



## **Marsh Mellow<sup>®</sup> Springs**

[www.daytonlamina.com](http://www.daytonlamina.com)  
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technical information.



The Lamina Marsh Mellow® Die Spring is a proven cost saver for the metal stamping industry. Marsh Mellow® Die Springs 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.

## To select the proper diameter...

### Deflection

■ Marsh Mellow® Die Springs may be safely compressed to 27.5% of their free length. Operating within a 27.5% compression range will increase the life of the springs. Any deflection greater than 27.5% will greatly reduce the life of Marsh Mellow® Die Springs.

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

### Spring Ratios

■ The spring length should not be less than 1.2 times the O.D. and not more than 1.7 times the spring O.D. (i.e. a 2" O.D. spring would range between 2.4" to 3.4" length for optimum life.

Consideration should be given to the cycle rate.

### Cycle Rate

Marsh Mellow® Die Springs may be compressed up to 27.5% of their free height based upon the following C.P.M. Chart.

| Maximum Percentage Compression (%) |     |     |     |     |    |
|------------------------------------|-----|-----|-----|-----|----|
| 30mm thru 63mm O.D.                | 10  | 15  | 20  | 25  | 30 |
| 1-1/8" thru 2-1/2" O.D.            |     |     |     |     |    |
| C.P.M.                             | 200 | 150 | 125 | 100 | 75 |
| 80mm thru 150mm O.D.               | 10  | 15  | 20  | 25  | 30 |
| 3-1/4" thru 6" O.D.                |     |     |     |     |    |
| C.P.M.                             | 100 | 75  | 55  | 45  | 35 |

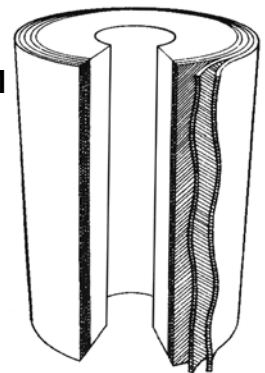
### Compression Set

**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.

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 Mellow® Die Springs can give up to and greater than 1 million cycles of life.

## TO DETERMINE MAXIMUM FREE HEIGHT:

Ratios for all sizes, Length to O.D. should be:  
Minimum 1.2  
Maximum 1.7



### Temperature Range

Marsh Mellow® Die Springs should be limited to use in the range: -32.5°C (-25°F) to +63°C (135°F) internal temperature. Temperatures above 63°C (135°F) will reduce the part life.

### Storage

Light and heat affect the storage life of rubber springs. We recommend storing Marsh Mellow® Die Springs in low light and temperatures under 63°C (135°F).

### Fluid Compatibility

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

**Petroleum Based Lubricants**—Marsh Mellow® Die Springs 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.

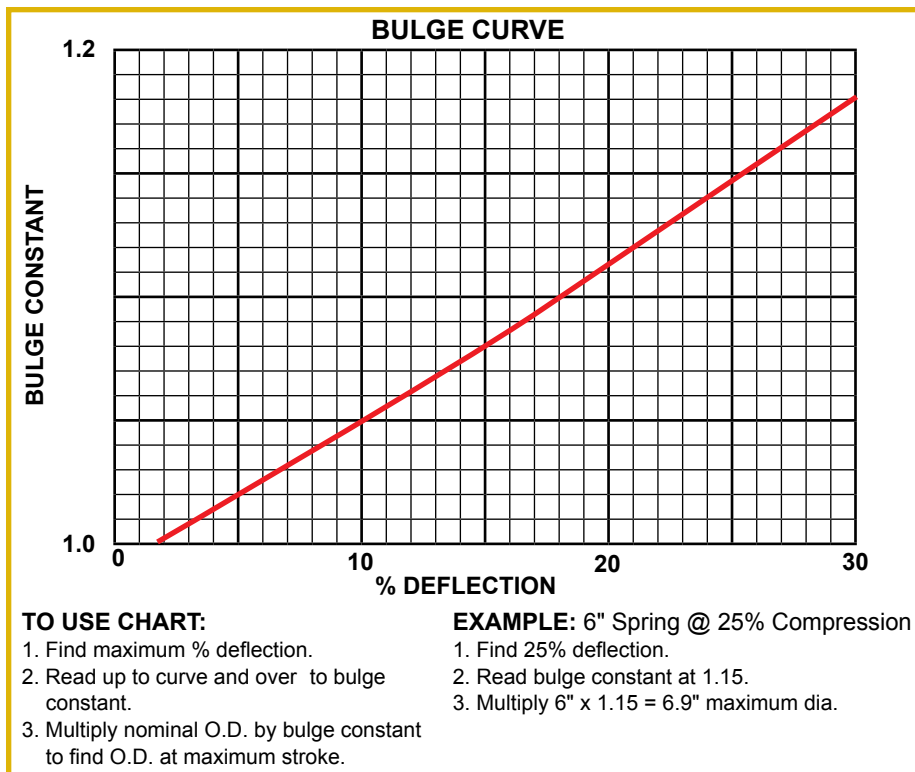
**The active life of Marsh Mellow® Die Springs is 3–5 years depending on environment and cycle time.**



## Marsh Mellow<sup>®</sup> Die 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
- Pressure control on trim, flange & form dies
- Floating upper shoes on blank dies
- Substitutes for nitrogen modular press cushions
- Cam Returns



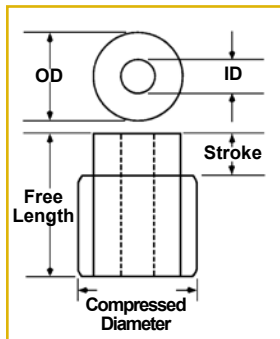
### Marsh Mellow<sup>®</sup> Die Spring Selection

Most important in selecting desired diameters, close attention must be given to the bulge curve chart. Marsh Mellow<sup>®</sup> Die 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<sup>®</sup> Die Springs free length should not be more than 1.7 times the diameter and not less than 1.2 times the diameter. For added length, springs may be used with a guide rod or stacked with locators. (Stacking of springs does not increase force but increases total deflection.) See Figures 3 and 4 on page 12.

| LOADS AS A PERCENTAGE OF DEFLECTION |          |        |         |        |         |        |         |        |         |        |         |
|-------------------------------------|----------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|
| Actual O.D. x I.D.                  |          | 10%    |         | 15%    |         | 20%    |         | 25%    |         | 30%    |         |
| Inch                                | mm       | Pounds | Newtons | Pounds | Newtons | Pounds | Newtons | Pounds | Newtons | Pounds | Newtons |
| 1-1/8" x 5/16"                      | 30 x 8   | 100    | 445     | 160    | 712     | 220    | 979     | 280    | 1245    | 355    | 1579    |
| 1-5/8" x 5/8"                       | 40 x 16  | 220    | 979     | 330    | 1468    | 465    | 2068    | 625    | 2780    | 860    | 3825    |
| 2" x 3/4"                           | 50 x 20  | 290    | 1290    | 470    | 2091    | 650    | 2891    | 910    | 4048    | 1250   | 5560    |
| 2-1/2" x 3/4"                       | 63 x 20  | 570    | 2535    | 920    | 4092    | 1300   | 5782    | 1780   | 7917    | 2450   | 10898   |
| 3-1/4" x 1"                         | 80 x 25  | 925    | 4114    | 1550   | 6894    | 2050   | 9118    | 2770   | 12321   | 3710   | 16502   |
| 4" x 1"                             | 100 x 25 | 1550   | 6894    | 2450   | 10898   | 3540   | 15746   | 4810   | 21395   | 6570   | 29223   |
| 5" x 1"                             | 125 x 25 | 2950   | 13122   | 4600   | 20461   | 6500   | 28912   | 8850   | 39365   | 11950  | 53154   |
| 6" x 1"                             | 150 x 25 | 4500   | 20016   | 6800   | 30246   | 9580   | 42612   | 12950  | 57602   | 17620  | 78374   |

| MARSH MELLOW® DIE SPRING 1-1/8" OD x 5/16" ID         |        |                               |           |           |
|-------------------------------------------------------|--------|-------------------------------|-----------|-----------|
| Lamina Part Number                                    |        | MM113-125                     | MM113-150 | MM113-200 |
| Ratio of Length to O.D.                               |        | 1.11                          | 1.33      | 1.78      |
| Free Length                                           |        | 1.25                          | 1.50      | 2.00      |
| Maximum Compressed OD (@ Max. Compression)            |        | 1.44                          | 1.44      | 1.44      |
| Maximum Stroke 27.5%                                  |        | .34                           | .41       | .55       |
| Total Spring Force Per 1/8" Compression<br><br>Pounds | Stroke | Force                         | Force     | Force     |
|                                                       | 0.125  | 120                           | 100       | 80        |
|                                                       | 0.25   | 240                           | 190       | 150       |
|                                                       | 0.375  | 390                           | 300       | 220       |
|                                                       | 0.50   | 670                           | 450       | 300       |
|                                                       | 0.625  |                               |           | 410       |
| Shaded area recommended                               |        | Unshaded area not recommended |           |           |

Cut length tolerance: + 1/8" / -0



**NOTES:**

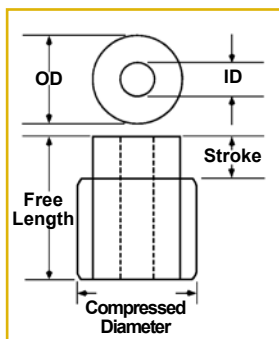
- Minimum recommended length-to-OD ratio is 1.2.
- Maximum recommended length-to-OD ratio is 1.7.
- Force values have been estimated.

| MARSH MELLOW® DIE SPRING 30mm OD x 8mm ID             |        |            |                               |            |            |
|-------------------------------------------------------|--------|------------|-------------------------------|------------|------------|
| Lamina Part Number                                    |        | MM030-032M | MM030-040M                    | MM030-050M | MM030-063M |
| Ratio of Length to O.D.                               |        | 1.07       | 1.33                          | 1.67       | 2.10       |
| Free Length                                           |        | 32mm       | 40mm                          | 50mm       | 63mm       |
| Maximum Compressed OD (@ Max. Compression)            |        | 38mm       | 38mm                          | 38mm       | 38mm       |
| Maximum Stroke 27.5%                                  |        | 8.80mm     | 11.00mm                       | 13.75mm    | 17.33mm    |
| Total Spring Force Per 5mm Compression<br><br>Newtons | Stroke | Force      | Force                         | Force      | Force      |
|                                                       | 5      | 730        | 570                           | 500        | 420        |
|                                                       | 10     | 1900       | 1400                          | 1000       | 750        |
|                                                       | 15     |            | 2400                          | 1800       | 1300       |
|                                                       | 20     |            |                               | 3300       | 1900       |
| Shaded area recommended                               |        |            | Unshaded area not recommended |            |            |

Cut length tolerance: + 3mm / -0

| MARSH MELLOW <sup>®</sup> DIE SPRING 1-5/8" OD x 5/8" ID    |           |           |                               |           |       |
|-------------------------------------------------------------|-----------|-----------|-------------------------------|-----------|-------|
| Lamina Part Number                                          | MM163-150 | MM163-200 | MM163-250                     | MM163-325 |       |
| Ratio of Length to O.D.                                     | 0.92      | 1.23      | 1.54                          | 2.00      |       |
| Free Length                                                 | 1.50      | 2.00      | 2.50                          | 3.25      |       |
| Maximum Compressed OD<br>(@ Max. Compression)               | 2.00      | 2.00      | 2.00                          | 2.00      |       |
| Maximum Stroke 27.5%                                        | 0.41      | 0.55      | 0.69                          | 0.89      |       |
| Total Spring Force<br>Per 1/8"<br>Compression<br><br>Pounds | Stroke    | Force     | Force                         | Force     | Force |
|                                                             | 0.125     | 210       | 150                           | 110       | 80    |
|                                                             | 0.25      | 410       | 270                           | 210       | 150   |
|                                                             | 0.375     | 640       | 430                           | 330       | 230   |
|                                                             | 0.50      | 1210      | 600                           | 450       | 320   |
|                                                             | 0.625     |           | 910                           | 610       | 410   |
|                                                             | 0.75      |           | 1440                          | 840       | 520   |
|                                                             | 0.875     |           |                               | 1200      | 660   |
|                                                             | 1.00      |           |                               | 1700      | 840   |
| Shaded area recommended                                     |           |           | Unshaded area not recommended |           |       |

Cut length tolerance: + 1/8" / -0



**NOTES:**

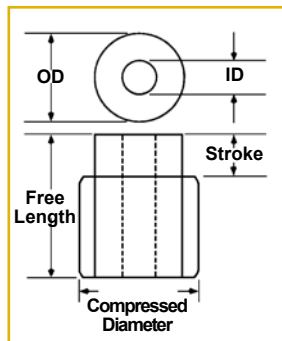
- Minimum recommended length-to-OD ratio is 1.2.
- Maximum recommended length-to-OD ratio is 1.7.
- Force values have been estimated.

| MARSH MELLOW <sup>®</sup> DIE SPRING 40mm OD x 16mm ID      |            |            |                               |            |       |
|-------------------------------------------------------------|------------|------------|-------------------------------|------------|-------|
| Lamina Part Number                                          | MM040-040M | MM040-050M | MM040-063M                    | MM040-080M |       |
| Ratio of Length to O.D.                                     | 1.00       | 1.25       | 1.58                          | 2.00       |       |
| Free Length                                                 | 40mm       | 50mm       | 63mm                          | 80mm       |       |
| Maximum Compressed OD<br>(@ Max. Compression)               | 50mm       | 50mm       | 50mm                          | 50mm       |       |
| Maximum Stroke 27.5%                                        | 11.00mm    | 13.75mm    | 17.33mm                       | 22.00mm    |       |
| Total Spring Force<br>Per 5mm<br>Compression<br><br>Newtons | Stroke     | Force      | Force                         | Force      | Force |
|                                                             | 5          | 850        | 610                           | 450        | 370   |
|                                                             | 10         | 2000       | 1700                          | 1200       | 850   |
|                                                             | 15         | 5500       | 3300                          | 2200       | 1500  |
|                                                             | 20         |            | 7000                          | 3700       | 2000  |
|                                                             | 25         |            |                               | 6900       | 3600  |
| Shaded area recommended                                     |            |            | Unshaded area not recommended |            |       |

Cut length tolerance: + 3mm / -0

| MARSH MELLOW® DIE SPRING 2" OD x 3/4" ID              |           |           |                               |           |       |
|-------------------------------------------------------|-----------|-----------|-------------------------------|-----------|-------|
| Lamina Part Number                                    | MM200-200 | MM200-250 | MM200-325                     | MM200-400 |       |
| Ratio of Length to O.D.                               | 1.00      | 1.25      | 1.63                          | 2.00      |       |
| Free Length                                           | 2.00      | 2.50      | 3.25                          | 4.00      |       |
| Maximum Compressed OD (@ Max. Compression)            | 2.56      | 2.56      | 2.56                          | 2.56      |       |
| Maximum Stroke 27.5%                                  | 0.55      | 0.69      | 0.89                          | 1.10      |       |
| Total Spring Force Per 1/8" Compression<br><br>Pounds | Stroke    | Force     | Force                         | Force     | Force |
|                                                       | 0.125     | 170       | 150                           | 120       | 100   |
|                                                       | 0.25      | 400       | 320                           | 230       | 180   |
|                                                       | 0.375     | 660       | 500                           | 380       | 270   |
|                                                       | 0.50      | 920       | 700                           | 520       | 380   |
|                                                       | 0.625     | 1270      | 960                           | 670       | 490   |
|                                                       | 0.75      | 1850      | 1310                          | 840       | 620   |
|                                                       | 0.875     |           |                               | 1270      | 760   |
|                                                       | 1.000     |           |                               |           | 920   |
| Shaded area recommended                               |           |           | Unshaded area not recommended |           |       |

Cut length tolerance: + 1/8" / -0



#### NOTES:

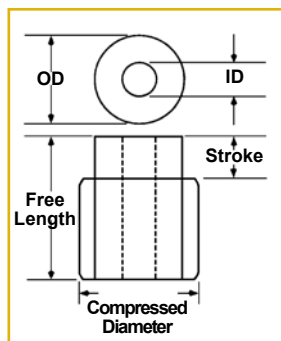
- Minimum recommended length-to-OD ratio is 1.2.
- Maximum recommended length-to-OD ratio is 1.7.
- Force values have been estimated.

| MARSH MELLOW® DIE SPRING 50mm OD x 20mm ID            |            |            |                               |            |       |
|-------------------------------------------------------|------------|------------|-------------------------------|------------|-------|
| Lamina Part Number                                    | MM050-050M | MM050-063M | MM050-080M                    | MM050-100M |       |
| Ratio of Length to O.D.                               | 1.00       | 1.26       | 1.60                          | 2.00       |       |
| Free Length                                           | 50mm       | 63mm       | 80mm                          | 100mm      |       |
| Maximum Compressed OD (@ Max. Compression)            | 64mm       | 64mm       | 64mm                          | 64mm       |       |
| Maximum Stroke 27.5%                                  | 13.75mm    | 17.33mm    | 22.00mm                       | 27.50mm    |       |
| Total Spring Force Per 5mm Compression<br><br>Newtons | Stroke     | Force      | Force                         | Force      | Force |
|                                                       | 5          | 860        | 540                           | 450        | 320   |
|                                                       | 10         | 2500       | 1800                          | 1200       | 860   |
|                                                       | 15         | 4900       | 3300                          | 2300       | 1600  |
|                                                       | 20         | 10300      | 5400                          | 3500       | 2500  |
|                                                       | 25         |            | 10100                         | 5300       | 3500  |
|                                                       | 30         |            |                               | 8000       | 4900  |
| Shaded area recommended                               |            |            | Unshaded area not recommended |            |       |

Cut length tolerance: + 3mm / -0

| MARSH MELLOW <sup>®</sup> DIE SPRING 2.50" OD x 3/4" ID |        |           |                               |           |           |
|---------------------------------------------------------|--------|-----------|-------------------------------|-----------|-----------|
| Lamina Part Number                                      |        | MM250-250 | MM250-325                     | MM250-400 | MM250-500 |
| Ratio of Length to O.D.                                 |        | 1.00      | 1.30                          | 1.60      | 2.00      |
| Free Length                                             |        | 2.50      | 3.25                          | 4.00      | 5.00      |
| Maximum Compressed OD (@ Max. Compression)              |        | 3.20      | 3.20                          | 3.20      | 3.20      |
| Maximum Stroke 27.5%                                    |        | 0.69      | 0.89                          | 1.10      | 1.38      |
| Total Spring Force Per 1/8" Compression<br><br>Pounds   | Stroke | Force     | Force                         | Force     | Force     |
|                                                         | 0.25   | 570       | 420                           | 330       | 250       |
|                                                         | 0.50   | 1300      | 950                           | 751       | 570       |
|                                                         | 0.75   | 2400      | 1570                          | 1200      | 920       |
|                                                         | 1.00   | 5400      | 2600                          | 1750      | 1300      |
|                                                         | 1.25   |           | 4600                          | 2600      | 1750      |
|                                                         | 1.50   |           |                               | 4600      | 2400      |
| Shaded area recommended                                 |        |           | Unshaded area not recommended |           |           |

Cut length tolerance: + 1/8" / -0



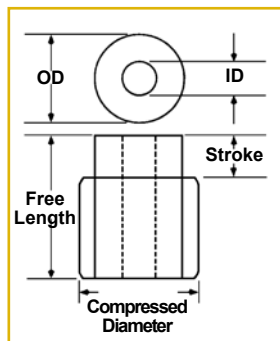
**NOTES:**

- Minimum recommended length-to-OD ratio is 1.2.
- Maximum recommended length-to-OD ratio is 1.7.
- Force values have been estimated.

| MARSH MELLOW <sup>®</sup> DIE SPRING 63mm OD x 20mm ID |        |            |                               |            |            |
|--------------------------------------------------------|--------|------------|-------------------------------|------------|------------|
| Lamina Part Number                                     |        | MM063-063M | MM063-080M                    | MM063-100M | MM063-125M |
| Ratio of Length to O.D.                                |        | 1.00       | 1.27                          | 1.59       | 1.98       |
| Free Length                                            |        | 63mm       | 80mm                          | 100mm      | 125mm      |
| Maximum Compressed OD (@ Max. Compression)             |        | 79mm       | 79mm                          | 79mm       | 79mm       |
| Maximum Stroke 27.5%                                   |        | 17.33mm    | 22.00mm                       | 27.50mm    | 34.38mm    |
| Total Spring Force Per 5mm Compression<br><br>Newtons  | Stroke | Force      | Force                         | Force      | Force      |
|                                                        | 5      | 1400       | 1100                          | 880        | 650        |
|                                                        | 10     | 3700       | 2600                          | 2000       | 1500       |
|                                                        | 15     | 6400       | 4600                          | 3500       | 2300       |
|                                                        | 20     | 10500      | 7100                          | 5000       | 3700       |
|                                                        | 25     | 20500      | 10000                         | 7100       | 5000       |
|                                                        | 30     |            | 14600                         | 9600       | 6900       |
|                                                        | 35     |            |                               | 12500      | 9000       |
| Shaded area recommended                                |        |            | Unshaded area not recommended |            |            |

Cut length tolerance: + 3mm / -0

| MARSH MELLOW® DIE SPRING 3-1/4" OD x 1" ID            |           |           |           |                               |           |           |           |
|-------------------------------------------------------|-----------|-----------|-----------|-------------------------------|-----------|-----------|-----------|
| Lamina Part Number                                    | MM325-325 | MM325-350 | MM325-400 | MM325-450                     | MM325-500 | MM325-550 | MM325-600 |
| Ratio of Length to O.D.                               | 1.00      | 1.08      | 1.23      | 1.38                          | 1.54      | 1.69      | 1.85      |
| Free Length                                           | 3.25      | 3.50      | 4.00      | 4.50                          | 5.00      | 5.50      | 6.00      |
| Maximum Compressed OD (@ Max. Compression)            | 4.16      | 4.16      | 4.16      | 4.16                          | 4.16      | 4.16      | 4.16      |
| Maximum Stroke 27.5%                                  | .89       | .96       | 1.10      | 1.24                          | 1.38      | 1.51      | 1.65      |
| Total Spring Force Per 1/8" Compression<br><br>Pounds | Stroke    | Force     | Force     | Force                         | Force     | Force     | Force     |
|                                                       | 0.25      | 800       | 700       | 600                           | 400       | 320       | 250       |
|                                                       | 0.50      | 1600      | 1500      | 1260                          | 900       | 630       | 700       |
|                                                       | 0.75      | 2550      | 2300      | 2000                          | 1600      | 1400      | 1100      |
|                                                       | 1.00      | 4000      | 3500      | 2850                          | 2200      | 1950      | 1700      |
|                                                       | 1.25      | 7000      | 5600      | 4150                          | 3100      | 2600      | 2300      |
|                                                       | 1.50      |           |           | 6400                          | 4300      | 3500      | 3000      |
|                                                       | 1.75      |           |           |                               | 6500      | 4850      | 4000      |
|                                                       | 2.00      |           |           |                               |           | 7500      | 5200      |
| Shaded area recommended                               |           |           |           | Unshaded area not recommended |           |           |           |



#### NOTES:

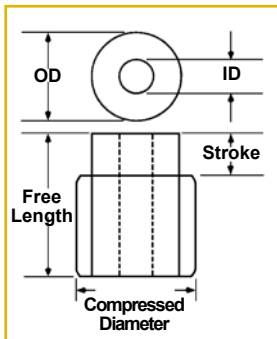
- Minimum recommended length-to-OD ratio is 1.2.
- Maximum recommended length-to-OD ratio is 1.7.
- Force values have been estimated.

Cut length tolerance: + 1/8" / -0

| MARSH MELLOW® DIE SPRING 80mm OD x 25mm ID            |            |            |                               |            |            |
|-------------------------------------------------------|------------|------------|-------------------------------|------------|------------|
| Lamina Part Number                                    | MM080-080M | MM080-100M | MM080-125M                    | MM080-140M | MM080-150M |
| Ratio of Length to O.D.                               | 1.00       | 1.25       | 1.56                          | 1.75       | 1.88       |
| Free Length                                           | 80mm       | 100mm      | 125mm                         | 140mm      | 150mm      |
| Maximum Compressed OD (@ Max. Compression)            | 104mm      | 104mm      | 104mm                         | 104mm      | 104mm      |
| Maximum Stroke 27.5%                                  | 22.00mm    | 27.50mm    | 34.38mm                       | 38.50mm    | 41.25mm    |
| Total Spring Force Per 5mm Compression<br><br>Newtons | Stroke     | Force      | Force                         | Force      | Force      |
|                                                       | 5          | 2200       | 1900                          | 1250       | 1100       |
|                                                       | 10         | 4400       | 3800                          | 2500       | 2200       |
|                                                       | 15         | 8050       | 6200                          | 4500       | 3950       |
|                                                       | 20         | 11700      | 8600                          | 6500       | 5700       |
|                                                       | 25         | 16900      | 12050                         | 8750       | 7400       |
|                                                       | 30         | 22100      | 15500                         | 11000      | 9100       |
|                                                       | 35         |            | 23450                         | 14050      | 11400      |
|                                                       | 40         |            | 31400                         | 17100      | 13700      |
|                                                       | 45         |            |                               | 24250      | 17350      |
|                                                       | 50         |            |                               | 31400      | 21000      |
| Shaded area recommended                               |            |            | Unshaded area not recommended |            |            |

Cut length tolerance: + 3mm / -0

| MARSH MELLOW <sup>®</sup> DIE SPRING 4" OD x 1" ID    |           |           |           |           |                               |           |           |           |
|-------------------------------------------------------|-----------|-----------|-----------|-----------|-------------------------------|-----------|-----------|-----------|
| Lamina Part Number                                    | MM400-400 | MM400-450 | MM400-500 | MM400-550 | MM400-600                     | MM400-650 | MM400-700 | MM400-750 |
| Ratio of Length to O.D.                               | 1.00      | 1.125     | 1.25      | 1.375     | 1.50                          | 1.625     | 1.75      | 1.875     |
| Free Length                                           | 4.00      | 4.50      | 5.00      | 5.50      | 6.00                          | 6.350     | 7.00      | 7.50      |
| Maximum Compressed OD (@ Max. Compression)            | 5.12      | 5.12      | 5.12      | 5.12      | 5.12                          | 5.12      | 5.12      | 5.12      |
| Maximum Stroke 27.5%                                  | 1.10      | 1.24      | 1.38      | 1.51      | 1.65                          | 1.79      | 1.93      | 2.06      |
| Total Spring Force Per 1/4" Compression<br><br>Pounds | Stroke    | Force     | Force     | Force     | Force                         | Force     | Force     | Force     |
|                                                       | 0.25      | 900       | 750       | 700       | 550                           | 500       | 400       | 300       |
|                                                       | 0.50      | 2000      | 1900      | 1500      | 1400                          | 1200      | 1100      | 800       |
|                                                       | 0.75      | 3300      | 2800      | 2500      | 2200                          | 2000      | 1800      | 1500      |
|                                                       | 1.00      | 4800      | 4100      | 3530      | 3100                          | 2800      | 2600      | 2200      |
|                                                       | 1.25      | 7100      | 5700      | 4700      | 4200                          | 3700      | 3300      | 2800      |
|                                                       | 1.50      | 11500     | 8200      | 6400      | 5400                          | 4700      | 4200      | 3600      |
|                                                       | 1.75      | 15500     | 12500     | 9000      | 7100                          | 6100      | 5400      | 4500      |
|                                                       | 2.00      |           | 14200     | 15000     | 10000                         | 8000      | 6800      | 5500      |
|                                                       | 2.25      |           |           |           | 14000                         | 11000     | 8900      | 6800      |
| Shaded area recommended                               |           |           |           |           | Unshaded area not recommended |           |           |           |


**NOTES:**

- Minimum recommended length-to-OD ratio is 1.2.
- Maximum recommended length-to-OD ratio is 1.7.
- Force values have been estimated.

Cut length tolerance: + 1/8" / -0

| MARSH MELLOW <sup>®</sup> DIE SPRING 100mm OD x 25mm ID |            |            |            |            |                               |            |            |            |
|---------------------------------------------------------|------------|------------|------------|------------|-------------------------------|------------|------------|------------|
| Lamina Part Number                                      | MM100-100M | MM100-125M | MM100-140M | MM100-150M | MM100-160M                    | MM100-180M | MM100-190M | MM100-200M |
| Ratio of Length to O.D.                                 | 1.00       | 1.25       | 1.40       | 1.50       | 1.60                          | 1.80       | 1.90       | 2.00       |
| Free Length                                             | 100mm      | 125mm      | 140mm      | 150mm      | 160mm                         | 180mm      | 190mm      | 200mm      |
| Maximum Compressed OD (@ Max. Compression)              | 128mm      | 128mm      | 128mm      | 128mm      | 128mm                         | 128mm      | 128mm      | 128mm      |
| Maximum Stroke 27.5%                                    | 27.5mm     | 34.38mm    | 38.50mm    | 41.25mm    | 44.00mm                       | 49.50mm    | 52.25mm    | 55.00mm    |
| Total Spring Force Per 5mm Compression<br><br>Newtons   | Stroke     | Force      | Force      | Force      | Force                         | Force      | Force      | Force      |
|                                                         | 5          | 2750       | 2150       | 1700       | 1600                          | 1300       | 1150       | 1000       |
|                                                         | 10         | 5500       | 4300       | 3400       | 3200                          | 2600       | 2300       | 2000       |
|                                                         | 15         | 9700       | 7250       | 6300       | 5950                          | 5150       | 4450       | 4150       |
|                                                         | 20         | 13900      | 10200      | 9200       | 8700                          | 7700       | 6600       | 6300       |
|                                                         | 25         | 19400      | 14050      | 12200      | 11300                         | 10100      | 8800       | 8250       |
|                                                         | 30         | 24900      | 17900      | 15200      | 13900                         | 12500      | 11000      | 10200      |
|                                                         | 35         | 44650      | 22950      | 18900      | 17400                         | 15750      | 13750      | 12600      |
|                                                         | 40         | 64400      | 28000      | 22600      | 20900                         | 19000      | 16500      | 15000      |
|                                                         | 45         |            | 46200      | 29200      | 25900                         | 22750      | 19250      | 17500      |
|                                                         | 50         |            | 64400      | 35800      | 30900                         | 26500      | 22000      | 20000      |
|                                                         | 55         |            |            |            | 47650                         | 35200      | 26450      | 23700      |
|                                                         | 60         |            |            |            | 64400                         | 43900      | 30900      | 27400      |
| Shaded area recommended                                 |            |            |            |            | Unshaded area not recommended |            |            |            |

Cut length tolerance: + 3mm / -0

| MARSH MELLOW® DIE SPRING 5" OD x 1" ID                |           |           |           |                               |           |           |           |           |           |
|-------------------------------------------------------|-----------|-----------|-----------|-------------------------------|-----------|-----------|-----------|-----------|-----------|
| Lamina Part Number                                    | MM500-500 | MM500-550 | MM500-600 | MM500-650                     | MM500-700 | MM500-750 | MM500-800 | MM500-850 | MM500-900 |
| Ratio of Length to O.D.                               | 1.0       | 1.1       | 1.2       | 1.3                           | 1.4       | 1.5       | 1.6       | 1.7       | 1.8       |
| Free Length                                           | 5.00      | 5.50      | 6.00      | 6.50                          | 7.00      | 7.50      | 8.00      | 8.50      | 9.00      |
| Maximum Compressed OD (@ Max. Compression)            | 6.40      | 6.40      | 6.40      | 6.40                          | 6.40      | 6.40      | 6.40      | 6.40      | 6.40      |
| Maximum Stroke 27.5%                                  | 1.38      | 1.51      | 1.65      | 1.79                          | 1.93      | 2.08      | 2.20      | 2.34      | 2.48      |
| Total Spring Force Per 1/4" Compression<br><br>Pounds | Stroke    | Force     | Force     | Force                         | Force     | Force     | Force     | Force     | Force     |
|                                                       | 0.25      | 1400      | 1300      | 1000                          | 900       | 700       | 600       | 400       | 300       |
|                                                       | 0.50      | 3000      | 2700      | 2200                          | 2000      | 1700      | 1600      | 1300      | 1100      |
|                                                       | 0.75      | 4600      | 4000      | 3400                          | 3200      | 2800      | 2700      | 2200      | 1900      |
|                                                       | 1.00      | 6400      | 5600      | 4800                          | 4400      | 3900      | 3700      | 3100      | 2900      |
|                                                       | 1.25      | 8700      | 7500      | 6300                          | 5800      | 5200      | 4800      | 4100      | 3800      |
|                                                       | 1.50      | 11700     | 9900      | 8100                          | 7300      | 6600      | 6000      | 5200      | 4800      |
|                                                       | 1.75      | 17000     | 13500     | 10500                         | 9100      | 8000      | 7400      | 6300      | 5700      |
|                                                       | 2.00      | 24500     | 17900     | 13800                         | 11500     | 9700      | 9000      | 7500      | 6900      |
|                                                       | 2.25      |           |           | 19000                         | 15500     | 12500     | 11000     | 9000      | 8100      |
|                                                       | 2.50      |           |           |                               | 20500     | 16300     | 13700     | 10800     | 9700      |
|                                                       | 2.75      |           |           |                               |           | 21500     | 17300     | 13300     | 11500     |
| 3000 Shaded area recommended                          |           |           |           | Unshaded area not recommended |           |           |           |           |           |

Cut length tolerance: + 1/8" / -0

**NOTES:**

- Minimum recommended length-to-OD ratio is 1.2.
- Maximum recommended length-to-OD ratio is 1.7.
- Force values have been estimated.

| MARSH MELLOW® DIE SPRING 125mm OD x 25mm ID           |            |            |            |                               |            |            |            |            |            |
|-------------------------------------------------------|------------|------------|------------|-------------------------------|------------|------------|------------|------------|------------|
| Lamina Part Number                                    | MM125-125M | MM125-140M | MM125-150M | MM125-160M                    | MM125-180M | MM125-190M | MM125-200M | MM125-215M | MM125-225M |
| Ratio of Length to O.D.                               | 1.00       | 1.12       | 1.20       | 1.28                          | 1.44       | 1.52       | 1.60       | 1.72       | 1.80       |
| Free Length                                           | 125mm      | 140mm      | 150mm      | 160mm                         | 180mm      | 190mm      | 200mm      | 215mm      | 225mm      |
| Maximum Compressed OD (@ Max. Compression)            | 161mm      | 161mm      | 161mm      | 161mm                         | 161mm      | 161mm      | 161mm      | 161mm      | 161mm      |
| Maximum Stroke 27.5%                                  | 34.38mm    | 38.50mm    | 41.25mm    | 44.00mm                       | 49.50mm    | 52.25mm    | 55.00mm    | 59.13mm    | 61.88mm    |
| Total Spring Force Per 5mm Compression<br><br>Newtons | Stroke     | Force      | Force      | Force                         | Force      | Force      | Force      | Force      | Force      |
|                                                       | 5          | 3900       | 3400       | 3000                          | 2750       | 2500       | 2250       | 2000       | 1750       |
|                                                       | 10         | 7800       | 6800       | 6000                          | 5500       | 5000       | 4500       | 4000       | 3500       |
|                                                       | 15         | 12650      | 11150      | 10000                         | 9350       | 8000       | 7600       | 7250       | 6650       |
|                                                       | 20         | 17500      | 15500      | 14000                         | 13200      | 11000      | 10700      | 10500      | 9800       |
|                                                       | 25         | 23750      | 20350      | 18750                         | 17250      | 15000      | 14100      | 13250      | 12400      |
|                                                       | 30         | 30000      | 25200      | 23500                         | 21300      | 19000      | 17500      | 16000      | 15000      |
|                                                       | 35         | 39000      | 32350      | 29000                         | 26400      | 23600      | 21350      | 19750      | 18000      |
|                                                       | 40         | 48000      | 39500      | 34500                         | 31500      | 28200      | 25200      | 23500      | 21000      |
|                                                       | 45         | 74000      | 49250      | 43250                         | 38500      | 32600      | 29850      | 27500      | 25000      |
|                                                       | 50         | 100000     | 59000      | 52000                         | 45500      | 37000      | 34500      | 31500      | 29000      |
|                                                       | 55         |            |            | 76000                         | 55500      | 44500      | 41050      | 36750      | 33000      |
|                                                       | 60         |            |            | 100000                        | 65500      | 52000      | 47600      | 42000      | 37000      |
|                                                       | 65         |            |            |                               |            | 66750      | 54800      | 49750      | 43500      |
|                                                       | 70         |            |            |                               |            | 81500      | 62000      | 57500      | 50000      |
| Shaded area recommended                               |            |            |            | Unshaded area not recommended |            |            |            |            |            |

Cut length tolerance: + 3mm / -0

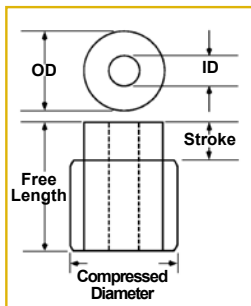
| MARSH MELLOW <sup>®</sup> DIE SPRING 6" OD x 1" ID    |           |           |           |                               |           |           |            |
|-------------------------------------------------------|-----------|-----------|-----------|-------------------------------|-----------|-----------|------------|
| Lamina Part Number                                    | MM600-600 | MM600-650 | MM600-700 | MM600-750                     | MM600-800 | MM600-900 | MM600-1000 |
| Ratio of Length to O.D.                               | 1.0       | 1.08      | 1.17      | 1.25                          | 1.33      | 1.50      | 1.67       |
| Free Length                                           | 6.00      | 6.50      | 7.00      | 7.50                          | 8.00      | 9.00      | 10.00      |
| Maximum Compressed OD (@ Max. Compression)            | 7.63      | 7.63      | 7.63      | 7.63                          | 7.63      | 7.63      | 7.63       |
| Maximum Stroke 27.5%                                  | 1.65      | 1.79      | 1.93      | 2.06                          | 2.20      | 2.48      | 2.75       |
| Total Spring Force Per 1/4" Compression<br><br>Pounds | Stroke    | Force     | Force     | Force                         | Force     | Force     | Force      |
|                                                       | 0.25      | 1400      | 1300      | 1100                          | 900       | 800       | 7580       |
|                                                       | 0.50      | 3400      | 3100      | 2800                          | 2400      | 2200      | 2150       |
|                                                       | 0.75      | 5400      | 5000      | 4500                          | 4000      | 3700      | 3300       |
|                                                       | 1.00      | 7500      | 6900      | 6100                          | 5500      | 5100      | 4400       |
|                                                       | 1.25      | 10000     | 9000      | 8200                          | 7300      | 6700      | 6100       |
|                                                       | 1.50      | 12900     | 11200     | 10100                         | 9100      | 8300      | 7500       |
|                                                       | 1.75      | 16500     | 14200     | 12500                         | 11100     | 10100     | 9000       |
|                                                       | 2.00      | 22000     | 18300     | 15600                         | 13500     | 12100     | 10800      |
|                                                       | 2.25      | 30000     | 24300     | 19500                         | 16500     | 14700     | 12800      |
|                                                       | 2.50      |           | 31600     | 25200                         | 20300     | 17800     | 15200      |
|                                                       | 2.75      |           |           | 32000                         | 26600     | 22100     | 18400      |
|                                                       | 3.00      |           |           |                               | 38000     | 28000     | 22600      |
| Shaded area recommended                               |           |           |           | Unshaded area not recommended |           |           |            |

**NOTES:**

- Minimum recommended length-to-OD ratio is 1.2.
- Maximum recommended length-to-OD ratio is 1.7.
- Force values have been estimated.

Cut length tolerance: + 1/8" / -0

Cut length tolerance: + 3mm / -0



| MARSH MELLOW <sup>®</sup> DIE SPRING 150mm OD x 25mm ID |            |            |            |                               |            |            |
|---------------------------------------------------------|------------|------------|------------|-------------------------------|------------|------------|
| Lamina Part Number                                      | MM150-150M | MM150-160M | MM150-180M | MM150-190M                    | MM150-200M | MM150-250M |
| Ratio of Length to O.D.                                 | 1.00       | 1.07       | 1.20       | 1.27                          | 1.33       | 1.67       |
| Free Length                                             | 150mm      | 160mm      | 180mm      | 190mm                         | 200mm      | 250mm      |
| Maximum Compressed OD (@ Max. Compression)              | 192mm      | 192mm      | 192mm      | 192mm                         | 192mm      | 192mm      |
| Maximum Stroke 27.5%                                    | 41.25mm    | 44.00mm    | 49.50mm    | 52.25mm                       | 55.00mm    | 68.75mm    |
| Total Spring Force Per 5mm Compression<br><br>Newtons   | Stroke     | Force      | Force      | Force                         | Force      | Force      |
|                                                         | 5          | 6000       | 5500       | 5000                          | 4500       | 4000       |
|                                                         | 10         | 12000      | 11000      | 10000                         | 9000       | 8000       |
|                                                         | 15         | 18500      | 16500      | 15000                         | 14000      | 13000      |
|                                                         | 20         | 25000      | 22000      | 20000                         | 19000      | 18000      |
|                                                         | 25         | 32500      | 29500      | 26500                         | 25500      | 21500      |
|                                                         | 30         | 40000      | 37000      | 33000                         | 32000      | 25000      |
|                                                         | 35         | 49000      | 46000      | 39500                         | 37500      | 32500      |
|                                                         | 40         | 58000      | 55000      | 46000                         | 43000      | 40000      |
|                                                         | 45         | 75000      | 66000      | 53500                         | 50500      | 47500      |
|                                                         | 50         | 92000      | 77000      | 61000                         | 58000      | 55000      |
|                                                         | 55         | 123500     | 106500     | 76500                         | 69500      | 58500      |
|                                                         | 60         | 155000     | 136000     | 92000                         | 81000      | 62000      |
|                                                         | 65         |            |            | 116000                        | 102000     | 83500      |
|                                                         | 70         |            |            | 140000                        | 123000     | 105000     |
|                                                         | 75         |            |            |                               |            | 130000     |
|                                                         | 80         |            |            |                               |            | 155000     |
| Shaded area recommended                                 |            |            |            | Unshaded area not recommended |            |            |

## Installation Instructions

### 1. Hole or Pocket Size

Marsh Mellow® Die Springs are 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. See bulge curve on page 3.

### 2. Locating Stud

Threaded studs can be used as locators.

#### Threaded Studs Available

(Press-fit) into Marsh Mellow® Die Springs to order ad suffix "T" i.e. for stud

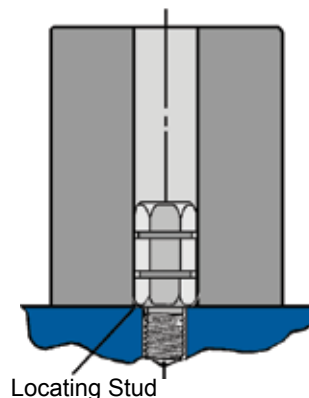
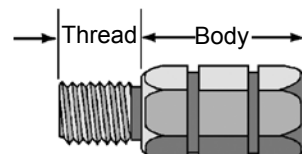
| MARSHMELLOW I.D. | PART NUMBER                                    | THREAD LENGTH  | BODY LENGTH    | OVERALL LENGTH |
|------------------|------------------------------------------------|----------------|----------------|----------------|
| *8mm<br>5/16"    | <b>T-Stud-M6-1.0</b><br><b>T-Stud-1/4-20</b>   | 12.5mm<br>1/2" | 38mm<br>1-1/2" | 50.5mm<br>2"   |
| *16mm<br>5/8"    | <b>T-Stud-M10-1.5</b><br><b>T-Stud-3/8-16</b>  | 16mm<br>5/8"   | 38mm<br>1-1/2" | 54mm<br>2-1/8" |
| *20mm<br>3/4"    | <b>T-Stud-M12-1.75</b><br><b>T-Stud-1/2-13</b> | 20mm<br>3/4"   | 38mm<br>1-1/2" | 58mm<br>2-1/4" |
| *25mm<br>1"      | <b>T-Stud-M20-2.5</b><br><b>T-Stud-3/4-10</b>  | 30mm<br>1"     | 50mm<br>2"     | 801mm<br>3"    |

*\*Metric studs will be used with metric sized Marsh Mellow® Die Springs unless otherwise requested.*

*Regarding installing studs in Marsh Mellow® Die Springs:*

*The body length of the stud should never exceed 50% of the Marsh Mellow® Die Spring free length.*

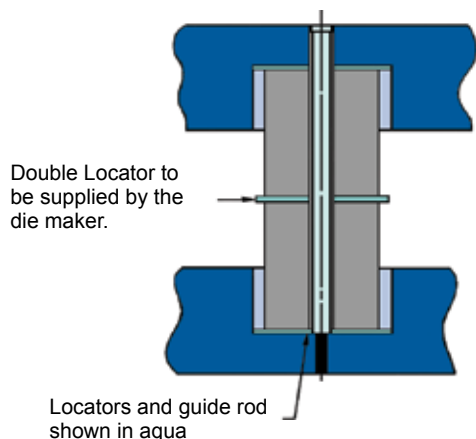
*If such a condition does arise, the stud must be altered to allow for compression.*



## STACKING

### 3. Using Locators

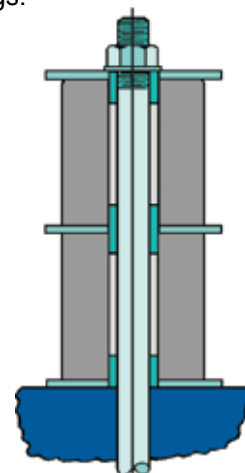
Locators can be made from washers and should fit closely around the rod. O.D. pocket must accommodate bulge growth.



### 4. Using Guide Rods

Guide rods are recommended when stacking Marsh Mellow® Die Springs.

Guide rods, washers and sleeves are supplied by the die maker.



## Application Requirements

### Considerations for the selection of individual Marsh Mellow® Die Springs

- 1 Determine the force required to blank, form, hold or strip the part. Remember—die design is an art, not an exact science. At times more force may be necessary than originally calculated. We recommend an upward adjustment over determined force (this allows for the set that a spring will take over it's lifetime and any additional friction).
- 2 Determine the working stroke required to make the part.
- 3 Determine the die open clearance.
- 4 Determine the working area.
- 5 Determine the strokes per minute.



- 6 Determine if there are restrictions on the outside diameters (because of the bulge—expansion of the spring when compressed (see the bulge curve on page 3) due to restraints, interferences, flat and smooth mounting/striking surfaces, etc.

#### Please Note:

- 7 The Marsh Mellow® Die Spring is made from a Rubber Compound – its physical properties deteriorate over time. Depending on temperature, light, ratios, deflection, cycle rate, etc. the spring begins to diminish after three years of life. Heat is an enemy of rubber, either heat generated from compression of the spring or operating environment temperatures.

The active life of a Marsh Mellow® Die Spring is 3 – 5 years depending on operating conditions.

#### Application Ideas:

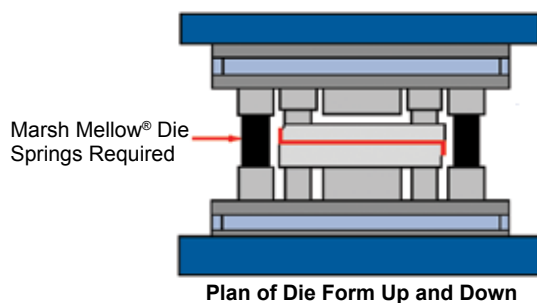
Marsh Mellow® Die Springs are designed to replace certain standard size coil die springs and nitrogen cylinders.

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). SEE EXAMPLE 2.
4. Floating punches on inverted stretch draws (replacing nitrogen cylinders).

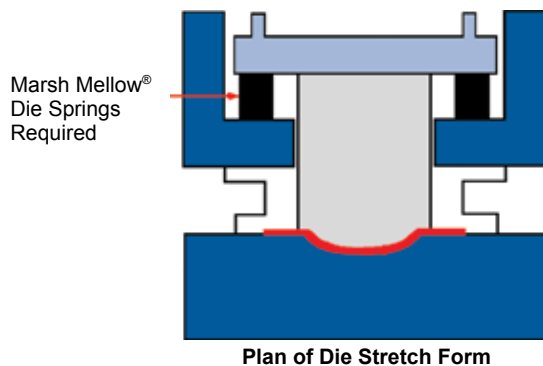
In addition, the larger diameter parts can exert forces from 1900 to 155,000 newtons (Lbs.) each, and are an extremely effective alternative to costly nitrogen cylinders as in CAM returns.

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.

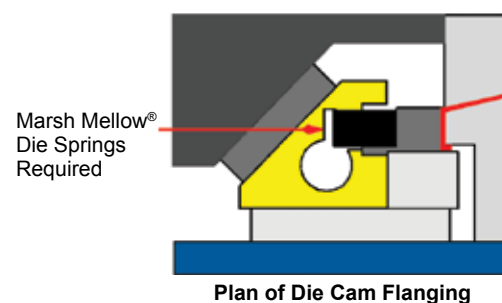
**EXAMPLE 1**



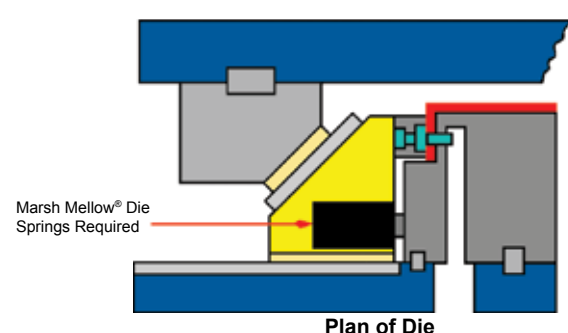
**EXAMPLE 2**



**EXAMPLE 3**



**EXAMPLE 4**



**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

**Note:** Storage Blocks to be spaced as far apart as practical.

## NOTES

## OTHER LAMINA PRODUCTS

Lamina supplies the most extensive selection of springs and pressure control devices used in die sets, molds, fixtures and machines. Among the products Lamina stocks are the following:



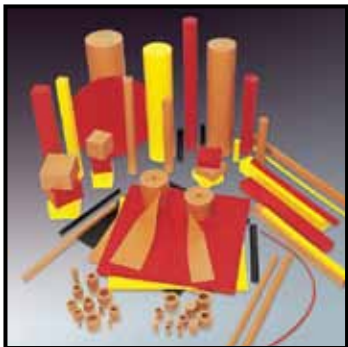
### **Danly<sup>™</sup> DieMax XL<sup>®</sup> Die Springs**

- ◆ Yields reliable, trouble-free performance
- ◆ High tensile strength chrome silicon material
- ◆ Optimal rectangular wire design



### **MRO Utility Springs**

- ◆ Engineered for durability
- ◆ Unlimited applications for general utility and industry
- ◆ Available in a variety of compression and extension springs



### **Formathane<sup>®</sup> Urethane**

- ◆ Specially formulated for metalforming
- ◆ Greater abrasion resistance
- ◆ Higher pressures with added durability

## Commitment to Quality & Customer Satisfaction

*Dayton Lamina is a leading manufacturer of tool, die and mold components for the metal-working and plastics industries. As a customer-focused, world-class supplier of choice, we provide the brands, product breadth, distribution network and technical support for all your metal forming needs.*

*Our goal is to give our customers the most innovative and value-added products and services.*



# DAYTON Lamina™

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Lamina® LEMPCO

\*Dayton Lamina's line of Danly products is available only to North America.

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