NOMINAL O.D. BY BULGE CONSTANT TO FIND O.D. AT MAX. STROKE.

EXAMPLE: 6" SPRING @ 25% COMPRESSION

- 1.) FIND 25% DEFLECTION.
- 2.) READ BULGE CONSTANT AT 1.15
- 3.) MULTIPLY 6" x 1.15 = 6.9" MAX. DIA.

Marsh Mellow Springs may be ordered in lengths not shown in this catalog.

Marsh Mellow Springs

LOADS AS A PERCENTAGE OF DEFLECTION

Hole Size	Actual O.D. x I.D.	10%	15%	20%	25%	30%
1½"	1⅝" x ⅝"	100	160	220	280	355
2"	1⅞" x ⅞"	220	330	465	625	860
2⅝"	2" x ¾"	290	470	650	910	1250
3¼"	2½" x ¾"	570	920	1300	1780	2450
4¼"	3¼" x 1"	925	1550	2050	2770	3710
5¼"	4" x 1"	1550	2450	3540	4810	6570
6½"	5" x 1"	2950	4600	6500	8850	11950
7⅝"	6" x 1"	4500	6800	9580	12950	17620

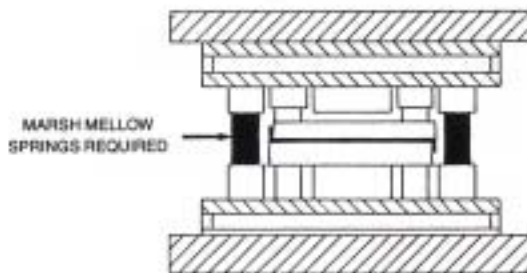
Application Ideas:

Marsh Mellow springs are designed to directly replace certain standard size coil die springs and nitrogen cylinders.

In addition, the larger diameter parts can exert forces from 425 lbs. to 40,000 lbs, each, and are an **extremely effective** alternative to costly nitrogen cylinders as in CAM returns.

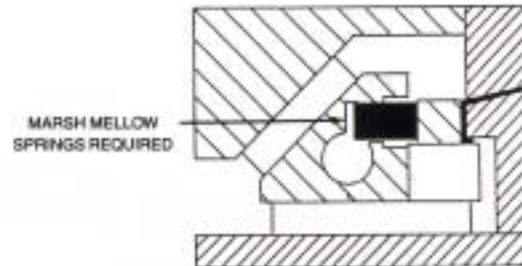
1. Die storage blocks. SEE EXAMPLE 1
2. Running storage blocks (which will balance uneven press ram thereby improving part quality).
3. Floating upper shoe on blank dies (improving quick die change).
4. Floating punches on inverted stretch draws (replacing nitrogen cylinders).
5. Cam returns. SEE EXAMPLES 3 & 4
6. Die springs (on pads eliminating costly spring pockets).
7. Pressure control on trim, flange, and form dies.
8. Replace nitrogen modular press cushions on OBI presses.

EXAMPLE 1



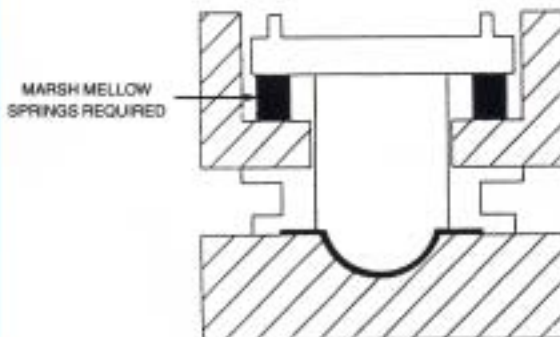
PLAN OF DIE
FORM UP AND DOWN

EXAMPLE 3



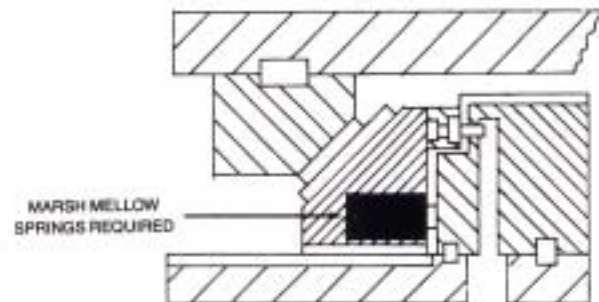
PLAN OF DIE
CAM FLANGING

EXAMPLE 2



PLAN OF DIE
STRETCH FORM

EXAMPLE 4



PLAN OF DIE

NOTE: STORAGE BLOCKS TO BE SPACED AS FAR APART AS PRACTICAL.

Cam Returns are an excellent application for Marsh Mellow die springs. As the Marsh Mellow die springs eliminate the sometimes awkward long coil springs required to produce enough pressure to return the cams.



Lamina^{INC.}

Marsh Mellow Springs



Marsh Mellow Springs
are widely accepted and used
in the **Automotive and**
Metal Stamping Industries.

Typical Applications

- Die storage blocks.
- Floating punches on stretch draws.
- Running storage blocks (to balance uneven press ram).
- Die springs.
- Floating upper shoes on blank dies.
- Pressure control on trim, flange, and form dies.
- Cam returns
- Substitutes for nitrogen modular press cushions.

Available in 8 diameters
listed on following pages

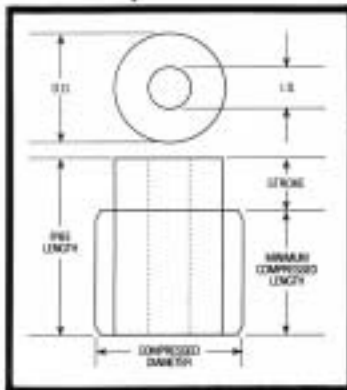


Lamina INC.

Marsh Mellow® Design Data

1-1/8" O.D. x 5/16" I.D.

Lamina Order Number	MM113-125		MM113-150		MM113-200		MM113-250		MM113-300	
Free Length Inch	1.25		1.50		2.00		2.50		3.00	
Minimum Compressed Length (Free Length - Max. Compression)	.75		.90		1.20		1.50		1.80	
Maximum Compressed Dia. (@ Max. Compression)	1.44		1.44		1.44		1.44		1.44	
Maximum Compression	.36		.45		.60		.75		.90	
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.125	120	.125	100	.125	80	.125	70	.125	60
	.25	240	.25	190	.25	150	.25	120	.250	110
	.375	390	.375	300	.375	220	.375	180	.375	150
			.50	450	.50	300	.50	220	.500	200
					.625	410	.625	300	.625	250
							.75	390	.750	300
									.875	370



1-5/8" O.D. x 5/8" I.D.

Lamina Order Number	MM163-150		MM163-200		MM163-250		MM163-325		MM163-400	
Free Length Inch	1.50		2.00		2.50		3.25		4.00	
Minimum Compressed Length (Free Length - Max. Compression)	.90		1.20		1.50		1.95		2.40	
Maximum Compressed Dia. (@ Max. Compression)	2.00		2.00		2.00		2.00		2.00	
Maximum Compression	.45		.60		.75		.98		1.20	
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.125	210	.125	150	.125	110	.125	80	.125	40
	.25	410	.25	270	.25	210	.25	150	.25	120
	.375	640	.375	430	.375	330	.375	230	.375	180
	.50	1,210	.50	600	.50	450	.50	320	.50	250
			.625	910	.625	610	.625	410	.625	320
					.75	840	.75	520	.75	400
							.875	660	.875	480
							1.00	840	1.00	590
									1.125	700
								1.25	860	

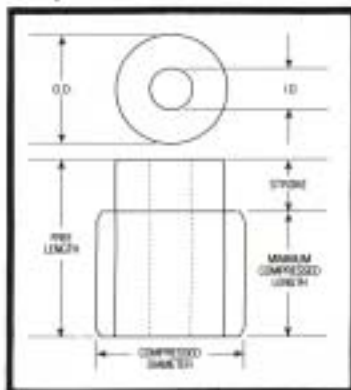


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Marsh Mellow® Design Data

2" O.D. x 3/4" I.D.

Lamina Order Number	MM200-125	MM200-150	MM200-200	MM200-250	MM200-325	MM200-400	MM200-500							
Free Length Inch	1.25	1.50	2.00	2.50	3.25	4.00	5.00							
Minimum Compressed Length (Free Length - Max. Compression)	.75	.90	1.20	1.50	1.95	2.40	3.00							
Maximum Compressed Dia. (@ Max. Compression)	2.56	2.56	2.56	2.56	2.56	2.56	2.56							
Maximum Compression	.38	.45	.60	.75	.98	1.20	1.50							
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.125	360	.125	220	.125	170	.125	150	.125	120	.125	100		
	.25	770	.25	540	.25	400	.25	320	.25	230	.25	180	.25	70
	.375	1,320	.375	940	.375	660	.375	500	.375	380	.375	270	.375	150
			.50	1,680	.50	920	.50	700	.50	520	.50	380	.50	230
					.625	1,270	.625	960	.625	670	.625	490	.625	330
							.75	1,310	.75	840	.75	620	.75	430
									.875	1,030	.875	760	.875	520
									1.00	1,270	1.00	920	1.00	600
											1.125	1,100	1.125	710
											1.25	1,350	1.25	840
													1.375	980
													1.50	1,160

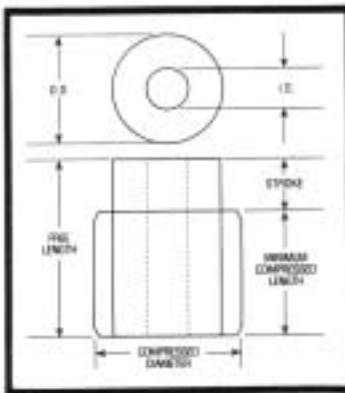


2 1/2" O.D. x 3/4" I.D.

Lamina Order Number	MM250-150	MM250-200	MM250-250	MM250-325	MM250-400	MM250-500	MM250-600							
Free Length Inch	1.50	2.00	2.50	3.25	4.00	5.00	6.00							
Minimum Compressed Length (Free Length - Max. Compression)	.90	1.20	1.50	1.95	2.40	3.00	3.60							
Maximum Compressed Dia. (@ Max. Compression)	3.20	3.20	3.20	3.20	3.20	3.20	3.20							
Maximum Compression	.45	.60	.75	.98	1.20	1.50	1.80							
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.25	1,080	.25	750	.25	570	.25	420	.25	330	.25	250	.25	170
	.50	3,000	.50	1,750	.50	1,300	.50	950	.50	750	.50	570	.50	500
					.75	2,400	.75	1,570	.75	1,200	.75	920	.75	750
							1.00	2,600	1.00	1,750	1.00	1,300	1.00	1,010
									1.25	2,600	1.25	1,750	1.25	1,360
											1.50	2,400	1.50	1,750
													1.75	2,240

3-1/4" O.D. x 1" I.D.

Lamina Order Number	MM325-250		MM325-300		MM325-325		MM325-350		MM325-400		MM325-450	
Free Length Inch	2.00		3.00		3.25		3.50		4.00		4.50	
Minimum Compressed Length (Free Length – Max. Compression)	1.50		1.80		1.95		2.10		2.40		2.70	
Maximum Compressed Dia. (@ Max. Compression)	4.16		4.16		4.16		4.16		4.16		4.16	
Maximum Compression	.60		.90		.96		1.05		1.20		1.35	
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.25	950	.25	750	.25	800	.25	700	.25	600	.25	400
	.50	2,200	.50	1,700	.50	1,600	.50	1,500	.50	1,260	.50	900
			.75	3,000	.75	2,550	.75	2,300	.75	2,000	.75	1,600
			1.00	4,700	1.00	4,000	1.00	3,500	1.00	2,850	1.00	2,200
									1.25	4,150	1.25	3,100



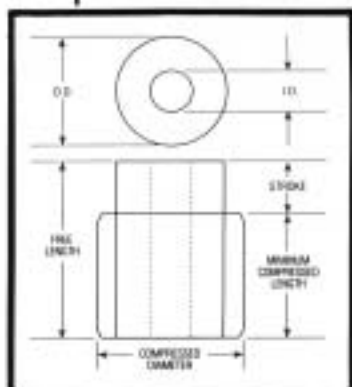
3-1/4" O.D. x 1" I.D.

Lamina Order Number	MM325-500		MM325-550		MM325-600		MM325-650		MM325-700	
Free Length Inch	5.00		5.50		6.00		6.50		7.00	
Minimum Compressed Length (Free Length – Max. Compression)	3.00		3.30		3.60		3.90		4.20	
Maximum Compressed Dia. (@ Max. Compression)	4.16		4.16		4.16		4.16		4.16	
Maximum Compression	1.50		1.65		1.80		1.95		2.10	
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.25	320	.25	250	.25	230	.25	220	.25	200
	.50	630	.50	750	.50	700	.50	650	.50	580
	.75	1,400	.75	1,200	.75	1,100	.75	870	.75	940
	1.00	1,950	1.00	1,700	1.00	1,600	1.00	1,400	1.00	1,300
	1.25	2,600	1.25	2,300	1.25	2,100	1.25	1,900	1.25	1,730
	1.50	3,500	1.50	3,000	1.50	2,850	1.50	2,400	1.50	2,200
			1.75	4,000	1.75	3,400	1.75	3,000	1.75	2,700
							2.00	3,800	2.00	3,300

Lamina^{INC.} Marsh Mellow[®] Design Data

4" O.D. x 1" I.D.

Lamina Order Number	MM400-250	MM400-300	MM400-325	MM400-350	MM400-400	MM400-450	MM400-500							
Free Length Inch	2.50	3.00	3.25	3.50	4.00	4.50	5.00							
Minimum Compressed Length (Free Length - Max. Compression)	1.50	1.80	1.95	2.10	2.40	2.70	3.00							
Maximum Compressed Dia. (@ Max. Compression)	5.12	5.12	5.12	5.12	5.12	5.12	5.12							
Maximum Compression	.75	.90	.98	1.05	1.20	1.35	1.50							
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.25	1,600	.25	1,300	.25	1,200	.25	1,000	.25	900	.25	750	.25	700
	.50	3,900	.50	3,000	.50	2,600	.50	2,200	.50	2,000	.50	1,900	.50	1,500
	.75	7,400	.75	5,300	.75	4,300	.75	3,900	.75	3,300	.75	2,800	.75	2,500
			1.00	9,500	1.00	6,900	1.00	6,000	1.00	4,800	1.00	4,100	1.00	3,500
									1.25	7,100	1.25	5,700	1.25	4,700
													1.50	6,400



4" O.D. x 1" I.D.

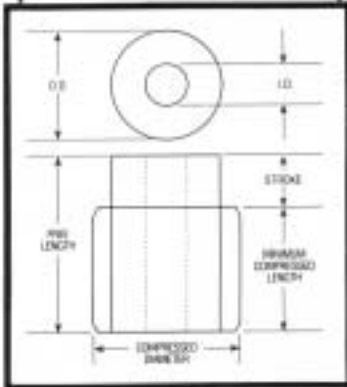
Lamina Order Number	MM400-550	MM400-600	MM400-650	MM400-700	MM400-750	MM400-800						
Free Length Inch	5.50	6.00	6.50	7.00	7.50	8.00						
Minimum Compressed Length (Free Length - Max. Compression)	3.30	3.60	3.90	4.20	4.50	4.80						
Maximum Compressed Dia. (@ Max. Compression)	5.12	5.12	5.12	5.12	5.12	5.12						
Maximum Compression	1.65	1.80	1.95	2.10	2.25	2.40						
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.25	550	.25	500	.25	400	.25	300	.25	200	.25	200
	.50	1,400	.50	1,200	.50	1,100	.50	800	.50	800	.50	700
	.75	2,200	.75	2,000	.75	1,800	.75	1,500	.75	1,400	.75	1,300
	1.00	3,100	1.00	2,800	1.00	2,600	1.00	2,200	1.00	2,000	1.00	1,800
	1.25	4,200	1.25	3,700	1.25	3,300	1.25	2,800	1.25	2,600	1.25	2,400
	1.50	5,400	1.50	4,700	1.50	4,200	1.50	3,600	1.50	3,300	1.50	3,000
			1.75	6,100	1.75	5,400	1.75	4,500	1.75	4,100	1.75	3,700
					2.00	6,800	2.00	5,500	2.00	4,900	2.00	4,500
							2.25	6,800	2.25	6,000	2.25	5,300
											2.50	6,500



Marsh Mellow® Design Data

5" O.D. x 1" I.D.

Lamina Order Number	MM500-250		MM500-300		MM500-325		MM500-350		MM500-400		MM500-450		MM500-500		MM500-550	
Free Length Inch	2.50		3.00		3.25		3.50		4.00		4.50		5.00		5.50	
Minimum Compressed Length (Free Length - Max. Compression)	1.50		1.80		1.95		2.10		2.40		2.70		3.00		3.30	
Maximum Compressed Dia. (@ Max. Compression)	6.40		6.40		6.40		6.40		6.40		6.40		6.40		6.40	
Maximum Compression	.75		.90		.98		1.05		1.20		1.35		1.50		1.65	
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.25	3,300	.25	2,900	.25	2,800	.25	2,500	.25	1,800	.25	1,500	.25	1,400	.25	1,300
	.50	9,000	.50	5,900	.50	5,300	.50	4,900	.50	3,700	.50	3,200	.50	3,000	.50	2,700
	.75	13,500	.75	9,800	.75	8,700	.75	8,000	.75	6,000	.75	5,100	.75	4,600	.75	4,000
			1.00	17,200	1.00	14,400	1.00	12,300	1.00	8,700	1.00	7,400	1.00	6,400	1.00	5,800
									1.25	12,700	1.25	10,200	1.25	8,700	1.25	7,500
													1.50	11,700	1.50	9,900



5" O.D. x 1" I.D.

Lamina Order Number	MM500-600		MM500-650		MM500-700		MM500-750		MM500-800		MM500-850		MM500-900	
Free Length Inch	6.00		6.50		7.00		7.50		8.00		8.50		9.00	
Minimum Compressed Length (Free Length - Max. Compression)	3.60		3.90		4.20		4.50		4.80		5.10		5.40	
Maximum Compressed Dia. (@ Max. Compression)	6.40		6.40		6.40		6.40		6.40		6.40		6.40	
Maximum Compression	1.80		1.95		2.10		2.25		2.40		2.55		2.70	
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.25	1,000	.25	900	.25	700	.25	600	.25	400	.25	400	.25	300
	.50	2,200	.50	2,000	.50	1,700	.50	1,600	.50	1,300	.50	1,200	.50	1,100
	.75	3,400	.75	3,200	.75	2,800	.75	2,700	.75	2,200	.75	2,100	.75	1,900
	1.00	4,800	1.00	4,400	1.00	3,900	1.00	3,700	1.00	3,100	1.00	2,900	1.00	2,700
	1.25	6,300	1.25	5,800	1.25	5,200	1.25	4,800	1.25	4,100	1.25	3,800	1.25	3,500
	1.50	8,100	1.50	7,300	1.50	6,600	1.50	6,000	1.50	5,200	1.50	4,800	1.50	4,400
	1.75	10,500	1.75	9,100	1.75	8,000	1.75	7,400	1.75	6,300	1.75	5,700	1.75	5,300
			2.00	11,500	2.00	9,700	2.00	9,000	2.00	7,500	2.00	6,900	2.00	6,300
					2.25	12,500	2.25	11,000	2.25	9,000	2.25	8,100	2.25	7,500
									2.50	10,800	2.50	9,700	2.50	8,700

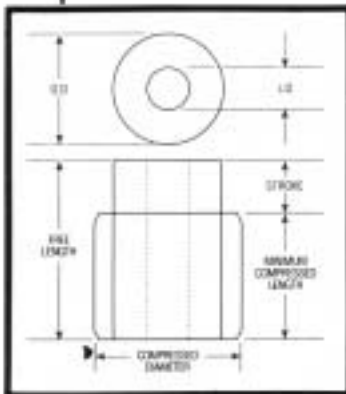


Lamina INC

Marsh Mellow® Design Data

6" O.D. x 1" I.D.

Lamina Order Number	MM600-250		MM600-300		MM600-325		MM600-350		MM600-400		MM600-450		MM600-500	
Free Length Inch	2.50		3.00		3.25		3.50		4.00		4.50		5.00	
Minimum Compressed Length (Free Length - Max. Compression)	1.50		1.80		1.95		2.10		2.40		2.70		3.00	
Maximum Compressed Dia. (@ Max. Compression)	7.63		7.63		7.63		7.63		7.63		7.63		7.63	
Maximum Compression	.75		.90		.98		1.05		1.20		1.35		1.50	
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force
	.25	5,700	.25	3,900	.25	3,300	.25	3,000	.25	2,500	.25	2,100	.25	1,800
	.50	13,000	.50	8,500	.50	7,500	.50	6,900	.50	4,800	.50	5,000	.50	4,100
	.75	26,200	.75	15,800	.75	12,400	.75	11,200	.75	9,500	.75	8,100	.75	6,700
			1.00	28,800	1.00	20,500	1.00	17,600	1.00	14,000	1.00	11,900	1.00	9,400
									1.25	21,400	1.25	16,800	1.25	12,800
													1.50	17,200



6" O.D. x 1" I.D.

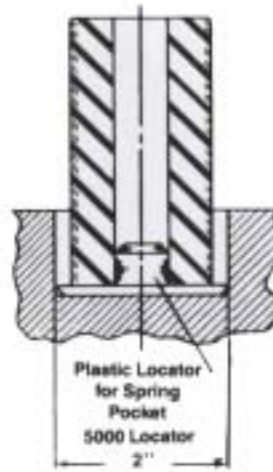
Lamina Order Number	MM600-550		MM600-600		MM600-650		MM600-700		MM600-750		MM600-800		MM600-1000		
Free Length Inch	5.50		6.00		6.50		7.00		7.50		8.00		10.00		
Minimum Compressed Length (Free Length - Max. Compression)	3.30		3.60		3.90		4.20		4.50		4.80		6.00		
Maximum Compressed Dia. (@ Max. Compression)	7.63		7.63		7.63		7.63		7.63		7.63		7.63		
Maximum Compression	1.55		1.80		1.95		2.10		2.25		2.40		3.00		
Total Spring Force Per 1/8" Compression Pounds	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	Stroke	Force	
	.25	1,700	.25	1,400	.25	1,300	.25	1,100	.25	900	.25	800	.25	700	
	.50	3,700	.50	3,400	.50	3,100	.50	2,800	.50	1,400	.50	2,200	.50	2,100	
	.75	6,000	.75	5,400	.75	5,000	.75	4,500	.75	4,000	.75	3,700	.75	3,300	
	1.00	8,300	1.00	7,500	1.00	6,900	1.00	6,100	1.00	5,500	1.00	5,100	1.00	4,400	
	1.25	11,200	1.25	10,000	1.25	9,000	1.25	8,200	1.25	7,300	1.25	6,700	1.25	5,600	
	1.50	14,700	1.50	12,900	1.50	11,200	1.50	10,100	1.50	9,100	1.50	8,300	1.50	6,800	
	1.75	19,600	1.75	16,500	1.75	14,200	1.75	12,500	1.75	11,100	1.75	10,100	1.75	8,000	
			2.00	22,000	2.00	18,300	2.00	15,600	2.00	13,500	2.00	12,100	2.00	9,500	
								2.25	19,500	2.25	16,500	2.25	14,700	2.25	11,000
											2.50	17,800	2.50	12,700	
													2.75	14,700	
													3.00	17,200	

Installation Instructions

1. Hole or Pocket Size

Marsh Mellow die springs were designed to insure proper fit in specific size holes or spring pockets. Insure that the hole or spring pocket is the proper size and that the Marsh Mellow die spring is centered.

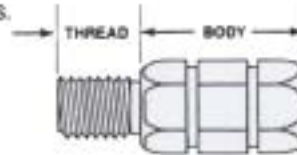
Replace 2" Dia. Die Spring. A plastic locating device (Order # 5000) is available for the 1^{5/8}" Dia. Marsh Mellow die spring.



2. Locating Stud

Threaded studs can be used as locators.

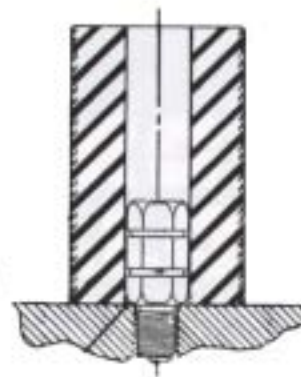
Threaded Studs Available
(Press-fit) into MARSH MELLOW SPRINGS. To order add suffix "T" i.e. for stud.)



MARSH MELLOW I.D.	PART NO.	THREAD LENGTH	BODY LENGTH	OVERALL LENGTH
5/16"	T-STUD-1/4-20	1/2"	1 1/2"	2"
5/8"	T-STUD-3/8-16	5/8"	1 1/2"	2 1/8"
3/4"	T-STUD-1/2-13	3/4"	1 1/2"	2 1/4"
1"	T-STUD-3/4-10	1"	2"	3"

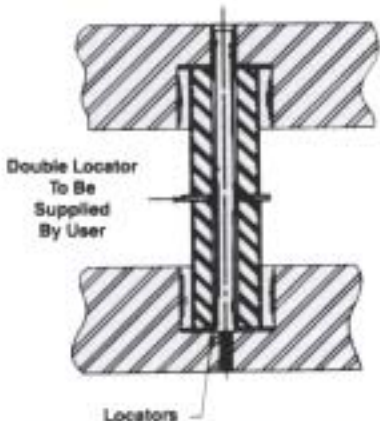
**Regarding installing studs in Marsh Mellow Springs:*

The body length of the stud should never exceed 50% of the Marsh Mellow Spring free length. If such a condition does arise, the stud must be altered to allow for compression.



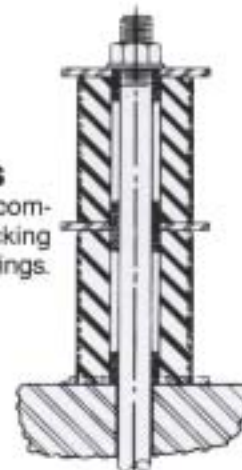
3. Locators

Locators can be made from washers and should fit closely around the rod. O.D. must accommodate bulge growth.



4. Guide Rods

Guide rods are recommended when stacking Marsh Mellow die springs.






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