



Die Springs MASTER CATALOG 13

SUPERIOR SOLUTIONS

Raymond®

Die Springs

Associated Spring
RAYMOND 
A business of BARNES GROUP INC



Associated Spring Raymond Die Springs are manufactured using a wire cross section developed to provide optimum balance between load-carrying characteristics and cycle life.

Produced under carefully controlled processes with special equipment developed by Barnes Group, Inc.'s research and development facilities.

All of the manufacturing steps are closely monitored by rigid quality controls, inspection and testing to ensure that the long service life engineered into every die spring is constant.

Full technical specifications available on request from Associated Spring Raymond

All of our die springs are manufactured to the highest possible standards and are designed to be interchangeable with many major manufacturers of the same type, size, and color.

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INCH

METRIC

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Associated Spring RAYMOND

A business of BARNES GROUP INC

Associated Spring Raymond is committed to providing Engineered Solutions Delivered On Time. We provide solutions based on engineering design & application engineering, prototype testing & validation, quality manufacturing (ISO, TS, & AS certified environments as needed), & dedicated stocking with JIT delivery. We provide catalog components and custom engineered solutions to a variety of OEMs and industries from sub-sea to high altitude. Our strong corporate history is one of the many reasons why Quality is number one. Whether it is a catalog part or a fully custom sub-assembly, Associated Spring Raymond can provide a complete engineered solution to your OEM or aftermarket application.

Selecting Die Springs



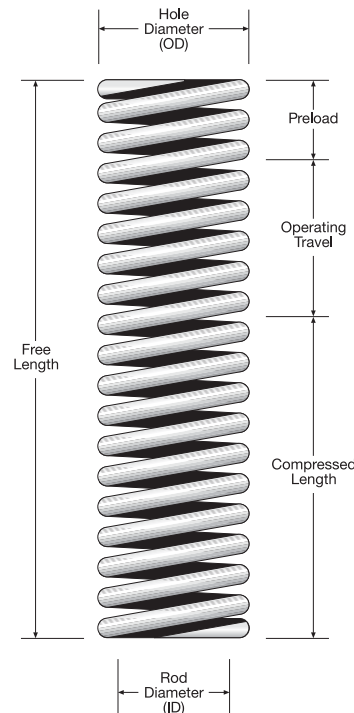
A general rule to observe in spring selection is to always use as many springs as the die will accommodate which will produce the required load with the least amount of deflection. This will increase the useful life of the spring, reduce the chances of spring failure and the resulting downtime, loss of production and increased maintenance cost.

Die spring costs are a very small percentage of the total cost of the die. An effort to save a few cents on die springs is a misguided act that can cost many dollars in lost time and labor.

The more rapidly a spring works, the more attention must be paid to its fatigue limits. In slow moving dies or fixtures, it is possible to get good performance with springs operating near maximum deflection. As the working speed increases, the life expectancy of the spring at that deflection decreases.

Springs for strippers, pressure pads, and other die components can be selected from the following pages. When selecting a die spring it is necessary to determine the type of performance required of the springs: short, normal, or long run. For short- or normal-run a die on optimum life. The recommended deflections for each spring based on the performance required are shown on pages 6 to 28.

Another approach when selecting a spring is to work back from the amount of operating travel the springs will be subjected to as indicated by the die layout. Select springs in the appropriate duty range which will operate efficiently at the required travel. Calculate the number of springs needed by dividing the load supplied by one spring into the total load required. Round the total number of springs to the next higher even number for balanced performance.



Associated Spring Raymond

has capabilities well beyond the catalog components shown. We supply custom components and functional assemblies. If you simply need a Raymond® die spring or other spring type with a different finish this can be easily done.

Some common finishes are:

- Plain
- Dacromet®
- Geomet®
- Zinc
- Black Oxide
- Temperature Indicating
- Teflon®

Additional catalogs are available for other catalog stocked parts for:



CloverDome

m-Struts®



Our engineers can also customize the dimensions and/or rates for your OEM or aftermarket application based on the design constraints. Even further we can design and supply functional sub-assemblies for new designs or cost reduction efforts. Contact Associated Spring Raymond to learn more about the possibilities for your application:

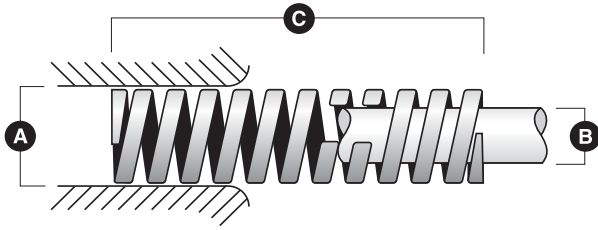
Please Order From:
Clark & Osborne, LLP
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Indianapolis, IN 46220
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317-253-4486 FAX
sales@clarkandosborne.com

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Die Spring Features & Benefits



Raymond Die Springs Offer	Features	Benefits
Superior Materials & Wire Profile	• All Raymond die springs are made from high tensile strength chromium alloy steels. • Optimal wire cross section. • Spring ends are ground square. • Other raw materials are available for special conditions and environments.	• Inherent toughness to withstand heavy load demands. • Superior performance in high stress applications. • Heat resistance up to 230°C. • Readily available, cost efficient raw material. • Consistent controlled metallurgy. • Offers maximum design possibilities. • Wire cross section provides optimum deflection and protection against failure due to excessive stress build-up. • Square ends create reliable, flat, maximum load-bearing surface. • Specialty materials available to meet customer requirements.
Dimensional Consistency	• Dimensional requirements remain consistent and measurably the same from one batch of springs to the next.	• Provides uniform spring performance. • Ensures consistent rate recordings. • Greater load accuracy at a given test height. • Certainty that OD will work freely in prescribed hole and ID will work freely over prescribed rod. • Raymond assurance of the highest production and quality standards. • Reliable performance engineered into every Raymond die spring.
Longer Spring Life	• Engineered to better withstand shock loading. • Designed to endure constant high-speed deflections. • Shot-peened to increase fatigue life. • Less downtime.	• Reliable, trouble-free performance. • Increased fatigue life by as much as 30%. • Reduced spring breakage. • Uniform performance over a longer lifetime. • More cost effective. • Extra performance margins.
Excellent Deflection	• Springs provide greater available travel to solid.	• More travel in each spring. • Higher load capacities. • Increased fatigue life. • Greater application flexibility. • More reliable performance. • Lower solid height.



US Series

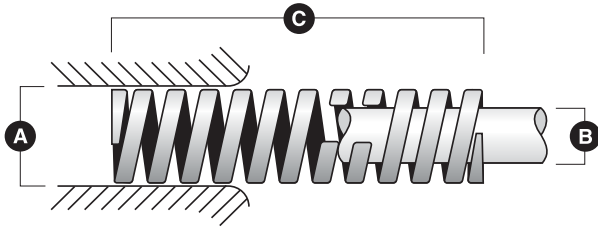
Raymond® MEDIUM DUTY DIE SPRINGS					INCH DIMENSIONS					BLUE	
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in. Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (25% of free length)		For Long Life (35% of free length)		Maximum Operating Def. (40% of free length)		*Maximum Deflection (50% of free length)
A	B	C			Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)		Deflection (in)
3/8	3/16	1	103-104	6.0	15.0	0.25	21.0	0.35	24.0	0.40	0.50
		1 1/4	103-105	5.0	15.6	0.31	21.9	0.44	25.0	0.50	0.63
		1 1/2	103-106	4.2	15.8	0.38	22.1	0.53	25.2	0.60	0.75
		1 3/4	103-107	3.7	16.2	0.44	22.7	0.61	25.9	0.70	0.88
		2	103-108	3.1	15.5	0.50	21.7	0.70	24.8	0.80	1.00
		2 1/2	103-110	2.6	16.3	0.63	22.8	0.88	26.0	1.00	1.25
		3	103-112	2.1	15.8	0.75	22.0	1.05	25.2	1.20	1.50
		12	103-148	0.6	18.0	3.00	25.2	4.20	28.8	4.80	6.00
1/2	9/32	1	103-204	11.0	27.5	0.25	38.5	0.35	44.0	0.40	0.50
		1 1/4	103-205	8.2	25.6	0.31	35.9	0.44	41.0	0.50	0.63
		1 1/2	103-206	6.8	25.5	0.38	35.7	0.53	40.8	0.60	0.75
		1 3/4	103-207	6.0	26.3	0.44	36.8	0.61	42.0	0.70	0.88
		2	103-208	5.5	27.5	0.50	38.5	0.70	44.0	0.80	1.00
		2 1/2	103-210	4.5	28.1	0.63	39.4	0.88	45.0	1.00	1.25
		3	103-212	3.5	26.3	0.75	36.8	1.05	42.0	1.20	1.50
		3 1/2	103-214	3.0	26.3	0.88	36.8	1.23	42.0	1.40	1.75
		4 1/2	103-218	2.3	25.9	1.13	36.2	1.58	41.4	1.80	2.25
		5 1/2	103-222	2.0	27.5	1.38	38.5	1.93	44.0	2.20	2.75
		6 1/2	103-226	1.4	22.8	1.63	31.9	2.28	36.4	2.60	3.25
		7 1/2	103-230	1.2	22.5	1.88	31.5	2.63	36.0	3.00	3.75
5/8	11/32	12	103-248	0.7	21.0	3.00	29.4	4.20	33.6	4.80	6.00
		1	103-304	16.4	41.0	0.25	57.4	0.35	65.6	0.40	0.50
		1 1/4	103-305	12.4	38.8	0.31	54.3	0.44	62.0	0.50	0.63
		1 1/2	103-306	10.8	40.5	0.38	56.7	0.53	64.8	0.60	0.75
		1 3/4	103-307	9.6	42.0	0.44	58.8	0.61	67.2	0.70	0.88
		2	103-308	8.6	43.0	0.50	60.2	0.70	68.8	0.80	1.00
		2 1/2	103-310	6.5	40.6	0.63	56.9	0.88	65.0	1.00	1.25
		3	103-312	5.8	43.5	0.75	60.9	1.05	69.6	1.20	1.50
		3 1/2	103-314	5.0	43.8	0.88	61.3	1.23	70.0	1.40	1.75
		4	103-316	4.4	44.0	1.00	61.6	1.40	70.4	1.60	2.00
3/4	3/8	12	103-348	1.5	45.0	3.00	63.0	4.20	72.0	4.80	6.00
		1	103-404	32.0	80.0	0.25	112.0	0.35	128.0	0.40	0.50
		1 1/4	103-405	25.6	80.0	0.31	112.0	0.44	128.0	0.50	0.63
		1 1/2	103-406	20.0	75.0	0.38	105.0	0.53	120.0	0.60	0.75
		1 3/4	103-407	17.6	77.0	0.44	107.8	0.61	123.2	0.70	0.88
		2	103-408	15.0	75.0	0.50	105.0	0.70	120.0	0.80	1.00
		2 1/2	103-410	12.0	75.0	0.63	105.0	0.88	120.0	1.00	1.25
		3	103-412	10.1	75.8	0.75	106.1	1.05	121.2	1.20	1.50
		3 1/2	103-414	8.3	72.6	0.88	101.7	1.23	116.2	1.40	1.75
		4	103-416	7.5	75.0	1.00	105.0	1.40	120.0	1.60	2.00
		4 1/2	103-418	6.4	72.0	1.13	100.8	1.58	115.2	1.80	2.25
		5	103-420	6.0	75.0	1.25	105.0	1.75	120.0	2.00	2.50
		5 1/2	103-422	5.5	75.6	1.38	105.9	1.93	121.0	2.20	2.75
		6	103-424	5.0	75.0	1.50	105.0	2.10	120.0	2.40	3.00
		6 1/2	103-426	4.7	76.4	1.63	106.9	2.28	122.2	2.60	3.25
		7 1/2	103-430	3.8	71.3	1.88	99.8	2.63	114.0	3.00	3.75
		12	103-448	2.4	72.0	3.00	100.8	4.20	115.2	4.80	6.00

* Deflection values shown represent compressed lengths near solid and are for design information only.
The color blue is a registered trademark of Barnes Group Inc.



Raymond® MEDIUM DUTY DIE SPRINGS					INCH DIMENSIONS						BLUE
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in. Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (25% of free length)		For Long Life (35% of free length)		Maximum Operating Def. (40% of free length)		*Maximum Deflection (50% of free length)
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
1	1/2	1	103-504	55.0	137.5	0.25	192.5	0.35	220.0	0.40	0.50
		1 1/4	103-505	45.0	140.6	0.31	196.9	0.44	225.0	0.50	0.63
		1 1/2	103-506	37.3	139.9	0.38	195.8	0.53	223.8	0.60	0.75
		1 3/4	103-507	32.0	140.0	0.44	196.0	0.61	224.0	0.70	0.88
		2	103-508	26.8	134.0	0.50	187.6	0.70	214.4	0.80	1.00
		2 1/2	103-510	20.9	130.6	0.63	182.9	0.88	209.0	1.00	1.25
		3	103-512	17.1	128.3	0.75	179.6	1.05	205.2	1.20	1.50
		3 1/2	103-514	14.5	126.9	0.88	177.6	1.23	203.0	1.40	1.75
		4	103-516	12.5	125.0	1.00	175.0	1.40	200.0	1.60	2.00
		4 1/2	103-518	11.0	123.8	1.13	173.3	1.58	198.0	1.80	2.25
		5	103-520	9.6	120.0	1.25	168.0	1.75	192.0	2.00	2.50
		5 1/2	103-522	8.8	121.0	1.38	169.4	1.93	193.6	2.20	2.75
		6	103-524	8.0	120.0	1.50	168.0	2.10	192.0	2.40	3.00
1 1/4	5/8	7	103-528	7.2	126.0	1.75	176.4	2.45	201.6	2.80	3.50
		8	103-532	6.0	120.0	2.00	168.0	2.80	192.0	3.20	4.00
		12	103-548	4.0	120.0	3.00	168.0	4.20	192.0	4.80	6.00
		1 1/2	103-606	49.6	186.0	0.38	260.4	0.53	297.6	0.60	0.75
		1 3/4	103-607	40.6	177.6	0.44	248.7	0.61	284.2	0.70	0.88
		2	103-608	37.6	188.0	0.50	263.2	0.70	300.8	0.80	1.00
		2 1/2	103-610	28.8	180.0	0.63	252.0	0.88	288.0	1.00	1.25
		3	103-612	24.0	180.0	0.75	252.0	1.05	288.0	1.20	1.50
		3 1/2	103-614	20.0	175.0	0.88	245.0	1.23	280.0	1.40	1.75
		4	103-616	17.6	176.0	1.00	246.4	1.40	281.6	1.60	2.00
		4 1/2	103-618	16.0	180.0	1.13	252.0	1.58	288.0	1.80	2.25
		5	103-620	14.3	178.8	1.25	250.3	1.75	286.0	2.00	2.50
		5 1/2	103-622	12.8	176.0	1.38	246.4	1.93	281.6	2.20	2.75
1 1/2	3/4	6	103-624	12.0	180.0	1.50	252.0	2.10	288.0	2.40	3.00
		7	103-628	10.4	182.0	1.75	254.8	2.45	291.2	2.80	3.50
		8	103-632	8.8	176.0	2.00	246.4	2.80	281.6	3.20	4.00
		10	103-640	7.2	180.0	2.50	252.0	3.50	288.0	4.00	5.00
		12	103-648	6.0	180.0	3.00	252.0	4.20	288.0	4.80	6.00
		2	103-708	53.0	265.0	0.50	371.0	0.70	424.0	0.80	1.00
		2 1/2	103-710	42.7	266.9	0.63	373.6	0.88	427.0	1.00	1.25
		3	103-712	36.0	270.0	0.75	378.0	1.05	432.0	1.20	1.50
		3 1/2	103-714	30.0	262.5	0.88	367.5	1.23	420.0	1.40	1.75
		4	103-716	24.9	249.0	1.00	348.6	1.40	398.4	1.60	2.00
		4 1/2	103-718	23.0	258.8	1.13	362.3	1.58	414.0	1.80	2.25
		5	103-720	21.0	262.5	1.25	367.5	1.75	420.0	2.00	2.50
		5 1/2	103-722	18.5	254.4	1.38	356.1	1.93	407.0	2.20	2.75
2	1	6	103-724	17.0	255.0	1.50	357.0	2.10	408.0	2.40	3.00
		7	103-728	15.3	267.8	1.75	374.9	2.45	428.4	2.80	3.50
		8	103-732	13.2	264.0	2.00	369.6	2.80	422.4	3.20	4.00
		10	103-740	10.6	265.0	2.50	371.0	3.50	424.0	4.00	5.00
		12	103-748	8.5	255.0	3.00	357.0	4.20	408.0	4.80	6.00
		2 1/2	103-810	100.0	625.0	0.63	875.0	0.88	1000.0	1.00	1.25
		3	103-812	83.0	622.5	0.75	871.5	1.05	996.0	1.20	1.50
		3 1/2	103-814	67.7	592.4	0.88	829.3	1.23	947.8	1.40	1.75
		4	103-816	60.0	600.0	1.00	840.0	1.40	960.0	1.60	2.00
		4 1/2	103-818	53.0	596.3	1.13	834.8	1.58	954.0	1.80	2.25
		5	103-820	47.0	587.5	1.25	822.5	1.75	940.0	2.00	2.50
		5 1/2	103-822	40.5	556.9	1.38	779.6	1.93	891.0	2.20	2.75
		6	103-824	39.0	585.0	1.50	819.0	2.10	936.0	2.40	3.00
2	1	7	103-828	31.2	546.0	1.75	764.4	2.45	873.6	2.80	3.50
		8	103-832	28.5	570.0	2.00	798.0	2.80	912.0	3.20	4.00
		10	103-840	21.6	540.0	2.50	756.0	3.50	864.0	4.00	5.00
		12	103-848	18.5	555.0	3.00	777.0	4.20	888.0	4.80	6.00

* Deflection values shown represent compressed lengths near solid and are for design information only.
The color blue is a registered trademark of Barnes Group Inc.



US Series

Raymond® MEDIUM HEAVY DUTY DIE SPRINGS					INCH DIMENSIONS						RED
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in. Def. (lb)	LOAD DEFLECTION TABLE						
A	B	C			For Optimum Life (20% of free length)		For Long Life (25% of free length)		Maximum Operating Def. (30% of free length)		*Maximum Deflection (37% of free length)
					Load (lb)	Deflection (in)		Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
3/8	3/16	1	104-104	8.4	16.8	0.20	21.0	0.25	25.2	0.30	0.37
		1 1/4	104-105	7.3	18.3	0.25	22.8	0.31	27.4	0.38	0.46
		1 1/2	104-106	6.7	20.1	0.30	25.1	0.38	30.2	0.45	0.56
		1 3/4	104-107	5.8	20.3	0.35	25.4	0.44	30.5	0.53	0.65
		2	104-108	5.0	20.0	0.40	25.0	0.50	30.0	0.60	0.74
		2 1/2	104-110	3.7	18.5	0.50	23.3	0.63	27.8	0.75	0.93
		3	104-112	3.0	18.0	0.60	22.5	0.75	27.0	0.90	1.11
		12	104-148	0.8	19.2	2.40	24.0	3.00	28.8	3.60	4.44
1/2	9/32	1	104-204	15.5	31.0	0.20	38.8	0.25	46.5	0.30	0.37
		1 1/4	104-205	12.2	30.5	0.25	37.8	0.31	45.8	0.38	0.46
		1 1/2	104-206	9.8	29.4	0.30	37.2	0.38	44.1	0.45	0.56
		1 3/4	104-207	8.5	29.8	0.35	37.2	0.44	44.6	0.53	0.65
		2	104-208	7.5	30.0	0.40	37.5	0.50	45.0	0.60	0.74
		2 1/2	104-210	6.0	30.0	0.50	37.5	0.63	45.0	0.75	0.93
		3	104-212	5.1	30.6	0.60	38.3	0.75	45.9	0.90	1.11
		3 1/2	104-214	4.0	28.0	0.70	35.0	0.88	42.0	1.05	1.30
12	104-248	1.1	26.4	2.40	33.0	3.00	39.6	3.60	4.44		
5/8	11/32	1	104-304	30.0	60.0	0.20	75.0	0.25	90.0	0.30	0.37
		1 1/4	104-305	21.5	53.8	0.25	67.2	0.31	80.6	0.38	0.46
		1 1/2	104-306	19.0	57.0	0.30	71.3	0.38	85.5	0.45	0.56
		1 3/4	104-307	16.8	58.8	0.35	73.5	0.44	88.2	0.53	0.65
		2	104-308	15.5	62.0	0.40	77.5	0.50	93.0	0.60	0.74
		2 1/2	104-310	11.5	57.5	0.50	71.9	0.63	86.3	0.75	0.93
		3	104-312	10.0	60.0	0.60	75.0	0.75	90.0	0.90	1.11
		3 1/2	104-314	8.5	59.5	0.70	74.4	0.88	89.3	1.05	1.30
4	104-316	7.6	60.8	0.80	76.0	1.00	91.2	1.20	1.48		
12	104-348	2.6	62.4	2.40	78.0	3.00	93.6	3.60	4.44		
3/4	3/8	1	104-404	50.0	100.0	0.20	125.0	0.25	150.0	0.30	0.37
		1 1/4	104-405	38.0	95.0	0.25	118.8	0.31	142.5	0.38	0.46
		1 1/2	104-406	31.0	93.0	0.30	117.8	0.38	139.5	0.45	0.56
		1 3/4	104-407	27.0	94.5	0.35	118.8	0.44	141.8	0.53	0.65
		2	104-408	24.0	96.0	0.40	120.0	0.50	144.0	0.60	0.74
		2 1/2	104-410	18.8	94.0	0.50	118.4	0.63	141.0	0.75	0.93
		3	104-412	14.9	89.4	0.60	111.8	0.75	134.1	0.90	1.11
		3 1/2	104-414	12.8	89.6	0.70	112.0	0.88	134.4	1.05	1.30
		4	104-416	11.0	88.0	0.80	110.0	1.00	132.0	1.20	1.48
		4 1/2	104-418	10.0	90.0	0.90	113.0	1.13	135.0	1.35	1.67
		5	104-420	9.0	90.0	1.00	112.5	1.25	135.0	1.50	1.85
		5 1/2	104-422	8.0	88.0	1.10	110.0	1.38	132.0	1.65	2.04
		6	104-424	7.5	90.0	1.20	112.5	1.50	135.0	1.80	2.22
		12	104-448	3.5	84.0	2.40	105.0	3.00	126.0	3.60	4.44

* Deflection values shown represent compressed lengths near solid and are for design information only. The color blue is a registered trademark of Barnes Group Inc.



Raymond® MEDIUM HEAVY DUTY DIE SPRINGS					INCH DIMENSIONS					RED	
Hole Dia.	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in. Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (20% of free length)		For Long Life (25% of free length)		Maximum Operating Def. (30% of free length)		*Maximum Deflection (37% of free length)
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
1	1/2	1	104-504	82.7	165.4	0.20	206.8	0.25	248.1	0.30	0.37
		1 1/4	104-505	65.3	163.3	0.25	202.4	0.31	244.9	0.38	0.46
		1 1/2	104-506	53.8	161.4	0.30	204.4	0.38	242.1	0.45	0.56
		1 3/4	104-507	46.1	161.4	0.35	202.8	0.44	242.0	0.53	0.65
		2	104-508	40.0	160.0	0.40	200.0	0.50	240.0	0.60	0.74
		2 1/2	104-510	32.2	161.0	0.50	202.9	0.63	241.5	0.75	0.93
		3	104-512	26.7	160.2	0.60	200.3	0.75	240.3	0.90	1.11
		3 1/2	104-514	22.9	160.3	0.70	201.5	0.88	240.5	1.05	1.30
		4	104-516	20.2	161.6	0.80	202.0	1.00	242.4	1.20	1.48
		4 1/2	104-518	17.8	160.2	0.90	201.1	1.13	240.3	1.35	1.67
		5	104-520	15.7	157.0	1.00	196.3	1.25	235.5	1.50	1.85
		5 1/2	104-522	13.7	150.7	1.10	189.1	1.38	226.1	1.65	2.04
		6	104-524	12.5	150.0	1.20	187.5	1.50	225.0	1.80	2.22
1 1/4	5/8	7	104-528	10.9	152.6	1.40	190.8	1.75	228.9	2.10	2.59
		8	104-532	9.6	153.6	1.60	192.0	2.00	230.4	2.40	2.96
		12	104-548	6.5	156.0	2.40	195.0	3.00	234.0	3.60	4.44
		1 1/2	104-606	114.4	343.2	0.30	429.0	0.38	514.8	0.45	0.56
		1 3/4	104-607	100.8	352.8	0.35	441.0	0.44	529.2	0.53	0.65
		2	104-608	83.8	335.2	0.40	419.0	0.50	502.8	0.60	0.74
		2 1/2	104-610	62.4	312.0	0.50	390.0	0.63	468.0	0.75	0.93
		3	104-612	51.2	307.2	0.60	384.0	0.75	460.8	0.90	1.11
		3 1/2	104-614	44.0	308.0	0.70	385.0	0.88	462.0	1.05	1.30
		4	104-616	38.1	304.8	0.80	381.0	1.00	457.2	1.20	1.48
		4 1/2	104-618	32.9	296.1	0.90	371.8	1.13	444.2	1.35	1.67
		5	104-620	30.0	300.0	1.00	375.0	1.25	450.0	1.50	1.85
		5 1/2	104-622	26.4	290.4	1.10	363.0	1.38	435.6	1.65	2.04
1 1/2	3/4	6	104-624	25.0	300.0	1.20	375.0	1.50	450.0	1.80	2.22
		7	104-628	21.0	294.0	1.40	367.5	1.75	441.0	2.10	2.59
		8	104-632	18.4	294.4	1.60	368.0	2.00	441.6	2.40	2.96
		10	104-640	14.5	290.0	2.00	362.5	2.50	435.0	3.00	3.70
		12	104-648	12.4	297.6	2.40	372.0	3.00	446.4	3.60	4.44
		2	104-708	103.0	412.0	0.40	515.0	0.50	618.0	0.60	0.74
		2 1/2	104-710	81.2	406.0	0.50	511.6	0.63	609.0	0.75	0.93
		3	104-712	62.4	374.4	0.60	468.0	0.75	561.6	0.90	1.11
		3 1/2	104-714	54.0	378.0	0.70	475.2	0.88	567.0	1.05	1.30
		4	104-716	46.5	372.0	0.80	465.0	1.00	558.0	1.20	1.48
		4 1/2	104-718	41.0	369.0	0.90	463.3	1.13	553.5	1.35	1.67
		5	104-720	36.8	368.0	1.00	460.0	1.25	552.0	1.50	1.85
		5 1/2	104-722	33.0	363.0	1.10	455.4	1.38	544.5	1.65	2.04
2	1	6	104-724	29.5	354.0	1.20	442.5	1.50	531.0	1.80	2.22
		7	104-728	25.5	357.0	1.40	446.3	1.75	535.5	2.10	2.59
		8	104-732	22.0	352.0	1.60	440.0	2.00	528.0	2.40	2.96
		10	104-740	17.6	352.0	2.00	440.0	2.50	528.0	3.00	3.70
		12	104-748	14.4	345.6	2.40	432.0	3.00	518.4	3.60	4.44
		2 1/2	104-810	118.4	592.0	0.50	740.0	0.63	888.0	0.75	0.93
		3	104-812	93.0	558.0	0.60	697.5	0.75	837.0	0.90	1.11
		3 1/2	104-814	78.2	547.4	0.70	688.2	0.88	821.1	1.05	1.30
		4	104-816	66.4	531.2	0.80	664.0	1.00	796.8	1.20	1.48
		4 1/2	104-818	60.0	540.0	0.90	675.0	1.13	810.0	1.35	1.67
		5	104-820	53.4	534.0	1.00	667.5	1.25	801.0	1.50	1.85
		5 1/2	104-822	49.0	539.0	1.10	676.2	1.38	808.5	1.65	2.04
		6	104-824	45.0	540.0	1.20	675.0	1.50	810.0	1.80	2.22
2	1	7	104-828	37.4	523.6	1.40	654.5	1.75	785.4	2.10	2.59
		8	104-832	33.0	528.0	1.60	660.0	2.00	792.0	2.40	2.96
		10	104-840	26.0	520.0	2.00	650.0	2.50	780.0	3.00	3.70
		12	104-848	21.5	516.0	2.40	645.0	3.00	774.0	3.60	4.44

* Deflection values shown represent compressed lengths near solid and are for design information only.

The color red is a registered trademark of Barnes Group Inc.



US Series

Raymond® HEAVY DUTY DIE SPRINGS					INCH DIMENSIONS						GOLD
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in. Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (20% of free length)		Maximum Operating Def. (25% of free length)		*Maximum Deflection (30% of free length)
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
3/8	3/16	1	105-104	11.6	17.4	0.15	23.2	0.20	29.0	0.25	0.30
		1 1/4	105-105	9.8	18.6	0.19	24.5	0.25	30.4	0.31	0.38
		1 1/2	105-106	8.0	18.4	0.23	24.0	0.30	30.4	0.38	0.45
		1 3/4	105-107	7.5	19.5	0.26	26.3	0.35	33.0	0.44	0.53
		2	105-108	6.2	18.6	0.30	24.8	0.40	31.0	0.50	0.60
		2 1/2	105-110	5.0	19.0	0.38	25.0	0.50	31.5	0.63	0.75
		3	105-112	4.1	18.5	0.45	24.6	0.60	30.8	0.75	0.90
		2	105-148	1.1	19.8	1.80	26.4	2.40	33.0	3.00	3.60
		1	105-204	22.5	33.8	0.15	45.0	0.20	56.3	0.25	0.30
		1 1/4	105-205	18.2	34.6	0.19	45.5	0.25	56.4	0.31	0.38
1/2	9/32	1 1/2	105-206	14.8	34.0	0.23	44.4	0.30	56.2	0.38	0.45
		1 3/4	105-207	12.6	32.8	0.26	44.1	0.35	55.4	0.44	0.53
		2	105-208	11.0	33.0	0.30	44.0	0.40	55.0	0.50	0.60
		2 1/2	105-210	8.6	32.7	0.38	43.0	0.50	54.2	0.63	0.75
		3	105-212	7.4	33.3	0.45	44.4	0.60	55.5	0.75	0.90
		3 1/2	105-214	6.0	31.8	0.53	42.0	0.70	52.8	0.88	1.05
		12	105-248	1.7	30.6	1.80	40.8	2.40	51.0	3.00	3.60
		1	105-304	42.4	63.6	0.15	84.8	0.20	106.0	0.25	0.30
5/8	11/32	1 1/4	105-305	32.5	61.8	0.19	81.3	0.25	100.8	0.31	0.38
		1 1/2	105-306	28.0	64.4	0.23	84.0	0.30	106.4	0.38	0.45
		1 3/4	105-307	24.0	62.4	0.26	84.0	0.35	105.6	0.44	0.53
		2	105-308	20.8	62.4	0.30	83.2	0.40	104.0	0.50	0.60
		2 1/2	105-310	17.0	64.6	0.38	85.0	0.50	107.1	0.63	0.75
		3	105-312	14.0	63.0	0.45	84.0	0.60	105.0	0.75	0.90
		3 1/2	105-314	12.2	64.7	0.53	85.4	0.70	107.4	0.88	1.05
		4	105-316	10.8	64.8	0.60	86.4	0.80	108.0	1.00	1.20
		12	105-348	3.0	54.0	1.80	72.0	2.40	90.0	3.00	3.60
		1	105-404	108.0	162.0	0.15	216.0	0.20	270.0	0.25	0.27
3/4	3/8	1 1/4	105-405	88.0	167.2	0.19	220.0	0.25	272.8	0.31	0.35
		1 1/2	105-406	69.0	158.7	0.23	207.0	0.30	262.2	0.38	0.45
		1 3/4	105-407	60.0	156.0	0.26	210.0	0.35	264.0	0.44	0.53
		2	105-408	51.5	154.5	0.30	206.0	0.40	257.5	0.50	0.60
		2 1/2	105-410	40.0	152.0	0.38	200.0	0.50	252.0	0.63	0.75
		3	105-412	33.0	148.5	0.45	198.0	0.60	247.5	0.75	0.90
		3 1/2	105-414	29.0	153.7	0.53	203.0	0.70	255.2	0.88	1.05
		4	105-416	25.0	150.0	0.60	200.0	0.80	250.0	1.00	1.20
		4 1/2	105-418	22.0	149.6	0.68	198.0	0.90	248.6	1.13	1.35
		5	105-420	19.5	146.3	0.75	195.0	1.00	243.8	1.25	1.50
		5 1/2	105-422	17.8	147.7	0.83	195.8	1.10	245.6	1.38	1.65
		6	105-424	16.0	144.0	0.90	192.0	1.20	240.0	1.50	1.80
		12	105-448	8.0	144.0	1.80	192.0	2.40	240.0	3.00	3.60

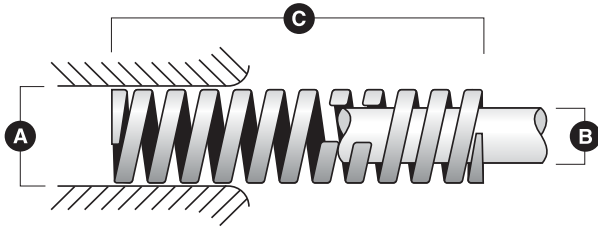
* Deflection values shown represent compressed lengths near solid and are for design information only.
The color blue is a registered trademark of Barnes Group Inc.



Raymond® HEAVY DUTY DIE SPRINGS INCH DIMENSIONS GOLD											
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in. Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (20% of free length)		Maximum Operating Def. (25% of free length)		*Maximum Deflection (30% of free length)
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
1	1/2	1	105-504	193.2	289.8	0.15	386.4	0.20	483.0	0.25	0.27
		1 1/4	105-505	146.5	278.4	0.19	366.3	0.25	454.2	0.31	0.38
		1 1/2	105-506	120.0	276.0	0.23	360.0	0.30	456.0	0.38	0.45
		1 3/4	105-507	104.0	270.4	0.26	364.0	0.35	457.6	0.44	0.53
		2	105-508	87.2	261.6	0.30	348.8	0.40	436.0	0.50	0.60
		2 1/2	105-510	66.5	252.7	0.38	332.5	0.50	419.0	0.63	0.75
		3	105-512	54.4	244.8	0.45	326.4	0.60	408.0	0.75	0.90
		3 1/2	105-514	45.6	241.7	0.53	319.2	0.70	401.3	0.88	1.05
		4	105-516	40.0	240.0	0.60	320.0	0.80	400.0	1.00	1.20
		4 1/2	105-518	35.2	239.4	0.68	316.8	0.90	397.8	1.13	1.35
		5	105-520	31.2	234.0	0.75	312.0	1.00	390.0	1.25	1.50
		5 1/2	105-522	28.8	239.0	0.83	316.8	1.10	397.4	1.38	1.65
1 1/4	5/8	6	105-524	25.6	230.4	0.90	307.2	1.20	384.0	1.50	1.80
		7	105-528	22.4	235.2	1.05	313.6	1.40	392.0	1.75	2.10
		8	105-532	19.2	230.4	1.20	307.2	1.60	384.0	2.00	2.40
		12	105-548	12.8	230.4	1.80	307.2	2.40	384.0	3.00	3.60
		1 1/2	105-606	220.0	506.0	0.23	660.0	0.30	836.0	0.38	0.45
		1 3/4	105-607	181.6	472.2	0.26	635.6	0.35	799.0	0.44	0.53
		2	105-608	149.6	448.8	0.30	598.4	0.40	748.0	0.50	0.57
		2 1/2	105-610	117.6	446.9	0.38	588.0	0.50	740.9	0.63	0.75
		3	105-612	95.2	428.4	0.45	571.2	0.60	714.0	0.75	0.90
		3 1/2	105-614	78.0	413.4	0.53	546.0	0.70	686.4	0.88	1.05
		4	105-616	66.4	398.4	0.60	531.2	0.80	664.0	1.00	1.20
		4 1/2	105-618	58.4	397.1	0.68	525.6	0.90	659.9	1.13	1.35
1 1/2	3/4	5	105-620	53.0	397.5	0.75	530.0	1.00	662.5	1.25	1.50
		5 1/2	105-622	47.2	391.8	0.83	519.2	1.10	651.4	1.38	1.65
		6	105-624	45.0	405.0	0.90	540.0	1.20	675.0	1.50	1.80
		7	105-628	36.8	386.4	1.05	515.2	1.40	644.0	1.75	2.10
		8	105-632	32.8	393.6	1.20	524.8	1.60	656.0	2.00	2.40
		10	105-640	25.6	384.0	1.50	512.0	2.00	640.0	2.50	3.00
		12	105-648	22.0	396.0	1.80	528.0	2.40	660.0	3.00	3.60
		2	105-708	198.0	594.0	0.30	792.0	0.40	990.0	0.50	0.60
		2 1/2	105-710	155.0	589.0	0.38	775.0	0.50	976.5	0.63	0.75
		3	105-712	130.0	585.0	0.45	780.0	0.60	975.0	0.75	0.90
		3 1/2	105-714	106.4	563.9	0.53	744.8	0.70	936.3	0.88	1.05
		4	105-716	91.2	547.2	0.60	729.6	0.80	912.0	1.00	1.20
2	1	4 1/2	105-718	81.6	554.9	0.68	734.4	0.90	922.1	1.13	1.35
		5	105-720	73.0	547.5	0.75	730.0	1.00	912.5	1.25	1.50
		5 1/2	105-722	67.0	556.1	0.83	737.0	1.10	924.6	1.38	1.65
		6	105-724	58.4	525.6	0.90	700.8	1.20	876.0	1.50	1.80
		7	105-728	49.6	520.8	1.05	694.4	1.40	868.0	1.75	2.10
		8	105-732	43.2	518.4	1.20	691.2	1.60	864.0	2.00	2.40
		10	105-740	36.2	543.0	1.50	724.0	2.00	905.0	2.50	3.00
		12	105-748	30.0	540.0	1.80	720.0	2.40	900.0	3.00	3.60
		2 1/2	105-810	251.2	954.6	0.38	1256.0	0.50	1582.6	0.63	0.75
		3	105-812	206.0	927.0	0.45	1236.0	0.60	1545.0	0.75	0.90
		3 1/2	105-814	170.0	901.0	0.53	1190.0	0.70	1496.0	0.88	1.05
		4	105-816	150.0	900.0	0.60	1200.0	0.80	1500.0	1.00	1.20
		4 1/2	105-818	127.2	865.0	0.68	1144.8	0.90	1437.4	1.13	1.35
2	1	5	105-820	118.6	889.5	0.75	1186.0	1.00	1482.5	1.25	1.50
		5 1/2	105-822	107.7	893.9	0.83	1184.7	1.10	1486.3	1.38	1.65
		6	105-824	97.7	879.3	0.90	1172.4	1.20	1465.5	1.50	1.80
		7	105-828	82.0	861.0	1.05	1148.0	1.40	1435.0	1.75	2.10
		8	105-832	73.0	876.0	1.20	1168.0	1.60	1460.0	2.00	2.40
		10	105-840	57.2	858.0	1.50	1144.0	2.00	1430.0	2.50	3.00
		12	105-848	47.7	858.6	1.80	1144.8	2.40	1431.0	3.00	3.60

* Deflection values shown represent compressed lengths near solid and are for design information only.

The color gold is a registered trademark of Barnes Group Inc.



US Series

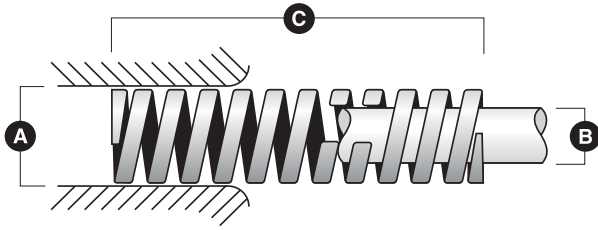
Raymond® EXTRA HEAVY DUTY DIE SPRINGS					INCH DIMENSIONS					GREEN	
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in. Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (17% of free length)		Maximum Operating Def. (20% of free length)		*Maximum Deflection (25% of free length)
A	B	C			Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)		Deflection (in)
3/8	3/16	1	106-104	21.0	31.5	0.15	35.7	0.17	42.0	0.20	0.25
		1 1/4	106-105	14.6	27.7	0.19	30.7	0.21	36.5	0.25	0.31
		1 1/2	106-106	12.5	28.8	0.23	32.5	0.26	37.5	0.30	0.38
		1 3/4	106-107	10.5	27.3	0.26	31.5	0.30	36.8	0.35	0.44
		2	106-108	9.0	27.0	0.30	30.6	0.34	36.0	0.40	0.50
		2 1/2	106-110	7.5	28.5	0.38	32.3	0.43	37.5	0.50	0.63
		3	106-112	6.3	28.4	0.45	32.1	0.51	37.8	0.60	0.75
		12	106-148	1.5	27.0	1.80	30.6	2.04	36.0	2.40	3.00
1/2	9/32	1	106-204	31.0	46.5	0.15	52.7	0.17	62.0	0.20	0.25
		1 1/4	106-205	24.0	45.6	0.19	50.4	0.21	60.0	0.25	0.31
		1 1/2	106-206	19.2	44.2	0.23	49.9	0.26	57.6	0.30	0.38
		1 3/4	106-207	17.0	44.2	0.26	51.0	0.30	59.5	0.35	0.44
		2	106-208	14.0	42.0	0.30	47.6	0.34	56.0	0.40	0.50
		2 1/2	106-210	11.5	43.7	0.38	49.5	0.43	57.5	0.50	0.63
		3	106-212	9.4	42.3	0.45	47.9	0.51	56.4	0.60	0.75
		3 1/2	106-214	8.0	42.4	0.53	48.0	0.60	56.0	0.70	0.88
12	106-248	2.4	43.2	1.80	49.0	2.04	57.6	2.40	3.00		
5/8	11/32	1	106-304	63.0	94.5	0.15	107.1	0.17	126.0	0.20	0.25
		1 1/4	106-305	43.8	83.2	0.19	92.0	0.21	109.5	0.25	0.31
		1 1/2	106-306	37.0	85.1	0.23	96.2	0.26	111.0	0.30	0.38
		1 3/4	106-307	31.0	80.6	0.26	93.0	0.30	108.5	0.35	0.44
		2	106-308	28.0	84.0	0.30	95.2	0.34	112.0	0.40	0.50
		2 1/2	106-310	22.0	83.6	0.38	94.6	0.43	110.0	0.50	0.63
		3	106-312	19.0	85.5	0.45	96.9	0.51	114.0	0.60	0.75
		3 1/2	106-314	15.4	81.6	0.53	92.4	0.60	107.8	0.70	0.88
4	106-316	13.5	81.0	0.60	91.8	0.68	108.0	0.80	1.00		
12	106-348	4.5	81.0	1.80	91.8	2.04	108.0	2.40	3.00		
3/4	3/8	1	106-404	140.0	210.0	0.15	238.0	0.17	280.0	0.20	0.25
		1 1/4	106-405	110.0	209.0	0.19	231.0	0.21	275.0	0.25	0.31
		1 1/2	106-406	89.0	204.7	0.23	231.4	0.26	267.0	0.30	0.38
		1 3/4	106-407	75.0	195.0	0.26	225.0	0.30	262.5	0.35	0.44
		2	106-408	66.0	198.0	0.30	224.4	0.34	264.0	0.40	0.50
		2 1/2	106-410	50.0	190.0	0.38	215.0	0.43	250.0	0.50	0.63
		3	106-412	40.5	182.3	0.45	206.6	0.51	243.0	0.60	0.75
		3 1/2	106-414	34.5	182.9	0.53	207.0	0.60	241.5	0.70	0.88
		4	106-416	30.0	180.0	0.60	204.0	0.68	240.0	0.80	1.00
		4 1/2	106-418	26.5	180.2	0.68	204.1	0.77	238.5	0.90	1.13
		5	106-420	23.5	176.3	0.75	199.8	0.85	235.0	1.00	1.25
		5 1/2	106-422	21.5	178.5	0.83	202.1	0.94	236.5	1.10	1.38
		6	106-424	19.5	175.5	0.90	198.9	1.02	234.0	1.20	1.50
		12	106-448	9.5	171.0	1.80	193.8	2.04	228.0	2.40	3.00

* Deflection values shown represent compressed lengths near solid and are for design information only. The color blue is a registered trademark of Barnes Group Inc.



Raymond® EXTRA HEAVY DUTY DIE SPRINGS					INCH DIMENSIONS						GREEN
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in. Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (17% of free length)		Maximum Operating Def. (20% of free length)		*Maximum Deflection (25% of free length)
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
1	1/2	1 1/2	106-506	160.0	368.0	0.23	416.0	0.26	480.0	0.30	0.38
		2	106-508	116.0	348.0	0.30	394.4	0.34	464.0	0.40	0.50
		2 1/2	106-510	89.6	340.5	0.38	385.3	0.43	448.0	0.50	0.63
		3	106-512	73.6	331.2	0.45	375.4	0.51	441.6	0.60	0.75
		3 1/2	106-514	62.4	330.7	0.53	374.4	0.60	436.8	0.70	0.88
		4	106-516	55.2	331.2	0.60	375.4	0.68	441.6	0.80	1.00
		4 1/2	106-518	48.8	331.8	0.68	375.8	0.77	439.2	0.90	1.13
		5	106-520	43.2	324.0	0.75	367.2	0.85	432.0	1.00	1.25
		6	106-524	36.0	324.0	0.90	367.2	1.02	432.0	1.20	1.50
1 1/4	5/8	12	106-548	17.6	316.8	1.80	359.0	2.04	422.4	2.40	3.00
		2	106-608	205.0	615.0	0.30	697.0	0.34	820.0	0.40	0.50
		2 1/2	106-610	152.5	579.5	0.38	655.8	0.43	762.5	0.50	0.63
		3	106-612	122.0	549.0	0.45	622.2	0.51	732.0	0.60	0.75
		3 1/2	106-614	108.5	575.1	0.53	651.0	0.60	759.5	0.70	0.88
		4	106-616	89.0	534.0	0.60	605.2	0.68	712.0	0.80	1.00
		4 1/2	106-618	83.5	567.8	0.68	643.0	0.77	751.5	0.90	1.13
		5	106-620	70.0	525.0	0.75	595.0	0.85	700.0	1.00	1.25
		6	106-624	57.5	517.5	0.90	586.5	1.02	690.0	1.20	1.50
1 1/2	3/4	8	106-632	46.0	552.0	1.20	625.6	1.36	736.0	1.60	2.00
		10	106-640	34.5	517.5	1.50	586.5	1.70	690.0	2.00	2.50
		12	106-648	27.0	486.0	1.80	550.8	2.04	648.0	2.40	3.00
		2	106-708	408.5	1225.5	0.30	1388.9	0.34	1634.0	0.40	0.45
		2 1/2	106-710	328.5	1248.3	0.38	1412.6	0.43	1642.5	0.50	0.63
		3	106-712	255.0	1147.5	0.45	1300.5	0.51	1530.0	0.60	0.75
		3 1/2	106-714	213.5	1131.6	0.53	1281.0	0.60	1494.5	0.70	0.88
		4	106-716	184.5	1107.0	0.60	1254.6	0.68	1476.0	0.80	1.00
		4 1/2	106-718	162.5	1105.0	0.68	1251.3	0.77	1462.5	0.90	1.13
2	1	5	106-720	145.0	1087.5	0.75	1232.5	0.85	1450.0	1.00	1.25
		6	106-724	120.5	1084.5	0.90	1229.1	1.02	1446.0	1.20	1.50
		8	106-732	90.5	1086.0	1.20	1230.8	1.36	1448.0	1.60	2.00
		10	106-740	71.0	1065.0	1.50	1207.0	1.70	1420.0	2.00	2.50
		12	106-748	55.0	990.0	1.80	1122.0	2.04	1320.0	2.40	3.00
		2 1/2	106-810	411.0	1561.8	0.38	1767.3	0.43	2055.0	0.50	0.60
		3	106-812	319.0	1435.5	0.45	1626.9	0.51	1914.0	0.60	0.70
		3 1/2	106-814	276.4	1464.9	0.53	1658.4	0.60	1934.8	0.70	0.88
		4	106-816	231.1	1386.6	0.60	1571.5	0.68	1848.8	0.80	0.97
2	1	4 1/2	106-818	188.8	1283.8	0.68	1453.8	0.77	1699.2	0.90	1.13
		5	106-820	180.4	1353.0	0.75	1533.4	0.85	1804.0	1.00	1.25
		6	106-824	147.3	1325.7	0.90	1502.5	1.02	1767.6	1.20	1.50
		8	106-832	111.6	1339.2	1.20	1517.8	1.36	1785.6	1.60	2.00
		10	106-840	88.4	1326.0	1.50	1502.8	1.70	1768.0	2.00	2.50
		12	106-848	71.2	1281.6	1.80	1452.5	2.04	1708.8	2.40	3.00

* Deflection values shown represent compressed lengths near solid and are for design information only.
The color green is a registered trademark of Barnes Group Inc.



US Series

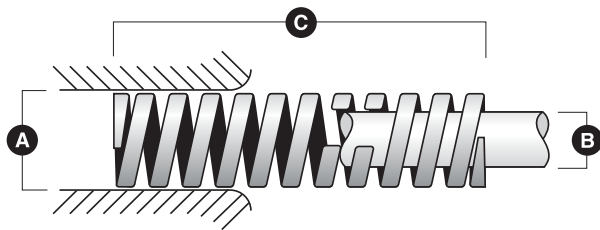
Raymond® MEDIUM DUTY DIE SPRINGS					METRIC DIMENSIONS						BLUE
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (25% of free length)		For Long Life (35% of free length)		Maximum Operating Def. (40% of free length)		*Maximum Deflection (50% of free length)
					A	B	C		Deflection (mm)	Load (N)	Deflection (mm)
9.53	4.76	25.40	103-104	10.5	67	6.4	93	8.9	107	10.2	12.7
		31.75	103-105	8.8	69	7.9	97	11.1	111	12.7	15.9
		38.10	103-106	7.4	70	9.5	98	13.3	112	15.2	19.1
		44.45	103-107	6.5	72	11.1	101	15.6	115	17.8	22.2
		50.80	103-108	5.4	69	12.7	97	17.8	110	20.3	25.4
		63.50	103-110	4.6	73	15.9	101	22.2	116	25.4	31.8
		76.20	103-112	3.7	70	19.1	98	26.7	112	30.5	38.1
		304.80	103-148	1.1	80	76.2	112	106.7	128	121.9	152.4
12.70	7.14	25.40	103-204	19.3	122	6.4	171	8.9	196	10.2	12.7
		31.75	103-205	14.4	114	7.9	160	11.1	182	12.7	15.9
		38.10	103-206	11.9	113	9.5	159	13.3	181	15.2	19.1
		44.45	103-207	10.5	117	11.1	163	15.6	187	17.8	22.2
		50.80	103-208	9.6	122	12.7	171	17.8	196	20.3	25.4
		63.50	103-210	7.9	125	15.9	175	22.2	200	25.4	31.8
		76.20	103-212	6.1	117	19.1	163	26.7	187	30.5	38.1
		88.90	103-214	5.3	117	22.2	163	31.1	187	35.6	44.5
		114.30	103-218	4.0	115	28.6	161	40.0	184	45.7	57.2
		139.70	103-222	3.5	122	34.9	171	48.9	196	55.9	69.9
		165.10	103-226	2.5	101	41.3	142	57.8	162	66.0	82.6
		190.50	103-230	2.1	100	47.6	140	66.7	160	76.2	95.3
		304.80	103-248	1.2	93	76.2	131	106.7	149	121.9	152.4
15.88	8.73	25.40	103-304	28.7	182	6.4	255	8.9	292	10.2	12.7
		31.75	103-305	21.7	173	7.9	242	11.1	276	12.7	15.9
		38.10	103-306	18.9	180	9.5	252	13.3	288	15.2	19.1
		44.45	103-307	16.8	187	11.1	262	15.6	299	17.8	22.2
		50.80	103-308	15.1	191	12.7	268	17.8	306	20.3	25.4
		63.50	103-310	11.4	181	15.9	253	22.2	289	25.4	31.8
		76.20	103-312	10.2	193	19.1	271	26.7	310	30.5	38.1
		88.90	103-314	8.8	195	22.2	273	31.1	311	35.6	44.5
		101.60	103-316	7.7	196	25.4	274	35.6	313	40.6	50.8
		304.80	103-348	2.6	200	76.2	280	106.7	320	121.9	152.4
19.05	9.53	25.40	103-404	56.0	356	6.4	498	8.9	569	10.2	12.7
		31.75	103-405	44.8	356	7.9	498	11.1	569	12.7	15.9
		38.10	103-406	35.0	334	9.5	467	13.3	534	15.2	19.1
		44.45	103-407	30.8	342	11.1	479	15.6	548	17.8	22.2
		50.80	103-408	26.3	334	12.7	467	17.8	534	20.3	25.4
		63.50	103-410	21.0	334	15.9	467	22.2	534	25.4	31.8
		76.20	103-412	17.7	337	19.1	472	26.7	539	30.5	38.1
		88.90	103-414	14.5	323	22.2	452	31.1	517	35.6	44.5
		101.60	103-416	13.1	334	25.4	467	35.6	534	40.6	50.8
		114.30	103-418	11.2	320	28.6	448	40.0	512	45.7	57.2
		127.00	103-420	10.5	334	31.8	467	44.5	534	50.8	63.5
		139.70	103-422	9.6	336	34.9	471	48.9	538	55.9	69.9
		152.40	103-424	8.8	334	38.1	467	53.3	534	61.0	76.2
		165.10	103-426	8.2	340	41.3	475	57.8	544	66.0	82.6
		190.50	103-430	6.7	317	47.6	444	66.7	507	76.2	95.3
		304.80	103-448	4.2	320	76.2	448	106.7	512	121.9	152.4

* Deflection values shown represent compressed lengths near solid and are for design information only.
The color blue is a registered trademark of Barnes Group Inc.



Raymond® MEDIUM DUTY DIE SPRINGS					METRIC DIMENSIONS						BLUE
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (25% of free length)		For Long Life (35% of free length)		Maximum Operating Def. (40% of free length)		*Maximum Deflection (50% of free length)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
25.40	12.70	25.40	103-504	96.3	612	6.4	856	8.9	979	10.2	12.7
		31.75	103-505	78.8	626	7.9	876	11.1	1001	12.7	15.9
		38.10	103-506	65.3	622	9.5	871	13.3	995	15.2	19.1
		44.45	103-507	56.0	623	11.1	872	15.6	996	17.8	22.2
		50.80	103-508	46.9	596	12.7	834	17.8	954	20.3	25.4
		63.50	103-510	36.6	581	15.9	814	22.2	930	25.4	31.8
		76.20	103-512	29.9	571	19.1	799	26.7	913	30.5	38.1
		88.90	103-514	25.4	564	22.2	790	31.1	903	35.6	44.5
		101.60	103-516	21.9	556	25.4	778	35.6	890	40.6	50.8
		114.30	103-518	19.3	551	28.6	771	40.0	881	45.7	57.2
		127.00	103-520	16.8	534	31.8	747	44.5	854	50.8	63.5
		139.70	103-522	15.4	538	34.9	753	48.9	861	55.9	69.9
		152.40	103-524	14.0	534	38.1	747	53.3	854	61.0	76.2
		177.80	103-528	12.6	560	44.5	785	62.2	897	71.1	88.9
		203.20	103-532	10.5	534	50.8	747	71.1	854	81.3	101.6
		304.80	103-548	7.0	534	76.2	747	106.7	854	121.9	152.4
31.75	15.88	38.10	103-606	86.9	827	9.5	1158	13.3	1324	15.2	19.1
		44.45	103-607	71.1	790	11.1	1106	15.6	1264	17.8	22.2
		50.80	103-608	65.8	836	12.7	1171	17.8	1338	20.3	25.4
		63.50	103-610	50.4	801	15.9	1121	22.2	1281	25.4	31.8
		76.20	103-612	42.0	801	19.1	1121	26.7	1281	30.5	38.1
		88.90	103-614	35.0	778	22.2	1090	31.1	1245	35.6	44.5
		101.60	103-616	30.8	783	25.4	1096	35.6	1253	40.6	50.8
		114.30	103-618	28.0	801	28.6	1121	40.0	1281	45.7	57.2
		127.00	103-620	25.0	795	31.8	1113	44.5	1272	50.8	63.5
		139.70	103-622	22.4	783	34.9	1096	48.9	1253	55.9	69.9
		152.40	103-624	21.0	801	38.1	1121	53.3	1281	61.0	76.2
		177.80	103-628	18.2	810	44.5	1133	62.2	1295	71.1	88.9
		203.20	103-632	15.4	783	50.8	1096	71.1	1253	81.3	101.6
		254.00	103-640	12.6	801	63.5	1121	88.9	1281	101.6	127.0
		304.80	103-648	10.5	801	76.2	1121	106.7	1281	121.9	152.4
38.10	19.05	50.80	103-708	92.8	1179	12.7	1650	17.8	1886	20.3	25.4
		63.50	103-710	74.8	1187	15.9	1662	22.2	1899	25.4	31.8
		76.20	103-712	63.0	1201	19.1	1681	26.7	1922	30.5	38.1
		88.90	103-714	52.5	1168	22.2	1635	31.1	1868	35.6	44.5
		101.60	103-716	43.6	1108	25.4	1551	35.6	1772	40.6	50.8
		114.30	103-718	40.3	1151	28.6	1611	40.0	1841	45.7	57.2
		127.00	103-720	36.8	1168	31.8	1635	44.5	1868	50.8	63.5
		139.70	103-722	32.4	1131	34.9	1584	48.9	1810	55.9	69.9
		152.40	103-724	29.8	1134	38.1	1588	53.3	1815	61.0	76.2
		177.80	103-728	26.8	1191	44.5	1668	62.2	1906	71.1	88.9
		203.20	103-732	23.1	1174	50.8	1644	71.1	1879	81.3	101.6
		254.00	103-740	18.6	1179	63.5	1650	88.9	1886	101.6	127.0
		304.80	103-748	14.9	1134	76.2	1588	106.7	1815	121.9	152.4
50.80	25.40	63.50	103-810	175.1	2780	15.9	3892	22.2	4448	25.4	31.8
		76.20	103-812	145.3	2769	19.1	3876	26.7	4430	30.5	38.1
		88.90	103-814	118.5	2635	22.2	3689	31.1	4216	35.6	44.5
		101.60	103-816	105.1	2669	25.4	3736	35.6	4270	40.6	50.8
		114.30	103-818	92.8	2652	28.6	3713	40.0	4243	45.7	57.2
		127.00	103-820	82.3	2613	31.8	3658	44.5	4181	50.8	63.5
		139.70	103-822	70.9	2477	34.9	3468	48.9	3963	55.9	69.9
		152.40	103-824	68.3	2602	38.1	3643	53.3	4163	61.0	76.2
		177.80	103-828	54.6	2429	44.5	3400	62.2	3886	71.1	88.9
		203.20	103-832	49.9	2535	50.8	3550	71.1	4057	81.3	101.6
		254.00	103-840	37.8	2402	63.5	3363	88.9	3843	101.6	127.0
		304.80	103-848	32.4	2469	76.2	3456	106.7	3950	121.9	152.4

* Deflection values shown represent compressed lengths near solid and are for design information only.
The color blue is a registered trademark of Barnes Group Inc.



US Series

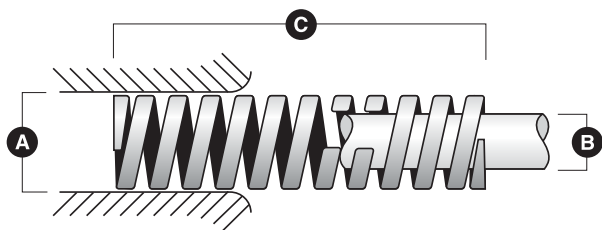
Raymond® MEDIUM HEAVY DUTY DIE SPRINGS					METRIC DIMENSIONS						RED
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (20% of free length)		For Long Life (25% of free length)		Maximum Operating Def. (30% of free length)		*Maximum Deflection (37% of free length)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
9.53	4.76	25.40	104-104	14.7	75	5.1	93	6.4	112	7.6	9.4
		31.75	104-105	12.8	81	6.4	101	7.9	122	9.5	11.7
		38.10	104-106	11.7	89	7.6	112	9.5	134	11.4	14.1
		44.45	104-107	10.2	90	8.9	113	11.1	135	13.3	16.4
		50.80	104-108	8.8	89	10.2	111	12.7	133	15.2	18.8
		63.50	104-110	6.5	82	12.7	104	16.0	124	19.1	23.5
		76.20	104-112	5.3	80	15.2	100	19.1	120	22.9	28.2
		304.80	104-148	1.4	85	61.0	107	76.2	128	91.4	112.8
12.70	7.14	25.40	104-204	27.1	138	5.1	173	6.4	207	7.6	9.4
		31.75	104-205	21.4	136	6.4	168	7.9	204	9.5	11.7
		38.10	104-206	17.2	131	7.6	165	9.7	196	11.4	14.1
		44.45	104-207	14.9	132	8.9	165	11.1	198	13.3	16.4
		50.80	104-208	13.1	133	10.2	167	12.7	200	15.2	18.8
		63.50	104-210	10.5	133	12.7	167	15.9	200	19.1	23.5
		76.20	104-212	8.9	136	15.2	170	19.1	204	22.9	28.2
		88.90	104-214	7.0	125	17.8	156	22.2	187	26.7	32.9
15.88	8.73	304.80	104-248	1.9	117	61.0	147	76.2	176	91.4	112.8
		25.40	104-304	52.5	267	5.1	334	6.4	400	7.6	9.4
		31.75	104-305	37.7	239	6.4	299	7.9	359	9.5	11.7
		38.10	104-306	33.3	254	7.6	317	9.5	380	11.4	14.1
		44.45	104-307	29.4	262	8.9	327	11.1	392	13.3	16.4
		50.80	104-308	27.1	276	10.2	345	12.7	414	15.2	18.8
		63.50	104-310	20.1	256	12.7	320	15.9	384	19.1	23.5
		76.20	104-312	17.5	267	15.2	334	19.1	400	22.9	28.2
19.05	9.53	88.90	104-314	14.9	265	17.8	331	22.2	397	26.7	32.9
		101.60	104-316	13.3	270	20.3	338	25.4	406	30.5	37.6
		304.80	104-348	4.6	278	61.0	347	76.2	416	91.4	112.8
		25.40	104-404	87.6	445	5.1	556	6.4	667	7.6	9.4
		31.75	104-405	66.5	423	6.4	528	7.9	634	9.5	11.7
		38.10	104-406	54.3	414	7.6	524	9.7	620	11.4	14.1
		44.45	104-407	47.3	420	8.9	528	11.2	631	13.3	16.4
		50.80	104-408	42.0	427	10.2	534	12.7	641	15.2	18.8
		63.50	104-410	32.9	418	12.7	527	16.0	627	19.1	23.5
		76.20	104-412	26.1	398	15.2	497	19.1	596	22.9	28.2
		88.90	104-414	22.4	399	17.8	498	22.2	598	26.7	32.9
		101.60	104-416	19.3	391	20.3	489	25.4	587	30.5	37.6
		114.30	104-418	17.5	400	22.9	503	28.7	600	34.3	42.3
		127.00	104-420	15.8	400	25.4	500	31.8	600	38.1	47.0
		139.70	104-422	14.0	391	27.9	489	34.9	587	41.9	51.7
		152.40	104-424	13.1	400	30.5	500	38.1	600	45.7	56.4
		304.80	104-448	6.1	374	61.0	467	76.2	560	91.4	112.8

* Deflection values shown represent compressed lengths near solid and are for design information only. The color blue is a registered trademark of Barnes Group Inc.



Raymond® MEDIUM HEAVY DUTY DIE SPRINGS					METRIC DIMENSIONS						RED
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (20% of free length)		For Long Life (25% of free length)		Maximum Operating Def. (30% of free length)		*Maximum Deflection (37% of free length)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
25.40	12.70	25.40	104-504	144.8	736	5.1	920	6.4	1104	7.6	9.4
		31.75	104-505	114.3	726	6.4	900	7.9	1089	9.5	11.7
		38.10	104-506	94.2	718	7.6	909	9.7	1077	11.4	14.1
		44.45	104-507	80.7	718	8.9	902	11.2	1076	13.3	16.4
		50.80	104-508	70.0	712	10.2	890	12.7	1068	15.2	18.8
		63.50	104-510	56.4	716	12.7	902	16.0	1074	19.1	23.5
		76.20	104-512	46.8	713	15.2	891	19.1	1069	22.9	28.2
		88.90	104-514	40.1	713	17.8	896	22.4	1070	26.7	32.9
		101.60	104-516	35.4	719	20.3	898	25.4	1078	30.5	37.6
		114.30	104-518	31.2	713	22.9	894	28.7	1069	34.3	42.3
		127.00	104-520	27.5	698	25.4	873	31.8	1048	38.1	47.0
		139.70	104-522	24.0	670	27.9	841	35.1	1006	41.9	51.7
		152.40	104-524	21.9	667	30.5	834	38.1	1001	45.7	56.4
		177.80	104-528	19.1	679	35.6	849	44.5	1018	53.3	65.8
		203.20	104-532	16.8	683	40.6	854	50.8	1025	61.0	75.2
		304.80	104-548	11.4	694	61.0	867	76.2	1041	91.4	112.8
31.75	15.88	38.10	104-606	200.3	1527	7.6	1908	9.5	2290	11.4	14.1
		44.45	104-607	176.5	1569	8.9	1962	11.1	2354	13.3	16.4
		50.80	104-608	146.7	1491	10.2	1864	12.7	2236	15.2	18.8
		63.50	104-610	109.3	1388	12.7	1735	15.9	2082	19.1	23.5
		76.20	104-612	89.7	1366	15.2	1708	19.1	2050	22.9	28.2
		88.90	104-614	77.1	1370	17.8	1712	22.2	2055	26.7	32.9
		101.60	104-616	66.7	1356	20.3	1695	25.4	2034	30.5	37.6
		114.30	104-618	57.6	1317	22.9	1654	28.7	1976	34.3	42.3
		127.00	104-620	52.5	1334	25.4	1668	31.8	2002	38.1	47.0
		139.70	104-622	46.2	1292	27.9	1615	34.9	1938	41.9	51.7
		152.40	104-624	43.8	1334	30.5	1668	38.1	2002	45.7	56.4
		177.80	104-628	36.8	1308	35.6	1635	44.5	1962	53.3	65.8
		203.20	104-632	32.2	1309	40.6	1637	50.8	1964	61.0	75.2
		254.00	104-640	25.4	1290	50.8	1612	63.5	1935	76.2	94.0
		304.80	104-648	21.7	1324	61.0	1655	76.2	1986	91.4	112.8
38.10	19.05	50.80	104-708	180.4	1833	10.2	2291	12.7	2749	15.2	18.8
		63.50	104-710	142.2	1806	12.7	2276	16.0	2709	19.1	23.5
		76.20	104-712	109.3	1665	15.2	2082	19.1	2498	22.9	28.2
		88.90	104-714	94.6	1681	17.8	2114	22.4	2522	26.7	32.9
		101.60	104-716	81.4	1655	20.3	2068	25.4	2482	30.5	37.6
		114.30	104-718	71.8	1641	22.9	2061	28.7	2462	34.3	42.3
		127.00	104-720	64.4	1637	25.4	2046	31.8	2455	38.1	47.0
		139.70	104-722	57.8	1615	27.9	2026	35.1	2422	41.9	51.7
		152.40	104-724	51.7	1575	30.5	1968	38.1	2362	45.7	56.4
		177.80	104-728	44.7	1588	35.6	1985	44.5	2382	53.3	65.8
		203.20	104-732	38.5	1566	40.6	1957	50.8	2349	61.0	75.2
		254.00	104-740	30.8	1566	50.8	1957	63.5	2349	76.2	94.0
		304.80	104-748	25.2	1537	61.0	1922	76.2	2306	91.4	112.8
50.80	25.40	63.50	104-810	207.3	2633	12.7	3292	15.9	3950	19.1	23.5
		76.20	104-812	162.8	2482	15.2	3102	19.1	3723	22.9	28.2
		88.90	104-814	136.9	2435	17.8	3061	22.4	3652	26.7	32.9
		101.60	104-816	116.3	2363	20.3	2953	25.4	3544	30.5	37.6
		114.30	104-818	105.1	2402	22.9	3002	28.6	3603	34.3	42.3
		127.00	104-820	93.5	2375	25.4	2969	31.8	3563	38.1	47.0
		139.70	104-822	85.8	2397	27.9	3008	35.1	3596	41.9	51.7
		152.40	104-824	78.8	2402	30.5	3002	38.1	3603	45.7	56.4
		177.80	104-828	65.5	2329	35.6	2911	44.5	3493	53.3	65.8
		203.20	104-832	57.8	2349	40.6	2936	50.8	3523	61.0	75.2
		254.00	104-840	45.5	2313	50.8	2891	63.5	3469	76.2	94.0
		304.80	104-848	37.6	2295	61.0	2869	76.2	3443	91.4	112.8

* Deflection values shown represent compressed lengths near solid and are for design information only.
The color red is a registered trademark of Barnes Group Inc.



US Series

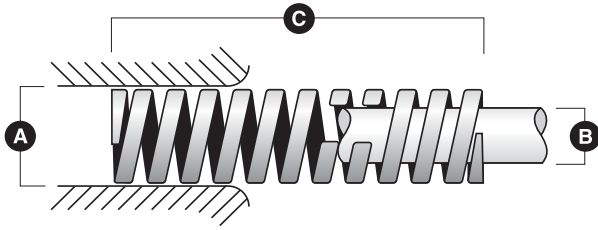
Raymond® HEAVY DUTY DIE SPRINGS					METRIC DIMENSIONS						GOLD
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (20% of free length)		Maximum Operating Def. (25% of free length)		*Maximum Deflection (30% of free length)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
A	B	C									
9.53	4.76	25.40	105-104	20.3	77	3.8	103	5.1	129	6.4	7.6
		31.75	105-105	17.2	83	4.8	109	6.4	135	7.9	9.5
		38.10	105-106	14.0	82	5.8	107	7.6	135	9.7	11.4
		44.45	105-107	13.1	87	6.6	117	8.9	147	11.2	13.3
		50.80	105-108	10.9	83	7.6	110	10.2	138	12.7	15.2
		63.50	105-110	8.8	85	9.7	111	12.7	140	16	19.1
		76.20	105-112	7.2	82	11.4	109	15.2	137	19.1	22.9
		304.80	105-148	1.9	88	45.7	117	61.0	147	76.2	91.4
12.70	7.14	25.40	105-204	39.4	150	3.8	200	5.1	250	6.4	7.6
		31.75	105-205	31.9	154	4.8	202	6.4	251	7.9	9.5
		38.10	105-206	25.9	151	5.8	197	7.6	250	9.7	11.4
		44.45	105-207	22.1	146	6.6	196	8.9	246	11.2	13.3
		50.80	105-208	19.3	147	7.6	196	10.2	245	12.7	15.2
		63.50	105-210	15.1	145	9.7	191	12.7	241	16	19.1
		76.20	105-212	13.0	148	11.4	197	15.2	247	19.1	22.9
		88.90	105-214	10.5	141	13.5	187	17.8	235	22.4	26.7
304.80	105-248	3.0	136	45.7	181	61.0	227	76.2	91.4		
15.88	8.73	25.40	105-304	74.2	283	3.8	377	5.1	471	6.4	7.6
		31.75	105-305	56.9	275	4.8	362	6.4	448	7.9	9.5
		38.10	105-306	49.0	286	5.8	374	7.6	473	9.7	11.4
		44.45	105-307	42.0	278	6.6	374	8.9	470	11.2	13.3
		50.80	105-308	36.4	278	7.6	370	10.2	463	12.7	15.2
		63.50	105-310	29.8	287	9.7	378	12.7	476	16	19.1
		76.20	105-312	24.5	280	11.4	374	15.2	467	19.1	22.9
		88.90	105-314	21.4	288	13.5	380	17.8	478	22.4	26.7
101.60	105-316	18.9	288	15.2	384	20.3	480	25.4	30.5		
304.80	105-348	5.3	240	45.7	320	61.0	400	76.2	91.4		
19.05	9.53	25.40	105-404	189.1	721	3.8	961	5.1	1201	6.4	6.9
		31.75	105-405	154.1	744	4.8	979	6.4	1213	7.9	8.9
		38.10	105-406	120.8	706	5.8	921	7.6	1166	9.7	11.4
		44.45	105-407	105.1	694	6.6	934	8.9	1174	11.2	13.3
		50.80	105-408	90.2	687	7.6	916	10.2	1145	12.7	15.2
		63.50	105-410	70.0	676	9.7	890	12.7	1121	16	19.1
		76.20	105-412	57.8	661	11.4	881	15.2	1101	19.1	22.9
		88.90	105-414	50.8	684	13.5	903	17.8	1135	22.4	26.7
		101.60	105-416	43.8	667	15.2	890	20.3	1112	25.4	30.5
		114.30	105-418	38.5	665	17.3	881	22.9	1106	28.7	34.3
		127.00	105-420	34.1	651	19.1	867	25.4	1084	31.8	38.1
		139.70	105-422	31.2	657	21.1	871	27.9	1092	35.1	41.9
		152.40	105-424	28.0	641	22.9	854	30.5	1068	38.1	45.7
		304.80	105-448	14.0	641	45.7	854	61.0	1068	76.2	91.4

* Deflection values shown represent compressed lengths near solid and are for design information only.
The color blue is a registered trademark of Barnes Group Inc.



Raymond®		HEAVY DUTY DIE SPRINGS			METRIC DIMENSIONS						GOLD	
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE							
					For Optimum Life (15% of free length)		For Long Life (20% of free length)		Maximum Operating Def. (25% of free length)		*Maximum Deflection (30% of free length)	
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)	
25.40	12.7	25.40	105-504	338.3	1289	3.8	1719	5.1	2148	6.4	6.9	
		31.75	105-505	256.5	1238	4.8	1629	6.4	2020	7.9	9.5	
		38.10	105-506	210.1	1228	5.8	1601	7.6	2028	9.7	11.4	
		44.45	105-507	182.1	1203	6.6	1619	8.9	2035	11.2	13.3	
		50.80	105-508	152.7	1164	7.6	1551	10.2	1939	12.7	15.2	
		63.50	105-510	116.4	1124	9.7	1479	12.7	1864	16	19.1	
		76.20	105-512	95.3	1089	11.4	1452	15.2	1815	19.1	22.9	
		88.90	105-514	79.8	1075	13.5	1420	17.8	1785	22.4	26.7	
		101.60	105-516	70.0	1068	15.2	1423	20.3	1779	25.4	30.5	
		114.30	105-518	61.6	1065	17.3	1409	22.9	1769	28.7	34.3	
		127.00	105-520	54.6	1041	19.1	1388	25.4	1735	31.8	38.1	
		139.70	105-522	50.4	1063	21.1	1409	27.9	1768	35.1	41.9	
		152.40	105-524	44.8	1025	22.9	1366	30.5	1708	38.1	45.7	
		177.80	105-528	39.2	1046	26.7	1395	35.6	1744	44.5	53.3	
		203.20	105-532	33.6	1025	30.5	1366	40.6	1708	50.8	61.0	
		304.80	105-548	22.4	1025	45.7	1366	61.0	1708	76.2	91.4	
31.75	15.88	38.10	105-606	385.2	2251	5.8	2936	7.6	3719	9.7	11.4	
		44.45	105-607	318.0	2100	6.6	2827	8.9	3554	11.2	13.3	
		50.80	105-608	261.9	1996	7.6	2662	10.2	3327	12.7	14.5	
		63.50	105-610	205.9	1988	9.7	2615	12.7	3296	16	19.1	
		76.20	105-612	166.7	1906	11.4	2541	15.2	3176	19.1	22.9	
		88.90	105-614	136.6	1839	13.5	2429	17.8	3053	22.4	26.7	
		101.60	105-616	116.3	1772	15.2	2363	20.3	2953	25.4	30.5	
		114.30	105-618	102.3	1766	17.3	2338	22.9	2935	28.7	34.3	
		127.00	105-620	92.8	1768	19.1	2357	25.4	2947	31.8	38.1	
		139.70	105-622	82.6	1743	21.1	2309	27.9	2897	35.1	41.9	
		152.40	105-624	78.8	1801	22.9	2402	30.5	3002	38.1	45.7	
		177.80	105-628	64.4	1719	26.7	2292	35.6	2865	44.5	53.3	
		203.20	105-632	57.4	1751	30.5	2334	40.6	2918	50.8	61.0	
		254.00	105-640	44.8	1708	38.1	2277	50.8	2847	63.5	76.2	
		304.80	105-648	38.5	1761	45.7	2349	61.0	2936	76.2	91.4	
38.10	19.05	50.80	105-708	346.7	2642	7.6	3523	10.2	4404	12.7	15.2	
		63.50	105-710	271.4	2620	9.7	3447	12.7	4343	16	19.1	
		76.20	105-712	227.6	2602	11.4	3469	15.2	4337	19.1	22.9	
		88.90	105-714	186.3	2508	13.5	3313	17.8	4165	22.4	26.7	
		101.60	105-716	159.7	2434	15.2	3245	20.3	4057	25.4	30.5	
		114.30	105-718	142.9	2468	17.3	3267	22.9	4102	28.7	34.3	
		127.00	105-720	127.8	2435	19.1	3247	25.4	4059	31.8	38.1	
		139.70	105-722	117.3	2474	21.1	3278	27.9	4113	35.1	41.9	
		152.40	105-724	102.3	2338	22.9	3117	30.5	3896	38.1	45.7	
		177.80	105-728	86.8	2317	26.7	3089	35.6	3861	44.5	53.3	
		203.20	105-732	75.6	2306	30.5	3074	40.6	3843	50.8	61.0	
		254.00	105-740	63.4	2415	38.1	3220	50.8	4025	63.5	76.2	
50.80	25.4	304.80	105-748	52.5	2402	45.7	3203	61.0	4003	76.2	91.4	
		63.50	105-810	439.9	4246	9.7	5587	12.7	7039	16	19.1	
		76.20	105-812	360.7	4123	11.4	5498	15.2	6872	19.1	22.9	
		88.90	105-814	297.7	4008	13.5	5293	17.8	6654	22.4	26.7	
		101.60	105-816	262.7	4003	15.2	5338	20.3	6672	25.4	30.5	
		114.30	105-818	222.7	3848	17.3	5092	22.9	6394	28.7	34.3	
		127.00	105-820	207.7	3956	19.1	5275	25.4	6594	31.8	38.1	
		139.70	105-822	188.6	3976	21.1	5270	27.9	6611	35.1	41.9	
		152.40	105-824	171.1	3911	22.9	5215	30.5	6519	38.1	45.7	
		177.80	105-828	143.6	3830	26.7	5106	35.6	6383	44.5	53.3	
		203.20	105-832	127.8	3896	30.5	5195	40.6	6494	50.8	61.0	
		254.00	105-840	100.2	3816	38.1	5089	50.8	6361	63.5	76.2	
		304.80	105-848	83.5	3819	45.7	5092	61.0	6365	76.2	91.4	

* Deflection values shown represent compressed lengths near solid and are for design information only.
The color gold is a registered trademark of Barnes Group Inc.



US Series

Raymond® EXTRA HEAVY DUTY DIE SPRINGS					METRIC DIMENSIONS						GREEN
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (17% of free length)		Maximum Operating Def. (20% of free length)		*Maximum Deflection (25% of free length)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
9.53	4.76	25.40	106-104	36.8	140	3.8	159	4.3	187	5.1	6.4
		31.75	106-105	25.6	123	4.8	137	5.3	162	6.4	7.9
		38.10	106-106	21.9	128	5.8	145	6.6	167	7.6	9.5
		44.45	106-107	18.4	121	6.6	140	7.6	164	8.9	11.1
		50.80	106-108	15.8	120	7.6	136	8.6	160	10.2	12.7
		63.50	106-110	13.1	127	9.7	144	10.9	167	12.7	15.9
		76.20	106-112	11.0	126	11.4	143	13.0	168	15.2	19.1
		304.80	106-148	2.6	120	45.7	136	51.8	160	61	76.2
12.70	7.14	25.40	106-204	54.3	207	3.8	234	4.3	276	5.1	6.4
		31.75	106-205	42.0	203	4.8	224	5.3	267	6.4	7.9
		38.10	106-206	33.6	197	5.8	222	6.6	256	7.6	9.5
		44.45	106-207	29.8	197	6.6	227	7.6	265	8.9	11.1
		50.80	106-208	24.5	187	7.6	212	8.6	249	10.2	12.7
		63.50	106-210	20.1	194	9.7	220	10.9	256	12.7	15.9
		76.20	106-212	16.5	188	11.4	213	13.0	251	15.2	19.1
		88.90	106-214	14.0	189	13.5	214	15.2	249	17.8	22.2
15.88	8.73	304.80	106-248	4.2	192	45.7	218	51.8	256	61	76.2
		25.40	106-304	110.3	420	3.8	476	4.3	560	5.1	6.4
		31.75	106-305	76.7	370	4.8	409	5.3	487	6.4	7.9
		38.10	106-306	64.8	379	5.8	428	6.6	494	7.6	9.5
		44.45	106-307	54.3	359	6.6	414	7.6	483	8.9	11.1
		50.80	106-308	49.0	374	7.6	423	8.6	498	10.2	12.7
		63.50	106-310	38.5	372	9.7	421	10.9	489	12.7	15.9
		76.20	106-312	33.3	380	11.4	431	13.0	507	15.2	19.1
19.05	9.53	88.90	106-314	27.0	363	13.5	411	15.2	479	17.8	22.2
		101.60	106-316	23.6	360	15.2	408	17.3	480	20.3	25.4
		304.80	106-348	7.9	360	45.7	408	51.8	480	61	76.2
		25.40	106-404	245.1	934	3.8	1059	4.3	1245	5.1	6.4
		31.75	106-405	192.6	930	4.8	1027	5.3	1223	6.4	7.9
		38.10	106-406	155.8	911	5.8	1029	6.6	1188	7.6	9.5
		44.45	106-407	131.3	867	6.6	1001	7.6	1168	8.9	11.1
		50.80	106-408	115.6	881	7.6	998	8.6	1174	10.2	12.7
		63.50	106-410	87.6	845	9.7	956	10.9	1112	12.7	15.9
		76.20	106-412	70.9	811	11.4	919	13.0	1081	15.2	19.1
		88.90	106-414	60.4	814	13.5	921	15.2	1074	17.8	22.2
		101.60	106-416	52.5	801	15.2	907	17.3	1068	20.3	25.4
		114.30	106-418	46.4	802	17.3	908	19.6	1061	22.9	28.6
		127.00	106-420	41.1	784	19.1	889	21.6	1045	25.4	31.8
		139.70	106-422	37.6	794	21.1	899	23.9	1052	27.9	34.9
		152.40	106-424	34.1	781	22.9	885	25.9	1041	30.5	38.1
		304.80	106-448	16.6	761	45.7	862	51.8	1014	61	76.2

* Deflection values shown represent compressed lengths near solid and are for design information only.
The color blue is a registered trademark of Barnes Group Inc.



Raymond® EXTRA HEAVY DUTY DIE SPRINGS					METRIC DIMENSIONS						GREEN
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (17% of free length)		Maximum Operating Def. (20% of free length)		*Maximum Deflection (25% of free length)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
25.40	12.70	38.10	106-506	280.2	1637	5.8	1850	6.6	2135	7.6	9.5
		50.80	106-508	203.1	1548	7.6	1754	8.6	2064	10.2	12.7
		63.50	106-510	156.9	1515	9.7	1714	10.9	1993	12.7	15.9
		76.20	106-512	128.9	1473	11.4	1670	13.0	1964	15.2	19.1
		88.90	106-514	109.3	1471	13.5	1665	15.2	1943	17.8	22.2
		101.60	106-516	96.7	1473	15.2	1670	17.3	1964	20.3	25.4
		114.30	106-518	85.4	1476	17.3	1672	19.6	1954	22.9	28.6
		127.00	106-520	75.6	1441	19.1	1633	21.6	1922	25.4	31.8
		152.40	106-524	63.0	1441	22.9	1633	25.9	1922	30.5	38.1
		304.80	106-548	30.8	1409	45.7	1597	51.8	1879	61	76.2
31.75	15.88	50.80	106-608	359.0	2736	7.6	3100	8.6	3647	10.2	12.7
		63.50	106-610	267.0	2578	9.7	2917	10.9	3392	12.7	15.9
		76.20	106-612	213.6	2442	11.4	2768	13.0	3256	15.2	19.1
		88.90	106-614	190.0	2558	13.5	2896	15.2	3378	17.8	22.2
		101.60	106-616	155.8	2375	15.2	2692	17.3	3167	20.3	25.4
		114.30	106-618	146.2	2526	17.3	2860	19.6	3343	22.9	28.6
		127.00	106-620	122.6	2335	19.1	2647	21.6	3114	25.4	31.8
		152.40	106-624	100.7	2302	22.9	2609	25.9	3069	30.5	38.1
		203.20	106-632	80.5	2455	30.5	2783	34.5	3274	40.6	50.8
		254.00	106-640	60.4	2302	38.1	2609	43.2	3069	50.8	63.5
38.10	19.05	304.80	106-648	47.3	2162	45.7	2450	51.8	2882	61	76.2
		50.80	106-708	715.3	5451	7.6	6178	8.6	7268	10.2	11.4
		63.50	106-710	575.2	5552	9.7	6283	10.9	7306	12.7	15.9
		76.20	106-712	446.5	5104	11.4	5785	13.0	6805	15.2	19.1
		88.90	106-714	373.8	5033	13.5	5698	15.2	6648	17.8	22.2
		101.60	106-716	323.1	4924	15.2	5580	17.3	6565	20.3	25.4
		114.30	106-718	284.5	4915	17.3	5566	19.6	6505	22.9	28.6
		127.00	106-720	253.9	4837	19.1	5482	21.6	6450	25.4	31.8
		152.40	106-724	211.0	4824	22.9	5467	25.9	6432	30.5	38.1
		203.20	106-732	158.5	4831	30.5	5475	34.5	6441	40.6	50.8
50.80	25.40	254.00	106-740	124.3	4737	38.1	5369	43.2	6316	50.8	63.5
		304.80	106-748	96.3	4404	45.7	4991	51.8	5871	61	76.2
		63.50	106-810	719.7	6947	9.7	7861	10.9	9141	12.7	15.2
		76.20	106-812	558.6	6385	11.4	7236	13.0	8513	15.2	17.8
		88.90	106-814	484.0	6516	13.5	7377	15.2	8606	17.8	22.2
		101.60	106-816	404.7	6168	15.2	6990	17.3	8223	20.3	24.6
		114.30	106-818	330.6	5710	17.3	6467	19.6	7558	22.9	28.6
		127.00	106-820	315.9	6018	19.1	6821	21.6	8024	25.4	31.8
		152.40	106-824	257.9	5897	22.9	6683	25.9	7862	30.5	38.1
		203.20	106-832	195.4	5957	30.5	6751	34.5	7942	40.6	50.8
		254.00	106-840	154.8	5898	38.1	6684	43.2	7864	50.8	63.5
		304.80	106-848	124.7	5701	45.7	6461	51.8	7601	61	76.2

* Deflection values shown represent compressed lengths near solid and are for design information only.
The color green is a registered trademark of Barnes Group Inc.



ISO Series

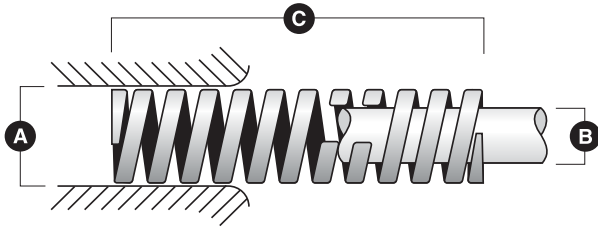
Raymond® LIGHT DUTY DIE SPRINGS ISO SPECIFICATION SERIES INCH DIMENSIONS GREEN											
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10" Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (25% of free length)		For Long Life (30% of free length)		Maximum Operating Def. (35% of free length)		*Maximum Deflection
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
0.394	0.197	0.98	203-104	5.71	14.1	0.25	16.9	0.30	19.7	0.35	0.406
		1.26	203-105	4.85	15.3	0.31	18.3	0.38	21.4	0.44	0.516
		1.50	203-106	3.88	14.5	0.37	17.4	0.45	20.3	0.52	0.614
		1.73	203-107	3.43	14.8	0.43	17.8	0.52	20.8	0.61	0.709
		2.01	203-108	2.86	14.3	0.50	17.2	0.60	20.1	0.70	0.823
		2.52	203-110	2.46	15.5	0.63	18.6	0.76	21.7	0.88	1.024
		2.99	203-112	1.83	13.7	0.75	16.4	0.90	19.1	1.05	1.228
		12.01	203-148	0.63	18.9	3.00	22.6	3.60	26.4	4.20	4.921
0.492	0.248	0.98	203-204	10.22	25.2	0.25	30.2	0.30	35.2	0.35	0.406
		1.26	203-205	9.36	29.5	0.31	35.4	0.38	41.3	0.44	0.517
		1.50	203-206	7.77	29.0	0.37	34.8	0.45	40.7	0.52	0.614
		1.73	203-207	6.91	29.9	0.43	35.9	0.52	41.9	0.61	0.709
		2.01	203-208	6.51	32.7	0.50	39.2	0.60	45.8	0.70	0.823
		2.52	203-210	5.31	33.5	0.63	40.2	0.76	46.8	0.88	1.035
		2.99	203-212	4.05	30.3	0.75	36.4	0.90	42.5	1.05	1.228
		3.50	203-214	3.08	27.0	0.88	32.4	1.05	37.8	1.23	1.437
0.630	0.315	12.01	203-248	0.80	24.0	3.00	28.8	3.60	33.6	4.20	4.921
		0.98	203-304	13.36	32.9	0.25	39.5	0.30	46.0	0.35	0.406
		1.26	203-305	13.08	41.2	0.31	49.4	0.38	57.7	0.44	0.516
		1.50	203-306	11.02	41.2	0.37	49.5	0.45	57.7	0.52	0.614
		1.73	203-307	9.76	42.3	0.43	50.7	0.52	59.2	0.61	0.709
		2.01	203-308	8.96	45.0	0.50	54.0	0.60	63.0	0.70	0.823
		2.52	203-310	6.11	38.5	0.63	46.2	0.76	53.9	0.88	1.035
		2.99	203-312	5.71	42.7	0.75	51.3	0.90	59.8	1.05	1.228
0.787	0.394	3.50	203-314	4.91	43.0	0.88	51.6	1.05	60.2	1.23	1.437
		4.02	203-316	4.45	44.7	1.00	53.7	1.20	62.6	1.41	1.646
		12.01	203-348	1.43	42.9	3.00	51.4	3.60	60.0	4.20	4.921
		0.98	203-404	31.86	78.4	0.25	94.1	0.30	109.8	0.35	0.402
		1.26	203-405	25.70	80.9	0.31	97.1	0.38	113.3	0.44	0.492
		1.50	203-406	19.01	71.1	0.37	85.3	0.45	99.6	0.52	0.591
		1.73	203-407	17.13	74.2	0.43	89.0	0.52	103.9	0.61	0.709
		2.01	203-408	13.99	70.2	0.50	84.3	0.60	98.3	0.70	0.787
0.984	0.492	2.52	203-410	11.42	71.9	0.63	86.3	0.76	100.7	0.88	0.984
		2.99	203-412	9.14	68.3	0.75	82.0	0.90	95.7	1.05	1.181
		3.50	203-414	7.99	70.0	0.88	84.0	1.05	98.0	1.23	1.378
		4.02	203-416	6.85	68.8	1.00	82.6	1.20	96.3	1.41	1.614
		4.53	203-418	6.22	70.5	1.13	84.6	1.36	98.6	1.59	1.811
		5.00	203-420	5.42	67.8	1.25	81.4	1.50	94.9	1.75	2.008
		5.47	203-422	4.80	65.6	1.37	78.8	1.64	91.9	1.92	2.205
		5.98	203-424	4.28	64.1	1.50	76.9	1.80	89.7	2.09	2.402
0.984	0.492	12.01	203-448	2.28	68.6	3.00	82.3	3.60	96.0	4.20	4.803
		0.98	203-504	57.10	140.5	0.25	168.6	0.30	196.7	0.35	0.402
		1.26	203-505	45.85	144.4	0.31	173.3	0.38	202.2	0.44	0.492
		1.50	203-506	35.40	132.4	0.37	158.9	0.45	185.4	0.52	0.591
		1.73	203-507	30.21	130.8	0.43	157.0	0.52	183.2	0.61	0.709
		2.01	203-508	25.12	126.1	0.50	151.3	0.60	176.6	0.70	0.787
		2.52	203-510	20.10	126.6	0.63	151.9	0.76	177.3	0.88	0.984
0.984	0.492	2.99	203-512	15.99	119.6	0.75	143.5	0.90	167.4	1.05	1.181

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® LIGHT DUTY DIE SPRINGS ISO SPECIFICATION SERIES INCH DIMENSIONS GREEN											
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10" Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (25% of free length)		For Long Life (30% of free length)		Maximum Operating Def. (35% of free length)		*Maximum Deflection
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
0.984	0.492	3.50	203-514	13.70	120.1	0.88	144.1	1.05	168.1	1.23	1.378
		4.02	203-516	12.05	121.0	1.00	145.2	1.20	169.4	1.41	1.614
		4.53	203-518	10.68	120.9	1.13	145.1	1.36	169.2	1.59	1.811
		5.00	203-520	9.54	119.2	1.25	143.1	1.50	166.9	1.75	2.008
		5.47	203-522	8.74	119.5	1.37	143.4	1.64	167.3	1.92	2.205
		5.98	203-524	7.99	119.6	1.50	143.5	1.80	167.4	2.09	2.402
		7.01	203-528	7.14	125.1	1.75	150.1	2.10	175.1	2.45	2.795
		7.99	203-532	5.94	118.7	2.00	142.4	2.40	166.1	2.80	3.189
		12.01	203-548	4.00	120.0	3.00	144.0	3.60	168.0	4.20	4.803
1.260	0.630	1.50	203-606	53.67	200.8	0.37	240.9	0.45	281.1	0.52	0.591
		1.73	203-607	45.39	196.6	0.43	235.9	0.52	275.2	0.61	0.709
		2.01	203-608	38.26	192.1	0.50	230.5	0.60	268.9	0.70	0.787
		2.52	203-610	30.26	190.6	0.63	228.8	0.76	266.9	0.88	0.984
		2.99	203-612	25.12	187.9	0.75	225.5	0.90	263.1	1.05	1.181
		3.50	203-614	21.24	186.1	0.88	223.3	1.05	260.5	1.23	1.378
		4.02	203-616	18.27	183.5	1.00	220.1	1.20	256.8	1.41	1.614
		4.53	203-618	16.56	187.5	1.13	224.9	1.36	262.4	1.59	1.811
		5.00	203-620	14.28	178.5	1.25	214.1	1.50	249.8	1.75	2.008
		5.47	203-622	13.13	179.7	1.37	215.6	1.64	251.6	1.92	2.205
		5.98	203-624	12.28	183.7	1.50	220.4	1.80	257.1	2.09	2.402
		7.01	203-628	10.39	182.1	1.75	218.5	2.10	254.9	2.45	2.795
		7.99	203-632	9.02	180.3	2.00	216.3	2.40	252.4	2.80	3.189
		10.00	203-640	7.14	178.5	2.50	214.1	3.00	249.8	3.50	4.016
		12.01	203-648	5.88	176.6	3.00	211.9	3.60	247.2	4.20	4.803
1.575	0.787	2.01	203-708	52.53	263.7	0.50	316.5	0.60	369.2	0.70	0.787
		2.52	203-710	41.68	262.6	0.63	315.1	0.76	367.6	0.88	0.984
		2.99	203-712	35.97	269.1	0.75	322.9	0.90	376.8	1.05	1.181
		3.50	203-714	29.12	255.1	0.88	306.1	1.05	357.2	1.23	1.378
		4.02	203-716	24.55	246.5	1.00	295.8	1.20	345.1	1.41	1.614
		4.53	203-718	22.61	256.0	1.13	307.1	1.36	358.3	1.59	1.811
		5.00	203-720	21.13	264.1	1.25	316.9	1.50	369.8	1.75	2.008
		5.47	203-722	18.27	250.0	1.37	300.0	1.64	350.0	1.92	2.205
		5.98	203-724	15.99	239.2	1.50	287.1	1.80	334.9	2.09	2.402
		7.01	203-728	14.39	252.1	1.75	302.5	2.10	353.0	2.45	2.795
		7.99	203-732	12.96	259.0	2.00	310.8	2.40	362.6	2.80	3.189
		10.00	203-740	9.71	242.7	2.50	291.2	3.00	339.8	3.50	4.016
		12.01	203-748	8.45	253.7	3.00	304.5	3.60	355.2	4.20	4.803
1.969	0.984	2.52	203-810	89.08	561.2	0.63	673.4	0.76	785.6	0.88	0.984
		2.99	203-812	71.38	533.9	0.75	640.7	0.90	747.5	1.05	1.181
		3.50	203-814	62.24	545.3	0.88	654.3	1.05	763.4	1.23	1.378
		4.02	203-816	53.67	538.9	1.00	646.7	1.20	754.5	1.41	1.614
		4.53	203-818	46.25	523.6	1.13	628.3	1.36	733.0	1.59	1.811
		5.00	203-820	40.54	506.8	1.25	608.2	1.50	709.5	1.75	2.008
		5.47	203-822	37.97	519.5	1.37	623.4	1.64	727.3	1.92	2.205
		5.98	203-824	34.26	512.6	1.50	615.1	1.80	717.6	2.09	2.402
		7.01	203-828	29.69	520.2	1.75	624.3	2.10	728.3	2.45	2.795
		7.99	203-832	25.12	502.0	2.00	602.4	2.40	702.8	2.80	3.189
		10.00	203-840	19.99	499.7	2.50	599.6	3.00	699.5	3.50	4.016
		12.01	203-848	16.27	488.6	3.00	586.3	3.60	684.0	4.20	4.803
2.480	1.496	2.99	203-912	107.92	807.3	0.75	968.8	0.90	1130.3	1.05	1.181
		3.50	203-914	90.22	790.4	0.88	948.4	1.05	1106.5	1.23	1.378
		4.02	203-916	74.80	751.0	1.00	901.2	1.20	1051.4	1.41	1.614
		4.53	203-918	66.24	749.8	1.13	899.7	1.36	1049.7	1.59	1.811
		5.00	203-920	58.81	735.2	1.25	882.3	1.50	1029.3	1.75	2.008
		5.98	203-924	48.14	720.2	1.50	864.2	1.80	1008.3	2.09	2.402
		7.01	203-928	40.83	715.3	1.75	858.4	2.10	1001.5	2.45	2.795
		7.99	203-932	35.23	704.0	2.00	844.8	2.40	985.6	2.80	3.189
		10.00	203-940	26.84	671.0	2.50	805.2	3.00	939.4	3.50	4.016
		12.01	203-948	21.81	654.9	3.00	785.8	3.60	916.8	4.20	4.803

*Tabulated deflections shown represent near solid and are for design information only.



ISO Series

Raymond® MEDIUM DUTY DIE SPRINGS ISO SPECIFICATION SERIES INCH DIMENSIONS BLUE											
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10" Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (20% of free length)		For Long Life (25% of free length)		Maximum Operating Def. (30% of free length)		*Maximum Deflection
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
0.394	0.197	0.98	204-104	9.14	18.0	0.20	22.5	0.25	27.0	0.30	0.374
		1.26	204-105	7.42	18.7	0.25	23.4	0.31	28.1	0.38	0.480
		1.50	204-106	6.79	20.3	0.30	25.4	0.37	30.5	0.45	0.567
		1.73	204-107	5.88	20.4	0.35	25.5	0.43	30.6	0.52	0.657
		2.01	204-108	5.08	20.4	0.40	25.5	0.50	30.6	0.60	0.764
		2.52	204-110	4.28	21.6	0.50	27.0	0.63	32.4	0.76	0.957
		2.99	204-112	3.03	18.1	0.60	22.6	0.75	27.2	0.90	1.138
		12.01	204-148	0.91	21.9	2.40	27.4	3.00	32.9	3.60	4.567
0.492	0.248	0.98	204-204	17.13	33.7	0.20	42.2	0.25	50.6	0.30	0.374
		1.26	204-205	14.16	35.7	0.25	44.6	0.31	53.5	0.38	0.480
		1.50	204-206	12.22	36.6	0.30	45.7	0.37	54.9	0.45	0.567
		1.73	204-207	10.56	36.6	0.35	45.8	0.43	54.9	0.52	0.657
		2.01	204-208	8.85	35.5	0.40	44.4	0.50	53.3	0.60	0.764
		2.52	204-210	6.91	34.8	0.50	43.5	0.63	52.2	0.76	0.957
		2.99	204-212	5.82	34.8	0.60	43.6	0.75	52.3	0.90	1.138
		3.50	204-214	4.80	33.6	0.70	42.0	0.88	50.4	1.05	1.331
0.630	0.315	12.01	204-248	1.20	28.8	2.40	36.0	3.00	43.2	3.60	4.567
		0.98	204-304	28.21	55.5	0.20	69.4	0.25	83.3	0.30	0.374
		1.26	204-305	21.18	53.4	0.25	66.7	0.31	80.1	0.38	0.480
		1.50	204-306	19.36	57.9	0.30	72.4	0.37	86.9	0.45	0.567
		1.73	204-307	17.13	59.4	0.35	74.2	0.43	89.0	0.52	0.657
		2.01	204-308	15.07	60.5	0.40	75.7	0.50	90.8	0.60	0.764
		2.52	204-310	11.71	59.0	0.50	73.7	0.63	88.5	0.76	0.957
		2.99	204-312	10.16	60.8	0.60	76.0	0.75	91.2	0.90	1.138
0.787	0.394	3.50	204-314	8.68	60.8	0.70	76.0	0.88	91.2	1.05	1.331
		4.02	204-316	7.71	61.9	0.80	77.4	1.00	92.9	1.20	1.528
		12.01	204-348	2.74	65.8	2.40	82.3	3.00	98.7	3.60	4.567
		0.98	204-404	55.96	110.2	0.20	137.7	0.25	165.2	0.30	0.370
		1.26	204-405	41.45	104.5	0.25	130.6	0.31	156.7	0.38	0.472
		1.50	204-406	31.98	95.7	0.30	119.6	0.37	143.5	0.45	0.551
		1.73	204-407	27.12	94.0	0.35	117.5	0.43	141.0	0.52	0.650
		2.01	204-408	23.81	95.6	0.40	119.5	0.50	143.4	0.60	0.748
0.984	0.492	2.52	204-410	18.44	92.9	0.50	116.2	0.63	139.4	0.76	0.945
		2.99	204-412	14.33	85.8	0.60	107.2	0.75	128.7	0.90	1.102
		3.50	204-414	12.56	88.0	0.70	110.0	0.88	132.1	1.05	1.299
		4.02	204-416	11.31	90.8	0.80	113.5	1.00	136.2	1.20	1.496
		4.53	204-418	10.34	93.6	0.91	117.0	1.13	140.4	1.36	1.693
		5.00	204-420	9.48	94.8	1.00	118.5	1.25	142.2	1.50	1.890
		5.47	204-422	8.62	94.4	1.09	118.0	1.37	141.6	1.64	2.047
		5.98	204-424	7.54	90.2	1.20	112.8	1.50	135.3	1.80	2.244
0.984	0.492	12.01	204-448	3.48	83.7	2.40	104.6	3.00	125.5	3.60	4.488
		0.98	204-504	83.94	165.2	0.20	206.6	0.25	247.9	0.30	0.370
		1.26	204-505	67.38	169.8	0.25	212.2	0.31	254.7	0.38	0.472
		1.50	204-506	53.10	158.9	0.30	198.6	0.37	238.4	0.45	0.551
		1.73	204-507	46.14	159.8	0.35	199.8	0.43	239.8	0.52	0.650
		2.01	204-508	39.17	157.3	0.40	196.7	0.50	236.0	0.60	0.748
0.984	0.492	2.52	204-510	30.26	152.5	0.50	190.6	0.63	228.8	0.76	0.945
		2.99	204-512	24.67	147.6	0.60	184.5	0.75	221.4	0.90	1.102

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® MEDIUM DUTY DIE SPRINGS ISO SPECIFICATION SERIES INCH DIMENSIONS BLUE											
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10" Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (20% of free length)		For Long Life (25% of free length)		Maximum Operating Def. (30% of free length)		*Maximum Deflection
A	B	C			Load (lb)		Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
0.984	0.492	3.50	204-514	21.81	152.9	0.70	191.1	0.88	229.3	1.05	1.299
		4.02	204-516	18.84	151.3	0.80	189.2	1.00	227.0	1.20	1.496
		4.53	204-518	15.99	144.8	0.91	181.0	1.13	217.2	1.36	1.693
		5.00	204-520	14.79	147.9	1.00	184.9	1.25	221.9	1.50	1.890
		5.47	204-522	13.25	145.0	1.09	181.3	1.37	217.5	1.64	2.047
		5.98	204-524	11.88	142.2	1.20	177.7	1.50	213.2	1.80	2.244
		7.01	204-528	10.16	142.5	1.40	178.1	1.75	213.7	2.10	2.638
		7.99	204-532	9.02	144.2	1.60	180.3	2.00	216.3	2.40	2.992
		12.01	204-548	5.82	139.9	2.40	174.9	3.00	209.8	3.60	4.488
1.260	0.630	1.50	204-606	105.64	316.1	0.30	395.1	0.37	474.1	0.45	0.551
		1.73	204-607	90.22	312.6	0.35	390.7	0.43	468.9	0.52	0.650
		2.01	204-608	76.51	307.3	0.40	384.1	0.50	460.9	0.60	0.748
		2.52	204-610	56.53	284.9	0.50	356.1	0.63	427.3	0.76	0.945
		2.99	204-612	45.97	275.1	0.60	343.9	0.75	412.6	0.90	1.102
		3.50	204-614	39.46	276.5	0.70	345.7	0.88	414.8	1.05	1.299
		4.02	204-616	33.57	269.7	0.80	337.1	1.00	404.5	1.20	1.496
		4.53	204-618	29.41	266.3	0.91	332.9	1.13	399.5	1.36	1.693
		5.00	204-620	25.58	255.8	1.00	319.8	1.25	383.7	1.50	1.890
		5.47	204-622	24.15	264.4	1.09	330.5	1.37	396.6	1.64	2.047
		5.98	204-624	21.58	258.3	1.20	322.9	1.50	387.5	1.80	2.244
		7.01	204-628	18.56	260.1	1.40	325.2	1.75	390.2	2.10	2.638
		7.99	204-632	16.50	263.8	1.60	329.7	2.00	395.7	2.40	2.992
		10.00	204-640	12.22	244.4	2.00	305.5	2.50	366.6	3.00	3.740
		12.01	204-648	10.45	251.0	2.40	313.7	3.00	376.5	3.60	4.488
1.575	0.787	2.01	204-708	103.69	416.4	0.40	520.5	0.50	624.7	0.60	0.748
		2.52	204-710	79.94	402.9	0.50	503.6	0.63	604.3	0.76	0.945
		2.99	204-712	61.67	369.1	0.60	461.3	0.75	553.6	0.90	1.102
		3.50	204-714	51.79	363.0	0.70	453.7	0.88	544.4	1.05	1.299
		4.02	204-716	46.25	371.5	0.80	464.4	1.00	557.2	1.20	1.496
		4.53	204-718	41.00	371.3	0.91	464.1	1.13	556.9	1.36	1.693
		5.00	204-720	35.80	358.0	1.00	447.5	1.25	537.1	1.50	1.890
		5.47	204-722	32.83	359.4	1.09	449.2	1.37	539.1	1.64	2.047
		5.98	204-724	29.46	352.7	1.20	440.8	1.50	529.0	1.80	2.244
		7.01	204-728	25.18	353.0	1.40	441.2	1.75	529.4	2.10	2.638
		7.99	204-732	20.96	335.0	1.60	418.7	2.00	502.5	2.40	2.992
		10.00	204-740	17.19	343.8	2.00	429.7	2.50	515.6	3.00	3.740
		12.01	204-748	14.05	337.4	2.40	421.7	3.00	506.0	3.60	4.488
1.969	0.984	2.52	204-810	119.34	601.4	0.50	751.8	0.63	902.2	0.76	0.945
		2.99	204-812	95.93	574.1	0.60	717.6	0.75	861.2	0.90	1.102
		3.50	204-814	79.94	560.3	0.70	700.3	0.88	840.4	1.05	1.299
		4.02	204-816	67.95	545.8	0.80	682.2	1.00	818.7	1.20	1.496
		4.53	204-818	60.53	548.1	0.91	685.1	1.13	822.2	1.36	1.693
		5.00	204-820	55.39	553.9	1.00	692.4	1.25	830.9	1.50	1.890
		5.47	204-822	49.68	543.8	1.09	679.7	1.37	815.6	1.64	2.047
		5.98	204-824	45.68	546.8	1.20	683.5	1.50	820.1	1.80	2.244
		7.01	204-828	39.68	556.3	1.40	695.3	1.75	834.4	2.10	2.638
		7.99	204-832	34.15	545.8	1.60	682.3	2.00	818.8	2.40	2.992
		9.02	204-836	29.06	524.1	1.80	655.1	2.26	786.2	2.70	3.386
		10.00	204-840	25.07	501.4	2.00	626.7	2.50	752.1	3.00	3.740
		12.01	204-848	22.04	529.4	2.40	661.7	3.00	794.0	3.60	4.488
2.480	1.496	2.99	204-912	178.15	1066.2	0.60	1332.7	0.75	1599.3	0.90	1.102
		3.50	204-914	148.46	1040.5	0.70	1300.6	0.88	1560.7	1.05	1.299
		4.02	204-916	126.19	1013.6	0.80	1267.0	1.00	1520.4	1.20	1.496
		4.53	204-918	106.78	967.0	0.91	1208.7	1.13	1450.4	1.36	1.693
		5.00	204-920	95.93	959.4	1.00	1199.2	1.25	1439.0	1.50	1.890
		5.98	204-924	77.66	929.5	1.20	1161.9	1.50	1394.2	1.80	2.244
		7.01	204-928	65.09	912.4	1.40	1140.5	1.75	1368.6	2.10	2.638
		7.99	204-932	57.10	912.8	1.60	1141.0	2.00	1369.2	2.40	2.992
		9.02	204-936	50.93	918.5	1.80	1148.1	2.26	1377.7	2.70	3.386
		10.00	204-940	44.77	895.4	2.00	1119.2	2.50	1343.1	3.00	3.740
		12.01	204-948	36.94	887.3	2.40	1109.1	3.00	1331.0	3.60	4.488

*Tabulated deflections shown represent near solid and are for design information only.



ISO Series

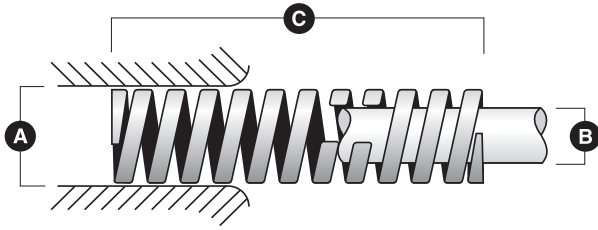
Raymond® HEAVY DUTY DIE SPRINGS ISO SPECIFICATION SERIES INCH DIMENSIONS RED											
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10" Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (20% of free length)		Maximum Operating Def. (25% of free length)		*Maximum Deflection
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)		Deflection (in)
0.394	0.197	0.98	205-104	12.62	18.6	0.15	24.8	0.20	31.0	0.25	0.295
		1.26	205-105	9.99	18.9	0.19	25.2	0.25	31.5	0.31	0.378
		1.50	205-106	9.76	21.9	0.22	29.2	0.30	36.5	0.37	0.449
		1.73	205-107	8.57	22.3	0.26	29.7	0.35	37.1	0.43	0.520
		2.01	205-108	7.31	22.0	0.30	29.4	0.40	36.7	0.50	0.602
		2.52	205-110	6.11	23.1	0.38	30.8	0.50	38.5	0.63	0.756
		2.99	205-112	4.28	19.2	0.45	25.6	0.60	32.0	0.75	0.898
		12.01	205-148	1.20	21.6	1.80	28.8	2.40	36.0	3.00	3.602
0.492	0.248	0.98	205-204	24.04	35.5	0.15	47.3	0.20	59.2	0.25	0.295
		1.26	205-205	18.96	35.8	0.19	47.8	0.25	59.7	0.31	0.378
		1.50	205-206	16.73	37.5	0.22	50.1	0.30	62.6	0.37	0.449
		1.73	205-207	14.05	36.5	0.26	48.7	0.35	60.8	0.43	0.520
		2.01	205-208	11.19	33.7	0.30	44.9	0.40	56.2	0.50	0.602
		2.52	205-210	8.57	32.4	0.38	43.2	0.50	54.0	0.63	0.756
		2.99	205-212	7.54	33.8	0.45	45.1	0.60	56.4	0.75	0.898
		3.50	205-214	6.51	34.2	0.53	45.6	0.70	57.0	0.88	1.051
0.630	0.315	12.01	205-248	1.60	28.8	1.80	38.4	2.40	48.0	3.00	3.602
		0.98	205-304	43.22	63.8	0.15	85.1	0.20	106.4	0.25	0.295
		1.26	205-305	30.15	57.0	0.19	76.0	0.25	95.0	0.31	0.378
		1.50	205-306	27.69	62.2	0.22	82.9	0.30	103.6	0.37	0.449
		1.73	205-307	24.44	63.5	0.26	84.7	0.35	105.8	0.43	0.520
		2.01	205-308	21.18	63.8	0.30	85.1	0.40	106.3	0.50	0.602
		2.52	205-310	17.30	65.4	0.38	87.2	0.50	109.0	0.63	0.756
		2.99	205-312	14.67	65.9	0.45	87.8	0.60	109.8	0.75	0.898
0.787	0.394	3.50	205-314	12.39	65.1	0.53	86.8	0.70	108.5	0.88	1.051
		4.02	205-316	11.02	66.4	0.60	88.5	0.80	110.7	1.00	1.205
		12.01	205-348	4.05	73.0	1.80	97.4	2.40	121.7	3.00	3.602
		0.98	205-404	123.34	182.1	0.15	242.8	0.20	303.5	0.25	0.295
		1.26	205-405	95.93	181.3	0.19	241.7	0.25	302.2	0.31	0.378
		1.50	205-406	73.66	165.3	0.22	220.4	0.30	275.5	0.37	0.433
		1.73	205-407	63.95	166.2	0.26	221.6	0.35	277.0	0.43	0.512
		2.01	205-408	53.67	161.7	0.30	215.6	0.40	269.4	0.50	0.591
0.984	0.492	2.52	205-410	41.17	155.6	0.38	207.5	0.50	259.4	0.63	0.748
		2.99	205-412	34.09	153.0	0.45	204.0	0.60	255.0	0.75	0.906
		3.50	205-414	28.84	151.6	0.53	202.1	0.70	252.6	0.88	1.063
		4.02	205-416	25.24	152.0	0.60	202.7	0.80	253.4	1.00	1.220
		4.53	205-418	21.93	148.9	0.68	198.6	0.91	248.2	1.13	1.378
		5.00	205-420	19.47	146.0	0.75	194.7	1.00	243.4	1.25	1.496
		5.47	205-422	17.70	145.3	0.82	193.8	1.09	242.2	1.37	1.654
		5.98	205-424	16.10	144.6	0.90	192.7	1.20	240.9	1.50	1.811
0.984	0.492	12.01	205-448	8.57	154.3	1.80	205.7	2.40	257.1	3.00	3.583
		0.98	205-504	214.13	316.2	0.15	421.5	0.20	526.9	0.25	0.295
		1.26	205-505	169.59	320.5	0.19	427.3	0.25	534.2	0.31	0.378
		1.50	205-506	125.05	280.6	0.22	374.2	0.30	467.7	0.37	0.433
		1.73	205-507	106.78	277.5	0.26	370.0	0.35	462.5	0.43	0.512
		2.01	205-508	89.08	268.3	0.30	357.7	0.40	447.2	0.50	0.591
0.984	0.492	2.52	205-510	70.23	265.5	0.38	354.0	0.50	442.4	0.63	0.748

*Tabulated deflections shown represent near solid and are for design information only.



Raymond®			HEAVY DUTY DIE SPRINGS		ISO SPECIFICATION SERIES				INCH DIMENSIONS		RED
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10" Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (20% of free length)		Maximum Operating Def. (25% of free length)		*Maximum Deflection
A	B	C			Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
0.984	0.492	2.99	205-512	56.53	253.7	0.45	338.3	0.60	422.9	0.75	0.906
		3.50	205-514	47.96	252.1	0.53	336.2	0.70	420.2	0.88	1.063
		4.02	205-516	41.68	251.1	0.60	334.8	0.80	418.5	1.00	1.220
		4.53	205-518	37.12	252.1	0.68	336.1	0.91	420.1	1.13	1.378
		5.00	205-520	32.95	247.1	0.75	329.5	1.00	411.9	1.25	1.496
		5.47	205-522	30.09	247.0	0.82	329.4	1.09	411.7	1.37	1.654
		5.98	205-524	27.29	245.0	0.90	326.7	1.20	408.4	1.50	1.811
		7.01	205-528	23.41	246.1	1.05	328.1	1.40	410.2	1.75	2.087
		7.99	205-532	20.44	245.1	1.20	326.8	1.60	408.5	2.00	2.402
		12.01	205-548	13.08	235.5	1.80	314.1	2.40	392.6	3.00	3.583
1.260	0.630	1.50	205-606	221.55	497.2	0.22	662.9	0.30	828.7	0.37	0.433
		1.73	205-607	185.00	480.8	0.26	641.0	0.35	801.3	0.43	0.512
		2.01	205-608	155.31	467.8	0.30	623.7	0.40	779.7	0.50	0.591
		2.52	205-610	121.05	457.6	0.38	610.1	0.50	762.6	0.63	0.748
		2.99	205-612	98.21	440.8	0.45	587.8	0.60	734.7	0.75	0.906
		3.50	205-614	80.51	423.2	0.53	564.3	0.70	705.3	0.88	1.063
		4.02	205-616	69.66	419.6	0.60	559.5	0.80	699.4	1.00	1.220
		4.53	205-618	61.10	415.0	0.68	553.3	0.91	691.6	1.13	1.378
		5.00	205-620	53.10	398.3	0.75	531.1	1.00	663.8	1.25	1.496
		5.47	205-622	49.11	403.1	0.82	537.5	1.09	671.9	1.37	1.654
		5.98	205-624	44.54	399.8	0.90	533.1	1.20	666.4	1.50	1.811
		7.01	205-628	38.37	403.4	1.05	537.8	1.40	672.3	1.75	2.087
		7.99	205-632	33.75	404.6	1.20	539.5	1.60	674.3	2.00	2.402
		10.00	205-640	26.49	397.4	1.50	529.9	2.00	662.4	2.50	2.992
		12.01	205-648	21.70	390.8	1.80	521.1	2.40	651.4	3.00	3.583
1.575	0.787	2.01	205-708	199.85	602.0	0.30	802.6	0.40	1003.3	0.50	0.591
		2.52	205-710	153.60	580.6	0.38	774.1	0.50	967.6	0.63	0.748
		2.99	205-712	125.05	561.3	0.45	748.4	0.60	935.5	0.75	0.906
		3.50	205-714	108.49	570.3	0.53	760.3	0.70	950.4	0.88	1.063
		4.02	205-716	93.07	560.7	0.60	747.6	0.80	934.5	1.00	1.220
		4.53	205-718	81.08	550.7	0.68	734.3	0.91	917.8	1.13	1.378
		5.00	205-720	73.09	548.2	0.75	730.9	1.00	913.7	1.25	1.496
		5.47	205-722	65.67	539.1	0.82	718.8	1.09	898.4	1.37	1.654
		5.98	205-724	59.96	538.2	0.90	717.6	1.20	897.0	1.50	1.811
		7.01	205-728	50.82	534.2	1.05	712.3	1.40	890.4	1.75	2.087
		7.99	205-732	43.97	527.1	1.20	702.8	1.60	878.6	2.00	2.402
		10.00	205-740	34.83	522.5	1.50	696.7	2.00	870.8	2.50	2.992
		12.01	205-748	29.12	524.6	1.80	699.4	2.40	874.3	3.00	3.583
1.969	0.984	2.52	205-810	235.82	891.4	0.38	1188.5	0.50	1485.6	0.63	0.748
		2.99	205-812	193.57	868.8	0.45	1158.5	0.60	1448.1	0.75	0.906
		3.50	205-814	164.45	864.4	0.53	1152.5	0.70	1440.6	0.88	1.063
		4.02	205-816	139.90	842.7	0.60	1123.7	0.80	1404.6	1.00	1.220
		4.53	205-818	122.77	833.8	0.68	1111.7	0.91	1389.7	1.13	1.378
		5.00	205-820	109.63	822.3	0.75	1096.4	1.00	1370.5	1.25	1.496
		5.47	205-822	95.93	787.5	0.82	1050.0	1.09	1312.5	1.37	1.654
		5.98	205-824	87.93	789.4	0.90	1052.5	1.20	1315.6	1.50	1.811
		7.01	205-828	76.51	804.4	1.05	1072.5	1.40	1340.6	1.75	2.087
		7.99	205-832	66.81	801.0	1.20	1067.9	1.60	1334.9	2.00	2.402
		10.00	205-840	50.82	762.3	1.50	1016.5	2.00	1270.6	2.50	2.992
		12.01	205-848	41.68	750.9	1.80	1001.1	2.40	1251.4	3.00	3.583

*Tabulated deflections shown represent near solid and are for design information only.



ISO Series

Raymond® EXTRA HEAVY DUTY DIE SPRINGS ISO SPECIFICATION SERIES INCH DIMENSIONS YELLOW

Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10" Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (17% of free length)		Maximum Operating Def. (20% of free length)		*Maximum Deflection
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
0.394	0.197	0.98	206-104	21.01	31.0	0.15	35.2	0.17	41.4	0.20	0.244
		1.26	206-105	15.93	30.1	0.19	34.1	0.21	40.2	0.25	0.315
		1.50	206-106	13.53	30.4	0.22	34.4	0.26	40.5	0.30	0.374
		1.73	206-107	10.96	28.5	0.26	32.3	0.30	38.0	0.35	0.433
		2.01	206-108	9.42	28.4	0.30	32.2	0.34	37.8	0.40	0.512
		2.52	206-110	7.54	28.5	0.38	32.3	0.43	38.0	0.50	0.630
		2.99	206-112	6.22	27.9	0.45	31.7	0.51	37.3	0.60	0.748
		12.01	206-148	1.48	26.8	1.80	30.3	2.04	35.7	2.40	2.992
0.492	0.248	0.98	206-204	33.40	49.3	0.15	55.9	0.17	65.8	0.20	0.244
		1.26	206-205	25.07	47.4	0.19	53.7	0.21	63.2	0.25	0.315
		1.50	206-206	20.56	46.1	0.22	52.3	0.26	61.5	0.30	0.374
		1.73	206-207	17.30	45.0	0.26	50.9	0.30	59.9	0.35	0.433
		2.01	206-208	14.96	45.1	0.30	51.1	0.34	60.1	0.40	0.512
		2.52	206-210	12.11	45.8	0.38	51.9	0.43	61.0	0.50	0.630
		2.99	206-212	9.76	43.8	0.45	49.7	0.51	58.4	0.60	0.748
		3.50	206-214	8.28	43.5	0.53	49.3	0.59	58.0	0.70	0.866
0.630	0.315	12.01	206-248	2.46	44.2	1.80	50.1	2.04	59.0	2.40	2.992
		0.98	206-304	67.38	99.5	0.15	112.7	0.17	132.6	0.20	0.244
		1.26	206-305	50.82	96.0	0.19	108.9	0.21	128.1	0.25	0.315
		1.50	206-306	41.17	92.4	0.22	104.7	0.26	123.2	0.30	0.374
		1.73	206-307	34.77	90.4	0.26	102.4	0.30	120.5	0.35	0.433
		2.01	206-308	29.86	90.0	0.30	101.9	0.34	119.9	0.40	0.512
		2.52	206-310	23.53	88.9	0.38	100.8	0.43	118.6	0.50	0.630
		2.99	206-312	19.47	87.4	0.45	99.1	0.51	116.5	0.60	0.748
0.787	0.394	3.50	206-314	16.84	88.5	0.53	100.3	0.59	118.1	0.70	0.866
		4.02	206-316	14.62	88.1	0.60	99.8	0.68	117.4	0.80	1.024
		12.01	206-348	4.80	86.4	1.80	97.9	2.04	115.2	2.40	2.992
		0.98	206-404	167.30	247.0	0.15	280.0	0.17	329.4	0.20	0.244
		1.26	206-405	127.90	241.7	0.19	274.0	0.21	322.3	0.25	0.315
		1.50	206-406	101.07	226.8	0.22	257.1	0.26	302.4	0.30	0.374
		1.73	206-407	85.08	221.1	0.26	250.6	0.30	294.8	0.35	0.433
		2.01	206-408	73.09	220.1	0.30	249.5	0.34	293.5	0.40	0.512
0.984	0.492	2.52	206-410	56.53	213.7	0.38	242.2	0.43	284.9	0.50	0.630
		2.99	206-412	46.65	209.4	0.45	237.3	0.51	279.2	0.60	0.748
		3.50	206-414	39.68	208.6	0.53	236.4	0.59	278.1	0.70	0.866
		4.02	206-416	34.60	208.5	0.60	236.2	0.68	277.9	0.80	1.024
		4.53	206-418	30.26	205.6	0.68	233.0	0.77	274.1	0.91	1.142
		5.00	206-420	27.12	203.4	0.75	230.6	0.85	271.2	1.00	1.260
		5.47	206-422	24.55	201.6	0.82	228.4	0.93	268.8	1.09	1.378
		5.98	206-424	22.27	199.9	0.90	226.6	1.02	266.5	1.20	0.315
0.984	0.492	12.01	206-448	12.11	218.1	1.80	247.1	2.04	290.7	2.40	2.992
		1.26	206-505	213.78	404.0	0.19	457.9	0.21	538.7	0.25	0.315
		1.50	206-506	197.57	443.4	0.22	502.5	0.26	591.2	0.30	0.374
		1.73	206-507	139.32	362.1	0.26	410.3	0.30	482.7	0.35	0.433
		2.01	206-508	118.48	356.9	0.30	404.5	0.34	475.8	0.40	0.512
		2.52	206-510	91.93	347.5	0.38	393.8	0.43	463.3	0.50	0.630
		2.99	206-512	74.69	335.2	0.45	379.9	0.51	447.0	0.60	0.748
		3.50	206-514	63.10	331.7	0.53	375.9	0.59	442.2	0.70	0.866

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® EXTRA HEAVY DUTY DIE SPRINGS ISO SPECIFICATION SERIES INCH DIMENSIONS YELLOW											
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10" Def. (lb)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (17% of free length)		Maximum Operating Def. (20% of free length)		*Maximum Deflection
					Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Load (lb)	Deflection (in)	Deflection (in)
0.984	0.492	4.02	206-516	54.99	331.3	0.60	375.4	0.68	441.7	0.80	1.024
		4.53	206-518	48.93	332.4	0.68	376.7	0.77	443.1	0.91	1.142
		5.00	206-520	43.57	326.8	0.75	370.3	0.85	435.7	1.00	1.260
		5.98	206-524	36.26	325.5	0.90	368.9	1.02	434.0	1.20	1.496
		7.01	206-528	30.78	323.5	1.05	366.7	1.19	431.4	1.40	1.732
		7.99	206-532	26.84	321.8	1.20	364.7	1.36	429.0	1.60	2.008
1.260	0.630	12.01	206-548	17.64	317.8	1.80	360.2	2.04	423.8	2.40	2.992
		1.50	206-606	301.60	676.9	0.22	767.1	0.26	902.5	0.30	0.374
		1.73	206-607	242.33	629.7	0.26	713.7	0.30	839.6	0.35	0.433
		2.01	206-608	201.56	607.1	0.30	688.1	0.34	809.5	0.40	0.512
		2.52	206-610	153.71	581.0	0.38	658.5	0.43	774.7	0.50	0.630
		2.99	206-612	124.76	560.0	0.45	634.7	0.51	746.7	0.60	0.748
		3.50	206-614	102.95	541.1	0.53	613.3	0.59	721.5	0.70	0.866
		4.02	206-616	88.51	533.2	0.60	604.2	0.68	710.9	0.80	1.024
		4.53	206-618	79.94	542.9	0.68	615.3	0.77	723.9	0.91	1.142
		5.00	206-620	70.80	531.1	0.75	601.9	0.85	708.1	1.00	1.260
		5.98	206-624	58.24	522.8	0.90	592.6	1.02	697.1	1.20	1.496
		7.01	206-628	50.36	529.4	1.05	600.0	1.19	705.9	1.40	1.732
		7.99	206-632	43.40	520.3	1.20	589.7	1.36	693.7	1.60	2.008
		10.00	206-640	34.72	520.8	1.50	590.2	1.70	694.4	2.00	2.520
1.575	0.787	12.01	206-648	27.98	504.0	1.80	571.2	2.04	672.0	2.40	2.992
		2.01	206-708	358.59	1080.1	0.30	1224.1	0.34	1440.1	0.40	0.512
		2.52	206-710	278.08	1051.1	0.38	1191.2	0.43	1401.4	0.50	0.630
		2.99	206-712	216.41	971.4	0.45	1100.9	0.51	1295.1	0.60	0.748
		3.50	206-714	183.29	963.4	0.53	1091.9	0.59	1284.6	0.70	0.866
		4.02	206-716	160.45	966.6	0.60	1095.4	0.68	1288.8	0.80	1.024
		4.53	206-718	139.90	950.2	0.68	1076.8	0.77	1266.9	0.91	1.142
		5.00	206-720	126.19	946.5	0.75	1072.7	0.85	1262.0	1.00	1.260
		5.98	206-724	95.93	861.2	0.90	976.0	1.02	1148.2	1.20	1.496
		7.99	206-732	75.37	903.6	1.20	1024.1	1.36	1204.9	1.60	2.008
1.969	0.984	10.00	206-740	61.10	916.5	1.50	1038.7	1.70	1222.0	2.00	2.520
		12.01	206-748	50.13	903.1	1.80	1023.5	2.04	1204.1	2.40	2.992
		2.52	206-810	404.84	1530.2	0.38	1734.2	0.43	2040.3	0.50	0.630
		2.99	206-812	326.61	1466.0	0.45	1661.5	0.51	1954.7	0.60	0.748
		3.50	206-814	271.23	1425.7	0.53	1615.7	0.59	1900.9	0.70	0.866
		4.02	206-816	231.26	1393.1	0.60	1578.8	0.68	1857.5	0.80	1.024
		4.53	206-818	200.99	1365.1	0.68	1547.1	0.77	1820.1	0.91	1.142
		5.00	206-820	180.44	1353.4	0.75	1533.8	0.85	1804.5	1.00	1.260
		5.98	206-824	136.47	1225.1	0.90	1388.4	1.02	1633.5	1.20	1.496
		7.99	206-832	106.78	1280.2	1.20	1450.9	1.36	1706.9	1.60	2.008
1.969	0.984	10.00	206-840	87.36	1310.5	1.50	1485.3	1.70	1747.4	2.00	2.520
		12.01	206-848	72.52	1306.3	1.80	1480.4	2.04	1741.7	2.40	2.992

*Tabulated deflections shown represent near solid and are for design information only.



ISO Series

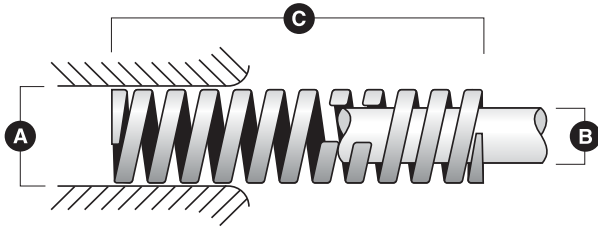
Raymond® LIGHT DUTY DIE SPRINGS ISO SPECIFICATION SERIES METRIC DIMENSIONS GREEN											
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (25% of free length)		For Long Life (30% of free length)		Maximum Operating Def. (35% of free length)		*Maximum Deflection
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
10	5	25	203-104	10.0	62.5	6.3	75.0	7.5	87.5	8.8	10.3
		32	203-105	8.5	68.0	8.0	81.6	9.6	95.2	11.2	13.1
		38	203-106	6.8	64.6	9.5	77.5	11.4	90.4	13.3	15.6
		44	203-107	6.0	66.0	11.0	79.2	13.2	92.4	15.4	18.0
		51	203-108	5.0	63.8	12.8	76.5	15.3	89.3	17.9	20.9
		64	203-110	4.3	68.8	16.0	82.6	19.2	96.3	22.4	26.0
		76	203-112	3.2	60.8	19.0	73.0	22.8	85.1	26.6	31.2
		305	203-148	1.1	83.9	76.3	100.7	91.5	117.4	106.8	125.0
12.5	6.3	25	203-204	17.9	111.9	6.3	134.3	7.5	156.6	8.8	10.3
		32	203-205	16.4	131.2	8.0	157.4	9.6	183.7	11.2	13.1
		38	203-206	13.6	129.2	9.5	155.0	11.4	180.9	13.3	15.6
		44	203-207	12.1	133.1	11.0	159.7	13.2	186.3	15.4	18.0
		51	203-208	11.4	145.4	12.8	174.4	15.3	203.5	17.9	20.9
		64	203-210	9.3	148.8	16.0	178.6	19.2	208.3	22.4	26.3
		76	203-212	7.1	134.9	19.0	161.9	22.8	188.9	26.6	31.2
		89	203-214	5.4	120.2	22.3	144.2	26.7	168.2	31.2	36.5
16	8	305	203-248	1.4	106.8	76.3	128.1	91.5	149.5	106.8	125.0
		25	203-304	23.4	146.3	6.3	175.5	7.5	204.8	8.8	10.3
		32	203-305	22.9	183.2	8.0	219.8	9.6	256.5	11.2	13.1
		38	203-306	19.3	183.4	9.5	220.0	11.4	256.7	13.3	15.6
		44	203-307	17.1	188.1	11.0	225.7	13.2	263.3	15.4	18.0
		51	203-308	15.7	200.2	12.8	240.2	15.3	280.2	17.9	20.9
		64	203-310	10.7	171.2	16.0	205.4	19.2	239.7	22.4	26.3
		76	203-312	10.0	190.0	19.0	228.0	22.8	266.0	26.6	31.2
20	10	89	203-314	8.6	191.4	22.3	229.6	26.7	267.9	31.2	36.5
		102	203-316	7.8	198.9	25.5	238.7	30.6	278.5	35.7	41.8
		305	203-348	2.5	190.6	76.3	228.8	91.5	266.9	106.8	125.0
		25	203-404	55.8	348.8	6.3	418.5	7.5	488.3	8.8	10.2
		32	203-405	45.0	360.0	8.0	432.0	9.6	504.0	11.2	12.5
		38	203-406	33.3	316.4	9.5	379.6	11.4	442.9	13.3	15.0
		44	203-407	30.0	330.0	11.0	396.0	13.2	462.0	15.4	18.0
		51	203-408	24.5	312.4	12.8	374.9	15.3	437.3	17.9	20.0
25	12.5	64	203-410	20.0	320.0	16.0	384.0	19.2	448.0	22.4	25.0
		76	203-412	16.0	304.0	19.0	364.8	22.8	425.6	26.6	30.0
		89	203-414	14.0	311.5	22.3	373.8	26.7	436.1	31.2	35.0
		102	203-416	12.0	306.0	25.5	367.2	30.6	428.4	35.7	41.0
		115	203-418	10.9	313.4	28.8	376.1	34.5	438.7	40.3	46.0
		127	203-420	9.5	301.6	31.8	362.0	38.1	422.3	44.5	51.0
		139	203-422	8.4	291.9	34.8	350.3	41.7	408.7	48.7	56.0
		152	203-424	7.5	285.0	38.0	342.0	45.6	399.0	53.2	61.0
25	12.5	305	203-448	4.0	305.0	76.3	366.0	91.5	427.0	106.8	122.0
		25	203-504	100.0	625.0	6.3	750.0	7.5	875.0	8.8	10.2
		32	203-505	80.3	642.4	8.0	770.9	9.6	899.4	11.2	12.5
		38	203-506	62.0	589.0	9.5	706.8	11.4	824.6	13.3	15.0
		44	203-507	52.9	581.9	11.0	698.3	13.2	814.7	15.4	18.0
		51	203-508	44.0	561.0	12.8	673.2	15.3	785.4	17.9	20.0
25	12.5	64	203-510	35.2	563.2	16.0	675.8	19.2	788.5	22.4	25.0
		76	203-512	28.0	532.0	19.0	638.4	22.8	744.8	26.6	30.0

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® LIGHT DUTY DIE SPRINGS ISO SPECIFICATION SERIES METRIC DIMENSIONS GREEN											
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (25% of free length)		For Long Life (30% of free length)		Maximum Operating Def. (35% of free length)		*Maximum Deflection
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
25	12.5	89	203-514	24.0	534.0	22.3	640.8	26.7	747.6	31.2	35.0
		102	203-516	21.1	538.1	25.5	645.7	30.6	753.3	35.7	41.0
		115	203-518	18.7	537.6	28.8	645.2	34.5	752.7	40.3	46.0
		127	203-520	16.7	530.2	31.8	636.3	38.1	742.3	44.5	51.0
		139	203-522	15.3	531.7	34.8	638.0	41.7	744.3	48.7	56.0
		152	203-524	14.0	532.0	38.0	638.4	45.6	744.8	53.2	61.0
		178	203-528	12.5	556.3	44.5	667.5	53.4	778.8	62.3	71.0
		203	203-532	10.4	527.8	50.8	633.4	60.9	738.9	71.1	81.0
		305	203-548	7.0	533.8	76.3	640.5	91.5	747.3	106.8	122.0
32	16	38	203-606	94.0	893.0	9.5	1071.6	11.4	1250.2	13.3	15.0
		44	203-607	79.5	874.5	11.0	1049.4	13.2	1224.3	15.4	18.0
		51	203-608	67.0	854.3	12.8	1025.1	15.3	1196.0	17.9	20.0
		64	203-610	53.0	848.0	16.0	1017.6	19.2	1187.2	22.4	25.0
		76	203-612	44.0	836.0	19.0	1003.2	22.8	1170.4	26.6	30.0
		89	203-614	37.2	827.7	22.3	993.2	26.7	1158.8	31.2	35.0
		102	203-616	32.0	816.0	25.5	979.2	30.6	1142.4	35.7	41.0
		115	203-618	29.0	833.8	28.8	1000.5	34.5	1167.3	40.3	46.0
		127	203-620	25.0	793.8	31.8	952.5	38.1	1111.3	44.5	51.0
		139	203-622	23.0	799.3	34.8	959.1	41.7	1119.0	48.7	56.0
		152	203-624	21.5	817.0	38.0	980.4	45.6	1143.8	53.2	61.0
		178	203-628	18.2	809.9	44.5	971.9	53.4	1133.9	62.3	71.0
		203	203-632	15.8	801.9	50.8	962.2	60.9	1122.6	71.1	81.0
		254	203-640	12.5	793.8	63.5	952.5	76.2	1111.3	88.9	102.0
		305	203-648	10.3	785.4	76.3	942.5	91.5	1099.5	106.8	122.0
40	20	51	203-708	92.0	1173.0	12.8	1407.6	15.3	1642.2	17.9	20.0
		64	203-710	73.0	1168.0	16.0	1401.6	19.2	1635.2	22.4	25.0
		76	203-712	63.0	1197.0	19.0	1436.4	22.8	1675.8	26.6	30.0
		89	203-714	51.0	1134.8	22.3	1361.7	26.7	1588.7	31.2	35.0
		102	203-716	43.0	1096.5	25.5	1315.8	30.6	1535.1	35.7	41.0
		115	203-718	39.6	1138.5	28.8	1366.2	34.5	1593.9	40.3	46.0
		127	203-720	37.0	1174.8	31.8	1409.7	38.1	1644.7	44.5	51.0
		139	203-722	32.0	1112.0	34.8	1334.4	41.7	1556.8	48.7	56.0
		152	203-724	28.0	1064.0	38.0	1276.8	45.6	1489.6	53.2	61.0
		178	203-728	25.2	1121.4	44.5	1345.7	53.4	1570.0	62.3	71.0
		203	203-732	22.7	1152.0	50.8	1382.4	60.9	1612.8	71.1	81.0
		254	203-740	17.0	1079.5	63.5	1295.4	76.2	1511.3	88.9	102.0
		305	203-748	14.8	1128.5	76.3	1354.2	91.5	1579.9	106.8	122.0
50	25	64	203-810	156.0	2496.0	16.0	2995.2	19.2	3494.4	22.4	25.0
		76	203-812	125.0	2375.0	19.0	2850.0	22.8	3325.0	26.6	30.0
		89	203-814	109.0	2425.3	22.3	2910.3	26.7	3395.4	31.2	35.0
		102	203-816	94.0	2397.0	25.5	2876.4	30.6	3355.8	35.7	41.0
		115	203-818	81.0	2328.8	28.8	2794.5	34.5	3260.3	40.3	46.0
		127	203-820	71.0	2254.3	31.8	2705.1	38.1	3156.0	44.5	51.0
		139	203-822	66.5	2310.9	34.8	2773.1	41.7	3235.2	48.7	56.0
		152	203-824	60.0	2280.0	38.0	2736.0	45.6	3192.0	53.2	61.0
		178	203-828	52.0	2314.0	44.5	2776.8	53.4	3239.6	62.3	71.0
		203	203-832	44.0	2233.0	50.8	2679.6	60.9	3126.2	71.1	81.0
		254	203-840	35.0	2222.5	63.5	2667.0	76.2	3111.5	88.9	102.0
63	38	305	203-848	28.5	2173.1	76.3	2607.8	91.5	3042.4	106.8	122.0
		76	203-912	189.0	3591.0	19.0	4309.2	22.8	5027.4	26.6	30.0
		89	203-914	158.0	3515.5	22.3	4218.6	26.7	4921.7	31.2	35.0
		102	203-916	131.0	3340.5	25.5	4008.6	30.6	4676.7	35.7	41.0
		115	203-918	116.0	3335.0	28.8	4002.0	34.5	4669.0	40.3	46.0
		127	203-920	103.0	3270.3	31.8	3924.3	38.1	4578.4	44.5	51.0
		152	203-924	84.3	3203.4	38.0	3844.1	45.6	4484.8	53.2	61.0
		178	203-928	71.5	3181.8	44.5	3818.1	53.4	4454.5	62.3	71.0
		203	203-932	61.7	3131.3	50.8	3757.5	60.9	4383.8	71.1	81.0
		254	203-940	47.0	2984.5	63.5	3581.4	76.2	4178.3	88.9	102.0
		305	203-948	38.2	2912.8	76.3	3495.3	91.5	4077.9	106.8	122.0

*Tabulated deflections shown represent near solid and are for design information only.



ISO Series

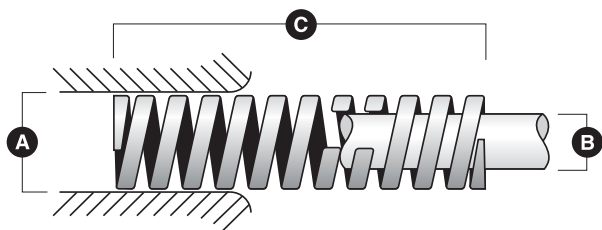
Raymond® MEDIUM DUTY DIE SPRINGS ISO SPECIFICATION SERIES METRIC DIMENSIONS BLUE											
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (20% of free length)		For Long Life (25% of free length)		Maximum Operating Def. (30% of free length)		*Maximum Deflection
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
10	5	25	204-104	16.0	80.0	5.0	100.0	6.3	120.0	7.5	9.5
		32	204-105	13.0	83.2	6.4	104.0	8.0	124.8	9.6	12.2
		38	204-106	11.9	90.4	7.6	113.1	9.5	135.7	11.4	14.4
		44	204-107	10.3	90.6	8.8	113.3	11.0	136.0	13.2	16.7
		51	204-108	8.9	90.8	10.2	113.5	12.8	136.2	15.3	19.4
		64	204-110	7.5	96.0	12.8	120.0	16.0	144.0	19.2	24.3
		76	204-112	5.3	80.6	15.2	100.7	19.0	120.8	22.8	28.9
		305	204-148	1.6	97.6	61.0	122.0	76.3	146.4	91.5	116.0
12.5	6.3	25	204-204	30.0	150.0	5.0	187.5	6.3	225.0	7.5	9.5
		32	204-205	24.8	158.7	6.4	198.4	8.0	238.1	9.6	12.2
		38	204-206	21.4	162.6	7.6	203.3	9.5	244.0	11.4	14.4
		44	204-207	18.5	162.8	8.8	203.5	11.0	244.2	13.2	16.7
		51	204-208	15.5	158.1	10.2	197.6	12.8	237.2	15.3	19.4
		64	204-210	12.1	154.9	12.8	193.6	16.0	232.3	19.2	24.3
		76	204-212	10.2	155.0	15.2	193.8	19.0	232.6	22.8	28.9
		89	204-214	8.4	149.5	17.8	186.9	22.3	224.3	26.7	33.8
16	8	305	204-248	2.1	128.1	61.0	160.1	76.3	192.2	91.5	116.0
		25	204-304	49.4	247.0	5.0	308.8	6.3	370.5	7.5	9.5
		32	204-305	37.1	237.4	6.4	296.8	8.0	356.2	9.6	12.2
		38	204-306	33.9	257.6	7.6	322.1	9.5	386.5	11.4	14.4
		44	204-307	30.0	264.0	8.8	330.0	11.0	396.0	13.2	16.7
		51	204-308	26.4	269.3	10.2	336.6	12.8	403.9	15.3	19.4
		64	204-310	20.5	262.4	12.8	328.0	16.0	393.6	19.2	24.3
		76	204-312	17.8	270.6	15.2	338.2	19.0	405.8	22.8	28.9
20	10	89	204-314	15.2	270.6	17.8	338.2	22.3	405.8	26.7	33.8
		102	204-316	13.5	275.4	20.4	344.3	25.5	413.1	30.6	38.8
		305	204-348	4.8	292.8	61.0	366.0	76.3	439.2	91.5	116.0
		25	204-404	98.0	490.0	5.0	612.5	6.3	735.0	7.5	9.4
		32	204-405	72.6	464.6	6.4	580.8	8.0	697.0	9.6	12.0
		38	204-406	56.0	425.6	7.6	532.0	9.5	638.4	11.4	14.0
		44	204-407	47.5	418.0	8.8	522.5	11.0	627.0	13.2	16.5
		51	204-408	41.7	425.3	10.2	531.7	12.8	638.0	15.3	19.0
25	12.5	64	204-410	32.3	413.4	12.8	516.8	16.0	620.2	19.2	24.0
		76	204-412	25.1	381.5	15.2	476.9	19.0	572.3	22.8	28.0
		89	204-414	22.0	391.6	17.8	489.5	22.3	587.4	26.7	33.0
		102	204-416	19.8	403.9	20.4	504.9	25.5	605.9	30.6	38.0
		115	204-418	18.1	416.3	23.0	520.4	28.8	624.5	34.5	43.0
		127	204-420	16.6	421.6	25.4	527.1	31.8	632.5	38.1	48.0
		139	204-422	15.1	419.8	27.8	524.7	34.8	629.7	41.7	52.0
		152	204-424	13.2	401.3	30.4	501.6	38.0	601.9	45.6	57.0
25	12.5	305	204-448	6.1	372.1	61.0	465.1	76.3	558.2	91.5	114.0
		25	204-504	147.0	735.0	5.0	918.8	6.3	1102.5	7.5	9.4
		32	204-505	118.0	755.2	6.4	944.0	8.0	1132.8	9.6	12.0
		38	204-506	93.0	706.8	7.6	883.5	9.5	1060.2	11.4	14.0
		44	204-507	80.8	711.0	8.8	888.8	11.0	1066.6	13.2	16.5
		51	204-508	68.6	699.7	10.2	874.7	12.8	1049.6	15.3	19.0
25	12.5	64	204-510	53.0	678.4	12.8	848.0	16.0	1017.6	19.2	24.0
		76	204-512	43.2	656.6	15.2	820.8	19.0	985.0	22.8	28.0

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® MEDIUM DUTY DIE SPRINGS ISO SPECIFICATION SERIES METRIC DIMENSIONS BLUE											
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (20% of free length)		For Long Life (25% of free length)		Maximum Operating Def. (30% of free length)		*Maximum Deflection
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
A	B	C									
25	12.5	89	204-514	38.2	680.0	17.8	850.0	22.3	1019.9	26.7	33.0
		102	204-516	33.0	673.2	20.4	841.5	25.5	1009.8	30.6	38.0
		115	204-518	28.0	644.0	23.0	805.0	28.8	966.0	34.5	43.0
		127	204-520	25.9	657.9	25.4	822.3	31.8	986.8	38.1	48.0
		139	204-522	23.2	645.0	27.8	806.2	34.8	967.4	41.7	52.0
		152	204-524	20.8	632.3	30.4	790.4	38.0	948.5	45.6	57.0
		178	204-528	17.8	633.7	35.6	792.1	44.5	950.5	53.4	67.0
		203	204-532	15.8	641.5	40.6	801.9	50.8	962.2	60.9	76.0
		305	204-548	10.2	622.2	61.0	777.8	76.3	933.3	91.5	114.0
32	16	38	204-606	185.0	1406.0	7.6	1757.5	9.5	2109.0	11.4	14.0
		44	204-607	158.0	1390.4	8.8	1738.0	11.0	2085.6	13.2	16.5
		51	204-608	134.0	1366.8	10.2	1708.5	12.8	2050.2	15.3	19.0
		64	204-610	99.0	1267.2	12.8	1584.0	16.0	1900.8	19.2	24.0
		76	204-612	80.5	1223.6	15.2	1529.5	19.0	1835.4	22.8	28.0
		89	204-614	69.1	1230.0	17.8	1537.5	22.3	1845.0	26.7	33.0
		102	204-616	58.8	1199.5	20.4	1499.4	25.5	1799.3	30.6	38.0
		115	204-618	51.5	1184.5	23.0	1480.6	28.8	1776.8	34.5	43.0
		127	204-620	44.8	1137.9	25.4	1422.4	31.8	1706.9	38.1	48.0
		139	204-622	42.3	1175.9	27.8	1469.9	34.8	1763.9	41.7	52.0
		152	204-624	37.8	1149.1	30.4	1436.4	38.0	1723.7	45.6	57.0
		178	204-628	32.5	1157.0	35.6	1446.3	44.5	1735.5	53.4	67.0
		203	204-632	28.9	1173.3	40.6	1466.7	50.8	1760.0	60.9	76.0
		254	204-640	21.4	1087.1	50.8	1358.9	63.5	1630.7	76.2	95.0
		305	204-648	18.3	1116.3	61.0	1395.4	76.3	1674.5	91.5	114.0
40	20	51	204-708	181.6	1852.3	10.2	2315.4	12.8	2778.5	15.3	19.0
		64	204-710	140.0	1792.0	12.8	2240.0	16.0	2688.0	19.2	24.0
		76	204-712	108.0	1641.6	15.2	2052.0	19.0	2462.4	22.8	28.0
		89	204-714	90.7	1614.5	17.8	2018.1	22.3	2421.7	26.7	33.0
		102	204-716	81.0	1652.4	20.4	2065.5	25.5	2478.6	30.6	38.0
		115	204-718	71.8	1651.4	23.0	2064.3	28.8	2477.1	34.5	43.0
		127	204-720	62.7	1592.6	25.4	1990.7	31.8	2388.9	38.1	48.0
		139	204-722	57.5	1598.5	27.8	1998.1	34.8	2397.8	41.7	52.0
		152	204-724	51.6	1568.6	30.4	1960.8	38.0	2353.0	45.6	57.0
		178	204-728	44.1	1570.0	35.6	1962.5	44.5	2354.9	53.4	67.0
		203	204-732	36.7	1490.0	40.6	1862.5	50.8	2235.0	60.9	76.0
		254	204-740	30.1	1529.1	50.8	1911.4	63.5	2293.6	76.2	95.0
		305	204-748	24.6	1500.6	61.0	1875.8	76.3	2250.9	91.5	114.0
50	25	64	204-810	209.0	2675.2	12.8	3344.0	16.0	4012.8	19.2	24.0
		76	204-812	168.0	2553.6	15.2	3192.0	19.0	3830.4	22.8	28.0
		89	204-814	140.0	2492.0	17.8	3115.0	22.3	3738.0	26.7	33.0
		102	204-816	119.0	2427.6	20.4	3034.5	25.5	3641.4	30.6	38.0
		115	204-818	106.0	2438.0	23.0	3047.5	28.8	3657.0	34.5	43.0
		127	204-820	97.0	2463.8	25.4	3079.8	31.8	3695.7	38.1	48.0
		139	204-822	87.0	2418.6	27.8	3023.3	34.8	3627.9	41.7	52.0
		152	204-824	80.0	2432.0	30.4	3040.0	38.0	3648.0	45.6	57.0
		178	204-828	69.5	2474.2	35.6	3092.8	44.5	3711.3	53.4	67.0
		203	204-832	59.8	2427.9	40.6	3034.9	50.8	3641.8	60.9	76.0
		229	204-836	50.9	2331.2	45.8	2914.0	57.3	3496.8	68.7	86.0
		254	204-840	43.9	2230.1	50.8	2787.7	63.5	3345.2	76.2	95.0
		305	204-848	38.6	2354.6	61.0	2943.3	76.3	3531.9	91.5	114.0
63	38	76	204-912	312.0	4742.4	15.2	5928.0	19.0	7113.6	22.8	28.0
		89	204-914	260.0	4628.0	17.8	5785.0	22.3	6942.0	26.7	33.0
		102	204-916	221.0	4508.4	20.4	5635.5	25.5	6762.6	30.6	38.0
		115	204-918	187.0	4301.0	23.0	5376.3	28.8	6451.5	34.5	43.0
		127	204-920	168.0	4267.2	25.4	5334.0	31.8	6400.8	38.1	48.0
		152	204-924	136.0	4134.4	30.4	5168.0	38.0	6201.6	45.6	57.0
		178	204-928	114.0	4058.4	35.6	5073.0	44.5	6087.6	53.4	67.0
		203	204-932	100.0	4060.0	40.6	5075.0	50.8	6090.0	60.9	76.0
		229	204-936	89.2	4085.4	45.8	5106.7	57.3	6128.0	68.7	86.0
		254	204-940	78.4	3982.7	50.8	4978.4	63.5	5974.1	76.2	95.0
		305	204-948	64.7	3946.7	61.0	4933.4	76.3	5920.1	91.5	114.0

*Tabulated deflections shown represent near solid and are for design information only.



ISO Series

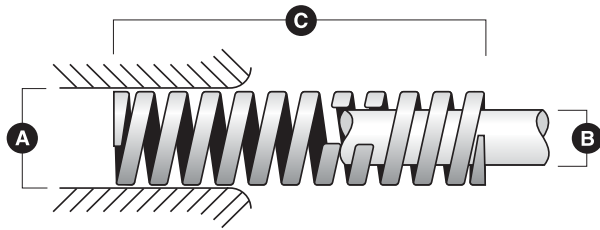
Raymond® HEAVY DUTY DIE SPRINGS ISO SPECIFICATION SERIES METRIC DIMENSIONS RED											
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (20% of free length)		Maximum Operating Def. (25% of free length)		*Maximum Deflection
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
10	5	25	205-104	22.1	82.9	3.8	110.5	5.0	138.1	6.3	7.5
		32	205-105	17.5	84.0	4.8	112.0	6.4	140.0	8.0	9.6
		38	205-106	17.1	97.5	5.7	130.0	7.6	162.5	9.5	11.4
		44	205-107	15.0	99.0	6.6	132.0	8.8	165.0	11.0	13.2
		51	205-108	12.8	97.9	7.7	130.6	10.2	163.2	12.8	15.3
		64	205-110	10.7	102.7	9.6	137.0	12.8	171.2	16.0	19.2
		76	205-112	7.5	85.5	11.4	114.0	15.2	142.5	19.0	22.8
		305	205-148	2.1	96.1	45.8	128.1	61.0	160.1	76.3	91.5
12.5	6.3	25	205-204	42.1	157.9	3.8	210.5	5.0	263.1	6.3	7.5
		32	205-205	33.2	159.4	4.8	212.5	6.4	265.6	8.0	9.6
		38	205-206	29.3	167.0	5.7	222.7	7.6	278.4	9.5	11.4
		44	205-207	24.6	162.4	6.6	216.5	8.8	270.6	11.0	13.2
		51	205-208	19.6	149.9	7.7	199.9	10.2	249.9	12.8	15.3
		64	205-210	15.0	144.0	9.6	192.0	12.8	240.0	16.0	19.2
		76	205-212	13.2	150.5	11.4	200.6	15.2	250.8	19.0	22.8
		89	205-214	11.4	152.2	13.4	202.9	17.8	253.7	22.3	26.7
		305	205-248	2.8	128.1	45.8	170.8	61.0	213.5	76.3	91.5
16	8	25	205-304	75.7	283.9	3.8	378.5	5.0	473.1	6.3	7.5
		32	205-305	52.8	253.4	4.8	337.9	6.4	422.4	8.0	9.6
		38	205-306	48.5	276.5	5.7	368.6	7.6	460.8	9.5	11.4
		44	205-307	42.8	282.5	6.6	376.6	8.8	470.8	11.0	13.2
		51	205-308	37.1	283.8	7.7	378.4	10.2	473.0	12.8	15.3
		64	205-310	30.3	290.9	9.6	387.8	12.8	484.8	16.0	19.2
		76	205-312	25.7	293.0	11.4	390.6	15.2	488.3	19.0	22.8
		89	205-314	21.7	289.7	13.4	386.3	17.8	482.8	22.3	26.7
		102	205-316	19.3	295.3	15.3	393.7	20.4	492.2	25.5	30.6
		305	205-348	7.1	324.8	45.8	433.1	61.0	541.4	76.3	91.5
20	10	25	205-404	216.0	810.0	3.8	1080.0	5.0	1350.0	6.3	7.5
		32	205-405	168.0	806.4	4.8	1075.2	6.4	1344.0	8.0	9.6
		38	205-406	129.0	735.3	5.7	980.4	7.6	1225.5	9.5	11.0
		44	205-407	112.0	739.2	6.6	985.6	8.8	1232.0	11.0	13.0
		51	205-408	94.0	719.1	7.7	958.8	10.2	1198.5	12.8	15.0
		64	205-410	72.1	692.2	9.6	922.9	12.8	1153.6	16.0	19.0
		76	205-412	59.7	680.6	11.4	907.4	15.2	1134.3	19.0	23.0
		89	205-414	50.5	674.2	13.4	898.9	17.8	1123.6	22.3	27.0
		102	205-416	44.2	676.3	15.3	901.7	20.4	1127.1	25.5	31.0
		115	205-418	38.4	662.4	17.3	883.2	23.0	1104.0	28.8	35.0
		127	205-420	34.1	649.6	19.1	866.1	25.4	1082.7	31.8	38.0
		139	205-422	31.0	646.4	20.9	861.8	27.8	1077.3	34.8	42.0
		152	205-424	28.2	643.0	22.8	857.3	30.4	1071.6	38.0	46.0
		305	205-448	15.0	686.3	45.8	915.0	61.0	1143.8	76.3	91.0
25	12.5	25	205-504	375.0	1406.3	3.8	1875.0	5.0	2343.8	6.3	7.5
		32	205-505	297.0	1425.6	4.8	1900.8	6.4	2376.0	8.0	9.6
		38	205-506	219.0	1248.3	5.7	1664.4	7.6	2080.5	9.5	11.0
		44	205-507	187.0	1234.2	6.6	1645.6	8.8	2057.0	11.0	13.0
		51	205-508	156.0	1193.4	7.7	1591.2	10.2	1989.0	12.8	15.0
		64	205-510	123.0	1180.8	9.6	1574.4	12.8	1968.0	16.0	19.0

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® HEAVY DUTY DIE SPRINGS ISO SPECIFICATION SERIES METRIC DIMENSIONS RED											
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (20% of free length)		Maximum Operating Def. (25% of free length)		*Maximum Deflection
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
25	12.5	76	205-512	99.0	1128.6	11.4	1504.8	15.2	1881.0	19.0	23.0
		89	205-514	84.0	1121.4	13.4	1495.2	17.8	1869.0	22.3	27.0
		102	205-516	73.0	1116.9	15.3	1489.2	20.4	1861.5	25.5	31.0
		115	205-518	65.0	1121.3	17.3	1495.0	23.0	1868.8	28.8	35.0
		127	205-520	57.7	1099.2	19.1	1465.6	25.4	1832.0	31.8	38.0
		139	205-522	52.7	1098.8	20.9	1465.1	27.8	1831.3	34.8	42.0
		152	205-524	47.8	1089.8	22.8	1453.1	30.4	1816.4	38.0	46.0
		178	205-528	41.0	1094.7	26.7	1459.6	35.6	1824.5	44.5	53.0
		203	205-532	35.8	1090.1	30.5	1453.5	40.6	1816.9	50.8	61.0
		305	205-548	22.9	1047.7	45.8	1396.9	61.0	1746.1	76.3	91.0
32	16	38	205-606	388.0	2211.6	5.7	2948.8	7.6	3686.0	9.5	11.0
		44	205-607	324.0	2138.4	6.6	2851.2	8.8	3564.0	11.0	13.0
		51	205-608	272.0	2080.8	7.7	2774.4	10.2	3468.0	12.8	15.0
		64	205-610	212.0	2035.2	9.6	2713.6	12.8	3392.0	16.0	19.0
		76	205-612	172.0	1960.8	11.4	2614.4	15.2	3268.0	19.0	23.0
		89	205-614	141.0	1882.4	13.4	2509.8	17.8	3137.3	22.3	27.0
		102	205-616	122.0	1866.6	15.3	2488.8	20.4	3111.0	25.5	31.0
		115	205-618	107.0	1845.8	17.3	2461.0	23.0	3076.3	28.8	35.0
		127	205-620	93.0	1771.7	19.1	2362.2	25.4	2952.8	31.8	38.0
		139	205-622	86.0	1793.1	20.9	2390.8	27.8	2988.5	34.8	42.0
		152	205-624	78.0	1778.4	22.8	2371.2	30.4	2964.0	38.0	46.0
		178	205-628	67.2	1794.2	26.7	2392.3	35.6	2990.4	44.5	53.0
		203	205-632	59.1	1799.6	30.5	2399.5	40.6	2999.3	50.8	61.0
		254	205-640	46.4	1767.8	38.1	2357.1	50.8	2946.4	63.5	76.0
40	20	305	205-648	38.0	1738.5	45.8	2318.0	61.0	2897.5	76.3	91.0
		51	205-708	350.0	2677.5	7.7	3570.0	10.2	4462.5	12.8	15.0
		64	205-710	269.0	2582.4	9.6	3443.2	12.8	4304.0	16.0	19.0
		76	205-712	219.0	2496.6	11.4	3328.8	15.2	4161.0	19.0	23.0
		89	205-714	190.0	2536.5	13.4	3382.0	17.8	4227.5	22.3	27.0
		102	205-716	163.0	2493.9	15.3	3325.2	20.4	4156.5	25.5	31.0
		115	205-718	142.0	2449.5	17.3	3266.0	23.0	4082.5	28.8	35.0
		127	205-720	128.0	2438.4	19.1	3251.2	25.4	4064.0	31.8	38.0
		139	205-722	115.0	2397.8	20.9	3197.0	27.8	3996.3	34.8	42.0
		152	205-724	105.0	2394.0	22.8	3192.0	30.4	3990.0	38.0	46.0
		178	205-728	89.0	2376.3	26.7	3168.4	35.6	3960.5	44.5	53.0
		203	205-732	77.0	2344.7	30.5	3126.2	40.6	3907.8	50.8	61.0
		254	205-740	61.0	2324.1	38.1	3098.8	50.8	3873.5	63.5	76.0
		305	205-748	51.0	2333.3	45.8	3111.0	61.0	3888.8	76.3	91.0
50	25	64	205-810	413.0	3964.8	9.6	5286.4	12.8	6608.0	16.0	19.0
		76	205-812	339.0	3864.6	11.4	5152.8	15.2	6441.0	19.0	23.0
		89	205-814	288.0	3844.8	13.4	5126.4	17.8	6408.0	22.3	27.0
		102	205-816	245.0	3748.5	15.3	4998.0	20.4	6247.5	25.5	31.0
		115	205-818	215.0	3708.8	17.3	4945.0	23.0	6181.3	28.8	35.0
		127	205-820	192.0	3657.6	19.1	4876.8	25.4	6096.0	31.8	38.0
		139	205-822	168.0	3502.8	20.9	4670.4	27.8	5838.0	34.8	42.0
		152	205-824	154.0	3511.2	22.8	4681.6	30.4	5852.0	38.0	46.0
		178	205-828	134.0	3577.8	26.7	4770.4	35.6	5963.0	44.5	53.0
		203	205-832	117.0	3562.7	30.5	4750.2	40.6	5937.8	50.8	61.0
		254	205-840	89.0	3390.9	38.1	4521.2	50.8	5651.5	63.5	76.0
		305	205-848	73.0	3339.8	45.8	4453.0	61.0	5566.3	76.3	91.0

*Tabulated deflections shown represent near solid and are for design information only.



ISO Series

Raymond® EXTRA HEAVY DUTY DIE SPRINGS ISO SPECIFICATION SERIES METRIC DIMENSIONS YELLOW

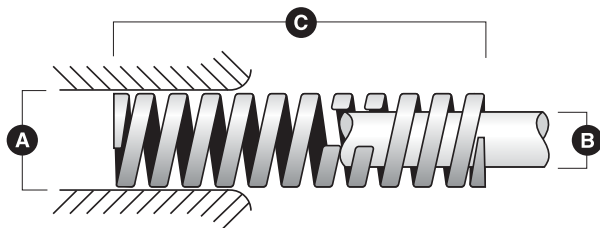
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (17% of free length)		Maximum Operating Def. (20% of free length)		*Maximum Deflection
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
10	5	25	206-104	36.8	138.0	3.8	156.4	4.3	184.0	5.0	6.2
		32	206-105	27.9	133.9	4.8	151.8	5.4	178.6	6.4	8.0
		38	206-106	23.7	135.1	5.7	153.1	6.5	180.1	7.6	9.5
		44	206-107	19.2	126.7	6.6	143.6	7.5	169.0	8.8	11.0
		51	206-108	16.5	126.2	7.7	143.1	8.7	168.3	10.2	13.0
		64	206-110	13.2	126.7	9.6	143.6	10.9	169.0	12.8	16.0
		76	206-112	10.9	124.3	11.4	140.8	12.9	165.7	15.2	19.0
		305	206-148	2.6	119.0	45.8	134.8	51.9	158.6	61.0	76.0
12.5	6.3	25	206-204	58.5	219.4	3.8	248.6	4.3	292.5	5.0	6.2
		32	206-205	43.9	210.7	4.8	238.8	5.4	281.0	6.4	8.0
		38	206-206	36.0	205.2	5.7	232.6	6.5	273.6	7.6	9.5
		44	206-207	30.3	200.0	6.6	226.6	7.5	266.6	8.8	11.0
		51	206-208	26.2	200.4	7.7	227.2	8.7	267.2	10.2	13.0
		64	206-210	21.2	203.5	9.6	230.7	10.9	271.4	12.8	16.0
		76	206-212	17.1	194.9	11.4	220.9	12.9	259.9	15.2	19.0
		89	206-214	14.5	193.6	13.4	219.4	15.1	258.1	17.8	22.0
16	8	305	206-248	4.3	196.7	45.8	223.0	51.9	262.3	61.0	76.0
		25	206-304	118.0	442.5	3.8	501.5	4.3	590.0	5.0	6.2
		32	206-305	89.0	427.2	4.8	484.2	5.4	569.6	6.4	8.0
		38	206-306	72.1	411.0	5.7	465.8	6.5	548.0	7.6	9.5
		44	206-307	60.9	401.9	6.6	455.5	7.5	535.9	8.8	11.0
		51	206-308	52.3	400.1	7.7	453.4	8.7	533.5	10.2	13.0
		64	206-310	41.2	395.5	9.6	448.3	10.9	527.4	12.8	16.0
		76	206-312	34.1	388.7	11.4	440.6	12.9	518.3	15.2	19.0
20	10	89	206-314	29.5	393.8	13.4	446.3	15.1	525.1	17.8	22.0
		102	206-316	25.6	391.7	15.3	443.9	17.3	522.2	20.4	26.0
		305	206-348	8.4	384.3	45.8	435.5	51.9	512.4	61.0	76.0
		25	206-404	293.0	1098.8	3.8	1245.3	4.3	1465.0	5.0	6.2
		32	206-405	224.0	1075.2	4.8	1218.6	5.4	1433.6	6.4	8.0
		38	206-406	177.0	1008.9	5.7	1143.4	6.5	1345.2	7.6	9.5
		44	206-407	149.0	983.4	6.6	1114.5	7.5	1311.2	8.8	11.0
		51	206-408	128.0	979.2	7.7	1109.8	8.7	1305.6	10.2	13.0
25	12.5	64	206-410	99.0	950.4	9.6	1077.1	10.9	1267.2	12.8	16.0
		76	206-412	81.7	931.4	11.4	1055.6	12.9	1241.8	15.2	19.0
		89	206-414	69.5	927.8	13.4	1051.5	15.1	1237.1	17.8	22.0
		102	206-416	60.6	927.2	15.3	1050.8	17.3	1236.2	20.4	26.0
		115	206-418	53.0	914.3	17.3	1036.2	19.6	1219.0	23.0	29.0
		127	206-420	47.5	904.9	19.1	1025.5	21.6	1206.5	25.4	32.0
		139	206-422	43.0	896.6	20.9	1016.1	23.6	1195.4	27.8	35.0
		152	206-424	39.0	889.2	22.8	1007.8	25.8	1185.6	30.4	38.0
25	12.5	305	206-448	21.2	969.9	45.8	1099.2	51.9	1293.2	61.0	76.0
		32	206-505	374.4	1797.1	4.8	2036.7	5.4	2396.2	6.4	8.0
		38	206-506	346.0	1972.2	5.7	2235.2	6.5	2629.6	7.6	9.5
		44	206-507	244.0	1610.4	6.6	1825.1	7.5	2147.2	8.8	11.0
		51	206-508	207.5	1587.4	7.7	1799.0	8.7	2116.5	10.2	13.0
		64	206-510	161.0	1545.6	9.6	1751.7	10.9	2060.8	12.8	16.0
		76	206-512	130.8	1491.1	11.4	1689.9	12.9	1988.2	15.2	19.0
		89	206-514	110.5	1475.2	13.4	1671.9	15.1	1966.9	17.8	22.0

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® EXTRA HEAVY DUTY DIE SPRINGS ISO SPECIFICATION SERIES METRIC DIMENSIONS YELLOW											
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1 mm Def. (N)	LOAD DEFLECTION TABLE						
					For Optimum Life (15% of free length)		For Long Life (17% of free length)		Maximum Operating Def. (20% of free length)		*Maximum Deflection
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Deflection (mm)
25	12.5	102	206-516	96.3	1473.4	15.3	1669.8	17.3	1964.5	20.4	26.0
		115	206-518	85.7	1478.3	17.3	1675.4	19.6	1971.1	23.0	29.0
		127	206-520	76.3	1453.5	19.1	1647.3	21.6	1938.0	25.4	32.0
		152	206-524	63.5	1447.8	22.8	1640.8	25.8	1930.4	30.4	38.0
		178	206-528	53.9	1439.1	26.7	1631.0	30.3	1918.8	35.6	44.0
		203	206-532	47.0	1431.2	30.5	1622.0	34.5	1908.2	40.6	51.0
		305	206-548	30.9	1413.7	45.8	1602.2	51.9	1884.9	61.0	76.0
32	16	38	206-606	528.2	3010.7	5.7	3412.2	6.5	4014.3	7.6	9.5
		44	206-607	424.4	2801.0	6.6	3174.5	7.5	3734.7	8.8	11.0
		51	206-608	353.0	2700.5	7.7	3060.5	8.7	3600.6	10.2	13.0
		64	206-610	269.2	2584.3	9.6	2928.9	10.9	3445.8	12.8	16.0
		76	206-612	218.5	2490.9	11.4	2823.0	12.9	3321.2	15.2	19.0
		89	206-614	180.3	2407.0	13.4	2727.9	15.1	3209.3	17.8	22.0
		102	206-616	155.0	2371.5	15.3	2687.7	17.3	3162.0	20.4	26.0
		115	206-618	140.0	2415.0	17.3	2737.0	19.6	3220.0	23.0	29.0
		127	206-620	124.0	2362.2	19.1	2677.2	21.6	3149.6	25.4	32.0
		152	206-624	102.0	2325.6	22.8	2635.7	25.8	3100.8	30.4	38.0
		178	206-628	88.2	2354.9	26.7	2668.9	30.3	3139.9	35.6	44.0
		203	206-632	76.0	2314.2	30.5	2622.8	34.5	3085.6	40.6	51.0
		254	206-640	60.8	2316.5	38.1	2625.3	43.2	3088.6	50.8	64.0
		305	206-648	49.0	2241.8	45.8	2540.7	51.9	2989.0	61.0	76.0
40	20	51	206-708	628.0	4804.2	7.7	5444.8	8.7	6405.6	10.2	13.0
		64	206-710	487.0	4675.2	9.6	5298.6	10.9	6233.6	12.8	16.0
		76	206-712	379.0	4320.6	11.4	4896.7	12.9	5760.8	15.2	19.0
		89	206-714	321.0	4285.4	13.4	4856.7	15.1	5713.8	17.8	22.0
		102	206-716	281.0	4299.3	15.3	4872.5	17.3	5732.4	20.4	26.0
		115	206-718	245.0	4226.3	17.3	4789.8	19.6	5635.0	23.0	29.0
		127	206-720	221.0	4210.1	19.1	4771.4	21.6	5613.4	25.4	32.0
		152	206-724	168.0	3830.4	22.8	4341.1	25.8	5107.2	30.4	38.0
		203	206-732	132.0	4019.4	30.5	4555.3	34.5	5359.2	40.6	51.0
		254	206-740	107.0	4076.7	38.1	4620.3	43.2	5435.6	50.8	64.0
		305	206-748	87.8	4016.9	45.8	4552.4	51.9	5355.8	61.0	76.0
50	25	64	206-810	709.0	6806.4	9.6	7713.9	10.9	9075.2	12.8	16.0
		76	206-812	572.0	6520.8	11.4	7390.2	12.9	8694.4	15.2	19.0
		89	206-814	475.0	6341.3	13.4	7186.8	15.1	8455.0	17.8	22.0
		102	206-816	405.0	6196.5	15.3	7022.7	17.3	8262.0	20.4	26.0
		115	206-818	352.0	6072.0	17.3	6881.6	19.6	8096.0	23.0	29.0
		127	206-820	316.0	6019.8	19.1	6822.4	21.6	8026.4	25.4	32.0
		152	206-824	239.0	5449.2	22.8	6175.8	25.8	7265.6	30.4	38.0
		203	206-832	187.0	5694.2	30.5	6453.4	34.5	7592.2	40.6	51.0
		254	206-840	153.0	5829.3	38.1	6606.5	43.2	7772.4	50.8	64.0
		305	206-848	127.0	5810.3	45.8	6585.0	51.9	7747.0	61.0	76.0

*Tabulated deflections shown represent near solid and are for design information only.



ISO-D Series

Raymond® ULTRA LIGHT DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS) LIGHT GREEN

Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 30% of free length		Load @ 40% of free length		Load @ 50% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
					Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
3/4	3/8	1	302-404-D	16.8	50	0.30	67	0.39	84	0.49	110	0.65
		1 1/4	302-405-D	12.9	49	0.38	65	0.50	81	0.63	110	0.85
		1 1/2	302-406-D	10.6	48	0.45	64	0.60	79	0.75	107	1.01
		1 3/4	302-407-D	9.0	47	0.52	62	0.69	78	0.87	105	1.17
		2	302-408-D	7.8	47	0.60	63	0.80	79	1.00	107	1.37
		2 1/2	302-410-D	6.5	49	0.76	65	1.01	81	1.26	114	1.77
		3	302-412-D	5.6	50	0.90	67	1.20	84	1.50	119	2.13
		3 1/2	302-414-D	4.7	50	1.05	66	1.40	83	1.75	118	2.50
		4	302-416-D	4.2	51	1.20	68	1.61	85	2.01	122	2.89
		4 1/2	302-418-D	3.7	49	1.35	66	1.80	82	2.24	117	3.20
		5	302-420-D	3.4	51	1.50	67	2.00	84	2.50	122	3.62
		5 1/2	302-422-D	3.1	51	1.65	68	2.20	85	2.76	123	4.00
1	1/2	6	302-424-D	2.8	50	1.80	67	2.39	84	2.99	121	4.33
		12	302-448-D	1.4	51	3.60	69	4.80	86	6.00	125	8.76
		1	302-504-D	30.8	91	0.30	121	0.39	151	0.49	176	0.57
		1 1/4	302-505-D	24.1	91	0.38	121	0.50	152	0.63	181	0.75
		1 1/2	302-506-D	20.4	92	0.45	122	0.60	153	0.75	187	0.91
		1 3/4	302-507-D	17.9	93	0.52	124	0.69	155	0.87	193	1.08
		2	302-508-D	15.4	93	0.60	124	0.80	155	1.00	195	1.27
		2 1/2	302-510-D	12.3	93	0.76	124	1.01	155	1.26	199	1.61
		3	302-512-D	10.3	93	0.90	124	1.20	155	1.50	200	1.93
		3 1/2	302-514-D	8.7	91	1.05	122	1.40	152	1.75	195	2.25
		4	302-516-D	7.5	91	1.20	121	1.61	151	2.01	196	2.59
		4 1/2	302-518-D	6.7	91	1.35	121	1.80	151	2.24	195	2.90
1 1/4	5/8	5	302-520-D	6.1	91	1.50	121	2.00	151	2.50	197	3.26
		5 1/2	302-522-D	5.5	91	1.65	121	2.20	151	2.76	197	3.59
		6	302-524-D	5.0	90	1.80	120	2.39	150	2.99	195	3.89
		7	302-528-D	4.3	91	2.10	122	2.80	152	3.50	199	4.58
		8	302-532-D	3.8	92	2.40	122	3.20	153	4.00	201	5.26
		12	302-548-D	2.5	91	3.60	121	4.80	151	6.00	199	7.91
		1 1/2	302-606-D	24.6	110	0.45	147	0.60	184	0.75	239	0.97
		1 3/4	302-607-D	21.3	111	0.52	148	0.69	184	0.87	243	1.14
		2	302-608-D	18.5	111	0.60	149	0.80	186	1.00	248	1.34
		2 1/2	302-610-D	14.6	110	0.76	147	1.01	183	1.26	249	1.71
		3	302-612-D	12.3	111	0.90	148	1.20	185	1.50	253	2.06
		3 1/2	302-614-D	10.3	109	1.05	145	1.40	181	1.75	248	2.40
1 1/2	3/4	4	302-616-D	9.0	108	1.20	144	1.61	180	2.01	247	2.76
		4 1/2	302-618-D	8.1	109	1.35	146	1.80	182	2.24	251	3.09
		5	302-620-D	7.3	109	1.50	145	2.00	181	2.50	251	3.46
		5 1/2	302-622-D	6.6	110	1.65	146	2.20	183	2.76	254	3.84
		6	302-624-D	6.1	109	1.80	145	2.39	181	2.99	252	4.16
		7	302-628-D	5.1	108	2.10	144	2.80	180	3.50	250	4.87
		8	302-632-D	4.5	107	2.40	142	3.20	178	4.00	247	5.55
		10	302-640-D	3.7	110	3.00	146	4.00	183	5.00	258	7.05
		12	302-648-D	3.0	109	3.60	145	4.80	182	6.00	256	8.46
		2	302-708-D	27.5	165	0.60	221	0.80	276	1.00	333	1.21
		2 1/2	302-710-D	22.4	169	0.76	226	1.01	282	1.26	351	1.57
		3	302-712-D	19.0	171	0.90	228	1.20	284	1.50	360	1.89
		3 1/2	302-714-D	16.2	170	1.05	227	1.40	284	1.75	363	2.24
		4	302-716-D	14.0	169	1.20	225	1.61	281	2.01	357	2.55

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Raymond® ULTRA LIGHT DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS)												LIGHT GREEN
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 30% of free length		Load @ 40% of free length		Load @ 50% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
					Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
1 1/2	3/4	4 1/2	302-718-D	12.6	170	1.35	227	1.80	283	2.24	365	2.89
		5	302-720-D	11.2	168	1.50	224	2.00	280	2.50	360	3.22
		5 1/2	302-722-D	10.1	167	1.65	223	2.20	279	2.76	359	3.55
		6	302-724-D	9.3	166	1.80	221	2.39	277	2.99	356	3.85
		7	302-728-D	7.8	164	2.10	219	2.80	274	3.50	352	4.50
		8	302-732-D	7.0	168	2.40	225	3.20	281	4.00	366	5.22
		10	302-740-D	5.6	168	3.00	224	4.00	280	5.00	367	6.55
		12	302-748-D	4.7	171	3.60	228	4.80	285	6.00	377	7.95
2	1	2 1/2	302-810-D	49.3	372	0.76	497	1.01	621	1.26	778	1.58
		3	302-812-D	40.3	362	0.90	482	1.20	603	1.50	760	1.89
		3 1/2	302-814-D	34.1	359	1.05	479	1.40	598	1.75	758	2.22
		4	302-816-D	29.7	358	1.20	477	1.61	596	2.01	762	2.57
		4 1/2	302-818-D	26.3	354	1.35	473	1.80	591	2.24	760	2.89
		5	302-820-D	24.1	361	1.50	482	2.00	602	2.50	783	3.25
		5 1/2	302-822-D	21.8	361	1.65	481	2.20	601	2.76	787	3.61
		6	302-824-D	19.6	352	1.80	469	2.39	586	2.99	759	3.87
		7	302-828-D	16.8	353	2.10	471	2.80	588	3.50	767	4.57
		8	302-832-D	14.6	349	2.40	465	3.20	582	4.00	759	5.21
		10	302-840-D	11.8	353	3.00	470	4.00	588	5.00	778	6.61
		12	302-848-D	9.8	354	3.60	472	4.80	590	6.00	783	7.97

*Tabulated deflections shown represent near solid and are for design information only.

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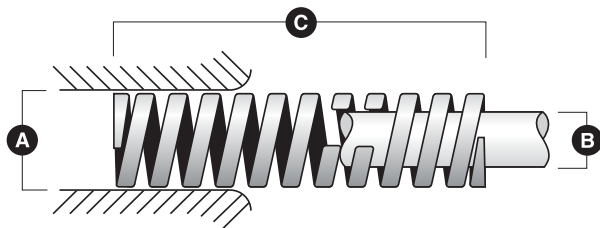
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ISO-D Series

Raymond® LIGHT DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS) GREEN

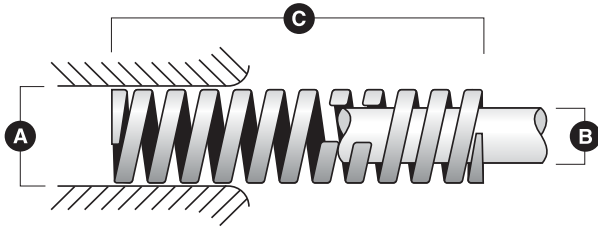
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 25% of free length		Load @ 30% of free length		Load @ 40% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
					Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
3/8	3/16	1	303-104-D	7.0	17	0.25	21	0.30	27	0.39	35	0.50
		1 1/4	303-105-D	5.7	18	0.31	21	0.38	29	0.50	39	0.68
		1 1/2	303-106-D	4.7	18	0.37	21	0.45	28	0.60	38	0.81
		1 3/4	303-107-D	3.7	16	0.43	19	0.52	25	0.69	35	0.95
		2	303-108-D	3.6	18	0.50	22	0.60	29	0.80	39	1.09
		2 1/2	303-110-D	3.0	19	0.63	23	0.76	30	1.01	45	1.48
		3	303-112-D	2.4	18	0.75	22	0.90	29	1.20	41	1.71
		12	303-148-D	0.6	18	3.00	21	3.60	29	4.80	41	6.93
1/2	9/32	1	303-204-D	10.6	26	0.25	31	0.30	42	0.39	66	0.62
		1 1/4	303-205-D	8.5	27	0.31	32	0.38	43	0.50	69	0.82
		1 1/2	303-206-D	7.3	27	0.37	33	0.45	44	0.60	72	0.99
		1 3/4	303-207-D	6.4	28	0.43	33	0.52	44	0.69	74	1.16
		2	303-208-D	5.3	27	0.50	32	0.60	43	0.80	71	1.33
		2 1/2	303-210-D	4.1	26	0.63	31	0.76	41	1.01	69	1.67
		3	303-212-D	3.4	25	0.75	30	0.90	40	1.20	66	1.96
		3 1/2	303-214-D	2.7	24	0.88	28	1.05	38	1.40	61	2.24
5/8	11/32	4	303-216-D	2.3	24	1.00	28	1.20	38	1.61	54	2.30
		12	303-248-D	0.8	23	3.00	28	3.60	37	4.80	60	7.75
		1	303-304-D	18.1	45	0.25	53	0.30	71	0.39	99	0.55
		1 1/4	303-305-D	13.3	42	0.31	50	0.38	67	0.50	92	0.69
		1 1/2	303-306-D	11.7	44	0.37	53	0.45	70	0.60	101	0.86
		1 3/4	303-307-D	10.2	44	0.43	53	0.52	71	0.69	104	1.02
		2	303-308-D	8.9	44	0.50	53	0.60	71	0.80	106	1.19
		2 1/2	303-310-D	7.2	46	0.63	55	0.76	73	1.01	111	1.54
3/4	3/8	3	303-312-D	5.7	43	0.75	51	0.90	68	1.20	100	1.76
		3 1/2	303-314-D	5.1	45	0.88	54	1.05	72	1.40	109	2.14
		4	303-316-D	4.3	43	1.00	52	1.20	70	1.61	109	2.52
		4 1/2	303-318-D	3.8	42	1.13	51	1.35	68	1.80	90	2.39
		12	303-348-D	1.5	44	3.00	53	3.60	70	4.80	109	7.44
		1	303-404-D	31.6	78	0.25	93	0.30	125	0.39	167	0.53
		1 1/4	303-405-D	24.8	78	0.31	94	0.38	125	0.50	173	0.70
		1 1/2	303-406-D	19.6	73	0.37	88	0.45	117	0.60	160	0.81
1	1/2	1 3/4	303-407-D	15.8	68	0.43	82	0.52	110	0.69	143	0.91
		2	303-408-D	14.2	71	0.50	86	0.60	114	0.80	133	0.93
		2 1/2	303-410-D	10.7	68	0.63	81	0.76	108	1.01	145	1.35
		3	303-412-D	9.2	69	0.75	82	0.90	110	1.20	150	1.63
		3 1/2	303-414-D	7.5	66	0.88	79	1.05	105	1.40	139	1.86
		4	303-416-D	6.8	68	1.00	82	1.20	109	1.61	150	2.21
		4 1/2	303-418-D	6.3	70	1.12	84	1.35	112	1.80	161	2.57
		5	303-420-D	5.4	67	1.25	81	1.50	107	2.00	149	2.78
		5 1/2	303-422-D	4.9	67	1.38	81	1.65	108	2.20	149	3.05
		6	303-424-D	4.3	64	1.50	77	1.80	103	2.39	138	3.19
		12	303-448-D	2.2	65	3.00	79	3.60	105	4.80	146	6.68
		1	303-504-D	58.9	145	0.25	174	0.30	232	0.39	306	0.52
		1 1/4	303-505-D	46.1	145	0.31	174	0.38	232	0.50	319	0.69
		1 1/2	303-506-D	36.9	138	0.37	165	0.45	221	0.60	300	0.81
		1 3/4	303-507-D	30.7	133	0.43	160	0.52	213	0.69	288	0.94
		2	303-508-D	26.2	131	0.50	158	0.60	210	0.80	283	1.08
		2 1/2	303-510-D	20.4	128	0.63	154	0.76	205	1.01	280	1.37
		3	303-512-D	16.3	122	0.75	146	0.90	195	1.20	259	1.59

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® LIGHT DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS) GREEN												
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 25% of free length		Load @ 30% of free length		Load @ 40% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
A	B	C			Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
1	1/2	3 1/2	303-514-D	14.1	124	0.88	149	1.05	198	1.40	268	1.90
		4	303-516-D	11.8	118	1.00	142	1.20	189	1.61	248	2.11
		4 1/2	303-518-D	10.6	119	1.12	143	1.35	190	1.80	257	2.42
		5	303-520-D	9.5	119	1.25	143	1.50	190	2.00	254	2.67
		5 1/2	303-522-D	8.3	115	1.38	137	1.65	183	2.20	234	2.81
		6	303-524-D	7.8	116	1.50	140	1.80	186	2.39	245	3.15
		7	303-528-D	6.7	118	1.75	141	2.10	189	2.80	252	3.75
		8	303-532-D	6.0	120	2.00	144	2.40	193	3.20	263	4.37
		12	303-548-D	3.9	116	3.00	139	3.60	185	4.80	247	6.40
1 1/4	5/8	1 1/2	303-606-D	52.4	196	0.37	235	0.45	314	0.60	501	0.96
		1 3/4	303-607-D	47.5	206	0.43	247	0.52	329	0.69	518	1.09
		2	303-608-D	40.3	202	0.50	243	0.60	324	0.80	515	1.28
		2 1/2	303-610-D	31.4	198	0.63	238	0.76	317	1.01	508	1.61
		3	303-612-D	26.1	195	0.75	234	0.90	312	1.20	502	1.93
		3 1/2	303-614-D	22.0	193	0.88	232	1.05	309	1.40	499	2.26
		4	303-616-D	19.3	193	1.00	232	1.20	309	1.61	504	2.61
		4 1/2	303-618-D	17.1	192	1.12	230	1.35	307	1.80	507	2.96
		5	303-620-D	14.7	184	1.25	221	1.50	295	2.00	473	3.20
		5 1/2	303-622-D	13.6	187	1.38	224	1.65	299	2.20	480	3.54
		6	303-624-D	12.4	185	1.50	222	1.80	297	2.39	480	3.87
		7	303-628-D	10.1	176	1.75	212	2.10	282	2.80	446	4.44
		8	303-632-D	8.9	178	2.00	214	2.40	285	3.20	455	5.10
10	303-640-D	7.2	180	2.50	216	3.00	288	4.00	464	6.45		
12	303-648-D	5.5	165	3.00	197	3.60	263	4.80	405	7.39		
1 1/2	3/4	2	303-708-D	59.7	300	0.50	360	0.60	480	0.80	592	0.99
		2 1/2	303-710-D	45.4	286	0.63	343	0.76	458	1.01	563	1.24
		3	303-712-D	38.0	284	0.75	341	0.90	455	1.20	567	1.49
		3 1/2	303-714-D	32.7	286	0.88	343	1.05	458	1.40	584	1.79
		4	303-716-D	27.7	278	1.00	334	1.20	446	1.61	561	2.02
		4 1/2	303-718-D	24.7	277	1.12	332	1.35	443	1.80	571	2.31
		5	303-720-D	22.4	280	1.25	336	1.50	448	2.00	576	2.57
		5 1/2	303-722-D	20.0	275	1.38	330	1.65	440	2.20	553	2.77
		6	303-724-D	18.1	271	1.50	325	1.80	434	2.39	548	3.02
		7	303-728-D	15.6	273	1.75	328	2.10	437	2.80	561	3.59
		8	303-732-D	13.4	268	2.00	321	2.40	428	3.20	542	4.05
		10	303-740-D	10.8	269	2.50	323	3.00	431	4.00	553	5.13
12	303-748-D	8.8	265	3.00	318	3.60	424	4.80	539	6.11		
2	1	2 1/2	303-810-D	84.8	534	0.63	641	0.76	855	1.01	1386	1.63
		3	303-812-D	71.5	535	0.75	641	0.90	855	1.20	1300	1.82
		3 1/2	303-814-D	59.7	523	0.88	627	1.05	836	1.40	1268	2.13
		4	303-816-D	51.6	518	1.00	622	1.20	829	1.61	1266	2.45
		4 1/2	303-818-D	44.9	504	1.12	605	1.35	806	1.80	1240	2.76
		5	303-820-D	40.2	502	1.25	603	1.50	804	2.00	1225	3.05
		5 1/2	303-822-D	36.0	496	1.38	596	1.65	794	2.20	1194	3.31
		6	303-824-D	32.5	486	1.50	583	1.80	778	2.39	1175	3.61
		7	303-828-D	27.8	486	1.75	584	2.10	778	2.80	1185	4.27
		8	303-832-D	23.9	477	2.00	572	2.40	763	3.20	1154	4.83
		10	303-840-D	20.4	509	2.50	611	3.00	814	4.00	1289	6.33
		12	303-848-D	15.3	459	3.00	550	3.60	734	4.80	1097	7.18
2 1/2	1 1/2	3	303-912-D	109.2	817	0.75	980	0.90	1307	1.20	1582	1.45
		3 1/2	303-914-D	89.9	788	0.88	945	1.05	1260	1.40	1526	1.70
		4	303-916-D	77.7	780	1.00	936	1.20	1248	1.61	1533	1.97
		4 1/2	303-918-D	67.4	757	1.12	908	1.35	1211	1.80	1495	2.22
		5	303-920-D	60.3	754	1.25	905	1.50	1207	2.00	1480	2.45
		6	303-924-D	49.3	738	1.50	885	1.80	1180	2.39	1448	2.94
		7	303-928-D	42.1	737	1.75	884	2.10	1179	2.80	1467	3.49
		8	303-932-D	36.1	721	2.00	866	2.40	1154	3.20	1423	3.94
		10	303-940-D	28.5	712	2.50	854	3.00	1139	4.00	1408	4.94
12	303-948-D	23.4	702	3.00	843	3.60	1124	4.80	1384	5.92		

*Tabulated deflections shown represent near solid and are for design information only.



ISO-D Series

Raymond® MEDIUM DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS) BLUE

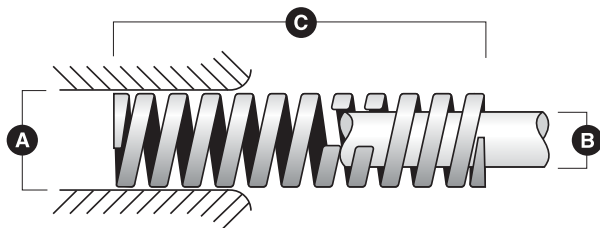
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 25% of free length		Load @ 30% of free length		Load @ 40% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
					Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
3/8	3/16	1	304-104-D	8.9	22	0.25	26	0.30	35	0.39	42	0.47
		1 1/4	304-105-D	7.7	24	0.31	29	0.38	39	0.50	52	0.68
		1 1/2	304-106-D	6.7	25	0.37	30	0.45	40	0.60	55	0.83
		1 3/4	304-107-D	5.5	24	0.43	28	0.52	38	0.69	51	0.93
		2	304-108-D	4.9	25	0.50	30	0.60	40	0.80	55	1.13
		2 1/2	304-110-D	3.8	24	0.63	29	0.76	38	1.01	52	1.39
		3	304-112-D	3.1	24	0.75	28	0.90	38	1.20	52	1.64
		12	304-148-D	0.8	23	3.00	28	3.60	37	4.80	51	6.67
1/2	9/32	1	304-204-D	16.8	41	0.25	50	0.30	66	0.39	84	0.50
		1 1/4	304-205-D	12.8	40	0.31	48	0.38	65	0.50	84	0.65
		1 1/2	304-206-D	10.7	40	0.37	48	0.45	64	0.60	84	0.78
		1 3/4	304-207-D	9.1	39	0.43	47	0.52	63	0.69	82	0.91
		2	304-208-D	7.8	39	0.50	47	0.60	63	0.80	83	1.06
		2 1/2	304-210-D	6.0	38	0.63	45	0.76	60	1.01	78	1.30
		3	304-212-D	5.0	37	0.75	44	0.90	59	1.20	76	1.54
		3 1/2	304-214-D	4.3	37	0.88	45	1.05	60	1.40	78	1.83
		4	304-216-D	3.6	36	1.00	43	1.20	58	1.60	74	2.06
		12	304-248-D	1.2	37	3.00	44	3.60	59	4.80	78	6.35
5/8	11/32	1	304-304-D	31.8	78	0.25	94	0.30	125	0.39	145	0.46
		1 1/4	304-305-D	22.8	72	0.31	86	0.38	115	0.50	128	0.56
		1 1/2	304-306-D	19.8	74	0.37	89	0.45	118	0.60	139	0.70
		1 3/4	304-307-D	17.5	76	0.43	91	0.52	121	0.69	147	0.84
		2	304-308-D	15.2	76	0.50	91	0.60	122	0.80	151	1.00
		2 1/2	304-310-D	11.9	75	0.63	90	0.76	120	1.01	149	1.25
		3	304-312-D	10.2	76	0.75	91	0.90	122	1.20	156	1.53
		3 1/2	304-314-D	8.6	75	0.88	90	1.05	120	1.40	153	1.78
		4	304-316-D	7.6	76	1.00	91	1.20	122	1.61	158	2.08
		4 1/2	304-318-D	6.7	76	1.13	91	1.35	121	1.80	141	2.09
		12	304-348-D	2.4	72	3.00	86	3.60	115	4.80	145	6.06
3/4	3/8	1	304-404-D	52.0	128	0.25	153	0.30	205	0.39	213	0.41
		1 1/4	304-405-D	38.8	122	0.31	147	0.38	195	0.50	205	0.53
		1 1/2	304-406-D	31.5	118	0.37	141	0.45	188	0.60	193	0.61
		1 3/4	304-407-D	26.6	115	0.43	138	0.52	185	0.69	189	0.71
		2	304-408-D	22.8	114	0.50	137	0.60	183	0.80	189	0.83
		2 1/2	304-410-D	17.6	111	0.63	133	0.76	177	1.01	180	1.02
		3	304-412-D	14.7	110	0.75	132	0.90	176	1.20	179	1.22
		3 1/2	304-414-D	12.6	110	0.88	133	1.05	177	1.40	184	1.46
		4	304-416-D	11.1	111	1.00	133	1.20	178	1.61	187	1.69
		4 1/2	304-418-D	9.7	110	1.13	132	1.36	176	1.81	184	1.89
		5	304-420-D	8.7	109	1.25	131	1.50	175	2.00	182	2.09
		5 1/2	304-422-D	8.1	110	1.37	132	1.64	176	2.19	187	2.32
		6	304-424-D	7.3	109	1.50	131	1.80	175	2.39	184	2.52
		12	304-448-D	3.7	110	3.00	132	3.60	176	4.80	190	5.20
1	1/2	1	304-504-D	97.9	241	0.25	289	0.30	385	0.39	385	0.39
		1 1/4	304-505-D	72.2	228	0.31	273	0.38	364	0.50	364	0.50
		1 1/2	304-506-D	59.5	223	0.37	267	0.45	356	0.60	361	0.61
		1 3/4	304-507-D	50.9	220	0.43	264	0.52	352	0.69	368	0.72
		2	304-508-D	42.6	214	0.50	256	0.60	342	0.80	354	0.83
		2 1/2	304-510-D	32.7	206	0.63	247	0.76	329	1.01	335	1.02
		3	304-512-D	28.0	209	0.75	251	0.90	335	1.20	353	1.26
		3 1/2	304-514-D	23.3	204	0.88	245	1.05	327	1.40	341	1.46

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® MEDIUM DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS)												BLUE
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 25% of free length		Load @ 30% of free length		Load @ 40% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
					Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
1	1/2	4	304-516-D	20.4	205	1.00	246	1.20	328	1.61	346	1.70
		4 1/2	304-518-D	18.1	205	1.13	246	1.36	327	1.81	349	1.93
		5	304-520-D	16.3	203	1.25	244	1.50	325	2.00	346	2.13
		5 1/2	304-522-D	15.0	205	1.37	246	1.64	329	2.19	355	2.37
		6	304-524-D	13.6	203	1.50	243	1.80	325	2.39	347	2.56
		7	304-528-D	11.5	201	1.75	242	2.10	322	2.80	344	2.99
		8	304-532-D	10.1	201	2.00	242	2.40	322	3.20	345	3.43
		12	304-548-D	6.6	198	3.00	238	3.60	317	4.80	338	5.12
1 1/4	5/8	1 1/2	304-606-D	95.3	356	0.37	428	0.45	570	0.60	653	0.69
		1 3/4	304-607-D	77.9	337	0.43	405	0.52	540	0.69	604	0.78
		2	304-608-D	66.4	333	0.50	400	0.60	533	0.80	606	0.91
		2 1/2	304-610-D	50.0	315	0.63	378	0.76	504	1.01	559	1.12
		3	304-612-D	40.5	303	0.75	363	0.90	485	1.20	524	1.30
		3 1/2	304-614-D	34.5	302	0.88	362	1.05	483	1.40	531	1.54
		4	304-616-D	29.4	296	1.00	355	1.20	473	1.61	514	1.74
		4 1/2	304-618-D	26.1	296	1.13	355	1.36	473	1.81	1116	4.27
		5	304-620-D	23.8	298	1.25	357	1.50	476	2.00	531	2.23
		5 1/2	304-622-D	21.6	295	1.37	355	1.64	473	2.19	525	2.43
		6	304-624-D	19.3	288	1.50	346	1.80	461	2.39	501	2.60
		7	304-628-D	16.5	290	1.75	347	2.10	463	2.80	510	3.09
1 1/2	3/4	8	304-632-D	14.2	284	2.00	341	2.40	454	3.20	491	3.46
		10	304-640-D	11.4	285	2.50	342	3.00	456	4.00	501	4.39
		12	304-648-D	9.5	286	3.00	343	3.60	458	4.80	507	5.32
		2	304-708-D	97.3	488	0.50	586	0.60	781	0.80	804	0.83
		2 1/2	304-710-D	73.5	463	0.63	556	0.76	741	1.01	749	1.02
		3	304-712-D	61.2	458	0.75	550	0.90	733	1.20	755	1.23
		3 1/2	304-714-D	50.9	446	0.88	535	1.05	713	1.40	725	1.43
		4	304-716-D	43.1	433	1.00	520	1.20	693	1.61	690	1.60
		4 1/2	304-718-D	38.2	432	1.13	518	1.36	691	1.81	694	1.82
		5	304-720-D	34.8	435	1.25	522	1.50	696	2.00	714	2.05
		5 1/2	304-722-D	31.6	432	1.37	519	1.64	692	2.19	709	2.24
		6	304-724-D	29.0	434	1.50	521	1.80	694	2.39	722	2.49
2	1	7	304-728-D	24.6	430	1.75	516	2.10	688	2.80	716	2.91
		8	304-732-D	21.3	426	2.00	512	2.40	682	3.20	706	3.31
		10	304-740-D	17.2	429	2.50	515	3.00	687	4.00	725	4.22
		12	304-748-D	14.1	424	3.00	509	3.60	679	4.80	712	5.04
		2 1/2	304-810-D	121.0	762	0.63	914	0.76	1219	1.01	1329	1.10
		3	304-812-D	94.9	710	0.75	852	0.90	1136	1.20	1181	1.24
		3 1/2	304-814-D	79.6	697	0.88	837	1.05	1116	1.40	1166	1.46
		4	304-816-D	69.3	696	1.00	835	1.20	1113	1.61	1184	1.71
		4 1/2	304-818-D	61.1	691	1.13	830	1.36	1106	1.81	1188	1.94
		5	304-820-D	54.1	676	1.25	812	1.50	1082	2.00	1144	2.11
		5 1/2	304-822-D	49.4	675	1.37	810	1.64	1080	2.19	1150	2.33
		6	304-824-D	44.7	669	1.50	803	1.80	1070	2.39	1135	2.54
2 1/2	1 1/2	7	304-828-D	37.6	659	1.75	791	2.10	1054	2.80	1114	2.96
		8	304-832-D	32.6	652	2.00	783	2.40	1043	3.20	1097	3.36
		9	304-836-D	29.0	654	2.25	785	2.70	1047	3.61	1116	3.84
		10	304-840-D	26.2	656	2.50	788	3.00	1050	4.00	1130	4.30
		12	304-848-D	21.6	650	3.00	780	3.60	1040	4.80	1115	5.15
		3	304-912-D	173.3	1297	0.75	1556	0.90	2074	1.20	2293	1.32
		3 1/2	304-914-D	141.3	1238	0.88	1485	1.05	1980	1.40	2170	1.54
		4	304-916-D	120.4	1208	1.00	1450	1.20	1933	1.61	2128	1.77
		4 1/2	304-918-D	104.8	1187	1.13	1424	1.36	1899	1.81	2097	2.00
		5	304-920-D	92.8	1161	1.25	1393	1.50	1857	2.00	2033	2.19
		6	304-924-D	75.6	1131	1.50	1357	1.80	1809	2.39	1976	2.61
		7	304-928-D	63.4	1111	1.75	1333	2.10	1778	2.80	1940	3.06
2 1/2	1 1/2	8	304-932-D	55.3	1105	2.00	1326	2.40	1768	3.20	1947	3.52
		9	304-936-D	49.0	1106	2.25	1327	2.70	1769	3.61	1970	4.02
		10	304-940-D	44.2	1105	2.50	1326	3.00	1769	4.00	1986	4.49
		12	304-948-D	36.6	1099	3.00	1319	3.60	1759	4.80	1990	5.43

*Tabulated deflections shown represent near solid and are for design information only.



ISO-D Series

Raymond®

HEAVY DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS)

RED

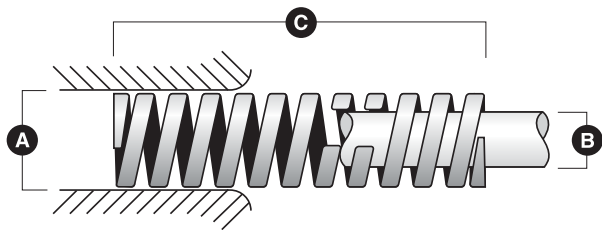
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 20% of free length		Load @ 25% of free length		Load @ 30% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
					Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
3/8	3/16	1	305-104-D	13.3	26	0.20	33	0.25	39	0.30	50	0.37
		1 1/4	305-105-D	10.2	26	0.25	32	0.31	39	0.38	50	0.48
		1 1/2	305-106-D	9.5	28	0.30	35	0.37	43	0.45	63	0.66
		1 3/4	305-107-D	8.3	29	0.35	36	0.43	43	0.52	65	0.78
		2	305-108-D	6.8	27	0.40	34	0.50	41	0.60	60	0.87
		2 1/2	305-110-D	5.6	28	0.50	35	0.63	43	0.76	65	1.16
		3	305-112-D	4.5	27	0.60	34	0.75	40	0.90	59	1.30
		12	305-148-D	1.1	26	2.40	33	3.00	40	3.60	58	5.30
1/2	9/32	1	305-204-D	24.2	48	0.20	60	0.25	71	0.30	107	0.44
		1 1/4	305-205-D	18.2	46	0.25	57	0.31	69	0.38	102	0.56
		1 1/2	305-206-D	15.4	46	0.30	58	0.37	69	0.45	107	0.69
		1 3/4	305-207-D	13.6	47	0.35	59	0.43	71	0.52	112	0.83
		2	305-208-D	11.4	46	0.40	57	0.50	69	0.60	108	0.94
		2 1/2	305-210-D	8.7	44	0.50	55	0.63	66	0.76	100	1.15
		3	305-212-D	7.7	46	0.60	57	0.75	69	0.90	112	1.46
		3 1/2	305-214-D	6.3	44	0.70	55	0.88	66	1.05	104	1.65
		4 1/2	305-216-D	4.8	43	0.90	54	1.13	65	1.35	82	1.72
		12	305-248-D	1.8	43	2.40	54	3.00	65	3.60	103	5.72
5/8	11/32	1	305-304-D	44.5	88	0.20	110	0.25	131	0.30	167	0.37
		1 1/4	305-305-D	34.8	88	0.25	110	0.31	132	0.38	177	0.51
		1 1/2	305-306-D	29.0	87	0.30	108	0.37	130	0.45	177	0.61
		1 3/4	305-307-D	26.0	90	0.35	113	0.43	135	0.52	196	0.76
		2	305-308-D	21.1	85	0.40	106	0.50	127	0.60	175	0.83
		2 1/2	305-310-D	16.8	85	0.50	106	0.63	127	0.76	179	1.07
		3	305-312-D	14.7	88	0.60	110	0.75	132	0.90	197	1.34
		3 1/2	305-314-D	12.5	87	0.70	109	0.88	131	1.05	197	1.58
		4	305-316-D	10.8	87	0.80	108	1.00	130	1.20	196	1.81
		4 1/2	305-318-D	9.0	81	0.90	101	1.13	121	1.35	155	1.73
		12	305-348-D	3.5	84	2.40	105	3.00	127	3.60	191	5.43
3/4	3/8	1	305-404-D	125.1	246	0.20	308	0.25	370	0.30	389	0.31
		1 1/4	305-405-D	97.8	247	0.25	308	0.31	370	0.38	424	0.43
		1 1/2	305-406-D	78.0	233	0.30	292	0.37	350	0.45	387	0.50
		1 3/4	305-407-D	66.4	230	0.35	288	0.43	345	0.52	384	0.58
		2	305-408-D	55.2	222	0.40	277	0.50	332	0.60	356	0.65
		2 1/2	305-410-D	42.4	214	0.50	267	0.63	320	0.76	334	0.79
		3	305-412-D	35.9	215	0.60	268	0.75	322	0.90	347	0.97
		3 1/2	305-414-D	30.7	215	0.70	269	0.88	323	1.05	358	1.17
		4	305-416-D	26.6	213	0.80	267	1.00	320	1.20	354	1.33
		4 1/2	305-418-D	23.9	217	0.91	271	1.13	325	1.36	373	1.56
		5	305-420-D	21.3	213	1.00	266	1.25	320	1.50	359	1.69
		5 1/2	305-422-D	19.3	212	1.09	265	1.37	318	1.64	350	1.81
		6	305-424-D	17.6	211	1.20	264	1.50	317	1.80	354	2.01
		12	305-448-D	8.7	208	2.40	261	3.00	313	3.60	353	4.06
1	1/2	1	305-504-D	212.1	417	0.20	522	0.25	626	0.30	635	0.30
		1 1/4	305-505-D	160.3	404	0.25	505	0.31	606	0.38	650	0.41
		1 1/2	305-506-D	125.3	375	0.30	469	0.37	562	0.45	562	0.45
		1 3/4	305-507-D	114.9	398	0.35	498	0.43	597	0.52	697	0.61
		2	305-508-D	93.1	374	0.40	468	0.50	561	0.60	612	0.66
		2 1/2	305-510-D	72.6	366	0.50	457	0.63	548	0.76	603	0.83
		3	305-512-D	61.3	367	0.60	458	0.75	550	0.90	627	1.02
		3 1/2	305-514-D	51.4	360	0.70	451	0.88	541	1.05	612	1.19

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® HEAVY DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS)												RED
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 20% of free length		Load @ 25% of free length		Load @ 30% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
A	B	C			Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
1	1/2	4	305-516-D	44.7	359	0.80	449	1.00	539	1.20	618	1.38
		4 1/2	305-518-D	40.3	365	0.91	456	1.13	548	1.36	654	1.62
		5	305-520-D	36.1	361	1.00	451	1.25	541	1.50	639	1.77
		5 1/2	305-522-D	32.8	359	1.09	449	1.37	539	1.64	637	1.94
		6	305-524-D	30.3	363	1.20	453	1.50	544	1.80	658	2.17
		7	305-528-D	25.8	362	1.40	452	1.75	543	2.10	662	2.56
		8	305-532-D	22.5	360	1.60	450	2.00	540	2.40	658	2.92
		12	305-548-D	15.3	367	2.40	459	3.00	550	3.60	705	4.61
1 1/4	5/8	1 1/2	305-606-D	221.1	662	0.30	827	0.37	992	0.45	1097	0.50
		1 3/4	305-607-D	178.7	619	0.35	774	0.43	929	0.52	978	0.55
		2	305-608-D	152.7	613	0.40	767	0.50	920	0.60	1004	0.66
		2 1/2	305-610-D	116.7	588	0.50	735	0.63	882	0.76	955	0.82
		3	305-612-D	98.0	587	0.60	733	0.75	880	0.90	980	1.00
		3 1/2	305-614-D	80.8	566	0.70	708	0.88	849	1.05	922	1.14
		4	305-616-D	70.6	567	0.80	709	1.00	850	1.20	948	1.34
		4 1/2	305-618-D	62.7	568	0.91	710	1.13	851	1.36	967	1.54
		5	305-620-D	56.4	564	1.00	705	1.25	846	1.50	963	1.71
		5 1/2	305-622-D	50.9	557	1.09	696	1.37	836	1.64	942	1.85
		6	305-624-D	46.7	559	1.20	698	1.50	838	1.80	957	2.05
		7	305-628-D	39.5	554	1.40	693	1.75	831	2.10	949	2.40
		8	305-632-D	34.6	554	1.60	692	2.00	831	2.40	959	2.77
		10	305-640-D	27.6	553	2.00	691	2.50	829	3.00	968	3.50
		12	305-648-D	22.9	551	2.40	689	3.00	827	3.60	970	4.23
1 1/2	3/4	2	305-708-D	212.2	852	0.40	1065	0.50	1278	0.60	1404	0.66
		2 1/2	305-710-D	171.3	863	0.50	1079	0.63	1295	0.76	1565	0.91
		3	305-712-D	133.4	798	0.60	998	0.75	1197	0.90	1334	1.00
		3 1/2	305-714-D	112.5	788	0.70	986	0.88	1183	1.05	1342	1.19
		4	305-716-D	97.3	781	0.80	977	1.00	1172	1.20	1344	1.38
		4 1/2	305-718-D	88.9	805	0.91	1007	1.13	1208	1.36	1485	1.67
		5	305-720-D	78.5	785	1.00	981	1.25	1177	1.50	1409	1.80
		5 1/2	305-722-D	70.5	771	1.09	964	1.37	1157	1.64	1362	1.93
		6	305-724-D	65.3	782	1.20	977	1.50	1172	1.80	1427	2.19
		7	305-728-D	55.2	774	1.40	968	1.75	1162	2.10	1416	2.56
		8	305-732-D	48.4	773	1.60	967	2.00	1160	2.40	1429	2.95
		10	305-740-D	38.6	772	2.00	965	2.50	1158	3.00	1445	3.74
		12	305-748-D	32.1	771	2.40	963	3.00	1156	3.60	1456	4.54
2	1	2 1/2	305-810-D	242.3	1221	0.50	1526	0.63	1831	0.76	2203	0.91
		3	305-812-D	191.3	1145	0.60	1431	0.75	1718	0.90	1981	1.04
		3 1/2	305-814-D	158.1	1108	0.70	1385	0.88	1662	1.05	1892	1.20
		4	305-816-D	139.8	1123	0.80	1404	1.00	1685	1.20	2020	1.44
		4 1/2	305-818-D	122.5	1110	0.91	1387	1.13	1665	1.36	2007	1.64
		5	305-820-D	108.0	1080	1.00	1350	1.25	1620	1.50	1901	1.76
		5 1/2	305-822-D	96.5	1056	1.09	1321	1.37	1585	1.64	1816	1.88
		6	305-824-D	88.0	1053	1.20	1316	1.50	1579	1.80	1825	2.07
		7	305-828-D	74.7	1047	1.40	1309	1.75	1571	2.10	1835	2.46
		8	305-832-D	65.7	1050	1.60	1313	2.00	1575	2.40	1878	2.86
		10	305-840-D	51.7	1034	2.00	1292	2.50	1551	3.00	1838	3.56
				12	305-848-D	43.1	1035	2.40	1294	3.00	1553	3.60
2 1/2	1 1/2	3	305-912-D	352.9	2112	0.60	2640	0.75	-	-	3176	0.90
		3 1/2	305-914-D	294.1	2061	0.70	2576	0.88	-	-	3088	1.05
		4	305-916-D	250.1	2009	0.80	2511	1.00	-	-	3001	1.20
		4 1/2	305-918-D	211.3	1896	0.90	2371	1.12	-	-	2852	1.35
		5	305-920-D	190.1	1901	1.00	2377	1.25	-	-	2852	1.50
		6	305-924-D	153.6	1838	1.20	2298	1.50	-	-	2765	1.80
		7	305-928-D	129.0	1809	1.40	2261	1.75	-	-	2710	2.10
		8	305-932-D	113.1	1807	1.60	2259	2.00	-	-	2713	2.40
		9	305-936-D	82.0	1476	1.80	1845	2.25	-	-	2214	2.70
		10	305-940-D	88.5	1770	2.00	2213	2.50	-	-	2655	3.00
		12	305-948-D	73.1	1755	2.40	2194	3.00	-	-	2633	3.60

*Tabulated deflections shown represent near solid and are for design information only.



ISO-D Series

Raymond®

EXTRA HEAVY DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS)

YELLOW

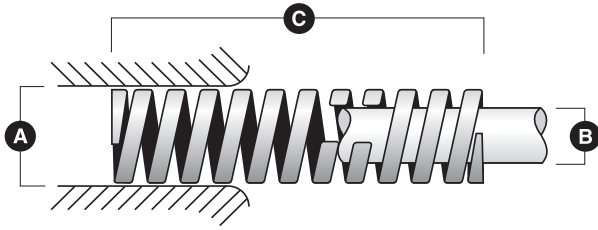
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 17% of free length		Load @ 20% of free length		Load @ 25% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
					Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
3/8	3/16	1	306-104-D	20.8	35	0.17	41	0.20	51	0.25	61	0.29
		1 1/4	306-105-D	15.7	34	0.21	40	0.25	49	0.31	57	0.37
		1 1/2	306-106-D	13.3	34	0.25	40	0.30	50	0.37	60	0.45
		1 3/4	306-107-D	11.2	33	0.29	39	0.35	49	0.43	57	0.51
		2	306-108-D	9.6	33	0.34	39	0.40	48	0.50	57	0.59
		2 1/2	306-110-D	7.6	33	0.43	38	0.50	48	0.63	57	0.76
		3	306-112-D	6.4	32	0.51	38	0.60	48	0.75	58	0.91
		12	306-148-D	1.6	32	2.04	37	2.40	47	3.00	58	3.71
1/2	9/32	1	306-204-D	31.2	52	0.17	61	0.20	77	0.25	109	0.35
		1 1/4	306-205-D	24.2	52	0.21	61	0.25	76	0.31	121	0.50
		1 1/2	306-206-D	19.7	50	0.25	59	0.30	74	0.37	108	0.55
		1 3/4	306-207-D	15.9	47	0.29	55	0.35	69	0.43	103	0.65
		2	306-208-D	14.4	49	0.34	58	0.40	72	0.50	107	0.74
		2 1/2	306-210-D	11.4	49	0.43	57	0.50	72	0.63	107	0.94
		3	306-212-D	9.5	48	0.51	57	0.60	71	0.75	106	1.12
		3 1/2	306-214-D	8.0	48	0.60	56	0.70	70	0.88	104	1.30
		4	306-216-D	7.3	49	0.68	58	0.80	73	1.00	103	1.42
		12	306-248-D	2.2	45	2.04	53	2.40	66	3.00	93	4.24
5/8	11/32	1	306-304-D	77.8	130	0.17	153	0.20	191	0.25	242	0.31
		1 1/4	306-305-D	56.6	121	0.21	143	0.25	178	0.31	216	0.38
		1 1/2	306-306-D	47.3	120	0.25	141	0.30	177	0.37	221	0.47
		1 3/4	306-307-D	40.4	119	0.29	140	0.35	175	0.43	221	0.55
		2	306-308-D	34.6	118	0.34	139	0.40	174	0.50	223	0.65
		2 1/2	306-310-D	27.4	118	0.43	138	0.50	173	0.63	229	0.83
		3	306-312-D	22.8	116	0.51	136	0.60	170	0.75	224	0.98
		3 1/2	306-314-D	19.5	116	0.60	137	0.70	171	0.88	232	1.19
		4	306-316-D	16.8	115	0.68	135	0.80	169	1.00	226	1.34
		4 1/2	306-318-D	15.1	115	0.77	136	0.90	170	1.13	264	1.75
		12	306-348-D	5.6	114	2.04	134	2.40	168	3.00	234	4.19
3/4	3/8	1	306-404-D	186.4	302	0.17	356	0.20	445	0.25	448	0.24
		1 1/4	306-405-D	139.8	290	0.21	341	0.25	427	0.31	451	0.32
		1 1/2	306-406-D	113.7	280	0.25	330	0.30	412	0.37	434	0.38
		1 3/4	306-407-D	97.2	270	0.29	318	0.35	398	0.43	444	0.46
		2	306-408-D	83.9	270	0.34	318	0.40	397	0.50	466	0.56
		2 1/2	306-410-D	65.5	265	0.43	311	0.50	389	0.63	461	0.70
		3	306-412-D	53.7	258	0.51	303	0.60	379	0.75	440	0.82
		3 1/2	306-414-D	44.8	252	0.60	296	0.70	370	0.88	416	0.93
		4	306-416-D	38.9	251	0.68	295	0.80	369	1.00	420	1.08
		4 1/2	306-418-D	34.4	250	0.77	294	0.91	368	1.13	409	1.19
		5	306-420-D	30.9	248	0.85	291	1.00	364	1.25	413	1.34
		5 1/2	306-422-D	27.7	243	0.93	286	1.09	357	1.37	401	1.45
		6	306-424-D	25.4	243	1.02	286	1.20	358	1.50	395	1.56
		12	306-448-D	12.6	242	2.04	284	2.40	355	3.00	408	3.25
1	1/2	1	306-504-D	262.1	446	0.17	524	0.20	655	0.25	753	0.29
		1 1/4	306-505-D	198.8	426	0.21	501	0.25	626	0.31	767	0.39
		1 1/2	306-506-D	158.3	403	0.25	474	0.30	592	0.37	704	0.44
		1 3/4	306-507-D	134.9	397	0.29	467	0.35	584	0.43	717	0.53
		2	306-508-D	112.4	384	0.34	451	0.40	564	0.50	677	0.60
		2 1/2	306-510-D	88.6	380	0.43	447	0.50	558	0.63	698	0.79
		3	306-512-D	73.9	376	0.51	442	0.60	552	0.75	701	0.95
		3 1/2	306-514-D	62.0	370	0.60	435	0.70	543	0.88	686	1.11

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® EXTRA HEAVY DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS)												YELLOW
Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 17% of free length		Load @ 20% of free length		Load @ 25% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
					Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
1	1/2	4	306-516-D	54.4	372	0.68	437	0.80	546	1.00	711	1.31
		4 1/2	306-518-D	48.5	373	0.77	439	0.91	549	1.13	731	1.51
		5	306-520-D	43.6	370	0.85	436	1.00	545	1.25	724	1.66
		5 1/2	306-522-D	39.6	368	0.93	433	1.09	541	1.37	718	1.81
		6	306-524-D	36.2	369	1.02	434	1.20	542	1.50	728	2.01
		7	306-528-D	31.1	371	1.19	437	1.40	546	1.75	752	2.41
		8	306-532-D	27.2	370	1.36	435	1.60	544	2.00	751	2.76
		12	306-548-D	18.0	367	2.04	432	2.40	540	3.00	754	4.19
1 1/4	5/8	1 1/2	306-606-D	273.1	695	0.25	817	0.30	1022	0.37	1118	0.41
		1 3/4	306-607-D	239.8	706	0.29	831	0.35	1039	0.43	1199	0.50
		2	306-608-D	200.7	685	0.34	806	0.40	1007	0.50	1177	0.59
		2 1/2	306-610-D	156.1	669	0.43	787	0.50	983	0.63	1186	0.76
		3	306-612-D	129.4	658	0.51	774	0.60	968	0.75	1192	0.92
		3 1/2	306-614-D	110.5	658	0.60	774	0.70	968	0.88	1240	1.12
		4	306-616-D	92.8	633	0.68	745	0.80	931	1.00	1136	1.22
		4 1/2	306-618-D	82.6	636	0.77	748	0.91	935	1.13	1178	1.43
		5	306-620-D	75.6	643	0.85	756	1.00	946	1.25	1233	1.63
		5 1/2	306-622-D	67.8	631	0.93	742	1.09	928	1.37	1183	1.74
		6	306-624-D	62.2	633	1.02	745	1.20	931	1.50	1210	1.94
		7	306-628-D	52.4	625	1.19	735	1.40	919	1.75	1185	2.26
1 1/2	3/4	8	306-632-D	45.9	624	1.36	735	1.60	918	2.00	1198	2.61
		10	306-640-D	36.7	624	1.70	734	2.00	917	2.50	1218	3.32
		12	306-648-D	30.5	622	2.04	732	2.40	915	3.00	1224	4.02
		2	306-708-D	336.1	1147	0.34	1350	0.40	1687	0.50	1932	0.57
		2 1/2	306-710-D	258.6	1108	0.43	1303	0.50	1629	0.63	1863	0.72
		3	306-712-D	213.4	1086	0.51	1277	0.60	1597	0.75	1865	0.87
		3 1/2	306-714-D	179.3	1068	0.60	1256	0.70	1570	0.88	1863	1.04
		4	306-716-D	156.3	1067	0.68	1256	0.80	1570	1.00	1927	1.23
		4 1/2	306-718-D	138.6	1067	0.77	1255	0.91	1569	1.13	1976	1.43
		5	306-720-D	124.5	1058	0.85	1245	1.00	1556	1.25	1966	1.58
		5 1/2	306-722-D	112.0	1042	0.93	1226	1.09	1533	1.37	1910	1.70
		6	306-724-D	102.6	1044	1.02	1228	1.20	1536	1.50	1948	1.90
2	1	7	306-728-D	86.7	1033	1.19	1216	1.40	1520	1.75	1933	2.23
		8	306-732-D	75.7	1029	1.36	1211	1.60	1514	2.00	1939	2.56
		10	306-740-D	60.3	1025	1.70	1206	2.00	1507	2.50	1961	3.25
		12	306-748-D	50.2	1024	2.04	1205	2.40	1506	3.00	1985	3.96
		2 1/2	306-810-D	383.4	1642	0.43	1932	0.50	2415	0.63	3245	0.85
		3	306-812-D	306.7	1560	0.51	1835	0.60	2294	0.75	3019	0.98
		3 1/2	306-814-D	257.6	1535	0.60	1806	0.70	2257	0.88	3023	1.17
		4	306-816-D	222.1	1516	0.68	1784	0.80	2230	1.00	3034	1.37
		4 1/2	306-818-D	195.2	1502	0.77	1767	0.91	2209	1.13	3043	1.56
		5	306-820-D	174.1	1480	0.85	1741	1.00	2176	1.25	2974	1.71
		5 1/2	306-822-D	157.1	1462	0.93	1719	1.09	2149	1.37	2926	1.86
		6	306-824-D	143.1	1456	1.02	1713	1.20	2141	1.50	2936	2.05
2 1/2	1 1/2	7	306-828-D	119.3	1421	1.19	1672	1.40	2090	1.75	2808	2.35
		8	306-832-D	105.6	1435	1.36	1688	1.60	2110	2.00	2935	2.78
		10	306-840-D	83.6	1422	1.70	1673	2.00	2091	2.50	2931	3.50
		12	306-848-D	68.5	1399	2.04	1646	2.40	2057	3.00	2843	4.15
		3	306-912-D	544	2765	0.51	3253	0.60	-	-	3681	0.68
		3 1/2	306-914-D	468	2786	0.60	3277	0.70	-	-	3881	0.83
		4	306-916-D	400	2729	0.68	3210	0.80	-	-	3791	0.95
		4 1/2	306-918-D	354	2701	0.76	3178	0.90	-	-	3801	1.07
		5	306-920-D	323	2742	0.85	3226	1.00	-	-	4181	1.30
		6	306-924-D	262	2660	1.02	3130	1.20	-	-	3845	1.47
		7	306-928-D	219	2612	1.19	3073	1.40	-	-	3627	1.65
		8	306-932-D	192	2614	1.36	3076	1.60	-	-	3686	1.92
		10	306-940-D	150	2553	1.70	3003	2.00	-	-	3501	2.33
		12	306-948-D	124	2541	2.04	2989	2.40	-	-	3493	2.81

*Tabulated deflections shown represent near solid and are for design information only.



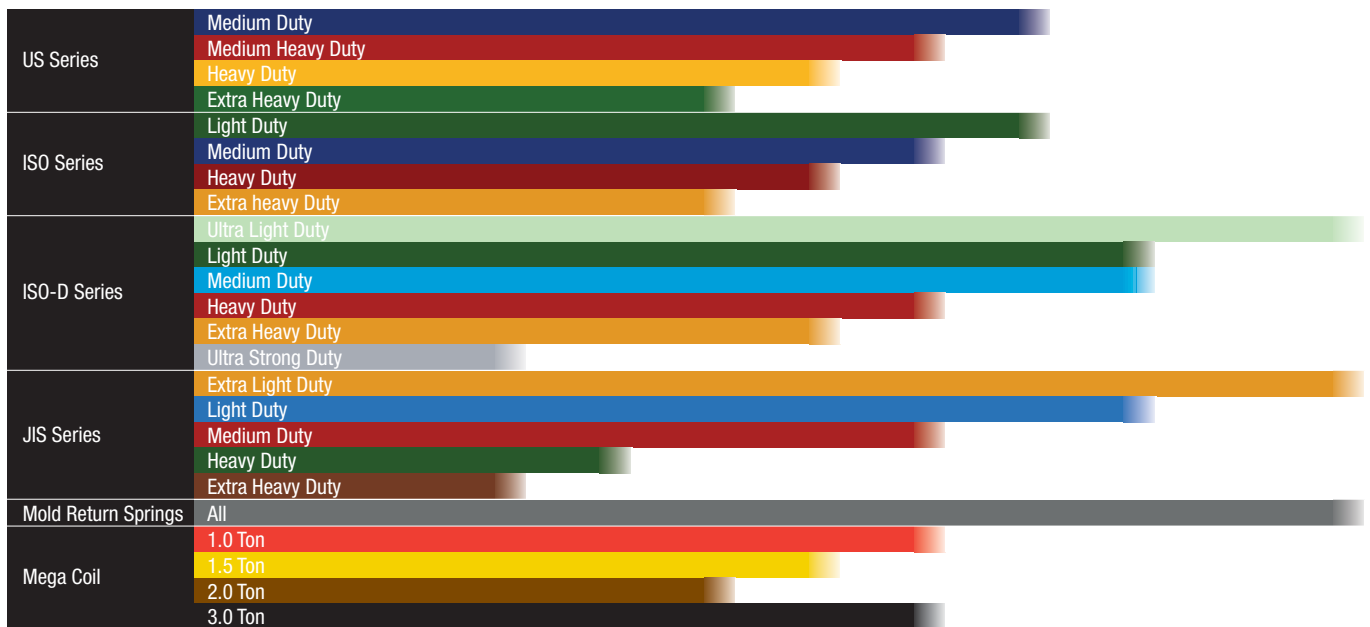
ISO-D Series

Raymond® ULTRA STRONG DUTY ISO D-LINE SPRINGS (INCH DIMENSIONS) GRAY

Hole Dia. (in)	Rod Dia. (in)	Free Length (in)	CATALOG NUMBER	Spring Rate per 1/10 Inch Deflection	LOAD DEFLECTION TABLE							
					Load @ 10% of free length		Load @ 13.5% of free length		Load @ 15% of free length		Load @ Max Recommended Deflection	Max Deflection (in)
					Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)		
1	1/2	2 1/2	307-510-D	367.7	927	0.25	1251	0.34	1390	0.38	1882	0.51
		3	307-512-D	317.5	950	0.30	1282	0.40	1425	0.45	2000	0.63
		3 1/2	307-514-D	263.8	924	0.35	1248	0.47	1387	0.53	2077	0.79
		4	307-516-D	222.7	894	0.40	1207	0.54	1341	0.60	2017	0.91
		4 1/2	307-518-D	205.6	931	0.45	1256	0.61	1396	0.68	2104	1.02
		5	307-520-D	186.1	931	0.50	1256	0.68	1396	0.75	2052	1.10
		6	307-524-D	145.6	871	0.60	1176	0.81	1307	0.90	1949	1.34
		7	307-528-D	131.3	920	0.70	1242	0.95	1381	1.05	2017	1.54
		8	307-532-D	115.3	922	0.80	1244	1.08	1383	1.20	2044	1.77
1 1/4	5/8	12	307-548-D	77.7	932	1.20	1259	1.62	1399	1.80	1926	2.48
		2 1/2	307-610-D	615.0	1550	0.25	2092	0.34	2324	0.38	3148	0.51
		3	307-612-D	499.1	1493	0.30	2016	0.40	2240	0.45	3144	0.63
		3 1/2	307-614-D	411.7	1443	0.35	1947	0.47	2164	0.53	3242	0.79
		4	307-616-D	354.0	1422	0.40	1919	0.54	2132	0.60	3206	0.91
		4 1/2	307-618-D	319.8	1448	0.45	1954	0.61	2172	0.68	3273	1.02
		5	307-620-D	283.2	1416	0.50	1912	0.68	2124	0.75	3122	1.10
		6	307-624-D	233.0	1394	0.60	1882	0.81	2091	0.90	3119	1.34
		7	307-628-D	201.6	1413	0.70	1907	0.95	2119	1.05	3095	1.54
1 1/2	3/4	8	307-632-D	173.6	1387	0.80	1873	1.08	2081	1.20	3076	1.77
		10	307-640-D	138.8	1388	1.00	1873	1.35	2081	1.50	3387	2.44
		12	307-648-D	111.9	1344	1.20	1814	1.62	2016	1.80	3305	2.95
		3 1/2	307-714-D	502.5	1761	0.35	2377	0.47	2641	0.53	3957	0.79
		4	307-716-D	435.1	1747	0.40	2359	0.54	2621	0.60	3940	0.91
		4 1/2	307-718-D	387.7	1755	0.45	2370	0.61	2633	0.68	3969	1.02
		5	307-720-D	355.2	1776	0.50	2397	0.68	2664	0.75	3915	1.10
		6	307-724-D	290.6	1739	0.60	2348	0.81	2609	0.90	4120	1.42
		7	307-728-D	245.0	1717	0.70	2317	0.95	2575	1.05	4147	1.69
2	1	8	307-732-D	213.6	1707	0.80	2304	1.08	2560	1.20	4120	1.93
		10	307-740-D	169.0	1690	1.00	2282	1.35	2535	1.50	4126	2.44
		12	307-748-D	140.5	1687	1.20	2277	1.62	2530	1.80	4148	2.95
		3 1/2	307-814-D	805.1	2821	0.35	3808	0.47	4232	0.53	6023	0.75
		4	307-816-D	693.8	2786	0.40	3761	0.54	4179	0.60	6009	0.87
		4 1/2	307-818-D	614.4	2782	0.45	3755	0.61	4173	0.68	6048	0.98
		5	307-820-D	552.7	2764	0.50	3731	0.68	4145	0.75	6094	1.10
		6	307-824-D	460.2	2754	0.60	3718	0.81	4131	0.90	6161	1.34
		7	307-828-D	398.6	2793	0.70	3771	0.95	4190	1.05	6277	1.57
		8	307-832-D	349.5	2793	0.80	3770	1.08	4189	1.20	6192	1.77
		10	307-840-D	269.5	2695	1.00	3638	1.35	4043	1.50	6155	2.28
		12	307-848-D	221.5	2660	1.20	3591	1.62	3990	1.80	6106	2.76

*Tabulated deflections shown represent near solid and are for design information only.

Deflection to Compressed Length Conversion Tables



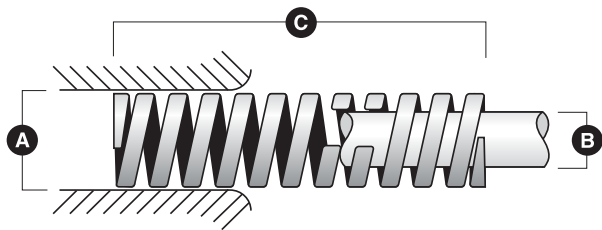
Raymond® DEFLECTION IN % FREE LENGTH (INCH DIMENSIONS)											
Free Length (in)	10%	13.50%	15%	17%	20%	25%	30%	35%	40%	45%	50%
1	0.90	0.87	0.85	0.83	0.80	0.75	0.70	0.65	0.60	0.55	0.50
1.25	1.13	1.08	1.06	1.04	1.00	0.94	0.88	0.81	0.75	0.69	0.63
1.5	1.35	1.30	1.28	1.25	1.20	1.13	1.05	0.98	0.90	0.83	0.75
1.75	1.58	1.51	1.49	1.45	1.40	1.31	1.23	1.14	1.05	0.96	0.88
2	1.80	1.73	1.70	1.66	1.60	1.50	1.40	1.30	1.20	1.10	1.00
2.5	2.25	2.16	2.13	2.08	2.00	1.88	1.75	1.63	1.50	1.38	1.25
3	2.70	2.60	2.55	2.49	2.40	2.25	2.10	1.95	1.80	1.65	1.50
3.5	3.15	3.03	2.98	2.91	2.80	2.63	2.45	2.28	2.10	1.93	1.75
4	3.60	3.46	3.40	3.32	3.20	3.00	2.80	2.60	2.40	2.20	2.00
4.5	4.05	3.89	3.83	3.74	3.60	3.38	3.15	2.93	2.70	2.48	2.25
5	4.50	4.33	4.25	4.15	4.00	3.75	3.50	3.25	3.00	2.75	2.50
5.5	4.95	4.76	4.68	4.57	4.40	4.13	3.85	3.58	3.30	3.03	2.75
6	5.40	5.19	5.10	4.98	4.80	4.50	4.20	3.90	3.60	3.30	3.00
6.5	5.85	5.62	5.53	5.40	5.20	4.88	4.55	4.23	3.90	3.58	3.25
7	6.30	6.06	5.95	5.81	5.60	5.25	4.90	4.55	4.20	3.85	3.50
7.5	6.75	6.49	6.38	6.23	6.00	5.63	5.25	4.88	4.50	4.13	3.75
8	7.20	6.92	6.80	6.64	6.40	6.00	5.60	5.20	4.80	4.40	4.00
10	9.00	8.65	8.50	8.30	8.00	7.50	7.00	6.50	6.00	5.50	5.00
12	10.80	10.38	10.20	9.96	9.60	9.00	8.40	7.80	7.20	6.60	6.00

Compressed Height in Inches

ISO-D Series

Raymond® DEFLECTION IN % FREE LENGTH (METRIC DIMENSIONS)											
Free Length (mm)	10%	13.50%	15%	17%	20%	25%	30%	35%	40%	45%	50%
25	22.5	21.6	21.3	20.8	20.0	18.8	17.5	16.3	15.0	13.8	12.5
32	28.8	27.7	27.2	26.6	25.6	24.0	22.4	20.8	19.2	17.6	16.0
38	34.2	32.9	32.3	31.5	30.4	28.5	26.6	24.7	22.8	20.9	19.0
44	39.6	38.1	37.4	36.5	35.2	33.0	30.8	28.6	26.4	24.2	22.0
51	45.9	44.1	43.4	42.3	40.8	38.3	35.7	33.2	30.6	28.1	25.5
64	57.6	55.4	54.4	53.1	51.2	48.0	44.8	41.6	38.4	35.2	32.0
76	68.4	65.7	64.6	63.1	60.8	57.0	53.2	49.4	45.6	41.8	38.0
89	80.1	77.0	75.7	73.9	71.2	66.8	62.3	57.9	53.4	49.0	44.5
102	91.8	88.2	86.7	84.7	81.6	76.5	71.4	66.3	61.2	56.1	51.0
114	102.6	98.6	96.9	94.6	91.2	85.5	79.8	74.1	68.4	62.7	57.0
127	114.3	109.9	108.0	105.4	101.6	95.3	88.9	82.6	76.2	69.9	63.5
140	126.0	121.1	119.0	116.2	112.0	105.0	98.0	91.0	84.0	77.0	70.0
152	136.8	131.5	129.2	126.2	121.6	114.0	106.4	98.8	91.2	83.6	76.0
165	148.5	142.7	140.3	137.0	132.0	123.8	115.5	107.3	99.0	90.8	82.5
178	160.2	154.0	151.3	147.7	142.4	133.5	124.6	115.7	106.8	97.9	89.0
191	171.9	165.2	162.4	158.5	152.8	143.3	133.7	124.2	114.6	105.1	95.5
203	182.7	175.6	172.6	168.5	162.4	152.3	142.1	132.0	121.8	111.7	101.5
254	228.6	219.7	215.9	210.8	203.2	190.5	177.8	165.1	152.4	139.7	127.0
305	274.5	263.8	259.3	253.2	244.0	228.8	213.5	198.3	183.0	167.8	152.5

Compressed Height in Millimeters



ISO-D Series

Raymond® ULTRA LIGHT DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS) LIGHT GREEN

Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE							
					Load @ 30% of free length		Load @ 40% of free length		Load @ 50% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
20.0	10.0	25	302-404-D	29.4	221	7.5	294	10.0	368	12.5	488	16.6
		32	302-405-D	22.6	217	9.6	289	12.8	362	16.0	488	21.6
		38	302-406-D	18.6	212	11.4	283	15.2	353	19.0	476	25.6
		44	302-407-D	15.7	207	13.2	276	17.6	345	22.0	468	29.8
		51	302-408-D	13.7	210	15.3	279	20.4	349	25.5	478	34.9
		64	302-410-D	11.3	217	19.2	289	25.6	362	32.0	507	44.9
		76	302-412-D	9.8	223	22.8	298	30.4	372	38.0	530	54.1
		89	302-414-D	8.3	222	26.7	295	35.6	369	44.5	526	63.4
		102	302-416-D	7.4	226	30.6	302	40.8	377	51.0	544	73.5
		114	302-418-D	6.4	219	34.2	292	45.6	365	57.0	521	81.4
		127	302-420-D	5.9	225	38.1	300	50.8	375	63.5	542	91.9
		140	302-422-D	5.4	227	42.0	302	56.0	378	70.0	549	101.6
		152	302-424-D	4.9	223	45.6	298	60.8	372	76.0	539	109.9
		305	302-448-D	2.5	229	91.5	305	122.0	381	152.5	556	222.5
25.0	12.5	25	302-504-D	53.9	404	7.5	539	10.0	674	12.5	782	14.5
		32	302-505-D	42.2	405	9.6	540	12.8	675	16.0	806	19.1
		38	302-506-D	35.8	408	11.4	544	15.2	680	19.0	831	23.2
		44	302-507-D	31.4	414	13.2	553	17.6	691	22.0	860	27.4
		51	302-508-D	27.0	413	15.3	551	20.4	689	25.5	869	32.2
		64	302-510-D	21.6	415	19.2	553	25.6	691	32.0	886	41.0
		76	302-512-D	18.1	413	22.8	550	30.4	688	38.0	889	49.1
		89	302-514-D	15.2	406	26.7	541	35.6	676	44.5	869	57.2
		102	302-516-D	13.2	404	30.6	539	40.8	673	51.0	870	65.9
		114	302-518-D	11.8	404	34.2	538	45.6	673	57.0	870	73.7
		127	302-520-D	10.6	404	38.1	538	50.8	673	63.5	878	82.8
		140	302-522-D	9.6	403	42.0	538	56.0	672	70.0	876	91.3
		152	302-524-D	8.8	401	45.6	535	60.8	669	76.0	869	98.8
		178	302-528-D	7.6	406	53.4	541	71.2	676	89.0	885	116.4
		203	302-532-D	6.7	408	60.9	544	81.2	680	101.5	895	133.6
		305	302-548-D	4.4	403	91.5	537	122.0	671	152.5	884	200.8
32.0	16.0	38	302-606-D	43.1	491	11.4	655	15.2	819	19.0	1065	24.7
		44	302-607-D	37.3	492	13.2	656	17.6	821	22.0	1082	29.0
		51	302-608-D	32.4	496	15.3	661	20.4	826	25.5	1105	34.1
		64	302-610-D	25.5	490	19.2	653	25.6	816	32.0	1107	43.4
		76	302-612-D	21.6	492	22.8	657	30.4	821	38.0	1128	52.2
		89	302-614-D	18.1	483	26.7	644	35.6	805	44.5	1102	60.9
		102	302-616-D	15.7	480	30.6	641	40.8	801	51.0	1099	70.0
		114	302-618-D	14.2	486	34.2	648	45.6	809	57.0	1115	78.5
		127	302-620-D	12.7	484	38.1	645	50.8	806	63.5	1118	88.0
		140	302-622-D	11.6	487	42.0	650	56.0	812	70.0	1131	97.5
		152	302-624-D	10.6	483	45.6	644	60.8	806	76.0	1120	105.7
		178	302-628-D	9.0	481	53.4	641	71.2	801	89.0	1113	123.7
		203	302-632-D	7.8	475	60.9	633	81.2	792	101.5	1100	141.0
		254	302-640-D	6.4	488	76.2	650	101.6	813	127.0	1146	179.0
		305	302-648-D	5.3	485	91.5	647	122.0	808	152.5	1140	215.0
40.0	20.0	51	302-708-D	48.1	736	15.3	981	20.4	1227	25.5	1481	30.8
		64	302-710-D	39.2	753	19.2	1004	25.6	1254	32.0	1560	39.8
		76	302-712-D	33.3	759	22.8	1012	30.4	1265	38.0	1602	48.1
		89	302-714-D	28.4	758	26.7	1011	35.6	1264	44.5	1613	56.8
		102	302-716-D	24.5	750	30.6	1000	40.8	1250	51.0	1588	64.8

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® ULTRA LIGHT DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS)												LIGHT GREEN	
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE								
					Load @ 30% of free length		Load @ 40% of free length		Load @ 50% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)	
A	B	C			Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)			
40.0	20.0	114	302-718-D	22.1	756	34.2	1008	45.6	1260	57.0	1622	73.4	
		127	302-720-D	19.6	747	38.1	996	50.8	1245	63.5	1601	81.7	
		140	302-722-D	17.7	743	42.0	991	56.0	1239	70.0	1595	90.1	
		152	302-724-D	16.2	739	45.6	985	60.8	1231	76.0	1583	97.7	
		178	302-728-D	13.7	732	53.4	975	71.2	1219	89.0	1567	114.4	
		203	302-732-D	12.3	749	60.9	999	81.2	1248	101.5	1630	132.5	
		254	302-740-D	9.8	747	76.2	996	101.6	1245	127.0	1631	166.4	
		305	302-748-D	8.3	759	91.5	1013	122.0	1266	152.5	1676	201.9	
50.0	25.0	64	302-810-D	86.3	1657	19.2	2209	25.6	2762	32.0	3461	40.1	
		76	302-812-D	70.6	1610	22.8	2146	30.4	2683	38.0	3382	47.9	
		89	302-814-D	59.8	1597	26.7	2129	35.6	2661	44.5	3373	56.4	
		102	302-816-D	52.0	1591	30.6	2122	40.8	2652	51.0	3390	65.2	
		114	302-818-D	46.1	1577	34.2	2102	45.6	2628	57.0	3379	73.3	
		127	302-820-D	42.2	1608	38.1	2144	50.8	2680	63.5	3482	82.5	
		140	302-822-D	38.2	1604	42.0	2139	56.0	2674	70.0	3503	91.7	
		152	302-824-D	34.3	1564	45.6	2085	60.8	2607	76.0	3375	98.4	
		178	302-828-D	29.4	1570	53.4	2093	71.2	2617	89.0	3410	116.0	
		203	302-832-D	25.5	1553	60.9	2071	81.2	2588	101.5	3376	132.4	
		254	302-840-D	20.6	1570	76.2	2093	101.6	2616	127.0	3459	167.9	
		305	302-848-D	17.2	1574	91.5	2098	122.0	2623	152.5	3483	202.5	

*Tabulated deflections shown represent near solid and are for design information only.

Associated Spring Raymond has capabilities well beyond the catalog components shown. We supply custom components and functional assemblies. If you simply need a Raymond® die spring or other spring type with a different finish this can be easily done.

Some common finishes are:

- Plain
- Dacromet®
- Geomet®
- Zinc
- Black Oxide
- Temperature Indicating
- Teflon®

Additional catalogs are available for other catalog stocked parts for:



CloverDome

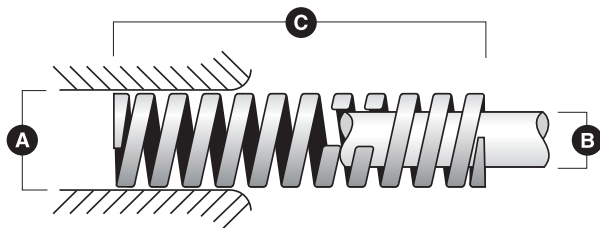
m-Struts®



Our engineers can also customize the dimensions and/or rates for your OEM or aftermarket application based on the design constraints. Even further we can design and supply functional sub-assemblies for new designs or cost reduction efforts. Contact Associated Spring Raymond to learn more about the possibilities for your application:

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ISO-D Series

Raymond® LIGHT DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS) GREEN

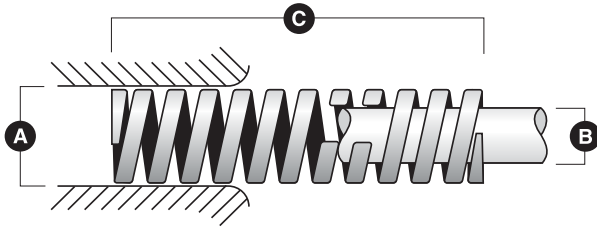
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE							
					Load @ 25% of free length		Load @ 30% of free length		Load @ 40% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
10.0	5.0	25	303-104-D	12.2	76	6.3	92	7.5	122	10.0	156	12.8
		32	303-105-D	9.9	79	8.0	95	9.6	127	12.8	172	17.3
		38	303-106-D	8.2	78	9.5	94	11.4	125	15.2	168	20.5
		44	303-107-D	6.4	71	11.0	85	13.2	113	17.6	155	24.1
		51	303-108-D	6.3	80	12.8	96	15.3	129	20.4	174	27.6
		64	303-110-D	5.3	85	16.0	102	19.2	135	25.6	198	37.5
		76	303-112-D	4.3	81	19.0	97	22.8	129	30.4	184	43.4
		305	303-148-D	1.0	79	76.3	95	91.5	127	122.0	183	176.0
12.5	7.0	25	303-204-D	18.6	116	6.3	139	7.5	186	10.0	292	15.7
		32	303-205-D	14.9	119	8.0	143	9.6	190	12.8	309	20.8
		38	303-206-D	12.7	121	9.5	145	11.4	194	15.2	321	25.2
		44	303-207-D	11.1	123	11.0	147	13.2	196	17.6	329	29.5
		51	303-208-D	9.3	118	12.8	142	15.3	190	20.4	315	33.9
		64	303-210-D	7.2	115	16.0	138	19.2	184	25.6	305	42.4
		76	303-212-D	5.9	112	19.0	134	22.8	178	30.4	292	49.8
		89	303-214-D	4.7	105	22.3	127	26.7	169	35.6	270	57.0
		102	303-216-D	4.1	105	25.5	125	30.6	167	40.8	239	58.4
		305	303-248-D	1.4	104	76.3	124	91.5	166	122.0	268	196.9
16.0	8.5	25	303-304-D	31.7	198	6.3	238	7.5	317	10.0	441	13.9
		32	303-305-D	23.2	186	8.0	223	9.6	297	12.8	409	17.6
		38	303-306-D	20.5	195	9.5	234	11.4	312	15.2	449	21.9
		44	303-307-D	17.9	197	11.0	236	13.2	315	17.6	461	25.8
		51	303-308-D	15.5	198	12.8	237	15.3	316	20.4	470	30.3
		64	303-310-D	12.7	203	16.0	243	19.2	325	25.6	496	39.1
		76	303-312-D	10.0	189	19.0	227	22.8	303	30.4	446	44.8
		89	303-314-D	8.9	199	22.3	239	26.7	318	35.6	486	54.4
		102	303-316-D	7.6	193	25.5	232	30.6	309	40.8	486	64.1
		114	303-318-D	6.6	188	28.5	226	34.2	301	45.6	401	60.8
		305	303-348-D	2.6	195	76.3	234	91.5	312	122.0	484	188.9
20.0	10.0	25	303-404-D	55.4	346	6.3	415	7.5	554	10.0	742	13.4
		32	303-405-D	43.4	347	8.0	416	9.6	555	12.8	772	17.8
		38	303-406-D	34.4	327	9.5	392	11.4	523	15.2	712	20.7
		44	303-407-D	27.7	305	11.0	366	13.2	488	17.6	637	23.0
		51	303-408-D	24.9	318	12.8	381	15.3	509	20.4	591	23.7
		64	303-410-D	18.8	301	16.0	361	19.2	482	25.6	643	34.2
		76	303-412-D	16.1	306	19.0	367	22.8	489	30.4	667	41.5
		89	303-414-D	13.1	292	22.3	350	26.7	467	35.6	619	47.2
		102	303-416-D	11.9	303	25.5	363	30.6	484	40.8	666	56.1
		114	303-418-D	11.0	315	28.5	378	34.2	504	45.6	717	65.4
		127	303-420-D	9.4	298	31.8	358	38.1	478	50.8	665	70.7
		140	303-422-D	8.6	298	35.0	357	42.0	476	56.0	664	77.5
		152	303-424-D	7.6	287	38.0	344	45.6	459	60.8	612	81.1
		305	303-448-D	3.8	291	76.3	350	91.5	466	122.0	648	169.6
25.0	12.5	25	303-504-D	103.1	644	6.3	773	7.5	1031	10.0	1361	13.2
		32	303-505-D	80.7	646	8.0	775	9.6	1033	12.8	1420	17.6
		38	303-506-D	64.6	613	9.5	736	11.4	981	15.2	1336	20.7
		44	303-507-D	53.8	592	11.0	710	13.2	947	17.6	1280	23.8
		51	303-508-D	45.8	584	12.8	701	15.3	935	20.4	1260	27.5
		64	303-510-D	35.7	571	16.0	685	19.2	914	25.6	1246	34.9
		76	303-512-D	28.6	542	19.0	651	22.8	868	30.4	1151	40.3

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® LIGHT DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS) GREEN												
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE							
					Load @ 25% of free length		Load @ 30% of free length		Load @ 40% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)
A	B	C			Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
25.0	12.5	89	303-514-D	24.8	551	22.3	661	26.7	881	35.6	1193	48.2
		102	303-516-D	20.6	526	25.5	631	30.6	841	40.8	1105	53.6
		114	303-518-D	18.6	534	28.5	640	34.2	854	45.6	1141	61.5
		127	303-520-D	16.7	530	31.8	636	38.1	847	50.8	1131	67.8
		140	303-522-D	14.6	506	35.0	607	42.0	810	56.0	1041	71.5
		152	303-524-D	13.6	518	38.0	621	45.6	828	60.8	1091	80.1
		178	303-528-D	11.8	524	44.5	629	53.4	839	71.2	1123	95.3
		203	303-532-D	10.6	535	50.8	642	60.9	857	81.2	1170	110.9
		305	303-548-D	6.8	515	76.3	618	91.5	824	122.0	1098	162.6
32.0	16.0	38	303-606-D	91.8	872	9.5	1046	11.4	1395	15.2	2230	24.3
		44	303-607-D	83.2	915	11.0	1098	13.2	1464	17.6	2305	27.7
		51	303-608-D	70.6	901	12.8	1081	15.3	1441	20.4	2289	32.4
		64	303-610-D	55.1	881	16.0	1057	19.2	1410	25.6	2257	41.0
		76	303-612-D	45.7	868	19.0	1041	22.8	1388	30.4	2233	48.9
		89	303-614-D	38.6	859	22.3	1031	26.7	1374	35.6	2220	57.5
		102	303-616-D	33.7	860	25.5	1032	30.6	1376	40.8	2240	66.4
		114	303-618-D	30.0	861	28.5	1033	34.2	1378	45.6	2255	75.3
		127	303-620-D	25.8	820	31.8	984	38.1	1312	50.8	2102	81.4
		140	303-622-D	23.8	826	35.0	991	42.0	1322	56.0	2135	89.8
		152	303-624-D	21.7	825	38.0	990	45.6	1319	60.8	2135	98.4
		178	303-628-D	17.6	784	44.5	941	53.4	1255	71.2	1986	112.7
		203	303-632-D	15.6	792	50.8	950	60.9	1267	81.2	2022	129.6
		254	303-640-D	12.6	799	63.5	959	76.2	1279	101.6	2062	163.8
		305	303-648-D	9.6	732	76.3	878	91.5	1171	122.0	1801	187.6
40.0	20.0	51	303-708-D	104.6	1333	12.8	1600	15.3	2133	20.4	2635	25.2
		64	303-710-D	79.6	1273	16.0	1528	19.2	2037	25.6	2506	31.5
		76	303-712-D	66.6	1264	19.0	1517	22.8	2023	30.4	2522	37.9
		89	303-714-D	57.2	1272	22.3	1527	26.7	2036	35.6	2596	45.4
		102	303-716-D	48.6	1239	25.5	1487	30.6	1982	40.8	2497	51.4
		114	303-718-D	43.2	1243	28.5	1491	34.2	1989	45.6	2538	58.7
		127	303-720-D	39.2	1245	31.8	1494	38.1	1992	50.8	2560	65.3
		140	303-722-D	35.0	1215	35.0	1458	42.0	1944	56.0	2462	70.4
		152	303-724-D	31.7	1206	38.0	1447	45.6	1929	60.8	2437	76.8
		178	303-728-D	27.3	1215	44.5	1458	53.4	1944	71.2	2493	91.3
		203	303-732-D	23.5	1191	50.8	1429	60.9	1905	81.2	2412	102.8
		254	303-740-D	18.9	1198	63.5	1438	76.2	1917	101.6	2461	130.4
		305	303-748-D	15.5	1179	76.3	1415	91.5	1886	122.0	2399	155.2
50.0	25.0	64	303-810-D	148.6	2377	16.0	2853	19.2	3804	25.6	6166	41.5
		76	303-812-D	125.2	2378	19.0	2853	22.8	3805	30.4	5782	46.2
		89	303-814-D	104.5	2324	22.3	2789	26.7	3719	35.6	5641	54.0
		102	303-816-D	90.4	2304	25.5	2765	30.6	3687	40.8	5629	62.3
		114	303-818-D	78.7	2261	28.5	2714	34.2	3618	45.6	5514	70.1
		127	303-820-D	70.4	2235	31.8	2681	38.1	3575	50.8	5447	77.4
		140	303-822-D	63.1	2192	35.0	2630	42.0	3507	56.0	5311	84.2
		152	303-824-D	56.9	2163	38.0	2595	45.6	3460	60.8	5224	91.8
		178	303-828-D	48.6	2164	44.5	2597	53.4	3462	71.2	5271	108.4
		203	303-832-D	41.8	2121	50.8	2545	60.9	3393	81.2	5132	122.8
		254	303-840-D	35.7	2264	63.5	2717	76.2	3623	101.6	5734	160.8
		305	303-848-D	26.8	2040	76.3	2448	91.5	3264	122.0	4879	182.4
63.0	38.0	76	303-912-D	191.2	3633	19.0	4359	22.8	5812	30.4	7036	36.8
		89	303-914-D	157.5	3503	22.3	4204	26.7	5605	35.6	6786	43.1
		102	303-916-D	136.1	3471	25.5	4165	30.6	5553	40.8	6819	50.1
		114	303-918-D	118.1	3395	28.5	4074	34.2	5432	45.6	6648	56.3
		127	303-920-D	105.7	3355	31.8	4026	38.1	5368	50.8	6583	62.3
		152	303-924-D	86.3	3281	38.0	3937	45.6	5249	60.8	6441	74.6
		178	303-928-D	73.7	3278	44.5	3934	53.4	5245	71.2	6527	88.6
		203	303-932-D	63.2	3209	50.8	3851	60.9	5134	81.2	6329	100.1
		254	303-940-D	49.9	3167	63.5	3800	76.2	5067	101.6	6264	125.6
		305	303-948-D	41.0	3124	76.3	3749	91.5	4998	122.0	6158	150.3

*Tabulated deflections shown represent near solid and are for design information only.



ISO-D Series

Raymond® MEDIUM DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS) BLUE

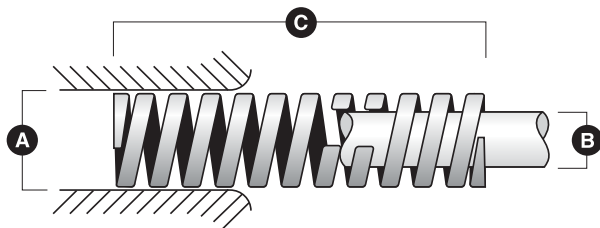
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE							
					Load @ 25% of free length		Load @ 30% of free length		Load @ 40% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
10.0	5.0	25	304-104-D	15.7	98	6.3	117	7.5	157	10.0	188	12.00
		32	304-105-D	13.5	108	8.0	130	9.6	173	12.8	233	17.20
		38	304-106-D	11.7	111	9.5	133	11.4	177	15.2	246	21.10
		44	304-107-D	9.6	105	11.0	127	13.2	169	17.6	227	23.70
		51	304-108-D	8.6	110	12.8	132	15.3	176	20.4	247	28.60
		64	304-110-D	6.6	106	16.0	127	19.2	169	25.6	233	35.20
		76	304-112-D	5.5	105	19.0	126	22.8	168	30.4	230	41.70
		305	304-148-D	1.4	103	76.3	124	91.5	165	122.0	229	169.40
12.5	7.0	25	304-204-D	29.4	184	6.3	220	7.5	294	10.0	376	12.80
		32	304-205-D	22.5	180	8.0	216	9.6	287	12.8	373	16.60
		38	304-206-D	18.7	178	9.5	213	11.4	284	15.2	372	19.90
		44	304-207-D	15.9	175	11.0	210	13.2	280	17.6	366	23.00
		51	304-208-D	13.7	175	12.8	210	15.3	280	20.4	371	27.00
		64	304-210-D	10.5	167	16.0	201	19.2	268	25.6	345	33.00
		76	304-212-D	8.7	165	19.0	198	22.8	264	30.4	338	39.00
		89	304-214-D	7.5	166	22.3	200	26.7	266	35.6	347	46.40
		102	304-216-D	6.3	161	25.5	193	30.6	257	40.8	329	52.30
		305	304-248-D	2.2	164	76.3	197	91.5	262	122.0	347	161.20
16.0	8.5	25	304-304-D	55.7	348	6.3	418	7.5	557	10.0	646	11.60
		32	304-305-D	40.0	320	8.0	384	9.6	512	12.8	568	14.20
		38	304-306-D	34.7	329	9.5	395	11.4	527	15.2	617	17.80
		44	304-307-D	30.6	336	11.0	404	13.2	538	17.6	655	21.40
		51	304-308-D	26.6	339	12.8	406	15.3	542	20.4	672	25.30
		64	304-310-D	20.8	333	16.0	399	19.2	532	25.6	661	31.80
		76	304-312-D	17.8	339	19.0	407	22.8	542	30.4	692	38.80
		89	304-314-D	15.0	335	22.3	402	26.7	535	35.6	681	45.30
		102	304-316-D	13.3	339	25.5	406	30.6	542	40.8	701	52.80
		114	304-318-D	11.8	336	28.5	404	34.2	538	45.6	627	53.10
		305	304-348-D	4.2	319	76.3	383	91.5	511	122.0	644	153.80
20.0	10.0	25	304-404-D	91.0	569	6.3	682	7.5	910	10.0	946	10.40
		32	304-405-D	67.9	543	8.0	652	9.6	869	12.8	910	13.40
		38	304-406-D	55.1	524	9.5	629	11.4	838	15.2	860	15.60
		44	304-407-D	46.7	513	11.0	616	13.2	821	17.6	840	18.00
		51	304-408-D	39.9	509	12.8	611	15.3	814	20.4	842	21.10
		64	304-410-D	30.8	493	16.0	592	19.2	790	25.6	802	26.00
		76	304-412-D	25.7	488	19.0	586	22.8	781	30.4	797	31.00
		89	304-414-D	22.1	491	22.3	590	26.7	786	35.6	817	37.00
		102	304-416-D	19.4	494	25.5	592	30.6	790	40.8	832	43.00
		115	304-418-D	17.0	488	28.8	586	34.5	781	46.0	817	48.10
		127	304-420-D	15.3	485	31.8	583	38.1	777	50.8	810	53.00
		139	304-422-D	14.1	490	34.8	588	41.7	785	55.6	832	59.00
		152	304-424-D	12.8	486	38.0	583	45.6	777	60.8	818	64.00
		305	304-448-D	6.4	489	76.3	587	91.5	782	122.0	846	132.00
25.0	12.5	25	304-504-D	171.5	1072	6.3	1286	7.5	1715	10.0	1715	10.00
		32	304-505-D	126.5	1012	8.0	1214	9.6	1619	12.8	1619	12.80
		38	304-506-D	104.2	990	9.5	1188	11.4	1584	15.2	1605	15.40
		44	304-507-D	89.1	980	11.0	1176	13.2	1567	17.6	1639	18.40
		51	304-508-D	74.6	951	12.8	1141	15.3	1521	20.4	1573	21.10
		64	304-510-D	57.3	916	16.0	1099	19.2	1466	25.6	1489	26.00
		76	304-512-D	49.0	930	19.0	1116	22.8	1488	30.4	1571	32.10
		89	304-514-D	40.8	909	22.3	1090	26.7	1454	35.6	1515	37.10

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® MEDIUM DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS) BLUE												
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE							
					Load @ 25% of free length		Load @ 30% of free length		Load @ 40% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
25.0	12.5	102	304-516-D	35.7	911	25.5	1093	30.6	1457	40.8	1540	43.10
		115	304-518-D	31.7	910	28.8	1092	34.5	1456	46.0	1551	49.00
		127	304-520-D	28.5	905	31.8	1086	38.1	1448	50.8	1539	54.00
		139	304-522-D	26.3	913	34.8	1096	41.7	1461	55.6	1579	60.10
		152	304-524-D	23.8	903	38.0	1083	45.6	1444	60.8	1544	65.00
		178	304-528-D	20.1	896	44.5	1075	53.4	1433	71.2	1530	76.00
		203	304-532-D	17.6	895	50.8	1074	60.9	1432	81.2	1536	87.10
		305	304-548-D	11.6	882	76.3	1059	91.5	1412	122.0	1504	130.00
32.0	16.0	38	304-606-D	166.8	1585	9.5	1902	11.4	2536	15.2	2903	17.40
		44	304-607-D	136.4	1500	11.0	1800	13.2	2400	17.6	2686	19.70
		51	304-608-D	116.2	1482	12.8	1778	15.3	2371	20.4	2697	23.20
		64	304-610-D	87.5	1401	16.0	1681	19.2	2241	25.6	2486	28.40
		76	304-612-D	70.9	1347	19.0	1617	22.8	2156	30.4	2333	32.90
		89	304-614-D	60.4	1343	22.3	1611	26.7	2148	35.6	2360	39.10
		102	304-616-D	51.6	1315	25.5	1578	30.6	2104	40.8	2285	44.30
		115	304-618-D	45.8	1315	28.8	1578	34.5	2105	46.0	4964	108.50
		127	304-620-D	41.7	1324	31.8	1589	38.1	2119	50.8	2361	56.60
		139	304-622-D	37.8	1314	34.8	1577	41.7	2103	55.6	2337	61.80
		152	304-624-D	33.8	1283	38.0	1539	45.6	2053	60.8	2228	66.00
		178	304-628-D	28.9	1288	44.5	1545	53.4	2061	71.2	2269	78.40
		203	304-632-D	24.9	1263	50.8	1515	60.9	2020	81.2	2184	87.80
		254	304-640-D	20.0	1268	63.5	1522	76.2	2029	101.6	2227	111.50
		305	304-648-D	16.7	1272	76.3	1526	91.5	2035	122.0	2255	135.20
40.0	20.0	51	304-708-D	170.3	2172	12.8	2606	15.3	3475	20.4	3577	21.00
		64	304-710-D	128.7	2059	16.0	2471	19.2	3295	25.6	3333	25.90
		76	304-712-D	107.3	2038	19.0	2445	22.8	3260	30.4	3357	31.30
		89	304-714-D	89.1	1982	22.3	2379	26.7	3172	35.6	3225	36.20
		102	304-716-D	75.5	1926	25.5	2312	30.6	3082	40.8	3067	40.60
		115	304-718-D	66.8	1921	28.8	2305	34.5	3074	46.0	3087	46.20
		127	304-720-D	61.0	1935	31.8	2323	38.1	3097	50.8	3176	52.10
		139	304-722-D	55.3	1923	34.8	2307	41.7	3076	55.6	3154	57.00
		152	304-724-D	50.8	1930	38.0	2316	45.6	3089	60.8	3211	63.20
		178	304-728-D	43.0	1914	44.5	2297	53.4	3062	71.2	3183	74.00
		203	304-732-D	37.4	1896	50.8	2275	60.9	3034	81.2	3138	84.00
		254	304-740-D	30.1	1909	63.5	2291	76.2	3054	101.6	3225	107.30
		305	304-748-D	24.8	1887	76.3	2265	91.5	3020	122.0	3168	128.00
50.0	25.0	64	304-810-D	211.8	3389	16.0	4067	19.2	5423	25.6	5910	27.90
		76	304-812-D	166.2	3158	19.0	3789	22.8	5052	30.4	5252	31.60
		89	304-814-D	139.4	3102	22.3	3722	26.7	4963	35.6	5186	37.20
		102	304-816-D	121.4	3095	25.5	3714	30.6	4952	40.8	5268	43.40
		115	304-818-D	107.0	3075	28.8	3690	34.5	4920	46.0	5284	49.40
		127	304-820-D	94.8	3009	31.8	3610	38.1	4814	50.8	5089	53.70
		139	304-822-D	86.4	3003	34.8	3604	41.7	4806	55.6	5117	59.20
		152	304-824-D	78.3	2975	38.0	3570	45.6	4759	60.8	5049	64.50
		178	304-828-D	65.9	2931	44.5	3517	53.4	4690	71.2	4953	75.20
		203	304-832-D	57.2	2901	50.8	3481	60.9	4641	81.2	4881	85.40
		229	304-836-D	50.8	2911	57.3	3493	68.7	4657	91.6	4962	97.60
		254	304-840-D	46.0	2919	63.5	3503	76.2	4671	101.6	5025	109.30
		305	304-848-D	37.9	2891	76.3	3469	91.5	4625	122.0	4959	130.80
63.0	38.0	76	304-912-D	303.5	5767	19.0	6920	22.8	9227	30.4	10199	33.60
		89	304-914-D	247.4	5506	22.3	6607	26.7	8809	35.6	9650	39.00
		102	304-916-D	210.8	5375	25.5	6450	30.6	8600	40.8	9464	44.90
		115	304-918-D	183.6	5278	28.8	6334	34.5	8445	46.0	9326	50.80
		127	304-920-D	162.6	5163	31.8	6195	38.1	8260	50.8	9041	55.60
		152	304-924-D	132.4	5029	38.0	6035	45.6	8047	60.8	8788	66.40
		178	304-928-D	111.1	4942	44.5	5930	53.4	7907	71.2	8629	77.70
		203	304-932-D	96.9	4916	50.8	5899	60.9	7866	81.2	8660	89.40
		229	304-936-D	85.9	4918	57.3	5901	68.7	7868	91.6	8762	102.00
		254	304-940-D	77.4	4917	63.5	5900	76.2	7867	101.6	8835	114.10
		305	304-948-D	64.1	4890	76.3	5868	91.5	7824	122.0	8850	138.00

*Tabulated deflections shown represent near solid and are for design information only.



ISO-D Series

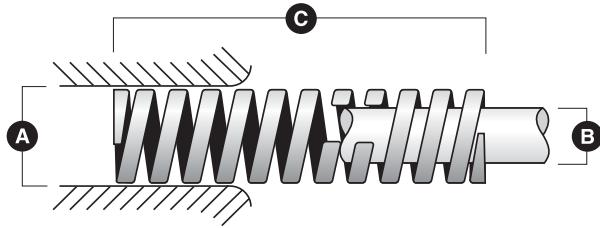
Raymond® HEAVY DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS)												RED
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE							
					Load @ 20% of free length		Load @ 25% of free length		Load @ 30% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
A	B	C			Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
10.0	5.0	25	305-104-D	23.4	117	5.0	146	6.3	175	7.5	222	9.50
		32	305-105-D	18.0	115	6.4	144	8.0	172	9.6	221	12.30
		38	305-106-D	16.6	126	7.6	158	9.5	189	11.4	279	16.80
		44	305-107-D	14.5	127	8.8	159	11.0	191	13.2	288	19.90
		51	305-108-D	12.0	122	10.2	153	12.8	183	15.3	266	22.20
		64	305-110-D	9.9	126	12.8	158	16.0	189	19.2	290	29.40
		76	305-112-D	7.9	120	15.2	150	19.0	179	22.8	260	33.10
		305	305-148-D	1.9	118	61.0	147	76.3	177	91.5	260	134.50
12.5	7.0	25	305-204-D	42.4	212	5.0	265	6.3	318	7.5	475	11.20
		32	305-205-D	31.8	203	6.4	254	8.0	305	9.6	455	14.30
		38	305-206-D	27.1	206	7.6	257	9.5	308	11.4	476	17.60
		44	305-207-D	23.8	209	8.8	261	11.0	314	13.2	499	21.00
		51	305-208-D	19.9	203	10.2	254	12.8	305	15.3	479	24.00
		64	305-210-D	15.2	194	12.8	243	16.0	291	19.2	443	29.20
		76	305-212-D	13.5	204	15.2	256	19.0	307	22.8	498	37.00
		89	305-214-D	11.1	197	17.8	246	22.3	295	26.7	465	42.00
		102	305-216-D	8.4	171	20.4	214	25.5	257	30.6	368	43.80
305	305-248-D	3.2	192	61.0	240	76.3	288	91.5	458	145.40		
16.0	8.5	25	305-304-D	78.0	390	5.0	487	6.3	585	7.5	741	9.50
		32	305-305-D	61.0	390	6.4	488	8.0	586	9.6	787	12.90
		38	305-306-D	50.7	385	7.6	482	9.5	578	11.4	786	15.50
		44	305-307-D	45.5	400	8.8	501	11.0	601	13.2	874	19.20
		51	305-308-D	36.9	377	10.2	471	12.8	565	15.3	779	21.10
		64	305-310-D	29.4	377	12.8	471	16.0	565	19.2	798	27.10
		76	305-312-D	25.7	390	15.2	488	19.0	585	22.8	875	34.10
		89	305-314-D	21.8	388	17.8	485	22.3	582	26.7	875	40.10
		102	305-316-D	18.9	386	20.4	482	25.5	579	30.6	870	46.00
		114	305-318-D	15.7	358	22.8	447	28.5	537	34.2	691	44.00
		305	305-348-D	6.2	375	61.0	469	76.3	563	91.5	849	138.00
20.0	10.0	25	305-404-D	219.2	1096	5.0	1370	6.3	1644	7.5	1731	7.90
		32	305-405-D	171.3	1097	6.4	1371	8.0	1645	9.6	1885	11.00
		38	305-406-D	136.6	1038	7.6	1298	9.5	1557	11.4	1721	12.60
		44	305-407-D	116.3	1024	8.8	1280	11.0	1536	13.2	1710	14.70
		51	305-408-D	96.7	986	10.2	1232	12.8	1479	15.3	1585	16.40
		64	305-410-D	74.2	950	12.8	1187	16.0	1425	19.2	1484	20.00
		76	305-412-D	62.8	955	15.2	1194	19.0	1433	22.8	1546	24.60
		89	305-414-D	53.9	959	17.8	1198	22.3	1438	26.7	1594	29.60
		102	305-416-D	46.5	949	20.4	1187	25.5	1424	30.6	1573	33.80
		114	305-418-D	41.9	963	22.8	1204	28.5	1445	34.2	1658	39.60
		127	305-420-D	37.3	948	25.4	1185	31.8	1422	38.1	1597	42.80
		140	305-422-D	33.9	942	28.0	1177	35.0	1413	42.0	1558	46.00
		152	305-424-D	30.9	939	30.4	1174	38.0	1409	45.6	1576	51.00
		305	305-448-D	15.2	927	61.0	1159	76.3	1391	91.5	1569	103.20
25.0	12.5	25	305-504-D	371.4	1857	5.0	2321	6.3	2785	7.5	2823	7.60
		32	305-505-D	280.7	1796	6.4	2246	8.0	2695	9.6	2891	10.30
		38	305-506-D	219.5	1668	7.6	2085	9.5	2502	11.4	2502	11.40
		44	305-507-D	201.3	1771	8.8	2214	11.0	2657	13.2	3100	15.40
		51	305-508-D	163.1	1664	10.2	2080	12.8	2495	15.3	2724	16.70
		64	305-510-D	127.1	1626	12.8	2033	16.0	2440	19.2	2681	21.10
		76	305-512-D	107.3	1631	15.2	2039	19.0	2446	22.8	2790	26.00
		89	305-514-D	90.1	1603	17.8	2004	22.3	2405	26.7	2720	30.20

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® HEAVY DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS)												RED
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE							
					Load @ 20% of free length		Load @ 25% of free length		Load @ 30% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
25.0	12.5	102	305-516-D	78.4	1599	20.4	1998	25.5	2398	30.6	2751	35.10
		114	305-518-D	70.6	1624	22.8	2029	28.5	2435	34.2	2908	41.20
		127	305-520-D	63.2	1605	25.4	2007	31.8	2408	38.1	2844	45.00
		140	305-522-D	57.5	1598	28.0	1997	35.0	2397	42.0	2834	49.30
		152	305-524-D	53.1	1613	30.4	2016	38.0	2420	45.6	2929	55.20
		178	305-528-D	45.2	1609	35.6	2012	44.5	2414	53.4	2943	65.10
		203	305-532-D	39.5	1602	40.6	2002	50.8	2403	60.9	2927	74.20
		305	305-548-D	26.8	1632	61.0	2040	76.3	2449	91.5	3136	117.20
32.0	16.0	38	305-606-D	387.2	2943	7.6	3678	9.5	4414	11.4	4879	12.60
		44	305-607-D	313.0	2754	8.8	3443	11.0	4131	13.2	4351	13.90
		51	305-608-D	267.5	2728	10.2	3410	12.8	4092	15.3	4467	16.70
		64	305-610-D	204.3	2615	12.8	3269	16.0	3923	19.2	4250	20.80
		76	305-612-D	171.7	2609	15.2	3261	19.0	3914	22.8	4360	25.40
		89	305-614-D	141.5	2518	17.8	3147	22.3	3777	26.7	4102	29.00
		102	305-616-D	123.6	2522	20.4	3152	25.5	3783	30.6	4215	34.10
		114	305-618-D	109.8	2525	22.8	3156	28.5	3787	34.2	4303	39.20
		127	305-620-D	98.7	2508	25.4	3135	31.8	3762	38.1	4285	43.40
		140	305-622-D	89.2	2478	28.0	3098	35.0	3718	42.0	4190	47.00
		152	305-624-D	81.7	2484	30.4	3105	38.0	3726	45.6	4258	52.10
		178	305-628-D	69.2	2465	35.6	3081	44.5	3697	53.4	4223	61.00
		203	305-632-D	60.7	2463	40.6	3078	50.8	3694	60.9	4264	70.30
		254	305-640-D	48.4	2458	50.8	3073	63.5	3687	76.2	4307	89.00
		305	305-648-D	40.2	2452	61.0	3064	76.3	3677	91.5	4316	107.40
40.0	20.0	51	305-708-D	371.7	3791	10.2	4739	12.8	5686	15.3	6244	16.80
		64	305-710-D	300.1	3841	12.8	4801	16.0	5761	19.2	6961	23.20
		76	305-712-D	233.6	3551	15.2	4439	19.0	5326	22.8	5934	25.40
		89	305-714-D	197.0	3507	17.8	4384	22.3	5260	26.7	5970	30.30
		102	305-716-D	170.3	3475	20.4	4344	25.5	5212	30.6	5979	35.10
		114	305-718-D	155.7	3582	22.8	4478	28.5	5373	34.2	6603	42.40
		127	305-720-D	137.4	3490	25.4	4363	31.8	5236	38.1	6266	45.60
		140	305-722-D	123.4	3431	28.0	4289	35.0	5147	42.0	6060	49.10
		152	305-724-D	114.4	3477	30.4	4346	38.0	5215	45.6	6347	55.50
		178	305-728-D	96.8	3445	35.6	4306	44.5	5167	53.4	6299	65.10
		203	305-732-D	84.7	3440	40.6	4300	50.8	5160	60.9	6355	75.00
		254	305-740-D	67.6	3433	50.8	4291	63.5	5149	76.2	6426	95.10
		305	305-748-D	56.2	3428	61.0	4285	76.3	5142	91.5	6474	115.20
50.0	25.0	64	305-810-D	424.3	5431	12.8	6788	16.0	8146	19.2	9800	23.10
		76	305-812-D	335.1	5094	15.2	6367	19.0	7640	22.8	8813	26.30
		89	305-814-D	276.8	4927	17.8	6159	22.3	7391	26.7	8415	30.40
		102	305-816-D	244.9	4996	20.4	6244	25.5	7493	30.6	8987	36.70
		114	305-818-D	214.6	4936	22.8	6170	28.5	7404	34.2	8928	41.60
		127	305-820-D	189.1	4804	25.4	6005	31.8	7205	38.1	8454	44.70
		140	305-822-D	169.0	4699	28.0	5874	35.0	7049	42.0	8080	47.80
		152	305-824-D	154.0	4683	30.4	5854	38.0	7024	45.6	8118	52.70
		178	305-828-D	130.8	4658	35.6	5822	44.5	6986	53.4	8164	62.40
		203	305-832-D	115.1	4671	40.6	5839	50.8	7007	60.9	8353	72.60
		254	305-840-D	90.5	4598	50.8	5748	63.5	6898	76.2	8174	90.30
		305	305-848-D	75.5	4606	61.0	5757	76.3	6908	91.5	8320	110.20
63.0	38.0	76	305-912-D	618	9394	15.2	11742	19.0	-	-	13411	21.70
		89	305-914-D	515	9167	17.8	11459	22.3	-	-	13493	26.20
		102	305-916-D	438	8935	20.4	11169	25.5	-	-	13140	30.00
		114	305-918-D	370	8436	22.8	10545	28.5	-	-	11470	31.00
		127	305-920-D	333	8458	25.4	10573	31.8	-	-	12221	36.70
		152	305-924-D	269	8178	30.4	10222	38.0	-	-	11675	43.40
		178	305-928-D	226	8046	35.6	10057	44.5	-	-	11277	49.90
		203	305-932-D	198	8039	40.6	10049	50.8	-	-	11801	59.60
		229	305-936-D	143.6	6577	45.8	8221	57.3	-	-	12307	85.70
		254	305-940-D	155	7874	50.8	9843	63.5	-	-	11811	76.20
		305	305-948-D	128	7808	61.0	9760	76.3	-	-	11712	91.50

*Tabulated deflections shown represent near solid and are for design information only.



ISO-D Series

Raymond®

EXTRA HEAVY DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS)

YELLOW

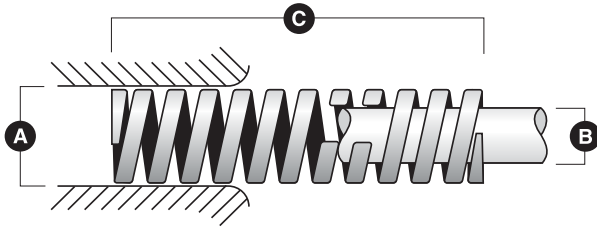
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE							
					Load @ 17% of free length		Load @ 20% of free length		Load @ 25% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
10.0	5.0	25	306-104-D	36.4	155	4.3	182	5.0	228	6.3	270	7.40
		32	306-105-D	27.5	149	5.4	176	6.4	220	8.0	256	9.30
		38	306-106-D	23.3	150	6.5	177	7.6	221	9.5	267	11.50
		44	306-107-D	19.6	147	7.5	173	8.8	216	11.0	255	13.00
		51	306-108-D	16.8	146	8.7	171	10.2	214	12.8	254	15.10
		64	306-110-D	13.3	145	10.9	170	12.8	213	16.0	255	19.20
		76	306-112-D	11.2	144	12.9	169	15.2	212	19.0	256	23.00
		305	306-148-D	2.7	141	51.9	166	61.0	207	76.3	256	94.30
12.5	7.0	25	306-204-D	54.7	233	4.3	274	5.0	342	6.3	487	8.90
		32	306-205-D	42.4	230	5.4	271	6.4	339	8.0	540	12.75
		38	306-206-D	34.6	223	6.5	263	7.6	328	9.5	480	13.90
		44	306-207-D	27.8	208	7.5	245	8.8	306	11.0	459	16.50
		51	306-208-D	25.3	219	8.7	258	10.2	322	12.8	477	18.90
		64	306-210-D	19.9	217	10.9	255	12.8	318	16.0	476	23.90
		76	306-212-D	16.6	215	12.9	253	15.2	316	19.0	474	28.50
		89	306-214-D	14.0	211	15.1	249	17.8	311	22.3	461	33.00
		102	306-216-D	12.7	220	17.3	259	20.4	324	25.5	457	36.00
		305	306-248-D	3.8	199	51.9	234	61.0	293	76.3	413	107.60
16.0	8.5	25	306-304-D	136.2	579	4.3	681	5.0	851	6.3	1076	7.90
		32	306-305-D	99.1	539	5.4	634	6.4	792	8.0	961	9.70
		38	306-306-D	82.8	535	6.5	629	7.6	786	9.5	985	11.90
		44	306-307-D	70.7	529	7.5	622	8.8	777	11.0	982	13.90
		51	306-308-D	60.5	525	8.7	617	10.2	772	12.8	993	16.40
		64	306-310-D	48.1	523	10.9	615	12.8	769	16.0	1019	21.20
		76	306-312-D	39.9	515	12.9	606	15.2	757	19.0	997	25.00
		89	306-314-D	34.2	518	15.1	609	17.8	762	22.3	1034	30.20
		102	306-316-D	29.5	511	17.3	601	20.4	751	25.5	1004	34.10
		114	306-318-D	26.4	512	19.4	602	22.8	752	28.5	1175	44.50
		305	306-348-D	9.8	508	51.9	597	61.0	746	76.3	1041	106.30
20.0	10.0	25	306-404-D	326.5	1345	4.3	1583	5.0	1978	6.3	1992	6.10
		32	306-405-D	244.9	1291	5.4	1518	6.4	1898	8.0	2008	8.20
		38	306-406-D	199.2	1247	6.5	1467	7.6	1834	9.5	1932	9.70
		44	306-407-D	170.3	1202	7.5	1415	8.8	1768	11.0	1975	11.60
		51	306-408-D	146.9	1202	8.7	1414	10.2	1768	12.8	2071	14.10
		64	306-410-D	114.7	1177	10.9	1385	12.8	1731	16.0	2052	17.90
		76	306-412-D	94.0	1147	12.9	1349	15.2	1686	19.0	1956	20.80
		89	306-414-D	78.4	1119	15.1	1316	17.8	1645	22.3	1850	23.60
		102	306-416-D	68.1	1115	17.3	1312	20.4	1640	25.5	1867	27.40
		115	306-418-D	60.3	1112	19.6	1308	23.0	1635	28.8	1820	30.20
		127	306-420-D	54.0	1101	21.6	1295	25.4	1619	31.8	1837	34.00
		139	306-422-D	48.5	1081	23.6	1272	27.8	1589	34.8	1785	36.80
		152	306-424-D	44.4	1082	25.8	1273	30.4	1591	38.0	1758	39.60
		305	306-448-D	22.0	1075	51.9	1265	61.0	1581	76.3	1815	82.50
25.0	12.5	25	306-504-D	459.0	1951	4.3	2295	5.0	2869	6.3	3351	7.30
		32	306-505-D	348.2	1894	5.4	2229	6.4	2786	8.0	3413	9.80
		38	306-506-D	277.2	1790	6.5	2106	7.6	2633	9.5	3132	11.30
		44	306-507-D	236.2	1767	7.5	2078	8.8	2598	11.0	3189	13.50
		51	306-508-D	196.8	1706	8.7	2008	10.2	2509	12.8	3011	15.30
		64	306-510-D	155.2	1689	10.9	1987	12.8	2483	16.0	3104	20.00
		76	306-512-D	129.3	1671	12.9	1966	15.2	2457	19.0	3117	24.10
		89	306-514-D	108.7	1644	15.1	1934	17.8	2417	22.3	3053	28.10

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® EXTRA HEAVY DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS)												YELLOW
Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE							
					Load @ 17% of free length		Load @ 20% of free length		Load @ 25% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
25.0	12.5	102	306-516-D	95.3	1653	17.3	1944	20.4	2430	25.5	3164	33.20
		115	306-518-D	84.9	1659	19.6	1952	23.0	2440	28.8	3251	38.30
		127	306-520-D	76.3	1647	21.6	1938	25.4	2423	31.8	3220	42.20
		139	306-522-D	69.3	1637	23.6	1926	27.8	2408	34.8	3194	46.10
		152	306-524-D	63.5	1640	25.8	1929	30.4	2411	38.0	3236	51.00
		178	306-528-D	54.5	1650	30.3	1942	35.6	2427	44.5	3343	61.30
		203	306-532-D	47.7	1644	34.5	1935	40.6	2418	50.8	3340	70.10
		305	306-548-D	31.5	1634	51.9	1922	61.0	2403	76.3	3353	106.40
32.0	16.0	38	306-606-D	478.3	3090	6.5	3635	7.6	4544	9.5	4975	10.40
		44	306-607-D	420.0	3142	7.5	3696	8.8	4620	11.0	5334	12.70
		51	306-608-D	351.4	3047	8.7	3584	10.2	4481	12.8	5236	14.90
		64	306-610-D	273.3	2974	10.9	3499	12.8	4373	16.0	5275	19.30
		76	306-612-D	226.6	2927	12.9	3444	15.2	4305	19.0	5302	23.40
		89	306-614-D	193.5	2927	15.1	3444	17.8	4305	22.3	5514	28.50
		102	306-616-D	162.5	2817	17.3	3314	20.4	4142	25.5	5052	31.10
		115	306-618-D	144.7	2829	19.6	3328	23.0	4160	28.8	5238	36.20
		127	306-620-D	132.5	2860	21.6	3364	25.4	4206	31.8	5484	41.40
		139	306-622-D	118.8	2806	23.6	3302	27.8	4127	34.8	5261	44.30
		152	306-624-D	109.0	2816	25.8	3313	30.4	4142	38.0	5384	49.40
		178	306-628-D	91.8	2779	30.3	3270	35.6	4087	44.5	5272	57.40
		203	306-632-D	80.5	2777	34.5	3267	40.6	4084	50.8	5327	66.20
		254	306-640-D	64.3	2774	43.2	3264	50.8	4080	63.5	5416	84.30
		305	306-648-D	53.4	2768	51.9	3257	61.0	4071	76.3	5446	102.00
40.0	20.0	51	306-708-D	588.7	5104	8.7	6004	10.2	7505	12.8	8594	14.60
		64	306-710-D	452.8	4927	10.9	5796	12.8	7245	16.0	8286	18.30
		76	306-712-D	373.8	4829	12.9	5681	15.2	7101	19.0	8297	22.20
		89	306-714-D	314.0	4750	15.1	5588	17.8	6985	22.3	8288	26.40
		102	306-716-D	273.8	4748	17.3	5585	20.4	6982	25.5	8570	31.30
		115	306-718-D	242.8	4746	19.6	5583	23.0	6979	28.8	8788	36.20
		127	306-720-D	218.0	4707	21.6	5538	25.4	6922	31.8	8743	40.10
		139	306-722-D	196.2	4637	23.6	5455	27.8	6819	34.8	8496	43.30
		152	306-724-D	179.7	4644	25.8	5464	30.4	6830	38.0	8663	48.20
		178	306-728-D	151.9	4597	30.3	5408	35.6	6760	44.5	8598	56.60
		203	306-732-D	132.7	4578	34.5	5386	40.6	6732	50.8	8623	65.00
		254	306-740-D	105.6	4559	43.2	5364	50.8	6705	63.5	8722	82.60
		305	306-748-D	87.9	4556	51.9	5359	61.0	6699	76.3	8830	100.50
50.0	25.0	64	306-810-D	671.4	7305	10.9	8594	12.8	10742	16.0	14435	21.50
		76	306-812-D	537.1	6940	12.9	8164	15.2	10205	19.0	13428	25.00
		89	306-814-D	451.2	6826	15.1	8031	17.8	10039	22.3	13445	29.80
		102	306-816-D	389.0	6744	17.3	7935	20.4	9918	25.5	13497	34.70
		115	306-818-D	341.8	6682	19.6	7861	23.0	9827	28.8	13535	39.60
		127	306-820-D	304.9	6582	21.6	7743	25.4	9679	31.8	13230	43.40
		139	306-822-D	275.1	6501	23.6	7648	27.8	9560	34.8	13013	47.30
		152	306-824-D	250.7	6477	25.8	7620	30.4	9525	38.0	13059	52.10
		178	306-828-D	208.9	6321	30.3	7436	35.6	9295	44.5	12491	59.80
		203	306-832-D	184.9	6381	34.5	7507	40.6	9384	50.8	13055	70.60
		254	306-840-D	146.5	6325	43.2	7442	50.8	9302	63.5	13038	89.00
		305	306-848-D	120.0	6221	51.9	7319	61.0	9149	76.3	12647	105.40
63.0	38.0	76	306-912-D	952	12300	12.9	14470	15.2	-	-	16374	17.20
		89	306-914-D	819	12391	15.1	14578	17.8	-	-	17265	21.08
		102	306-916-D	700	12138	17.3	14280	20.4	-	-	16863	24.09
		114	306-918-D	620	12016	19.4	14136	22.8	-	-	16907	27.27
		127	306-920-D	565	12198	21.6	14351	25.4	-	-	18600	32.92
		152	306-924-D	458	11835	25.8	13923	30.4	-	-	17102	37.34
		178	306-928-D	384	11620	30.3	13670	35.6	-	-	16136	42.02
		203	306-932-D	337	11630	34.5	13682	40.6	-	-	16395	48.65
		254	306-940-D	263	11356	43.2	13360	50.8	-	-	15575	59.22
		305	306-948-D	218	11303	51.9	13298	61.0	-	-	15537	71.27

*Tabulated deflections shown represent near solid and are for design information only.

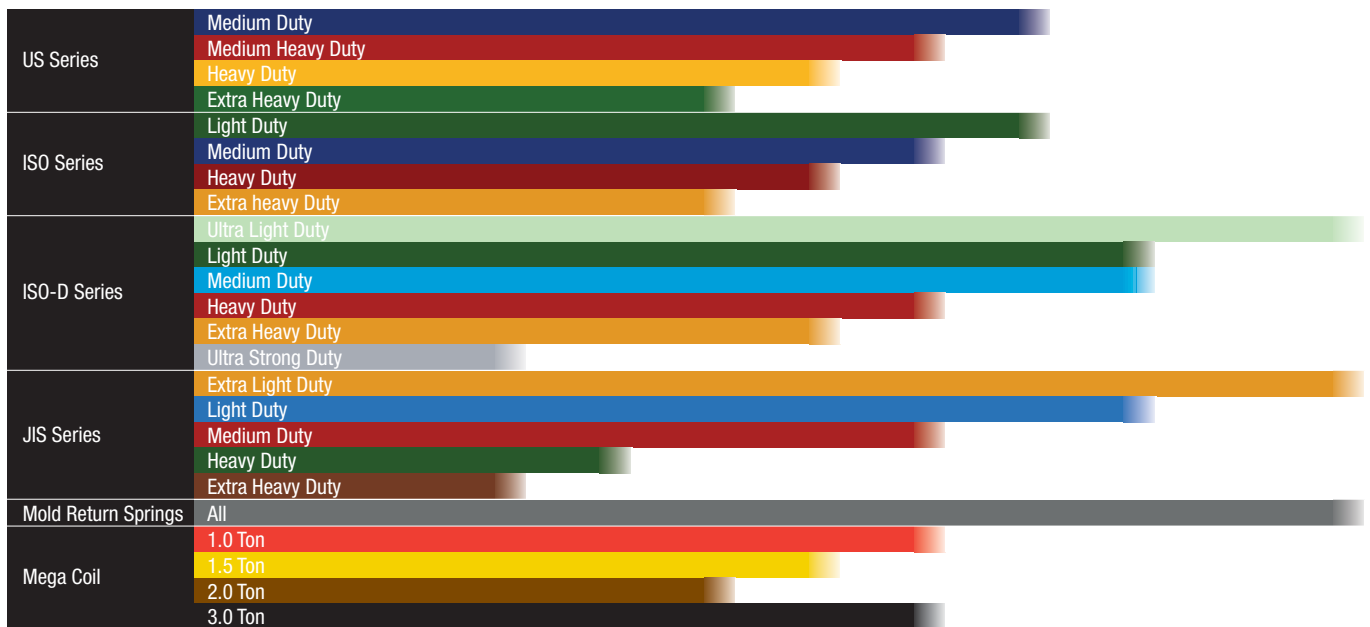


ISO-D Series

Raymond® ULTRA STRONG DUTY ISO D-LINE SPRINGS (METRIC DIMENSIONS) GRAY

Hole Dia. (mm)	Rod Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Spring Rate (N/mm)	LOAD DEFLECTION TABLE							
					Load @ 10% of free length		Load @ 13.5% of free length		Load @ 15% of free length		Load @ Max Recommended Deflection (N)	Max Deflection (mm)
					Load (N)	Deflection (mm)	Load (N)	Deflection (mm)	Load (N)	Deflection (mm)		
25.0	12.5	64	307-510-D	644.0	4122	6.4	5564	8.6	6182	9.6	8372	13.00
		76	307-512-D	556.0	4226	7.6	5705	10.3	6338	11.4	8896	16.00
		89	307-514-D	462.0	4112	8.9	5551	12.0	6168	13.4	9240	20.00
		102	307-516-D	390.0	3978	10.2	5370	13.8	5967	15.3	8970	23.00
		115	307-518-D	360.0	4140	11.5	5589	15.5	6210	17.3	9360	26.00
		127	307-520-D	326.0	4140	12.7	5589	17.1	6210	19.1	9128	28.00
		152	307-524-D	255.0	3876	15.2	5233	20.5	5814	22.8	8670	34.00
		178	307-528-D	230.0	4094	17.8	5527	24.0	6141	26.7	8970	39.00
		203	307-532-D	202.0	4101	20.3	5536	27.4	6151	30.5	9090	45.00
		305	307-548-D	136.0	4148	30.5	5600	41.2	6222	45.8	8568	63.00
32.0	16.0	64	307-610-D	1077.0	6893	6.4	9305	8.6	10339	9.6	14001	13.00
		76	307-612-D	874.0	6642	7.6	8967	10.3	9964	11.4	13984	16.00
		89	307-614-D	721.0	6417	8.9	8663	12.0	9625	13.4	14420	20.00
		102	307-616-D	620.0	6324	10.2	8537	13.8	9486	15.3	14260	23.00
		115	307-618-D	560.0	6440	11.5	8694	15.5	9660	17.3	14560	26.00
		127	307-620-D	496.0	6299	12.7	8504	17.1	9449	19.1	13888	28.00
		152	307-624-D	408.0	6202	15.2	8372	20.5	9302	22.8	13872	34.00
		178	307-628-D	353.0	6283	17.8	8483	24.0	9425	26.7	13767	39.00
		203	307-632-D	304.0	6171	20.3	8331	27.4	9257	30.5	13680	45.00
		254	307-640-D	243.0	6172	25.4	8332	34.3	9258	38.1	15066	62.00
40.0	20.0	305	307-648-D	196.0	5978	30.5	8070	41.2	8967	45.8	14700	75.00
		89	307-714-D	880.0	7832	8.9	10573	12.0	11748	13.4	17600	20.00
		102	307-716-D	762.0	7772	10.2	10493	13.8	11659	15.3	17526	23.00
		115	307-718-D	679.0	7809	11.5	10541	15.5	11713	17.3	17654	26.00
		127	307-720-D	622.0	7899	12.7	10664	17.1	11849	19.1	17416	28.00
		152	307-724-D	509.0	7737	15.2	10445	20.5	11605	22.8	18324	36.00
		178	307-728-D	429.0	7636	17.8	10309	24.0	11454	26.7	18447	43.00
		203	307-732-D	374.0	7592	20.3	10249	27.4	11388	30.5	18326	49.00
		254	307-740-D	296.0	7518	25.4	10150	34.3	11278	38.1	18352	62.00
		305	307-748-D	246.0	7503	30.5	10129	41.2	11255	45.8	18450	75.00
50.0	25.0	89	307-814-D	1410.0	12549	8.9	16941	12.0	18824	13.4	26790	19.00
		102	307-816-D	1215.0	12393	10.2	16731	13.8	18590	15.3	26730	22.00
		115	307-818-D	1076.0	12374	11.5	16705	15.5	18561	17.3	26900	25.00
		127	307-820-D	968.0	12294	12.7	16596	17.1	18440	19.1	27104	28.00
		152	307-824-D	806.0	12251	15.2	16539	20.5	18377	22.8	27404	34.00
		178	307-828-D	698.0	12424	17.8	16773	24.0	18637	26.7	27920	40.00
		203	307-832-D	612.0	12424	20.3	16772	27.4	18635	30.5	27540	45.00
		254	307-840-D	472.0	11989	25.4	16185	34.3	17983	38.1	27376	58.00
		305	307-848-D	388.0	11834	30.5	15976	41.2	17751	45.8	27160	70.00

Deflection to Compressed Length Conversion Tables



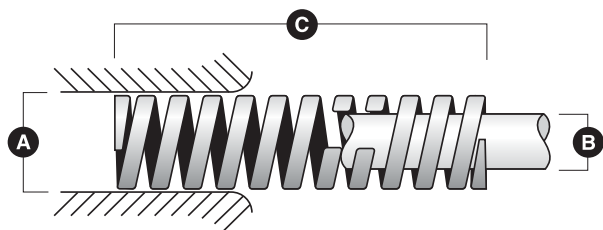
Raymond® DEFLECTION IN % FREE LENGTH (INCH DIMENSIONS)											
Free Length (in)	10%	13.50%	15%	17%	20%	25%	30%	35%	40%	45%	50%
1	0.90	0.87	0.85	0.83	0.80	0.75	0.70	0.65	0.60	0.55	0.50
1.25	1.13	1.08	1.06	1.04	1.00	0.94	0.88	0.81	0.75	0.69	0.63
1.5	1.35	1.30	1.28	1.25	1.20	1.13	1.05	0.98	0.90	0.83	0.75
1.75	1.58	1.51	1.49	1.45	1.40	1.31	1.23	1.14	1.05	0.96	0.88
2	1.80	1.73	1.70	1.66	1.60	1.50	1.40	1.30	1.20	1.10	1.00
2.5	2.25	2.16	2.13	2.08	2.00	1.88	1.75	1.63	1.50	1.38	1.25
3	2.70	2.60	2.55	2.49	2.40	2.25	2.10	1.95	1.80	1.65	1.50
3.5	3.15	3.03	2.98	2.91	2.80	2.63	2.45	2.28	2.10	1.93	1.75
4	3.60	3.46	3.40	3.32	3.20	3.00	2.80	2.60	2.40	2.20	2.00
4.5	4.05	3.89	3.83	3.74	3.60	3.38	3.15	2.93	2.70	2.48	2.25
5	4.50	4.33	4.25	4.15	4.00	3.75	3.50	3.25	3.00	2.75	2.50
5.5	4.95	4.76	4.68	4.57	4.40	4.13	3.85	3.58	3.30	3.03	2.75
6	5.40	5.19	5.10	4.98	4.80	4.50	4.20	3.90	3.60	3.30	3.00
6.5	5.85	5.62	5.53	5.40	5.20	4.88	4.55	4.23	3.90	3.58	3.25
7	6.30	6.06	5.95	5.81	5.60	5.25	4.90	4.55	4.20	3.85	3.50
7.5	6.75	6.49	6.38	6.23	6.00	5.63	5.25	4.88	4.50	4.13	3.75
8	7.20	6.92	6.80	6.64	6.40	6.00	5.60	5.20	4.80	4.40	4.00
10	9.00	8.65	8.50	8.30	8.00	7.50	7.00	6.50	6.00	5.50	5.00
12	10.80	10.38	10.20	9.96	9.60	9.00	8.40	7.80	7.20	6.60	6.00

Compressed Height in Inches

ISO-D Series

Raymond® DEFLECTION IN % FREE LENGTH (METRIC DIMENSIONS)											
Free Length (mm)	10%	13.50%	15%	17%	20%	25%	30%	35%	40%	45%	50%
25	22.5	21.6	21.3	20.8	20.0	18.8	17.5	16.3	15.0	13.8	12.5
32	28.8	27.7	27.2	26.6	25.6	24.0	22.4	20.8	19.2	17.6	16.0
38	34.2	32.9	32.3	31.5	30.4	28.5	26.6	24.7	22.8	20.9	19.0
44	39.6	38.1	37.4	36.5	35.2	33.0	30.8	28.6	26.4	24.2	22.0
51	45.9	44.1	43.4	42.3	40.8	38.3	35.7	33.2	30.6	28.1	25.5
64	57.6	55.4	54.4	53.1	51.2	48.0	44.8	41.6	38.4	35.2	32.0
76	68.4	65.7	64.6	63.1	60.8	57.0	53.2	49.4	45.6	41.8	38.0
89	80.1	77.0	75.7	73.9	71.2	66.8	62.3	57.9	53.4	49.0	44.5
102	91.8	88.2	86.7	84.7	81.6	76.5	71.4	66.3	61.2	56.1	51.0
114	102.6	98.6	96.9	94.6	91.2	85.5	79.8	74.1	68.4	62.7	57.0
127	114.3	109.9	108.0	105.4	101.6	95.3	88.9	82.6	76.2	69.9	63.5
140	126.0	121.1	119.0	116.2	112.0	105.0	98.0	91.0	84.0	77.0	70.0
152	136.8	131.5	129.2	126.2	121.6	114.0	106.4	98.8	91.2	83.6	76.0
165	148.5	142.7	140.3	137.0	132.0	123.8	115.5	107.3	99.0	90.8	82.5
178	160.2	154.0	151.3	147.7	142.4	133.5	124.6	115.7	106.8	97.9	89.0
191	171.9	165.2	162.4	158.5	152.8	143.3	133.7	124.2	114.6	105.1	95.5
203	182.7	175.6	172.6	168.5	162.4	152.3	142.1	132.0	121.8	111.7	101.5
254	228.6	219.7	215.9	210.8	203.2	190.5	177.8	165.1	152.4	139.7	127.0
305	274.5	263.8	259.3	253.2	244.0	228.8	213.5	198.3	183.0	167.8	152.5

Compressed Height in Millimeters



JIS Series

Raymond®

EXTRA LIGHT DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS)

YELLOW

Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (50% of free length)		For Long Life (45% of free length)		For Optimal Life (40% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.315	0.157	0.39	ASF 8 X 10	8.9	0.20		0.18		0.16	
		0.59	ASF 8 X 15	5.9	0.30		0.27		0.24	
		0.79	ASF 8 X 20	4.5	0.39		0.35		0.32	
		0.98	ASF 8 X 25	3.5	0.49		0.44		0.39	
		1.18	ASF 8 X 30	3.0	0.59	18	0.53	16	0.47	14
		1.38	ASF 8 X 35	2.5	0.69		0.62		0.55	
		1.58	ASF 8 X 40	2.2	0.79		0.71		0.63	
		1.77	ASF 8 X 45	2.0	0.89		0.80		0.71	
		1.97	ASF 8 X 50	1.8	0.99		0.89		0.79	
		2.17	ASF 8 X 55	1.6	1.08		0.97		0.87	
		2.36	ASF 8 X 60	1.5	1.18		1.06		0.95	
0.394	0.197	0.79	ASF 10 X 20	5.7	0.39		0.35		0.32	
		0.98	ASF 10 X 25	4.6	0.49		0.44		0.39	
		1.18	ASF 10 X 30	3.8	0.59		0.53		0.47	
		1.38	ASF 10 X 35	3.3	0.69		0.62		0.55	
		1.58	ASF 10 X 40	2.9	0.79		0.71		0.63	
		1.77	ASF 10 X 45	2.5	0.89		0.80		0.71	
		1.97	ASF 10 X 50	2.3	0.99	23	0.89	20	0.79	18
		2.17	ASF 10 X 55	2.1	1.08		0.97		0.87	
		2.36	ASF 10 X 60	1.9	1.18		1.06		0.95	
		2.56	ASF 10 X 65	1.8	1.28		1.15		1.02	
		2.76	ASF 10 X 70	1.7	1.38		1.24		1.10	
		2.95	ASF 10 X 75	1.5	1.48		1.33		1.18	
		3.15	ASF 10 X 80	1.4	1.58		1.42		1.26	
0.472	0.236	0.79	ASF 12 X 20	8.0	0.39		0.35		0.32	
		0.98	ASF 12 X 25	6.4	0.49		0.44		0.39	
		1.18	ASF 12 X 30	5.3	0.59		0.53		0.47	
		1.38	ASF 12 X 35	4.6	0.69		0.62		0.55	
		1.58	ASF 12 X 40	4.0	0.79		0.71		0.63	
		1.77	ASF 12 X 45	3.5	0.89		0.80		0.71	
		1.97	ASF 12 X 50	3.2	0.99	32	0.89	28	0.79	25
		2.17	ASF 12 X 55	2.9	1.08		0.97		0.87	
		2.36	ASF 12 X 60	2.7	1.18		1.06		0.95	
		2.56	ASF 12 X 65	2.5	1.28		1.15		1.02	
		2.76	ASF 12 X 70	2.3	1.38		1.24		1.10	
		2.95	ASF 12 X 75	2.1	1.48		1.33		1.18	
		3.15	ASF 12 X 80	2.0	1.58		1.42		1.26	
0.551	0.276	0.98	ASF 14 X 25	8.2	0.49		0.44		0.39	
		1.18	ASF 14 X 30	6.9	0.59		0.53		0.47	
		1.38	ASF 14 X 35	5.9	0.69		0.62		0.55	
		1.58	ASF 14 X 40	5.1	0.79		0.71		0.63	
		1.77	ASF 14 X 45	4.6	0.89		0.80		0.71	
		1.97	ASF 14 X 50	4.1	0.99		0.89		0.79	
		2.17	ASF 14 X 55	3.7	1.08	40	0.97	36	0.87	32
		2.36	ASF 14 X 60	3.4	1.18		1.06		0.95	
		2.56	ASF 14 X 65	3.1	1.28		1.15		1.02	
		2.76	ASF 14 X 70	2.9	1.38		1.24		1.10	
		2.95	ASF 14 X 75	2.7	1.48		1.33		1.18	
		3.15	ASF 14 X 80	2.6	1.58		1.42		1.26	
		3.54	ASF 14 X 90	2.3	1.77		1.59		1.42	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® EXTRA LIGHT DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS)					YELLOW					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (50% of free length)		For Long Life (45% of free length)		For Optimal Life (40% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.630	0.315	0.98	ASF 16 X 25	9.6	0.49		0.44		0.39	
		1.18	ASF 16 X 30	8.0	0.59		0.53		0.47	
		1.38	ASF 16 X 35	6.9	0.69		0.62		0.55	
		1.58	ASF 16 X 40	6.0	0.79		0.71		0.63	
		1.77	ASF 16 X 45	5.4	0.89		0.80		0.71	
		1.97	ASF 16 X 50	4.8	0.99		0.89		0.79	
		2.17	ASF 16 X 55	4.4	1.08	47	0.97	43	0.87	38
		2.36	ASF 16 X 60	4.0	1.18		1.06		0.95	
		2.56	ASF 16 X 65	3.7	1.28		1.15		1.02	
		2.76	ASF 16 X 70	3.4	1.38		1.24		1.10	
		2.95	ASF 16 X 75	3.2	1.48		1.33		1.18	
		3.15	ASF 16 X 80	3.0	1.58		1.42		1.26	
		3.54	ASF 16 X 90	2.7	1.77		1.59		1.42	
		3.94	ASF 16 X 100	2.4	1.97		1.77		1.58	
0.709	0.354	0.98	ASF 18 X 25	11.9	0.49		0.44		0.39	
		1.18	ASF 18 X 30	9.9	0.59		0.53		0.47	
		1.38	ASF 18 X 35	8.5	0.69		0.62		0.55	
		1.58	ASF 18 X 40	7.4	0.79		0.71		0.63	
		1.77	ASF 18 X 45	6.6	0.89		0.80		0.71	
		1.97	ASF 18 X 50	5.9	0.99		0.89		0.79	
		2.17	ASF 18 X 55	5.4	1.08	58	0.97	53	0.87	47
		2.36	ASF 18 X 60	5.0	1.18		1.06		0.95	
		2.56	ASF 18 X 65	4.6	1.28		1.15		1.02	
		2.76	ASF 18 X 70	4.2	1.38		1.24		1.10	
		2.95	ASF 18 X 75	4.0	1.48		1.33		1.18	
		3.15	ASF 18 X 80	3.7	1.58		1.42		1.26	
		3.54	ASF 18 X 90	3.3	1.77		1.59		1.42	
		3.94	ASF 18 X 100	3.0	1.97		1.77		1.58	
0.787	0.433	0.98	ASF 20 X 25	14.6	0.49		0.44		0.39	
		1.18	ASF 20 X 30	12.2	0.59		0.53		0.47	
		1.38	ASF 20 X 35	10.5	0.69		0.62		0.55	
		1.58	ASF 20 X 40	9.1	0.79		0.71		0.63	
		1.77	ASF 20 X 45	8.1	0.89		0.80		0.71	
		1.97	ASF 20 X 50	7.3	0.99		0.89		0.79	
		2.17	ASF 20 X 55	6.6	1.08		0.97		0.87	
		2.36	ASF 20 X 60	6.1	1.18	72	1.06	65	0.95	58
		2.56	ASF 20 X 65	5.6	1.28		1.15		1.02	
		2.76	ASF 20 X 70	5.2	1.38		1.24		1.10	
		2.95	ASF 20 X 75	4.9	1.48		1.33		1.18	
		3.15	ASF 20 X 80	4.6	1.58		1.42		1.26	
		3.54	ASF 20 X 90	4.1	1.77		1.59		1.42	
		3.94	ASF 20 X 100	3.7	1.97		1.77		1.58	
		4.92	ASF 20 X 125	2.9	2.46		2.21		1.97	
0.866	0.433	5.91	ASF 20 X 150	2.5	2.95		2.66		2.36	
		0.98	ASF 22 X 25	18.3	0.49		0.44		0.39	
		1.18	ASF 22 X 30	15.3	0.59		0.53		0.47	
		1.38	ASF 22 X 35	13.1	0.69		0.62		0.55	
		1.58	ASF 22 X 40	11.4	0.79		0.71		0.63	
		1.77	ASF 22 X 45	10.2	0.89		0.80		0.71	
		1.97	ASF 22 X 50	9.1	0.99		0.89		0.79	
		2.17	ASF 22 X 55	8.3	1.08		0.97		0.87	
		2.36	ASF 22 X 60	7.6	1.18	90	1.06	81	0.95	72
		2.56	ASF 22 X 65	7.0	1.28		1.15		1.02	
		2.76	ASF 22 X 70	6.5	1.38		1.24		1.10	
		2.95	ASF 22 X 75	6.1	1.48		1.33		1.18	
		3.15	ASF 22 X 80	5.7	1.58		1.42		1.26	
		3.54	ASF 22 X 90	5.1	1.77		1.59		1.42	
		3.94	ASF 22 X 100	4.6	1.97		1.77		1.58	
		4.92	ASF 22 X 125	3.7	2.46		2.21		1.97	
		5.91	ASF 22 X 150	3.0	2.95		2.66		2.36	

*Tabulated deflections shown represent near solid and are for design information only.



JIS Series

Raymond® EXTRA LIGHT DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS) YELLOW

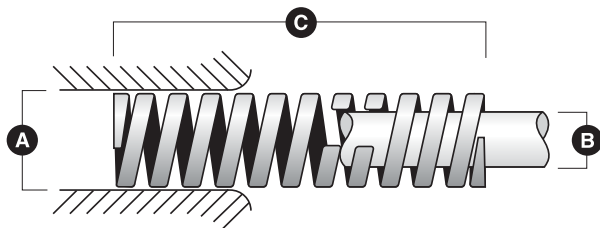
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (50% of free length)		For Long Life (45% of free length)		For Optimal Life (40% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.984	0.531	0.98	ASF 25 X 25	22.8	0.49		0.44		0.39	
		1.18	ASF 25 X 30	19.0	0.59		0.53		0.47	
		1.38	ASF 25 X 35	16.3	0.69		0.62		0.55	
		1.58	ASF 25 X 40	14.3	0.79		0.71		0.63	
		1.77	ASF 25 X 45	12.7	0.89		0.80		0.71	
		1.97	ASF 25 X 50	11.4	0.99		0.89		0.79	
		2.17	ASF 25 X 55	10.4	1.08		0.97		0.87	
		2.36	ASF 25 X 60	9.5	1.18		1.06		0.95	
		2.56	ASF 25 X 65	8.8	1.28	112	1.15	101	1.02	90
		2.76	ASF 25 X 70	8.2	1.38		1.24		1.10	
		2.95	ASF 25 X 75	7.6	1.48		1.33		1.18	
		3.15	ASF 25 X 80	7.1	1.58		1.42		1.26	
		3.54	ASF 25 X 90	6.3	1.77		1.59		1.42	
		3.94	ASF 25 X 100	5.7	1.97		1.77		1.58	
		4.92	ASF 25 X 125	4.6	2.46		2.21		1.97	
		5.91	ASF 25 X 150	3.8	2.95		2.66		2.36	
		6.89	ASF 25 X 175	3.3	3.45		3.10		2.76	
1.063	0.531	0.98	ASF 27 X 25	27.4	0.49		0.44		0.39	
		1.18	ASF 27 X 30	22.8	0.59		0.53		0.47	
		1.38	ASF 27 X 35	19.6	0.69		0.62		0.55	
		1.58	ASF 27 X 40	17.1	0.79		0.71		0.63	
		1.77	ASF 27 X 45	15.3	0.89		0.80		0.71	
		1.97	ASF 27 X 50	13.7	0.99		0.89		0.79	
		2.17	ASF 27 X 55	12.5	1.08		0.97		0.87	
		2.36	ASF 27 X 60	11.4	1.18		1.06		0.95	
		2.56	ASF 27 X 65	10.6	1.28	135	1.15	121	1.02	108
		2.76	ASF 27 X 70	9.8	1.38		1.24		1.10	
		2.95	ASF 27 X 75	9.1	1.48		1.33		1.18	
		3.15	ASF 27 X 80	8.6	1.58		1.42		1.26	
		3.54	ASF 27 X 90	7.6	1.77		1.59		1.42	
		3.94	ASF 27 X 100	6.9	1.97		1.77		1.58	
		4.92	ASF 27 X 125	5.5	2.46		2.21		1.97	
		5.91	ASF 27 X 150	4.6	2.95		2.66		2.36	
		6.89	ASF 27 X 175	3.9	3.45		3.10		2.76	
1.181	0.630	0.98	ASF 30 X 25	33.1	0.49		0.44		0.39	
		1.18	ASF 30 X 30	27.4	0.59		0.53		0.47	
		1.38	ASF 30 X 35	23.6	0.69		0.62		0.55	
		1.58	ASF 30 X 40	20.6	0.79		0.71		0.63	
		1.77	ASF 30 X 45	18.3	0.89		0.80		0.71	
		1.97	ASF 30 X 50	16.5	0.99		0.89		0.79	
		2.17	ASF 30 X 55	15.0	1.08		0.97		0.87	
		2.36	ASF 30 X 60	13.7	1.18	163	1.06	147	0.95	131
		2.56	ASF 30 X 65	12.7	1.28		1.15		1.02	
		2.76	ASF 30 X 70	11.7	1.38		1.24		1.10	
		2.95	ASF 30 X 75	11.0	1.48		1.33		1.18	
		3.15	ASF 30 X 80	10.3	1.58		1.42		1.26	
		3.54	ASF 30 X 90	9.1	1.77		1.59		1.42	
		3.94	ASF 30 X 100	8.2	1.97		1.77		1.58	
		4.92	ASF 30 X 125	6.6	2.46		2.21		1.97	
		5.91	ASF 30 X 150	5.5	2.95		2.66		2.36	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® EXTRA LIGHT DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS) YELLOW										
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (50% of free length)		For Long Life (45% of free length)		For Optimal Life (40% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
1.378	0.748	6.89	ASF 30 X 175	4.7	3.45	163	3.10	147	2.76	131
		7.87	ASF 30 X 200	4.1	3.94		3.54		3.15	
		1.58	ASF 35 X 40	28.0	0.79		0.71		0.63	
		1.77	ASF 35 X 45	24.9	0.89		0.80		0.71	
		1.97	ASF 35 X 50	22.4	0.99		0.89		0.79	
		2.17	ASF 35 X 55	20.3	1.08		0.97		0.87	
		2.36	ASF 35 X 60	18.6	1.18		1.06		0.95	
		2.56	ASF 35 X 65	17.2	1.28		1.15		1.02	
		2.76	ASF 35 X 70	16.0	1.38	221	1.24	198	1.10	176
		2.95	ASF 35 X 75	14.9	1.48		1.33		1.18	
		3.15	ASF 35 X 80	14.0	1.58		1.42		1.26	
		3.54	ASF 35 X 90	12.4	1.77		1.59		1.42	
		3.94	ASF 35 X 100	11.2	1.97		1.77		1.58	
		4.92	ASF 35 X 125	9.0	2.46		2.21		1.97	
		5.91	ASF 35 X 150	7.4	2.95		2.66		2.36	
		6.89	ASF 35 X 175	6.4	3.45		3.10		2.76	
		7.87	ASF 35 X 200	5.6	3.94		3.54		3.15	
1.575	0.866	1.58	ASF 40 X 40	36.4	0.79		0.71		0.63	
		1.97	ASF 40 X 50	29.2	0.99		0.89		0.79	
		2.36	ASF 40 X 60	24.3	1.18		1.06		0.95	
		2.76	ASF 40 X 70	20.8	1.38		1.24		1.10	
		3.15	ASF 40 X 80	18.3	1.58		1.42		1.26	
		3.54	ASF 40 X 90	16.2	1.77	287	1.59	258	1.42	230
		3.94	ASF 40 X 100	14.6	1.97		1.77		1.58	
		4.92	ASF 40 X 125	11.7	2.46		2.21		1.97	
		5.91	ASF 40 X 150	9.7	2.95		2.66		2.36	
		6.89	ASF 40 X 175	8.3	3.45		3.10		2.76	
		7.87	ASF 40 X 200	7.3	3.94		3.54		3.15	
		9.84	ASF 40 X 250	5.8	4.92		4.43		3.94	
1.969	0.984	1.97	ASF 50 X 50	45.7	0.99		0.89		0.79	
		2.36	ASF 50 X 60	38.0	1.18		1.06		0.95	
		2.76	ASF 50 X 70	32.6	1.38		1.24		1.10	
		3.15	ASF 50 X 80	28.6	1.58		1.42		1.26	
		3.54	ASF 50 X 90	25.4	1.77		1.59		1.42	
		3.94	ASF 50 X 100	22.8	1.97		1.77		1.58	
		4.92	ASF 50 X 125	18.3	2.46		2.21		1.97	
		5.91	ASF 50 X 150	15.2	2.95	450	2.66	405	2.36	360
		6.89	ASF 50 X 175	13.0	3.45		3.10		2.76	
		7.87	ASF 50 X 200	11.4	3.94		3.54		3.15	
		9.84	ASF 50 X 250	9.1	4.92		4.43		3.94	
		11.81	ASF 50 X 300	7.6	5.91		5.32		4.72	
		13.78	ASF 50 X 350	6.5	6.89		6.20		5.51	
		15.75	ASF 50 X 400	5.7	7.87		7.09		6.30	
		17.72	ASF 50 X 450	5.1	8.86		7.97		7.09	
		19.69	ASF 50 X 500	4.6	9.84		8.86		7.87	
2.362	1.299	2.36	ASF 60 X 60	54.8	1.18		1.06		0.95	
		2.76	ASF 60 X 70	46.9	1.38		1.24		1.10	
		3.15	ASF 60 X 80	41.1	1.58		1.42		1.26	
		3.54	ASF 60 X 90	36.5	1.77		1.59		1.42	
		3.94	ASF 60 X 100	32.9	1.97		1.77		1.58	
		4.92	ASF 60 X 125	26.3	2.46		2.21		1.97	
		5.91	ASF 60 X 150	21.9	2.95		2.66		2.36	
		6.89	ASF 60 X 175	18.8	3.45	647	3.10	582	2.76	518
		7.87	ASF 60 X 200	16.5	3.94		3.54		3.15	
		9.84	ASF 60 X 250	13.1	4.92		4.43		3.94	
		11.81	ASF 60 X 300	11.0	5.91		5.32		4.72	
		13.78	ASF 60 X 350	9.4	6.89		6.20		5.51	
		15.75	ASF 60 X 400	8.2	7.87		7.09		6.30	
		17.72	ASF 60 X 450	7.3	8.86		7.97		7.09	
		19.69	ASF 60 X 500	6.6	9.84		8.86		7.87	

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JIS Series

Raymond® LIGHT DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS) BLUE

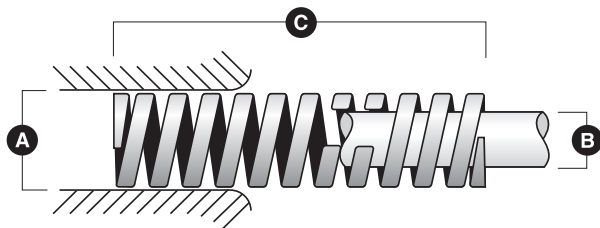
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (40% of free length)		For Long Life (36% of free length)		For Optimal Life (32% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.315	0.157	0.39	ASL 8 X 10	14.3	0.16		0.14		0.13	
		0.59	ASL 8 X 15	9.5	0.24		0.21		0.19	
		0.79	ASL 8 X 20	7.1	0.32		0.28		0.25	
		0.98	ASL 8 X 25	5.7	0.39		0.35		0.32	
		1.18	ASL 8 X 30	4.7	0.47	23	0.43	20	0.38	18
		1.38	ASL 8 X 35	4.1	0.55		0.50		0.44	
		1.58	ASL 8 X 40	3.6	0.63		0.57		0.50	
		1.77	ASL 8 X 45	3.2	0.71		0.64		0.57	
		1.97	ASL 8 X 50	2.9	0.79		0.71		0.63	
		2.17	ASL 8 X 55	2.6	0.87		0.78		0.69	
		2.36	ASL 8 X 60	2.4	0.95		0.85		0.76	
0.394	0.197	0.79	ASL 10 X 20	10.3	0.32		0.28		0.25	
		0.98	ASL 10 X 25	8.3	0.39		0.35		0.32	
		1.18	ASL 10 X 30	6.9	0.47		0.43		0.38	
		1.38	ASL 10 X 35	5.9	0.55		0.50		0.44	
		1.58	ASL 10 X 40	5.1	0.63		0.57		0.50	
		1.77	ASL 10 X 45	4.6	0.71		0.64		0.57	
		1.97	ASL 10 X 50	4.2	0.79	33	0.71	29	0.63	26
		2.17	ASL 10 X 55	3.8	0.87		0.78		0.69	
		2.36	ASL 10 X 60	3.4	0.95		0.85		0.76	
		2.56	ASL 10 X 65	3.1	1.02		0.92		0.82	
		2.76	ASL 10 X 70	2.9	1.10		0.99		0.88	
		2.95	ASL 10 X 75	2.7	1.18		1.06		0.95	
		3.15	ASL 10 X 80	2.6	1.26		1.13		1.01	
0.472	0.236	0.79	ASL 12 X 20	15.0	0.32		0.28		0.25	
		0.98	ASL 12 X 25	12.0	0.39		0.35		0.32	
		1.18	ASL 12 X 30	10.0	0.47		0.43		0.38	
		1.38	ASL 12 X 35	8.6	0.55		0.50		0.44	
		1.58	ASL 12 X 40	7.5	0.63		0.57		0.50	
		1.77	ASL 12 X 45	6.7	0.71		0.64		0.57	
		1.97	ASL 12 X 50	6.0	0.79	47	0.71	43	0.63	38
		2.17	ASL 12 X 55	5.5	0.87		0.78		0.69	
		2.36	ASL 12 X 60	5.0	0.95		0.85		0.76	
		2.56	ASL 12 X 65	4.6	1.02		0.92		0.82	
		2.76	ASL 12 X 70	4.3	1.10		0.99		0.88	
		2.95	ASL 12 X 75	4.0	1.18		1.06		0.95	
		3.15	ASL 12 X 80	3.8	1.26		1.13		1.01	
0.551	0.276	0.98	ASL 14 X 25	16.0	0.39		0.35		0.32	
		1.18	ASL 14 X 30	13.4	0.47		0.43		0.38	
		1.38	ASL 14 X 35	11.4	0.55		0.50		0.44	
		1.58	ASL 14 X 40	10.0	0.63		0.57		0.50	
		1.77	ASL 14 X 45	8.9	0.71		0.64		0.57	
		1.97	ASL 14 X 50	8.0	0.79		0.71		0.63	
		2.17	ASL 14 X 55	7.3	0.87	63	0.78	57	0.69	50
		2.36	ASL 14 X 60	6.7	0.95		0.85		0.76	
		2.56	ASL 14 X 65	6.2	1.02		0.92		0.82	
		2.76	ASL 14 X 70	5.7	1.10		0.99		0.88	
		2.95	ASL 14 X 75	5.3	1.18		1.06		0.95	
		3.15	ASL 14 X 80	5.0	1.26		1.13		1.01	
		3.54	ASL 14 X 90	4.4	1.42		1.28		1.13	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® LIGHT DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS)					BLUE					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (40% of free length)		For Long Life (36% of free length)		For Optimal Life (32% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.630	0.315	0.98	ASL 16 X 25	20.0	0.39		0.35		0.32	
		1.18	ASL 16 X 30	16.7	0.47		0.43		0.38	
		1.38	ASL 16 X 35	14.3	0.55		0.50		0.44	
		1.58	ASL 16 X 40	12.5	0.63		0.57		0.50	
		1.77	ASL 16 X 45	11.1	0.71		0.64		0.57	
		1.97	ASL 16 X 50	10.0	0.79		0.71		0.63	
		2.17	ASL 16 X 55	9.1	0.87	79	0.78	71	0.69	63
		2.36	ASL 16 X 60	8.3	0.95		0.85		0.76	
		2.56	ASL 16 X 65	7.7	1.02		0.92		0.82	
		2.76	ASL 16 X 70	7.1	1.10		0.99		0.88	
		2.95	ASL 16 X 75	6.7	1.18		1.06		0.95	
		3.15	ASL 16 X 80	6.3	1.26		1.13		1.01	
		3.54	ASL 16 X 90	5.6	1.42		1.28		1.13	
		3.94	ASL 16 X 100	5.0	1.58		1.42		1.26	
0.709	0.354	0.98	ASL 18 X 25	24.6	0.39		0.35		0.32	
		1.18	ASL 18 X 30	20.4	0.47		0.43		0.38	
		1.38	ASL 18 X 35	17.5	0.55		0.50		0.44	
		1.58	ASL 18 X 40	15.4	0.63		0.57		0.50	
		1.77	ASL 18 X 45	13.7	0.71		0.64		0.57	
		1.97	ASL 18 X 50	12.3	0.79		0.71		0.63	
		2.17	ASL 18 X 55	11.2	0.87	97	0.78	87	0.69	77
		2.36	ASL 18 X 60	10.2	0.95		0.85		0.76	
		2.56	ASL 18 X 65	9.5	1.02		0.92		0.82	
		2.76	ASL 18 X 70	8.8	1.10		0.99		0.88	
		2.95	ASL 18 X 75	8.2	1.18		1.06		0.95	
		3.15	ASL 18 X 80	7.7	1.26		1.13		1.01	
		3.54	ASL 18 X 90	6.9	1.42		1.28		1.13	
		3.94	ASL 18 X 100	6.1	1.58		1.42		1.26	
0.787	0.394	0.98	ASL 20 X 25	30.8	0.39		0.35		0.32	
		1.18	ASL 20 X 30	25.7	0.47		0.43		0.38	
		1.38	ASL 20 X 35	22.0	0.55		0.50		0.44	
		1.58	ASL 20 X 40	19.3	0.63		0.57		0.50	
		1.77	ASL 20 X 45	17.1	0.71		0.64		0.57	
		1.97	ASL 20 X 50	15.4	0.79		0.71		0.63	
		2.17	ASL 20 X 55	14.0	0.87		0.78		0.69	
		2.36	ASL 20 X 60	12.9	0.95	122	0.85	109	0.76	97
		2.56	ASL 20 X 65	11.9	1.02		0.92		0.82	
		2.76	ASL 20 X 70	11.0	1.10		0.99		0.88	
		2.95	ASL 20 X 75	10.3	1.18		1.06		0.95	
		3.15	ASL 20 X 80	9.7	1.26		1.13		1.01	
		3.54	ASL 20 X 90	8.6	1.42		1.28		1.13	
		3.94	ASL 20 X 100	7.7	1.58		1.42		1.26	
		4.92	ASL 20 X 125	6.2	1.97		1.77		1.58	
0.866	0.433	5.91	ASL 20 X 150	5.1	2.36		2.13		1.89	
		0.98	ASL 22 X 25	38.3	0.39		0.35		0.32	
		1.18	ASL 22 X 30	32.0	0.47		0.43		0.38	
		1.38	ASL 22 X 35	27.4	0.55		0.50		0.44	
		1.58	ASL 22 X 40	24.0	0.63		0.57		0.50	
		1.77	ASL 22 X 45	21.2	0.71		0.64		0.57	
		1.97	ASL 22 X 50	19.1	0.79		0.71		0.63	
		2.17	ASL 22 X 55	17.4	0.87		0.78		0.69	
		2.36	ASL 22 X 60	16.0	0.95	151	0.85	135	0.76	121
		2.56	ASL 22 X 65	14.7	1.02		0.92		0.82	
		2.76	ASL 22 X 70	13.7	1.10		0.99		0.88	
		2.95	ASL 22 X 75	12.7	1.18		1.06		0.95	
		3.15	ASL 22 X 80	12.0	1.26		1.13		1.01	
		3.54	ASL 22 X 90	10.6	1.42		1.28		1.13	
		3.94	ASL 22 X 100	9.6	1.58		1.42		1.26	
		4.92	ASL 22 X 125	7.7	1.97		1.77		1.58	
		5.91	ASL 22 X 150	6.4	2.36		2.13		1.89	

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JIS Series

Raymond® LIGHT DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS) BLUE

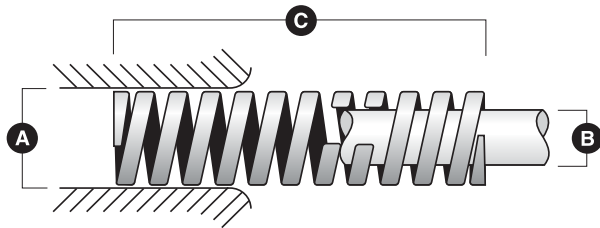
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (40% of free length)		For Long Life (36% of free length)		For Optimal Life (32% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.984	0.492	0.98	ASL 25 X 25	48.0	0.39		0.35		0.32	
		1.18	ASL 25 X 30	40.0	0.47		0.43		0.38	
		1.38	ASL 25 X 35	34.3	0.55		0.50		0.44	
		1.58	ASL 25 X 40	30.0	0.63		0.57		0.50	
		1.77	ASL 25 X 45	26.7	0.71		0.64		0.57	
		1.97	ASL 25 X 50	24.0	0.79		0.71		0.63	
		2.17	ASL 25 X 55	21.8	0.87		0.78		0.69	
		2.36	ASL 25 X 60	20.0	0.95	189	0.85	170	0.76	151
		2.56	ASL 25 X 65	18.4	1.02		0.92		0.82	
		2.76	ASL 25 X 70	17.1	1.10		0.99		0.88	
		2.95	ASL 25 X 75	16.0	1.18		1.06		0.95	
		3.15	ASL 25 X 80	15.0	1.26		1.13		1.01	
		3.54	ASL 25 X 90	13.3	1.42		1.28		1.13	
		3.94	ASL 25 X 100	12.0	1.58		1.42		1.26	
		4.92	ASL 25 X 125	9.6	1.97		1.77		1.58	
		5.91	ASL 25 X 150	8.0	2.36		2.13		1.89	
		6.89	ASL 25 X 175	6.9	2.76		2.48		2.21	
1.063	0.531	0.98	ASL 27 X 25	57.1	0.39		0.35		0.32	
		1.18	ASL 27 X 30	47.6	0.47		0.43		0.38	
		1.38	ASL 27 X 35	40.8	0.55		0.50		0.44	
		1.58	ASL 27 X 40	35.7	0.63		0.57		0.50	
		1.77	ASL 27 X 45	31.8	0.71		0.64		0.57	
		1.97	ASL 27 X 50	28.6	0.79		0.71		0.63	
		2.17	ASL 27 X 55	26.0	0.87		0.78		0.69	
		2.36	ASL 27 X 60	23.8	0.95		0.85		0.76	
		2.56	ASL 27 X 65	22.0	1.02	225	0.92	202	0.82	180
		2.76	ASL 27 X 70	20.4	1.10		0.99		0.88	
		2.95	ASL 27 X 75	19.0	1.18		1.06		0.95	
		3.15	ASL 27 X 80	17.9	1.26		1.13		1.01	
		3.54	ASL 27 X 90	15.9	1.42		1.28		1.13	
		3.94	ASL 27 X 100	14.3	1.58		1.42		1.26	
		4.92	ASL 27 X 125	11.4	1.97		1.77		1.58	
		5.91	ASL 27 X 150	9.5	2.36		2.13		1.89	
		6.89	ASL 27 X 175	8.2	2.76		2.48		2.21	
1.181	0.591	0.98	ASL 30 X 25	69.2	0.39		0.35		0.32	
		1.18	ASL 30 X 30	57.6	0.47		0.43		0.38	
		1.38	ASL 30 X 35	49.4	0.55		0.50		0.44	
		1.58	ASL 30 X 40	43.2	0.63		0.57		0.50	
		1.77	ASL 30 X 45	38.4	0.71		0.64		0.57	
		1.97	ASL 30 X 50	34.6	0.79		0.71		0.63	
		2.17	ASL 30 X 55	31.4	0.87		0.78		0.69	
		2.36	ASL 30 X 60	28.8	0.95	273	0.85	245	0.76	218
		2.56	ASL 30 X 65	26.6	1.02		0.92		0.82	
		2.76	ASL 30 X 70	24.7	1.10		0.99		0.88	
		2.95	ASL 30 X 75	23.0	1.18		1.06		0.95	
		3.15	ASL 30 X 80	21.6	1.26		1.13		1.01	
		3.54	ASL 30 X 90	19.2	1.42		1.28		1.13	
		3.94	ASL 30 X 100	17.2	1.58		1.42		1.26	
		4.92	ASL 30 X 125	13.8	1.97		1.77		1.58	
		5.91	ASL 30 X 150	11.5	2.36		2.13		1.89	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® LIGHT DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS)					BLUE					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (40% of free length)		For Long Life (36% of free length)		For Optimal Life (32% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
1.378	0.689	6.89	ASL 30 X 175	9.8	2.76	273	2.48	245	2.21	218
		7.87	ASL 30 X 200	8.6	3.15		2.84		2.52	
		1.58	ASL 35 X 40	58.9	0.63		0.57		0.50	
		1.77	ASL 35 X 45	52.4	0.71		0.64		0.57	
		1.97	ASL 35 X 50	47.1	0.79		0.71		0.63	
		2.17	ASL 35 X 55	42.8	0.87		0.78		0.69	
		2.36	ASL 35 X 60	39.2	0.95		0.85		0.76	
		2.56	ASL 35 X 65	36.3	1.02		0.92		0.82	
		2.76	ASL 35 X 70	33.6	1.10	371	0.99	334	0.88	297
		2.95	ASL 35 X 75	31.4	1.18		1.06		0.95	
		3.15	ASL 35 X 80	29.4	1.26		1.13		1.01	
		3.54	ASL 35 X 90	26.2	1.42		1.28		1.13	
		3.94	ASL 35 X 100	23.5	1.58		1.42		1.26	
		4.92	ASL 35 X 125	18.8	1.97		1.77		1.58	
		5.91	ASL 35 X 150	15.7	2.36		2.13		1.89	
		6.89	ASL 35 X 175	13.4	2.76		2.48		2.21	
		7.87	ASL 35 X 200	11.8	3.15		2.84		2.52	
1.575	0.787	1.58	ASL 40 X 40	77.1	0.63		0.57		0.50	
		1.97	ASL 40 X 50	61.7	0.79		0.71		0.63	
		2.36	ASL 40 X 60	51.4	0.95		0.85		0.76	
		2.76	ASL 40 X 70	44.0	1.10		0.99		0.88	
		3.15	ASL 40 X 80	38.5	1.26		1.13		1.01	
		3.54	ASL 40 X 90	34.3	1.42	486	1.28	437	1.13	389
		3.94	ASL 40 X 100	30.8	1.58		1.42		1.26	
		4.92	ASL 40 X 125	24.7	1.97		1.77		1.58	
		5.91	ASL 40 X 150	20.6	2.36		2.13		1.89	
		6.89	ASL 40 X 175	17.6	2.76		2.48		2.21	
		7.87	ASL 40 X 200	15.4	3.15		2.84		2.52	
		9.84	ASL 40 X 250	12.3	3.94		3.54		3.15	
1.969	0.984	1.97	ASL 50 X 50	96.4	0.79		0.71		0.63	
		2.36	ASL 50 X 60	80.4	0.95		0.85		0.76	
		2.76	ASL 50 X 70	68.9	1.10		0.99		0.88	
		3.15	ASL 50 X 80	60.3	1.26		1.13		1.01	
		3.54	ASL 50 X 90	53.6	1.42		1.28		1.13	
		3.94	ASL 50 X 100	48.3	1.58		1.42		1.26	
		4.92	ASL 50 X 125	38.6	1.97		1.77		1.58	
		5.91	ASL 50 X 150	32.2	2.36	760	2.13	684	1.89	608
		6.89	ASL 50 X 175	27.5	2.76		2.48		2.21	
		7.87	ASL 50 X 200	24.1	3.15		2.84		2.52	
		9.84	ASL 50 X 250	19.3	3.94		3.54		3.15	
		11.81	ASL 50 X 300	16.1	4.72		4.25		3.78	
		13.78	ASL 50 X 350	13.8	5.51		4.96		4.41	
		15.75	ASL 50 X 400	12.1	6.30		5.67		5.04	
		17.72	ASL 50 X 450	10.7	7.09		6.38		5.67	
		19.69	ASL 50 X 500	9.7	7.87		7.09		6.30	
2.362	1.181	2.36	ASL 60 X 60	115.6	0.95		0.85		0.76	
		2.76	ASL 60 X 70	99.1	1.10		0.99		0.88	
		3.15	ASL 60 X 80	86.7	1.26		1.13		1.01	
		3.54	ASL 60 X 90	77.1	1.42		1.28		1.13	
		3.94	ASL 60 X 100	69.4	1.58		1.42		1.26	
		4.92	ASL 60 X 125	55.5	1.97		1.77		1.58	
		5.91	ASL 60 X 150	46.3	2.36		2.13		1.89	
		6.89	ASL 60 X 175	39.6	2.76	1093	2.48	983	2.21	874
		7.87	ASL 60 X 200	34.7	3.15		2.84		2.52	
		9.84	ASL 60 X 250	27.8	3.94		3.54		3.15	
		11.81	ASL 60 X 300	23.1	4.72		4.25		3.78	
		13.78	ASL 60 X 350	19.8	5.51		4.96		4.41	
		15.75	ASL 60 X 400	17.4	6.30		5.67		5.04	
		17.72	ASL 60 X 450	15.4	7.09		6.38		5.67	
		19.69	ASL 60 X 500	13.9	7.87		7.09		6.30	

*Tabulated deflections shown represent near solid and are for design information only.



JIS Series

Raymond® MEDIUM DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS) RED

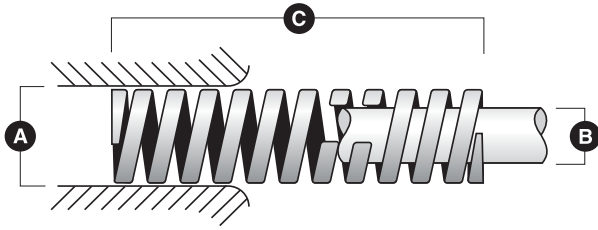
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (32% of free length)		For Long Life (29% of free length)		For Optimal Life (26% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.315	0.157	0.39	ASM 8 X 10	24.8	0.13		0.11		0.10	
		0.59	ASM 8 X 15	16.5	0.19		0.17		0.15	
		0.79	ASM 8 X 20	12.4	0.25		0.23		0.21	
		0.98	ASM 8 X 25	9.9	0.32		0.29		0.26	
		1.18	ASM 8 X 30	8.3	0.38		0.34		0.31	
		1.38	ASM 8 X 35	7.1	0.44	31	0.40	28	0.36	25
		1.58	ASM 8 X 40	6.2	0.50		0.46		0.41	
		1.77	ASM 8 X 45	5.5	0.57		0.51		0.46	
		1.97	ASM 8 X 50	5.0	0.63		0.57		0.51	
		2.17	ASM 8 X 55	4.5	0.69		0.63		0.56	
		2.36	ASM 8 X 60	4.1	0.76		0.69		0.61	
0.394	0.197	0.79	ASM 10 X 20	17.9	0.25		0.23		0.21	
		0.98	ASM 10 X 25	14.3	0.32		0.29		0.26	
		1.18	ASM 10 X 30	11.9	0.38		0.34		0.31	
		1.38	ASM 10 X 35	10.2	0.44		0.40		0.36	
		1.58	ASM 10 X 40	8.9	0.50		0.46		0.41	
		1.77	ASM 10 X 45	7.9	0.57		0.51		0.46	
		1.97	ASM 10 X 50	7.1	0.63	45	0.57	41	0.51	37
		2.17	ASM 10 X 55	6.5	0.69		0.63		0.56	
		2.36	ASM 10 X 60	5.9	0.76		0.69		0.61	
		2.56	ASM 10 X 65	5.5	0.82		0.74		0.67	
		2.76	ASM 10 X 70	5.1	0.88		0.80		0.72	
		2.95	ASM 10 X 75	4.7	0.95		0.86		0.77	
		3.15	ASM 10 X 80	4.5	1.01		0.91		0.82	
0.472	0.236	0.79	ASM 12 X 20	25.9	0.25		0.23		0.21	
		0.98	ASM 12 X 25	20.7	0.32		0.29		0.26	
		1.18	ASM 12 X 30	17.2	0.38		0.34		0.31	
		1.38	ASM 12 X 35	14.7	0.44		0.40		0.36	
		1.58	ASM 12 X 40	13.0	0.50		0.46		0.41	
		1.77	ASM 12 X 45	11.5	0.57		0.51		0.46	
		1.97	ASM 12 X 50	10.3	0.63	65	0.57	59	0.51	53
		2.17	ASM 12 X 55	9.4	0.69		0.63		0.56	
		2.36	ASM 12 X 60	8.6	0.76		0.69		0.61	
		2.56	ASM 12 X 65	7.9	0.82		0.74		0.67	
		2.76	ASM 12 X 70	7.4	0.88		0.80		0.72	
		2.95	ASM 12 X 75	6.9	0.95		0.86		0.77	
		3.15	ASM 12 X 80	6.5	1.01		0.91		0.82	
0.551	0.276	0.98	ASM 14 X 25	27.8	0.32		0.29		0.26	
		1.18	ASM 14 X 30	23.2	0.38		0.34		0.31	
		1.38	ASM 14 X 35	19.9	0.44		0.40		0.36	
		1.58	ASM 14 X 40	17.4	0.50		0.46		0.41	
		1.77	ASM 14 X 45	15.4	0.57		0.51		0.46	
		1.97	ASM 14 X 50	13.9	0.63		0.57		0.51	
		2.17	ASM 14 X 55	12.6	0.69	88	0.63	79	0.56	71
		2.36	ASM 14 X 60	11.6	0.76		0.69		0.61	
		2.56	ASM 14 X 65	10.7	0.82		0.74		0.67	
		2.76	ASM 14 X 70	9.9	0.88		0.80		0.72	
		2.95	ASM 14 X 75	9.3	0.95		0.86		0.77	
		3.15	ASM 14 X 80	8.7	1.01		0.91		0.82	
		3.54	ASM 14 X 90	7.7	1.13		1.03		0.92	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® MEDIUM DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS) RED										
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (32% of free length)		For Long Life (29% of free length)		For Optimal Life (26% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.630	0.315	0.98	ASM 16 X 25	36.5	0.32		0.29		0.26	
		1.18	ASM 16 X 30	30.4	0.38		0.34		0.31	
		1.38	ASM 16 X 35	26.6	0.44		0.40		0.36	
		1.58	ASM 16 X 40	22.7	0.50		0.46		0.41	
		1.77	ASM 16 X 45	20.2	0.57		0.51		0.46	
		1.97	ASM 16 X 50	18.2	0.63		0.57		0.51	
		2.17	ASM 16 X 55	16.5	0.69	115	0.63	104	0.56	93
		2.36	ASM 16 X 60	15.1	0.76		0.69		0.61	
		2.56	ASM 16 X 65	14.0	0.82		0.74		0.67	
		2.76	ASM 16 X 70	13.0	0.88		0.80		0.72	
		2.95	ASM 16 X 75	12.1	0.95		0.86		0.77	
		3.15	ASM 16 X 80	11.4	1.01		0.91		0.82	
		3.54	ASM 16 X 90	10.1	1.13		1.03		0.92	
		3.94	ASM 16 X 100	9.1	1.26		1.14		1.02	
0.709	0.354	0.98	ASM 18 X 25	46.4	0.32		0.29		0.26	
		1.18	ASM 18 X 30	38.7	0.38		0.34		0.31	
		1.38	ASM 18 X 35	33.1	0.44		0.40		0.36	
		1.58	ASM 18 X 40	29.0	0.50		0.46		0.41	
		1.77	ASM 18 X 45	25.8	0.57		0.51		0.46	
		1.97	ASM 18 X 50	23.2	0.63		0.57		0.51	
		2.17	ASM 18 X 55	21.1	0.69		0.63		0.56	
		2.36	ASM 18 X 60	19.3	0.76	146	0.69	132	0.61	119
		2.56	ASM 18 X 65	17.8	0.82		0.74		0.67	
		2.76	ASM 18 X 70	16.6	0.88		0.80		0.72	
		2.95	ASM 18 X 75	15.4	0.95		0.86		0.77	
		3.15	ASM 18 X 80	14.5	1.01		0.91		0.82	
		3.54	ASM 18 X 90	12.9	1.13		1.03		0.92	
		3.94	ASM 18 X 100	11.5	1.26		1.14		1.02	
0.787	0.394	0.98	ASM 20 X 25	57.1	0.32		0.29		0.26	
		1.18	ASM 20 X 30	47.6	0.38		0.34		0.31	
		1.38	ASM 20 X 35	40.8	0.44		0.40		0.36	
		1.58	ASM 20 X 40	35.7	0.50		0.46		0.41	
		1.77	ASM 20 X 45	31.7	0.57		0.51		0.46	
		1.97	ASM 20 X 50	28.6	0.63		0.57		0.51	
		2.17	ASM 20 X 55	25.9	0.69		0.63		0.56	
		2.36	ASM 20 X 60	23.8	0.76		0.69		0.61	
		2.56	ASM 20 X 65	21.9	0.82	180	0.74	163	0.67	146
		2.76	ASM 20 X 70	20.4	0.88		0.80		0.72	
		2.95	ASM 20 X 75	19.0	0.95		0.86		0.77	
		3.15	ASM 20 X 80	17.8	1.01		0.91		0.82	
		3.54	ASM 20 X 90	15.8	1.13		1.03		0.92	
		3.94	ASM 20 X 100	14.3	1.26		1.14		1.02	
0.866	0.433	4.92	ASM 20 X 125	11.4	1.58		1.43		1.28	
		5.91	ASM 20 X 150	9.5	1.89		1.71		1.54	
		0.98	ASM 22 X 25	69.3	0.32		0.29		0.26	
		1.18	ASM 22 X 30	57.7	0.38		0.34		0.31	
		1.38	ASM 22 X 35	49.4	0.44		0.40		0.36	
		1.58	ASM 22 X 40	43.2	0.50		0.46		0.41	
		1.77	ASM 22 X 45	38.5	0.57		0.51		0.46	
		1.97	ASM 22 X 50	34.6	0.63		0.57		0.51	
		2.17	ASM 22 X 55	31.4	0.69		0.63		0.56	
		2.36	ASM 22 X 60	28.8	0.76		0.69		0.61	
		2.56	ASM 22 X 65	26.6	0.82	218	0.74	197	0.67	177
		2.76	ASM 22 X 70	24.7	0.88		0.80		0.72	
		2.95	ASM 22 X 75	23.1	0.95		0.86		0.77	
		3.15	ASM 22 X 80	21.6	1.01		0.91		0.82	
		3.54	ASM 22 X 90	19.2	1.13		1.03		0.92	
		3.94	ASM 22 X 100	17.3	1.26		1.14		1.02	
		4.92	ASM 22 X 125	13.8	1.58		1.43		1.28	
		5.91	ASM 22 X 150	11.5	1.89		1.71		1.54	

*Tabulated deflections shown represent near solid and are for design information only.



JIS Series

Raymond® MEDIUM DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS) RED

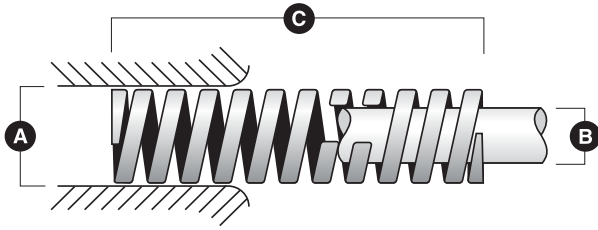
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (32% of free length)		For Long Life (29% of free length)		For Optimal Life (26% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.984	0.492	0.98	ASM 25 X 25	89.3	0.32		0.29		0.26	
		1.18	ASM 25 X 30	74.4	0.38		0.34		0.31	
		1.38	ASM 25 X 35	64.0	0.44		0.40		0.36	
		1.58	ASM 25 X 40	55.7	0.50		0.46		0.41	
		1.77	ASM 25 X 45	49.6	0.57		0.51		0.46	
		1.97	ASM 25 X 50	44.6	0.63		0.57		0.51	
		2.17	ASM 25 X 55	40.5	0.69		0.63		0.56	
		2.36	ASM 25 X 60	37.2	0.76	281	0.69	254	0.61	229
		2.56	ASM 25 X 65	34.3	0.82		0.74		0.67	
		2.76	ASM 25 X 70	31.9	0.88		0.80		0.72	
		2.95	ASM 25 X 75	29.8	0.95		0.86		0.77	
		3.15	ASM 25 X 80	27.9	1.01		0.91		0.82	
		3.54	ASM 25 X 90	24.8	1.13		1.03		0.92	
		3.94	ASM 25 X 100	22.3	1.26		1.14		1.02	
		4.92	ASM 25 X 125	17.8	1.58		1.43		1.28	
		5.91	ASM 25 X 150	14.9	1.89		1.71		1.54	
		6.89	ASM 25 X 175	12.7	2.21		2.00		1.79	
1.063	0.531	0.98	ASM 27 X 25	104.2	0.32		0.29		0.26	
		1.18	ASM 27 X 30	86.8	0.38		0.34		0.31	
		1.38	ASM 27 X 35	74.5	0.44		0.40		0.36	
		1.58	ASM 27 X 40	65.1	0.50		0.46		0.41	
		1.77	ASM 27 X 45	57.9	0.57		0.51		0.46	
		1.97	ASM 27 X 50	52.1	0.63		0.57		0.51	
		2.17	ASM 27 X 55	47.4	0.69		0.63		0.56	
		2.36	ASM 27 X 60	43.4	0.76	328	0.69	297	0.61	267
		2.56	ASM 27 X 65	40.0	0.82		0.74		0.67	
		2.76	ASM 27 X 70	37.2	0.88		0.80		0.72	
		2.95	ASM 27 X 75	34.7	0.95		0.86		0.77	
		3.15	ASM 27 X 80	32.6	1.01		0.91		0.82	
		3.54	ASM 27 X 90	28.9	1.13		1.03		0.92	
		3.94	ASM 27 X 100	26.0	1.26		1.14		1.02	
		4.92	ASM 27 X 125	20.8	1.58		1.43		1.28	
		5.91	ASM 27 X 150	17.4	1.89		1.71		1.54	
		6.89	ASM 27 X 175	14.9	2.21		2.00		1.79	
1.181	0.591	0.98	ASM 30 X 25	128.5	0.32		0.29		0.26	
		1.18	ASM 30 X 30	107.1	0.38		0.34		0.31	
		1.38	ASM 30 X 35	91.9	0.44		0.40		0.36	
		1.58	ASM 30 X 40	80.3	0.50		0.46		0.41	
		1.77	ASM 30 X 45	71.4	0.57		0.51		0.46	
		1.97	ASM 30 X 50	64.2	0.63		0.57		0.51	
		2.17	ASM 30 X 55	58.4	0.69		0.63		0.56	
		2.36	ASM 30 X 60	53.5	0.76	405	0.69	366	0.61	329
		2.56	ASM 30 X 65	49.4	0.82		0.74		0.67	
		2.76	ASM 30 X 70	45.9	0.88		0.80		0.72	
		2.95	ASM 30 X 75	42.8	0.95		0.86		0.77	
		3.15	ASM 30 X 80	40.1	1.01		0.91		0.82	
		3.54	ASM 30 X 90	35.7	1.13		1.03		0.92	
		3.94	ASM 30 X 100	32.2	1.26		1.14		1.02	
		4.92	ASM 30 X 125	25.7	1.58		1.43		1.28	
		5.91	ASM 30 X 150	21.4	1.89		1.71		1.54	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® MEDIUM DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS)					RED					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (32% of free length)		For Long Life (29% of free length)		For Optimal Life (26% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
1.378	0.689	6.89	ASM 30 X 175	18.3	2.21	405	2.00	366	1.79	329
		7.87	ASM 30 X 200	16.1	2.52		2.28		2.05	
		1.58	ASM 35 X 40	109.3	0.50		0.46		0.41	
		1.77	ASM 35 X 45	97.1	0.57		0.51		0.46	
		1.97	ASM 35 X 50	87.4	0.63		0.57		0.51	
		2.17	ASM 35 X 55	79.5	0.69		0.63		0.56	
		2.36	ASM 35 X 60	72.9	0.76		0.69		0.61	
		2.56	ASM 35 X 65	67.2	0.82		0.74		0.67	
		2.76	ASM 35 X 70	62.4	0.88	551	0.80	500	0.72	448
		2.95	ASM 35 X 75	58.2	0.95		0.86		0.77	
		3.15	ASM 35 X 80	54.7	1.01		0.91		0.82	
		3.54	ASM 35 X 90	48.5	1.13		1.03		0.92	
		3.94	ASM 35 X 100	43.7	1.26		1.14		1.02	
		4.92	ASM 35 X 125	35.0	1.58		1.43		1.28	
		5.91	ASM 35 X 150	29.1	1.89		1.71		1.54	
		6.89	ASM 35 X 175	25.0	2.21		2.00		1.79	
1.575	0.787	7.87	ASM 35 X 200	21.8	2.52		2.28		2.05	
		1.58	ASM 40 X 40	142.9	0.50		0.46		0.41	
		1.97	ASM 40 X 50	114.2	0.63		0.57		0.51	
		2.36	ASM 40 X 60	94.8	0.76		0.69		0.61	
		2.76	ASM 40 X 70	81.5	0.88		0.80		0.72	
		3.15	ASM 40 X 80	71.4	1.01		0.91		0.82	
		3.54	ASM 40 X 90	63.4	1.13	720	1.03	653	0.92	586
		3.94	ASM 40 X 100	57.1	1.26		1.14		1.02	
		4.92	ASM 40 X 125	45.7	1.58		1.43		1.28	
		5.91	ASM 40 X 150	38.0	1.89		1.71		1.54	
		6.89	ASM 40 X 175	32.6	2.21		2.00		1.79	
		7.87	ASM 40 X 200	28.6	2.52		2.28		2.05	
		9.84	ASM 40 X 250	22.8	3.15		2.85		2.56	
		1.97	ASM 50 X 50	178.4	0.63		0.57		0.51	
		2.36	ASM 50 X 60	148.7	0.76		0.69		0.61	
		2.76	ASM 50 X 70	127.5	0.88		0.80		0.72	
1.969	0.984	3.15	ASM 50 X 80	111.5	1.01		0.91		0.82	
		3.54	ASM 50 X 90	99.1	1.13		1.03		0.92	
		3.94	ASM 50 X 100	89.2	1.26	1124	1.14	1019	1.02	914
		4.92	ASM 50 X 125	71.4	1.58		1.43		1.28	
		5.91	ASM 50 X 150	59.4	1.89		1.71		1.54	
		6.89	ASM 50 X 175	50.9	2.21		2.00		1.79	
		7.87	ASM 50 X 200	44.6	2.52		2.28		2.05	
		9.84	ASM 50 X 250	35.7	3.15		2.85		2.56	
		11.81	ASM 50 X 300	29.7	3.78		3.43		3.07	
		2.36	ASM 60 X 60	213.6	0.76		0.69		0.61	
		2.76	ASM 60 X 70	183.3	0.88		0.80		0.72	
		3.15	ASM 60 X 80	160.6	1.01		0.91		0.82	
		3.54	ASM 60 X 90	142.8	1.13		1.03		0.92	
		3.94	ASM 60 X 100	128.5	1.26		1.14		1.02	
		4.92	ASM 60 X 125	102.8	1.58	1615	1.43	1463	1.28	1311
2.362	1.181	5.91	ASM 60 X 150	85.7	1.89		1.71		1.54	
		6.89	ASM 60 X 175	73.4	2.21		2.00		1.79	
		7.87	ASM 60 X 200	64.2	2.52		2.28		2.05	
		9.84	ASM 60 X 250	51.4	3.15		2.85		2.56	
		11.81	ASM 60 X 300	42.8	3.78		3.43		3.07	

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JIS Series

Raymond® HEAVY DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS) GREEN

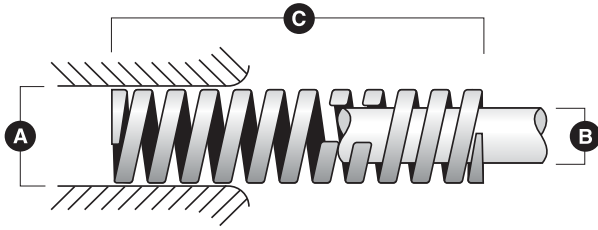
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (24% of free length)		For Long Life (22% of free length)		For Optimal Life (19% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.315	0.157	0.39	ASH 8 X 10	50.3	0.10		0.09		0.08	
		0.59	ASH 8 X 15	33.5	0.14		0.13		0.11	
		0.79	ASH 8 X 20	25.1	0.19		0.17		0.15	
		0.98	ASH 8 X 25	20.1	0.24		0.22		0.19	
		1.18	ASH 8 X 30	16.7	0.28	48	0.26	44	0.22	38
		1.38	ASH 8 X 35	14.3	0.33		0.30		0.26	
		1.58	ASH 8 X 40	12.6	0.38		0.35		0.30	
		1.77	ASH 8 X 45	11.1	0.43		0.39		0.34	
		1.97	ASH 8 X 50	10.1	0.47		0.43		0.37	
		2.17	ASH 8 X 55	9.1	0.52		0.48		0.41	
0.394	0.197	2.36	ASH 8 X 60	8.4	0.57		0.52		0.45	
		0.79	ASH 10 X 20	35.7	0.19		0.17		0.15	
		0.98	ASH 10 X 25	28.6	0.24		0.22		0.19	
		1.18	ASH 10 X 30	23.8	0.28		0.26		0.22	
		1.38	ASH 10 X 35	20.4	0.33		0.30		0.26	
		1.58	ASH 10 X 40	18.0	0.38		0.35		0.30	
		1.77	ASH 10 X 45	15.8	0.43		0.39		0.34	
		1.97	ASH 10 X 50	14.3	0.47	68	0.43	62	0.37	54
		2.17	ASH 10 X 55	13.0	0.52		0.48		0.41	
		2.36	ASH 10 X 60	11.9	0.57		0.52		0.45	
0.472	0.236	2.56	ASH 10 X 65	11.0	0.61		0.56		0.49	
		2.76	ASH 10 X 70	10.2	0.66		0.61		0.52	
		2.95	ASH 10 X 75	9.5	0.71		0.65		0.56	
		3.15	ASH 10 X 80	8.9	0.76		0.69		0.60	
		0.79	ASH 12 X 20	50.8	0.19		0.17		0.15	
		0.98	ASH 12 X 25	40.5	0.24		0.22		0.19	
		1.18	ASH 12 X 30	34.1	0.28		0.26		0.22	
		1.38	ASH 12 X 35	29.2	0.33		0.30		0.26	
		1.58	ASH 12 X 40	25.5	0.38		0.35		0.30	
		1.77	ASH 12 X 45	22.7	0.43		0.39		0.34	
0.551	0.276	1.97	ASH 12 X 50	20.4	0.47	96	0.43	88	0.37	76
		2.17	ASH 12 X 55	18.6	0.52		0.48		0.41	
		2.36	ASH 12 X 60	17.0	0.57		0.52		0.45	
		2.56	ASH 12 X 65	15.7	0.61		0.56		0.49	
		2.76	ASH 12 X 70	14.5	0.66		0.61		0.52	
		2.95	ASH 12 X 75	13.5	0.71		0.65		0.56	
		3.15	ASH 12 X 80	12.6	0.76		0.69		0.60	
		0.98	ASH 14 X 25	56.1	0.24		0.22		0.19	
		1.18	ASH 14 X 30	46.8	0.28		0.26		0.22	
		1.38	ASH 14 X 35	40.1	0.33		0.30		0.26	
0.551	0.276	1.58	ASH 14 X 40	35.1	0.38		0.35		0.30	
		1.77	ASH 14 X 45	31.2	0.43		0.39		0.34	
		1.97	ASH 14 X 50	28.0	0.47		0.43		0.37	
		2.17	ASH 14 X 55	25.5	0.52	133	0.48	121	0.41	105
		2.36	ASH 14 X 60	23.4	0.57		0.52		0.45	
		2.56	ASH 14 X 65	21.6	0.61		0.56		0.49	
		2.76	ASH 14 X 70	20.0	0.66		0.61		0.52	
		2.95	ASH 14 X 75	18.7	0.71		0.65		0.56	
		3.15	ASH 14 X 80	17.5	0.76		0.69		0.60	
		3.54	ASH 14 X 90	15.5	0.85		0.78		0.67	

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Raymond® HEAVY DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS)					GREEN					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (24% of free length)		For Long Life (22% of free length)		For Optimal Life (19% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.630	.315	0.98	ASH 16 X 25	73.3	0.24		0.22		0.19	
		1.18	ASH 16 X 30	61.0	0.28		0.26		0.22	
		1.38	ASH 16 X 35	52.3	0.33		0.30		0.26	
		1.58	ASH 16 X 40	45.8	0.38		0.35		0.30	
		1.77	ASH 16 X 45	40.7	0.43		0.39		0.34	
		1.97	ASH 16 X 50	36.6	0.47	173	0.43	158	0.37	137
		2.17	ASH 16 X 55	33.3	0.52		0.48		0.41	
		2.36	ASH 16 X 60	30.5	0.57		0.52		0.45	
		2.56	ASH 16 X 65	28.2	0.61		0.56		0.49	
		2.76	ASH 16 X 70	26.2	0.66		0.61		0.52	
		2.95	ASH 16 X 75	24.4	0.71		0.65		0.56	
		3.15	ASH 16 X 80	22.9	0.76		0.69		0.60	
		3.54	ASH 16 X 90	20.4	0.85		0.78		0.67	
		3.94	ASH 16 X 100	18.3	0.95		0.87		0.75	
0.709	0.354	0.98	ASH 18 X 25	92.3	0.24		0.22		0.19	
		1.18	ASH 18 X 30	77.5	0.28		0.26		0.22	
		1.38	ASH 18 X 35	65.9	0.33		0.30		0.26	
		1.58	ASH 18 X 40	57.7	0.38		0.35		0.30	
		1.77	ASH 18 X 45	51.3	0.43		0.39		0.34	
		1.97	ASH 18 X 50	46.1	0.47		0.43		0.37	
		2.17	ASH 18 X 55	41.9	0.52	218	0.48	199	0.41	173
		2.36	ASH 18 X 60	38.4	0.57		0.52		0.45	
		2.56	ASH 18 X 65	35.5	0.61		0.56		0.49	
		2.76	ASH 18 X 70	33.0	0.66		0.61		0.52	
		2.95	ASH 18 X 75	30.8	0.71		0.65		0.56	
		3.15	ASH 18 X 80	28.8	0.76		0.69		0.60	
		3.54	ASH 18 X 90	25.7	0.85		0.78		0.67	
		3.94	ASH 18 X 100	23.1	0.95		0.87		0.75	
0.787	0.394	0.98	ASH 20 X 25	114.2	0.24		0.22		0.19	
		1.18	ASH 20 X 30	95.1	0.28		0.26		0.22	
		1.38	ASH 20 X 35	81.5	0.33		0.30		0.26	
		1.58	ASH 20 X 40	71.4	0.38		0.35		0.30	
		1.77	ASH 20 X 45	63.4	0.43		0.39		0.34	
		1.97	ASH 20 X 50	57.1	0.47		0.43		0.37	
		2.17	ASH 20 X 55	51.9	0.52		0.48		0.41	
		2.36	ASH 20 X 60	47.6	0.57	270	0.52	247	0.45	214
		2.56	ASH 20 X 65	43.9	0.61		0.56		0.49	
		2.76	ASH 20 X 70	40.8	0.66		0.61		0.52	
		2.95	ASH 20 X 75	38.1	0.71		0.65		0.56	
		3.15	ASH 20 X 80	35.7	0.76		0.69		0.60	
		3.54	ASH 20 X 90	31.7	0.85		0.78		0.67	
		3.94	ASH 20 X 100	28.6	0.95		0.87		0.75	
		4.92	ASH 20 X 125	22.8	1.18		1.08		0.94	
0.866	0.433	5.91	ASH 20 X 150	19.0	1.42		1.30		1.12	
		0.98	ASH 22 X 25	138.0	0.24		0.22		0.19	
		1.18	ASH 22 X 30	115.0	0.28		0.26		0.22	
		1.38	ASH 22 X 35	98.8	0.33		0.30		0.26	
		1.58	ASH 22 X 40	86.2	0.38		0.35		0.30	
		1.77	ASH 22 X 45	76.5	0.43		0.39		0.34	
		1.97	ASH 22 X 50	69.0	0.47		0.43		0.37	
		2.17	ASH 22 X 55	62.5	0.52		0.48		0.41	
		2.36	ASH 22 X 60	57.4	0.57	326	0.52	298	0.45	258
		2.56	ASH 22 X 65	53.0	0.61		0.56		0.49	
		2.76	ASH 22 X 70	49.3	0.66		0.61		0.52	
		2.95	ASH 22 X 75	45.9	0.71		0.65		0.56	
		3.15	ASH 22 X 80	43.1	0.76		0.69		0.60	
		3.54	ASH 22 X 90	38.3	0.85		0.78		0.67	
		3.94	ASH 22 X 100	34.5	0.95		0.87		0.75	
		4.92	ASH 22 X 125	27.6	1.18		1.08		0.94	
		5.91	ASH 22 X 150	23.0	1.42		1.30		1.12	

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JIS Series

Raymond® HEAVY DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS) GREEN

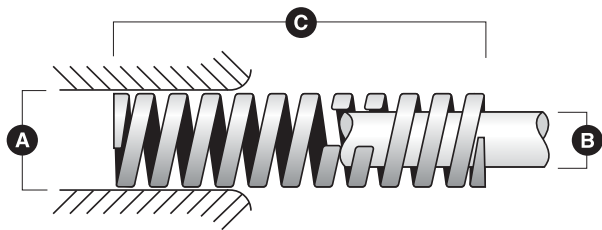
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (24% of free length)		For Long Life (22% of free length)		For Optimal Life (19% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.984	0.492	0.98	ASH 25 X 25	178.2	0.24		0.22		0.19	
		1.18	ASH 25 X 30	148.3	0.28		0.26		0.22	
		1.38	ASH 25 X 35	127.8	0.33		0.30		0.26	
		1.58	ASH 25 X 40	111.2	0.38		0.35		0.30	
		1.77	ASH 25 X 45	99.4	0.43		0.39		0.34	
		1.97	ASH 25 X 50	89.0	0.47		0.43		0.37	
		2.17	ASH 25 X 55	81.1	0.52		0.48		0.41	
		2.36	ASH 25 X 60	74.1	0.57	421	0.52	385	0.45	333
		2.56	ASH 25 X 65	68.5	0.61		0.56		0.49	
		2.76	ASH 25 X 70	63.6	0.66		0.61		0.52	
		2.95	ASH 25 X 75	59.4	0.71		0.65		0.56	
		3.15	ASH 25 X 80	55.6	0.76		0.69		0.60	
		3.54	ASH 25 X 90	49.4	0.85		0.78		0.67	
		3.94	ASH 25 X 100	44.5	0.95		0.87		0.75	
		4.92	ASH 25 X 125	35.6	1.18		1.08		0.94	
		5.91	ASH 25 X 150	29.7	1.42		1.30		1.12	
		6.89	ASH 25 X 175	25.5	1.65		1.52		1.31	
1.063	0.531	0.98	ASH 27 X 25	207.9	0.24		0.22		0.19	
		1.18	ASH 27 X 30	173.7	0.28		0.26		0.22	
		1.38	ASH 27 X 35	149.6	0.33		0.30		0.26	
		1.58	ASH 27 X 40	130.3	0.38		0.35		0.30	
		1.77	ASH 27 X 45	115.9	0.43		0.39		0.34	
		1.97	ASH 27 X 50	104.2	0.47		0.43		0.37	
		2.17	ASH 27 X 55	94.2	0.52		0.48		0.41	
		2.36	ASH 27 X 60	86.8	0.57		0.52		0.45	
		2.56	ASH 27 X 65	79.9	0.61	491	0.56	449	0.49	389
		2.76	ASH 27 X 70	74.4	0.66		0.61		0.52	
		2.95	ASH 27 X 75	69.1	0.71		0.65		0.56	
		3.15	ASH 27 X 80	65.1	0.76		0.69		0.60	
		3.54	ASH 27 X 90	57.8	0.85		0.78		0.67	
		3.94	ASH 27 X 100	52.1	0.95		0.87		0.75	
		4.92	ASH 27 X 125	41.7	1.18		1.08		0.94	
		5.91	ASH 27 X 150	34.7	1.42		1.30		1.12	
		6.89	ASH 27 X 175	29.8	1.65		1.52		1.31	
1.181	0.591	0.98	ASH 30 X 25	257.0	0.24		0.22		0.19	
		1.18	ASH 30 X 30	214.1	0.28		0.26		0.22	
		1.38	ASH 30 X 35	184.2	0.33		0.30		0.26	
		1.58	ASH 30 X 40	160.6	0.38		0.35		0.30	
		1.77	ASH 30 X 45	142.8	0.43		0.39		0.34	
		1.97	ASH 30 X 50	128.5	0.47		0.43		0.37	
		2.17	ASH 30 X 55	116.5	0.52		0.48		0.41	
		2.36	ASH 30 X 60	107.1	0.57	606	0.52	555	0.45	481
		2.56	ASH 30 X 65	98.8	0.61		0.56		0.49	
		2.76	ASH 30 X 70	91.8	0.66		0.61		0.52	
		2.95	ASH 30 X 75	85.7	0.71		0.65		0.56	
		3.15	ASH 30 X 80	80.3	0.76		0.69		0.60	
		3.54	ASH 30 X 90	71.4	0.85		0.78		0.67	
		3.94	ASH 30 X 100	64.2	0.95		0.87		0.75	
		4.92	ASH 30 X 125	51.4	1.18		1.08		0.94	
		5.91	ASH 30 X 150	42.8	1.42		1.30		1.12	

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Raymond® HEAVY DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS)					GREEN					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (24% of free length)		For Long Life (22% of free length)		For Optimal Life (19% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
1.378	0.689	6.89	ASH 30 X 175	36.7	1.65	606	1.52	555	1.31	481
		7.87	ASH 30 X 200	32.1	1.89		1.73		1.50	
		1.58	ASH 35 X 40	218.2	0.38		0.35		0.30	
		1.77	ASH 35 X 45	194.0	0.43		0.39		0.34	
		1.97	ASH 35 X 50	174.6	0.47		0.43		0.37	
		2.17	ASH 35 X 55	158.7	0.52		0.48		0.41	
		2.36	ASH 35 X 60	145.5	0.57		0.52		0.45	
		2.56	ASH 35 X 65	134.4	0.61		0.56		0.49	
		2.76	ASH 35 X 70	124.7	0.66	825	0.61	757	0.52	653
		2.95	ASH 35 X 75	116.4	0.71		0.65		0.56	
		3.15	ASH 35 X 80	109.1	0.76		0.69		0.60	
		3.54	ASH 35 X 90	97.0	0.85		0.78		0.67	
		3.94	ASH 35 X 100	87.3	0.95		0.87		0.75	
		4.92	ASH 35 X 125	69.8	1.18		1.08		0.94	
		5.91	ASH 35 X 150	58.2	1.42		1.30		1.12	
		6.89	ASH 35 X 175	49.9	1.65		1.52		1.31	
1.575	0.787	7.87	ASH 35 X 200	43.6	1.89		1.73		1.50	
		1.58	ASH 40 X 40	285.5	0.38		0.35		0.30	
		1.97	ASH 40 X 50	228.4	0.47		0.43		0.37	
		2.36	ASH 40 X 60	190.3	0.57		0.52		0.45	
		2.76	ASH 40 X 70	163.1	0.66		0.61		0.52	
		3.15	ASH 40 X 80	142.8	0.76		0.69		0.60	
		3.54	ASH 40 X 90	126.9	0.85	1079	0.78	991	0.67	854
		3.94	ASH 40 X 100	114.2	0.95		0.87		0.75	
		4.92	ASH 40 X 125	91.4	1.18		1.08		0.94	
		5.91	ASH 40 X 150	76.1	1.42		1.30		1.12	
		6.89	ASH 40 X 175	65.2	1.65		1.52		1.31	
		7.87	ASH 40 X 200	57.1	1.89		1.73		1.50	
		9.84	ASH 40 X 250	45.7	2.36		2.17		1.87	
		1.97	ASH 50 X 50	356.9	0.47		0.43		0.37	
		2.36	ASH 50 X 60	297.4	0.57		0.52		0.45	
		2.76	ASH 50 X 70	254.9	0.66		0.61		0.52	
1.969	0.984	3.15	ASH 50 X 80	223.0	0.76		0.69		0.60	
		3.54	ASH 50 X 90	198.3	0.85		0.78		0.67	
		3.94	ASH 50 X 100	178.4	0.95	1688	0.87	1545	0.75	1335
		4.92	ASH 50 X 125	142.8	1.18		1.08		0.94	
		5.91	ASH 50 X 150	118.9	1.42		1.30		1.12	
		6.89	ASH 50 X 175	101.9	1.65		1.52		1.31	
		7.87	ASH 50 X 200	89.2	1.89		1.73		1.50	
		9.84	ASH 50 X 250	71.4	2.36		2.17		1.87	
		11.81	ASH 50 X 300	59.4	2.84		2.60		2.24	
		2.36	ASH 60 X 60	428.3	0.57		0.52		0.45	
		2.76	ASH 60 X 70	367.1	0.66		0.61		0.52	
		3.15	ASH 60 X 80	321.2	0.76		0.69		0.60	
		3.54	ASH 60 X 90	285.5	0.85		0.78		0.67	
		3.94	ASH 60 X 100	257.0	0.95		0.87		0.75	
		4.92	ASH 60 X 125	205.6	1.18	2428	1.08	2227	0.94	1923
2.362	1.181	5.91	ASH 60 X 150	171.3	1.42		1.30		1.12	
		6.89	ASH 60 X 175	146.8	1.65		1.52		1.31	
		7.87	ASH 60 X 200	128.5	1.89		1.73		1.50	
		9.84	ASH 60 X 250	102.8	2.36		2.17		1.87	
		11.81	ASH 60 X 300	85.7	2.84		2.60		2.24	

*Tabulated deflections shown represent near solid and are for design information only.



JIS Series

Raymond®

EXTRA HEAVY DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS)

BROWN

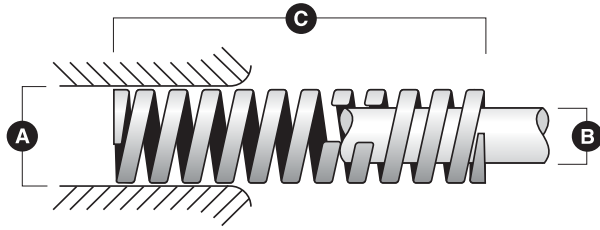
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (20% of free length)		For Long Life (18% of free length)		For Optimal Life (16% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.315	0.157	0.39	ASB 8 X 10	96.7	0.08		0.07		0.06	
		0.59	ASB 8 X 15	64.5	0.12		0.11		0.10	
		0.79	ASB 8 X 20	48.4	0.16		0.14		0.13	
		0.98	ASB 8 X 25	38.7	0.20		0.18		0.16	
		1.18	ASB 8 X 30	32.3	0.24		0.21		0.19	
		1.38	ASB 8 X 35	27.6	0.28	76	0.25	69	0.22	61
		1.58	ASB 8 X 40	24.0	0.32		0.28		0.25	
		1.77	ASB 8 X 45	21.5	0.35		0.32		0.28	
		1.97	ASB 8 X 50	19.4	0.39		0.35		0.32	
		2.17	ASB 8 X 55	17.6	0.43		0.39		0.35	
		2.36	ASB 8 X 60	16.1	0.47		0.43		0.38	
0.394	0.197	0.79	ASB 10 X 20	64.2	0.16		0.14		0.13	
		0.98	ASB 10 X 25	51.4	0.20		0.18		0.16	
		1.18	ASB 10 X 30	42.8	0.24		0.21		0.19	
		1.38	ASB 10 X 35	36.7	0.28		0.25		0.22	
		1.58	ASB 10 X 40	32.2	0.32		0.28		0.25	
		1.77	ASB 10 X 45	28.6	0.35		0.32		0.28	
		1.97	ASB 10 X 50	25.7	0.39	101	0.35	91	0.32	81
		2.17	ASB 10 X 55	23.4	0.43		0.39		0.35	
		2.36	ASB 10 X 60	21.4	0.47		0.43		0.38	
		2.56	ASB 10 X 65	19.8	0.51		0.46		0.41	
		2.76	ASB 10 X 70	18.3	0.55		0.50		0.44	
		2.95	ASB 10 X 75	17.1	0.59		0.53		0.47	
		3.15	ASB 10 X 80	16.1	0.63		0.57		0.50	
0.472	0.236	0.79	ASB 12 X 20	82.8	0.16		0.14		0.13	
		0.98	ASB 12 X 25	66.2	0.20		0.18		0.16	
		1.18	ASB 12 X 30	55.2	0.24		0.21		0.19	
		1.38	ASB 12 X 35	47.3	0.28		0.25		0.22	
		1.58	ASB 12 X 40	41.4	0.32		0.28		0.25	
		1.77	ASB 12 X 45	36.8	0.35		0.32		0.28	
		1.97	ASB 12 X 50	33.1	0.39	130	0.35	118	0.32	104
		2.17	ASB 12 X 55	30.1	0.43		0.39		0.35	
		2.36	ASB 12 X 60	27.6	0.47		0.43		0.38	
		2.56	ASB 12 X 65	25.4	0.51		0.46		0.41	
		2.76	ASB 12 X 70	23.6	0.55		0.50		0.44	
		2.95	ASB 12 X 75	22.0	0.59		0.53		0.47	
		3.15	ASB 12 X 80	20.6	0.63		0.57		0.50	
0.551	0.276	0.98	ASB 14 X 25	85.7	0.20		0.18		0.16	
		1.18	ASB 14 X 30	71.4	0.24		0.21		0.19	
		1.38	ASB 14 X 35	61.2	0.28		0.25		0.22	
		1.58	ASB 14 X 40	53.6	0.32		0.28		0.25	
		1.77	ASB 14 X 45	47.6	0.35		0.32		0.28	
		1.97	ASB 14 X 50	42.8	0.39		0.35		0.32	
		2.17	ASB 14 X 55	38.9	0.43	169	0.39	152	0.35	135
		2.36	ASB 14 X 60	35.7	0.47		0.43		0.38	
		2.56	ASB 14 X 65	33.0	0.51		0.46		0.41	
		2.76	ASB 14 X 70	30.6	0.55		0.50		0.44	
		2.95	ASB 14 X 75	28.6	0.59		0.53		0.47	
		3.15	ASB 14 X 80	26.8	0.63		0.57		0.50	
		3.54	ASB 14 X 90	23.8	0.71		0.64		0.57	

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Raymond® EXTRA HEAVY DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS)					BROWN					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (20% of free length)		For Long Life (18% of free length)		For Optimal Life (16% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.630	0.315	0.98	ASB 16 X 25	114.2	0.20		0.18		0.16	
		1.18	ASB 16 X 30	95.2	0.24		0.21		0.19	
		1.38	ASB 16 X 35	81.6	0.28		0.25		0.22	
		1.58	ASB 16 X 40	71.4	0.32		0.28		0.25	
		1.77	ASB 16 X 45	63.4	0.35		0.32		0.28	
		1.97	ASB 16 X 50	57.1	0.39		0.35		0.32	
		2.17	ASB 16 X 55	51.9	0.43	225	0.39	202	0.35	179
		2.36	ASB 16 X 60	47.6	0.47		0.43		0.38	
		2.56	ASB 16 X 65	43.9	0.51		0.46		0.41	
		2.76	ASB 16 X 70	40.8	0.55		0.50		0.44	
		2.95	ASB 16 X 75	38.1	0.59		0.53		0.47	
		3.15	ASB 16 X 80	35.7	0.63		0.57		0.50	
		3.54	ASB 16 X 90	31.8	0.71		0.64		0.57	
		3.94	ASB 16 X 100	28.6	0.79		0.71		0.63	
0.709	0.354	0.98	ASB 18 X 25	142.8	0.20		0.18		0.16	
		1.18	ASB 18 X 30	119.0	0.24		0.21		0.19	
		1.38	ASB 18 X 35	102.0	0.28		0.25		0.22	
		1.58	ASB 18 X 40	89.3	0.32		0.28		0.25	
		1.77	ASB 18 X 45	79.3	0.35		0.32		0.28	
		1.97	ASB 18 X 50	71.4	0.39		0.35		0.32	
		2.17	ASB 18 X 55	64.9	0.43	281	0.39	253	0.35	224
		2.36	ASB 18 X 60	59.5	0.47		0.43		0.38	
		2.56	ASB 18 X 65	54.9	0.51		0.46		0.41	
		2.76	ASB 18 X 70	51.0	0.55		0.50		0.44	
		2.95	ASB 18 X 75	47.6	0.59		0.53		0.47	
		3.15	ASB 18 X 80	44.7	0.63		0.57		0.50	
		3.54	ASB 18 X 90	39.7	0.71		0.64		0.57	
		3.94	ASB 18 X 100	35.8	0.79		0.71		0.63	
0.787	0.394	0.98	ASB 20 X 25	182.7	0.20		0.18		0.16	
		1.18	ASB 20 X 30	152.3	0.24		0.21		0.19	
		1.38	ASB 20 X 35	130.5	0.28		0.25		0.22	
		1.58	ASB 20 X 40	114.2	0.32		0.28		0.25	
		1.77	ASB 20 X 45	101.5	0.35		0.32		0.28	
		1.97	ASB 20 X 50	91.4	0.39		0.35		0.32	
		2.17	ASB 20 X 55	83.1	0.43		0.39		0.35	
		2.36	ASB 20 X 60	76.1	0.47	360	0.43	323	0.38	287
		2.56	ASB 20 X 65	70.3	0.51		0.46		0.41	
		2.76	ASB 20 X 70	65.3	0.55		0.50		0.44	
		2.95	ASB 20 X 75	60.9	0.59		0.53		0.47	
		3.15	ASB 20 X 80	57.1	0.63		0.57		0.50	
		3.54	ASB 20 X 90	50.8	0.71		0.64		0.57	
		3.94	ASB 20 X 100	45.7	0.79		0.71		0.63	
0.866	0.433	4.92	ASB 20 X 125	36.5	0.98		0.89		0.79	
		5.91	ASB 20 X 150	30.4	1.18		1.06		0.95	
		0.98	ASB 22 X 25	222.7	0.20		0.18		0.16	
		1.18	ASB 22 X 30	185.6	0.24		0.21		0.19	
		1.38	ASB 22 X 35	159.1	0.28		0.25		0.22	
		1.58	ASB 22 X 40	139.2	0.32		0.28		0.25	
		1.77	ASB 22 X 45	123.7	0.35		0.32		0.28	
		1.97	ASB 22 X 50	111.4	0.39		0.35		0.32	
		2.17	ASB 22 X 55	101.2	0.43		0.39		0.35	
		2.36	ASB 22 X 60	92.8	0.47	439	0.43	394	0.38	350
		2.56	ASB 22 X 65	85.7	0.51		0.46		0.41	
		2.76	ASB 22 X 70	79.5	0.55		0.50		0.44	
		2.95	ASB 22 X 75	74.2	0.59		0.53		0.47	
		3.15	ASB 22 X 80	69.6	0.63		0.57		0.50	
		3.54	ASB 22 X 90	61.8	0.71		0.64		0.57	
		3.94	ASB 22 X 100	55.7	0.79		0.71		0.63	
		4.92	ASB 22 X 125	44.5	0.98		0.89		0.79	
		5.91	ASB 22 X 150	37.1	1.18		1.06		0.95	

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JIS Series

Raymond® EXTRA HEAVY DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS) BROWN

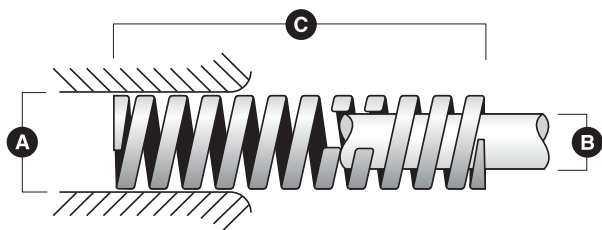
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (20% of free length)		For Long Life (18% of free length)		For Optimal Life (16% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
0.984	0.492	0.98	ASB 25 X 25	279.8	0.20		0.18		0.16	
		1.18	ASB 25 X 30	233.0	0.24		0.21		0.19	
		1.38	ASB 25 X 35	199.9	0.28		0.25		0.22	
		1.58	ASB 25 X 40	174.7	0.32		0.28		0.25	
		1.77	ASB 25 X 45	155.3	0.35		0.32		0.28	
		1.97	ASB 25 X 50	139.9	0.39		0.35		0.32	
		2.17	ASB 25 X 55	127.3	0.43		0.39		0.35	
		2.36	ASB 25 X 60	116.5	0.47	551	0.43	495	0.38	439
		2.56	ASB 25 X 65	107.4	0.51		0.46		0.41	
		2.76	ASB 25 X 70	99.9	0.55		0.50		0.44	
		2.95	ASB 25 X 75	93.1	0.59		0.53		0.47	
		3.15	ASB 25 X 80	87.4	0.63		0.57		0.50	
		3.54	ASB 25 X 90	77.7	0.71		0.64		0.57	
		3.94	ASB 25 X 100	70.2	0.79		0.71		0.63	
		4.92	ASB 25 X 125	56.0	0.98		0.89		0.79	
		5.91	ASB 25 X 150	46.7	1.18		1.06		0.95	
		6.89	ASB 25 X 175	40.0	1.38		1.24		1.10	
1.063	0.531	0.98	ASB 27 X 25	331.2	0.20		0.18		0.16	
		1.18	ASB 27 X 30	276.0	0.24		0.21		0.19	
		1.38	ASB 27 X 35	236.6	0.28		0.25		0.22	
		1.58	ASB 27 X 40	207.0	0.32		0.28		0.25	
		1.77	ASB 27 X 45	184.0	0.35		0.32		0.28	
		1.97	ASB 27 X 50	165.6	0.39		0.35		0.32	
		2.17	ASB 27 X 55	150.5	0.43		0.39		0.35	
		2.36	ASB 27 X 60	138.0	0.47		0.43		0.38	
		2.56	ASB 27 X 65	127.4	0.51	652	0.46	586	0.41	520
		2.76	ASB 27 X 70	118.3	0.55		0.50		0.44	
		2.95	ASB 27 X 75	110.4	0.59		0.53		0.47	
		3.15	ASB 27 X 80	103.5	0.63		0.57		0.50	
		3.54	ASB 27 X 90	92.0	0.71		0.64		0.57	
		3.94	ASB 27 X 100	82.8	0.79		0.71		0.63	
		4.92	ASB 27 X 125	66.2	0.98		0.89		0.79	
		5.91	ASB 27 X 150	55.2	1.18		1.06		0.95	
		6.89	ASB 27 X 175	47.3	1.38		1.24		1.10	
1.181	0.591	0.98	ASB 30 X 25	411.1	0.20		0.18		0.16	
		1.18	ASB 30 X 30	342.6	0.24		0.21		0.19	
		1.38	ASB 30 X 35	293.7	0.28		0.25		0.22	
		1.58	ASB 30 X 40	257.0	0.32		0.28		0.25	
		1.77	ASB 30 X 45	228.4	0.35		0.32		0.28	
		1.97	ASB 30 X 50	205.6	0.39		0.35		0.32	
		2.17	ASB 30 X 55	186.8	0.43		0.39		0.35	
		2.36	ASB 30 X 60	171.3	0.47	810	0.43	728	0.38	646
		2.56	ASB 30 X 65	158.1	0.51		0.46		0.41	
		2.76	ASB 30 X 70	146.8	0.55		0.50		0.44	
		2.95	ASB 30 X 75	137.0	0.59		0.53		0.47	
		3.15	ASB 30 X 80	128.5	0.63		0.57		0.50	
		3.54	ASB 30 X 90	114.2	0.71		0.64		0.57	
		3.94	ASB 30 X 100	102.8	0.79		0.71		0.63	
		4.92	ASB 30 X 125	82.2	0.98		0.89		0.79	
		5.91	ASB 30 X 150	68.5	1.18		1.06		0.95	

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Raymond® EXTRA HEAVY DUTY JIS B 5012 SERIES SPRINGS (INCH DIMENSIONS)					BROWN					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (20% of free length)		For Long Life (18% of free length)		For Optimal Life (16% of free length)	
					Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
1.378	0.689	6.89	ASB 30 X 175	58.7	1.38	810	1.24	728	1.10	646
		7.87	ASB 30 X 200	51.4	1.58		1.42		1.26	
		1.58	ASB 35 X 40	349.5	0.32		0.28		0.25	
		1.77	ASB 35 X 45	310.9	0.35		0.32		0.28	
		1.97	ASB 35 X 50	279.8	0.39		0.35		0.32	
		2.17	ASB 35 X 55	254.3	0.43		0.39		0.35	
		2.36	ASB 35 X 60	233.2	0.47		0.43		0.38	
		2.56	ASB 35 X 65	215.2	0.51		0.46		0.41	
		2.76	ASB 35 X 70	199.9	0.55	1101	0.50	993	0.44	881
		2.95	ASB 35 X 75	186.6	0.59		0.53		0.47	
		3.15	ASB 35 X 80	174.8	0.63		0.57		0.50	
		3.54	ASB 35 X 90	155.4	0.71		0.64		0.57	
		3.94	ASB 35 X 100	139.9	0.79		0.71		0.63	
		4.92	ASB 35 X 125	111.9	0.98		0.89		0.79	
		5.91	ASB 35 X 150	93.3	1.18		1.06		0.95	
		6.89	ASB 35 X 175	79.9	1.38		1.24		1.10	
		7.87	ASB 35 X 200	70.0	1.58		1.42		1.26	
1.575	0.787	1.58	ASB 40 X 40	456.8	0.32		0.28		0.25	
		1.97	ASB 40 X 50	365.5	0.39		0.35		0.32	
		2.36	ASB 40 X 60	304.5	0.47		0.43		0.38	
		2.76	ASB 40 X 70	261.0	0.55		0.50		0.44	
		3.15	ASB 40 X 80	228.4	0.63		0.57		0.50	
		3.54	ASB 40 X 90	203.0	0.71	1439	0.64	1297	0.57	1151
		3.94	ASB 40 X 100	182.7	0.79		0.71		0.63	
		4.92	ASB 40 X 125	146.2	0.98		0.89		0.79	
		5.91	ASB 40 X 150	121.8	1.18		1.06		0.95	
		6.89	ASB 40 X 175	104.4	1.38		1.24		1.10	
		7.87	ASB 40 X 200	85.7	1.58		1.42		1.26	
		9.84	ASB 40 X 250	73.1	1.97		1.77		1.58	
1.969	0.984	1.97	ASB 50 X 50	571.0	0.39		0.35		0.32	
		2.36	ASB 50 X 60	475.8	0.47		0.43		0.38	
		2.76	ASB 50 X 70	407.8	0.55		0.50		0.44	
		3.15	ASB 50 X 80	356.9	0.63		0.57		0.50	
		3.54	ASB 50 X 90	317.2	0.71		0.64		0.57	
		3.94	ASB 50 X 100	285.5	0.79	2250	0.71	2021	0.63	1799
		4.92	ASB 50 X 125	228.4	0.98		0.89		0.79	
		5.91	ASB 50 X 150	190.3	1.18		1.06		0.95	
		6.89	ASB 50 X 175	157.4	1.38		1.24		1.10	
		7.87	ASB 50 X 200	142.8	1.58		1.42		1.26	
		9.84	ASB 50 X 250	114.2	1.97		1.77		1.58	
		11.81	ASB 50 X 300	95.1	2.36		2.13		1.89	
2.362	1.181	2.36	ASB 60 X 60	685.2	0.47		0.43		0.38	
		2.76	ASB 60 X 70	582.4	0.55		0.50		0.44	
		3.15	ASB 60 X 80	513.9	0.63		0.57		0.50	
		3.54	ASB 60 X 90	456.8	0.71		0.64		0.57	
		3.94	ASB 60 X 100	411.1	0.79		0.71		0.63	
		4.92	ASB 60 X 125	328.9	0.98	3234	0.89	2912	0.79	2590
		5.91	ASB 60 X 150	274.1	1.18		1.06		0.95	
		6.89	ASB 60 X 175	234.9	1.38		1.24		1.10	
		7.87	ASB 60 X 200	205.6	1.58		1.42		1.26	
		9.84	ASB 60 X 250	164.5	1.97		1.77		1.58	
		11.81	ASB 60 X 300	137.0	2.36		2.13		1.89	

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JIS Series

Raymond®

EXTRA LIGHT DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS)

YELLOW

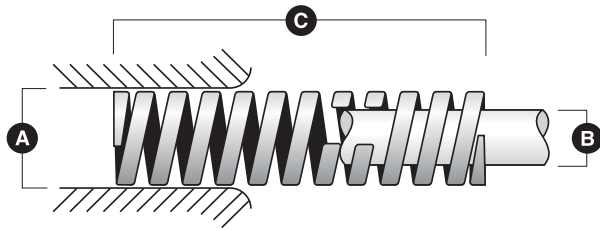
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (50% of free length)		For Long Life (45% of free length)		For Optimal Life (40% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
8	4	10	ASF 8 X 10	1.56	5.0		4.5		4.0	
		15	ASF 8 X 15	1.04	7.5		6.8		6.0	
		20	ASF 8 X 20	0.78	10.0		9.0		8.0	
		25	ASF 8 X 25	0.62	12.5		11.2		10.0	
		30	ASF 8 X 30	0.52	15.0		13.5		12.0	
		35	ASF 8 X 35	0.44	17.5	8	15.7	7	14.0	6
		40	ASF 8 X 40	0.39	20.0	(78.5)	18.0	(68.6)	16.0	(58.8)
		45	ASF 8 X 45	0.35	22.5		20.2		18.0	
		50	ASF 8 X 50	0.31	25.0		22.5		20.0	
		55	ASF 8 X 55	0.28	27.5		24.7		22.0	
		60	ASF 8 X 60	0.26	30.0		27.0		24.0	
10	5	20	ASF 10 X 20	1.00	10.0		9.0		8.0	
		25	ASF 10 X 25	0.80	12.5		11.2		10.0	
		30	ASF 10 X 30	0.67	15.0		13.5		12.0	
		35	ASF 10 X 35	0.57	17.5		15.7		14.0	
		40	ASF 10 X 40	0.50	20.0		18.0		16.0	
		45	ASF 10 X 45	0.44	22.5		20.2		18.0	
		50	ASF 10 X 50	0.40	25.0	10	22.5	9	20.0	8
		55	ASF 10 X 55	0.36	27.5	(98.1)	24.7	(88.3)	22.0	(78.5)
		60	ASF 10 X 60	0.33	30.0		27.0		24.0	
		65	ASF 10 X 65	0.31	32.5		29.2		26.0	
		70	ASF 10 X 70	0.29	35.0		31.5		28.0	
		75	ASF 10 X 75	0.27	37.5		33.7		30.0	
		80	ASF 10 X 80	0.25	40.0		36.0		32.0	
12	6	20	ASF 12 X 20	1.40	10.0		9.0		8.0	
		25	ASF 12 X 25	1.12	12.5		11.2		10.0	
		30	ASF 12 X 30	0.93	15.0		13.5		12.0	
		35	ASF 12 X 35	0.80	17.5		15.7		14.0	
		40	ASF 12 X 40	0.70	20.0		18.0		16.0	
		45	ASF 12 X 45	0.62	22.5		20.2		18.0	
		50	ASF 12 X 50	0.56	25.0	14	22.5	12.5	20.0	11
		55	ASF 12 X 55	0.51	27.5	(137.3)	24.7	(122.6)	22.0	(107.9)
		60	ASF 12 X 60	0.47	30.0		27.0		24.0	
		65	ASF 12 X 65	0.43	32.5		29.2		26.0	
		70	ASF 12 X 70	0.40	35.0		31.5		28.0	
		75	ASF 12 X 75	0.37	37.5		33.7		30.0	
		80	ASF 12 X 80	0.35	40.0		36.0		32.0	
14	7	25	ASF 14 X 25	1.44	12.5		11.2		10.0	
		30	ASF 14 X 30	1.20	15.0		13.5		12.0	
		35	ASF 14 X 35	1.03	17.5		15.7		14.0	
		40	ASF 14 X 40	0.90	20.0		18.0		16.0	
		45	ASF 14 X 45	0.80	22.5		20.2		18.0	
		50	ASF 14 X 50	0.72	25.0	18	22.5	16	20.0	14.5
		55	ASF 14 X 55	0.65	27.5	(176.5)	24.7	(156.9)	22.0	142.2
		60	ASF 14 X 60	0.60	30.0		27.0		24.0	
		65	ASF 14 X 65	0.55	32.5		29.2		26.0	
		70	ASF 14 X 70	0.51	35.0		31.5		28.0	
		75	ASF 14 X 75	0.48	37.5		33.7		30.0	
		80	ASF 14 X 80	0.45	40.0		36.0		32.0	
		90	ASF 14 X 90	0.40	45.0		40.5		36.0	

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Raymond® EXTRA LIGHT DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS) YELLOW										
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (50% of free length)		For Long Life (45% of free length)		For Optimal Life (40% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
16	8	25	ASF 16 X 25	1.68	12.5		11.2		10.0	
		30	ASF 16 X 30	1.40	15.0		13.5		12.0	
		35	ASF 16 X 35	1.20	17.5		15.7		14.0	
		40	ASF 16 X 40	1.05	20.0		18.0		16.0	
		45	ASF 16 X 45	0.94	22.5		20.2		18.0	
		50	ASF 16 X 50	0.84	25.0		22.5		20.0	
		55	ASF 16 X 55	0.77	27.5	21	24.7	19	22.0	17
		60	ASF 16 X 60	0.70	30.0	(206)	27.0	(186.3)	24.0	(166.7)
		65	ASF 16 X 65	0.65	32.5		29.2		26.0	
		70	ASF 16 X 70	0.60	35.0		31.5		28.0	
		75	ASF 16 X 75	0.56	37.5		33.7		30.0	
		80	ASF 16 X 80	0.53	40.0		36.0		32.0	
18	9	90	ASF 16 X 90	0.47	45.0		40.5		36.0	
		100	ASF 16 X 100	0.42	50.0		45.0		40.0	
		25	ASF 18 X 25	2.08	12.5		11.2		10.0	
		30	ASF 18 X 30	1.74	15.0		13.5		12.0	
		35	ASF 18 X 35	1.49	17.5		15.7		14.0	
		40	ASF 18 X 40	1.30	20.0		18.0		16.0	
		45	ASF 18 X 45	1.16	22.5		20.2		18.0	
		50	ASF 18 X 50	1.04	25.0		22.5		20.0	
		55	ASF 18 X 55	0.95	27.5	26	24.7	23	22.0	21
		60	ASF 18 X 60	0.87	30.0	(255)	27.0	(256)	24.0	(206)
		65	ASF 18 X 65	0.80	32.5		29.2		26.0	
		70	ASF 18 X 70	0.74	35.0		31.5		28.0	
20	11	75	ASF 18 X 75	0.70	37.5		33.7		30.0	
		80	ASF 18 X 80	0.65	40.0		36.0		32.0	
		90	ASF 18 X 90	0.58	45.0		40.5		36.0	
		100	ASF 18 X 100	0.52	50.0		45.0		40.0	
		25	ASF 20 X 25	2.56	12.5		11.2		10.0	
		30	ASF 20 X 30	2.13	15.0		13.5		12.0	
		35	ASF 20 X 35	1.83	17.5		15.7		14.0	
		40	ASF 20 X 40	1.60	20.0		18.0		16.0	
		45	ASF 20 X 45	1.42	22.5		20.2		18.0	
		50	ASF 20 X 50	1.28	25.0		22.5		20.0	
		55	ASF 20 X 55	1.16	27.5		24.7		22.0	
		60	ASF 20 X 60	1.07	30.0	32	27.0	29	24.0	26
22	11	65	ASF 20 X 65	0.98	32.5	(314)	29.2	(284)	26.0	(255)
		70	ASF 20 X 70	0.91	35.0		31.5		28.0	
		75	ASF 20 X 75	0.85	7.5		33.7		30.0	
		80	ASF 20 X 80	0.80	40.0		36.0		32.0	
		90	ASF 20 X 90	0.71	45.0		40.5		36.0	
		100	ASF 20 X 100	0.64	50.0		45.0		40.0	
		125	ASF 20 X 125	0.51	62.5		56.2		50.0	
		150	ASF 20 X 150	0.43	75.0		67.5		60.0	
		25	ASF 22 X 25	3.20	12.5		11.2		10.0	
		30	ASF 22 X 30	2.67	15.0		13.5		12.0	
		35	ASF 22 X 35	2.29	17.5		15.7		14.0	
		40	ASF 22 X 40	2.00	20.0		18.0		16.0	
22	11	45	ASF 22 X 45	1.78	22.5		20.2		18.0	
		50	ASF 22 X 50	1.60	25.0		22.5		20.0	
		55	ASF 22 X 55	1.46	27.5		24.7		22.0	
		60	ASF 22 X 60	1.33	30.0	40	27.0	36	24.0	32
		65	ASF 22 X 65	1.23	32.5	(392)	29.2	(353)	26.0	(314)
		70	ASF 22 X 70	1.14	35.0		31.5		28.0	
		75	ASF 22 X 75	1.07	37.5		33.7		30.0	
		80	ASF 22 X 80	1.00	40.0		36.0		32.0	
		90	ASF 22 X 90	0.89	45.0		40.5		36.0	
		100	ASF 22 X 100	0.80	50.0		45.0		40.0	
		125	ASF 22 X 125	0.64	62.5		56.2		50.0	
		150	ASF 22 X 150	0.53	75.0		67.5		60.0	

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JIS Series

Raymond®

EXTRA LIGHT DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS)

YELLOW

Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (50% of free length)		For Long Life (45% of free length)		For Optimal Life (40% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
25	13.5	25	ASF 25 X 25	4.00	12.5		11.2		10.0	
		30	ASF 25 X 30	3.33	15.0		13.5		12.0	
		35	ASF 25 X 35	2.85	17.5		15.7		14.0	
		40	ASF 25 X 40	2.50	20.0		18.0		16.0	
		45	ASF 25 X 45	2.22	22.5		20.2		18.0	
		50	ASF 25 X 50	2.00	25.0		22.5		20.0	
		55	ASF 25 X 55	1.82	27.5		24.7		22.0	
		60	ASF 25 X 60	1.67	30.0		27.0		24.0	
		65	ASF 25 X 65	1.54	32.5	50	29.2	45	26.0	40
		70	ASF 25 X 70	1.43	35.0	(450)	31.5	(441)	28.0	(392)
		75	ASF 25 X 75	1.33	37.5		33.7		30.0	
		80	ASF 25 X 80	1.25	40.0		36.0		32.0	
		90	ASF 25 X 90	1.11	45.0		40.5		36.0	
		100	ASF 25 X 100	1.00	50.0		45.0		40.0	
		125	ASF 25 X 125	0.80	62.5		56.2		50.0	
27	13.5	150	ASF 25 X 150	0.67	75.0		67.5		60.0	
		175	ASF 25 X 175	0.57	87.5		78.7		70.0	
		25	ASF 27 X 25	4.80	12.5		11.2		10.0	
		30	ASF 27 X 30	4.00	15.0		13.5		12.0	
		35	ASF 27 X 35	3.43	17.5		15.7		14.0	
		40	ASF 27 X 40	3.00	20.0		18.0		16.0	
		45	ASF 27 X 45	2.67	22.5		20.2		18.0	
		50	ASF 27 X 50	2.40	25.0		22.5		20.0	
		55	ASF 27 X 55	2.18	27.5		24.7		22.0	
		60	ASF 27 X 60	2.00	30.0	60	27.0	54	24.0	48
		65	ASF 27 X 65	1.85	32.5	(588)	29.2	(530)	26.0	(471)
		70	ASF 27 X 70	1.71	35.0		31.5		28.0	
		75	ASF 27 X 75	1.60	37.5		33.7		30.0	
		80	ASF 27 X 80	1.50	40.0		36.0		32.0	
		90	ASF 27 X 90	1.33	45.0		40.5		36.0	
30	16	100	ASF 27 X 100	1.20	50.0		45.0		40.0	
		125	ASF 27 X 125	0.96	62.5		56.2		50.0	
		150	ASF 27 X 150	0.80	75.0		67.5		60.0	
		175	ASF 27 X 175	0.69	87.5		78.7		70.0	
		25	ASF 30 X 25	5.80	12.5		11.2		10.0	
		30	ASF 30 X 30	4.80	15.0		13.5		12.0	
		35	ASF 30 X 35	4.13	17.5		15.7		14.0	
		40	ASF 30 X 40	3.60	20.0		18.0		16.0	
		45	ASF 30 X 45	3.21	22.5		20.2		18.0	
		50	ASF 30 X 50	2.88	25.0		22.5		20.0	
		55	ASF 30 X 55	2.63	27.5		24.7		22.0	
		60	ASF 30 X 60	2.40	30.0		27.0		24.0	
		65	ASF 30 X 65	2.22	32.5	72	29.2	65	26.0	58
		70	ASF 30 X 70	2.05	35.0	(706)	31.5	(637)	28.0	(569)
		75	ASF 30 X 75	1.93	37.5		33.7		30.0	
		80	ASF 30 X 80	1.80	40.0		36.0		32.0	
		90	ASF 30 X 90	1.60	45.0		40.5		36.0	
		100	ASF 30 X 100	1.44	50.0		45.0		40.0	
		125	ASF 30 X 125	1.15	62.5		56.2		50.0	
		150	ASF 30 X 150	0.96	75.0		67.5		60.0	

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Raymond® EXTRA LIGHT DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS)					YELLOW					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (50% of free length)		For Long Life (45% of free length)		For Optimal Life (40% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
30	16	175	ASF 30 X 175	0.82	87.5	72	78.7	65	70.0	58
		200	ASF 30 X 200	0.72	100.0	(706)	90.0	(637)	80.0	(569)
		40	ASF 35 X 40	4.90	20.0		18.0		16.0	
		45	ASF 35 X 45	4.36	22.5		20.2		18.0	
		50	ASF 35 X 50	3.92	25.0		22.5		20.0	
		55	ASF 35 X 55	3.56	27.5		24.7		22.0	
		60	ASF 35 X 60	3.26	30.0		27.0		24.0	
		65	ASF 35 X 65	3.02	32.5		29.2		26.0	
		70	ASF 35 X 70	2.80	35.0		31.5		28.0	
		75	ASF 35 X 75	2.61	37.5	98	33.7	88	30.0	78
		80	ASF 35 X 80	2.45	40.0	(961)	36.0	(963)	32.0	(765)
		90	ASF 35 X 90	2.17	45.0		40.5		36.0	
	19	100	ASF 35 X 100	1.96	50.0		45.0		40.0	
		125	ASF 35 X 125	1.57	62.5		56.2		50.0	
		150	ASF 35 X 150	1.30	75.0		67.5		60.0	
		175	ASF 35 X 175	1.12	87.5		78.7		70.0	
		200	ASF 35 X 200	0.98	100.0		90.0		80.0	
		40	ASF 40 X 40	6.38	20.0		18.0		16.0	
		50	ASF 40 X 50	5.12	25.0		22.5		20.0	
		60	ASF 40 X 60	4.26	30.0		27.0		24.0	
		70	ASF 40 X 70	3.65	35.0		31.5		28.0	
		80	ASF 40 X 80	3.20	40.0		36.0		32.0	
40	22	90	ASF 40 X 90	2.84	45.0		40.5		36.0	
		100	ASF 40 X 100	2.56	50.0	128	45.0	115	40.0	102
		125	ASF 40 X 125	2.04	62.5	(1,255)	56.2	(1,128)	50.0	(1,000)
		150	ASF 40 X 150	1.70	75.0		67.5		60.0	
		175	ASF 40 X 175	1.46	87.5		78.7		70.0	
		200	ASF 40 X 200	1.28	100.0		90.0		80.0	
		250	ASF 40 X 250	1.02	125.0		112.5		100.0	
		50	ASF 50 X 50	8.00	25.0		22.5		20.0	
		60	ASF 50 X 60	6.66	30.0		27.0		24.0	
		70	ASF 50 X 70	5.71	35.0		31.5		28.0	
		80	ASF 50 X 80	5.00	40.0		36.0		32.0	
		90	ASF 50 X 90	4.44	45.0		40.5		36.0	
		100	ASF 50 X 100	4.00	50.0		45.0		40.0	
		125	ASF 50 X 125	3.20	63.5		56.2		50.0	
		150	ASF 50 X 150	2.66	75.0	200	67.5	180	60.0	160
		175	ASF 50 X 175	2.28	87.5	(1,961)	78.7	(1,765)	70.0	(1,569)
		200	ASF 50 X 200	2.00	100.0		90.0		80.0	
		250	ASF 50 X 250	1.60	125.0		112.5		100.0	
		300	ASF 50 X 300	1.33	150.0		135.0		120.0	
		350	ASF 50 X 350	1.14	175.0		157.5		140.0	
		400	ASF 50 X 400	1.00	200.0		180.0		160.0	
		450	ASF 50 X 450	0.89	225.0		202.5		180.0	
		500	ASF 50 X 500	0.80	250.0		225.0		200.0	
		60	ASF 60 X 60	9.59	30.0		27.0		24.0	
		70	ASF 60 X 70	8.22	35.0		31.5		28.0	
		80	ASF 60 X 80	7.19	40.0		36.0		32.0	
		90	ASF 60 X 90	6.40	45.0		40.5		36.0	
		100	ASF 60 X 100	5.76	50.0		45.0		40.0	
		125	ASF 60 X 125	4.60	62.5		56.2		50.0	
		150	ASF 60 X 150	3.84	75.0		67.5		60.0	
		175	ASF 60 X 175	3.29	87.5	288	78.7	259	70.0	230
		200	ASF 60 X 200	2.88	100.0	(2,820)	90.0	(2,540)	80.0	(2,260)
		250	ASF 60 X 250	2.30	125.0		112.5		100.0	
		300	ASF 60 X 300	1.92	150.0		135.0		120.0	
		350	ASF 60 X 350	1.65	175.0		157.5		140.0	
		400	ASF 60 X 400	1.44	200.0		180.0		160.0	
		450	ASF 60 X 450	1.28	225.0		202.5		180.0	
		500	ASF 60 X 500	1.15	250.0		225.0		200.0	

*Tabulated deflections shown represent near solid and are for design information only.



JIS Series

Raymond® LIGHT DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS) BLUE

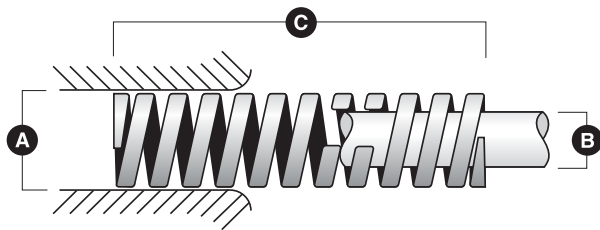
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (40% of free length)		For Long Life (36% of free length)		For Optimal Life (32% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
8	4	10	ASL 8 X 10	2.50	4.0		3.6		3.2	
		15	ASL 8 X 15	1.67	6.0		5.4		4.8	
		20	ASL 8 X 20	1.25	8.0		7.2		6.4	
		25	ASL 8 X 25	1.00	10.0		9.0		8.0	
		30	ASL 8 X 30	0.83	12.0		10.8		9.6	
		35	ASL 8 X 35	0.71	14.0	10	12.6	9	11.2	8
		40	ASL 8 X 40	0.63	16.0	(98.1)	14.4	(88.3)	12.8	(78.5)
		45	ASL 8 X 45	0.56	18.0		16.2		14.4	
		50	ASL 8 X 50	0.50	20.0		18.0		16.0	
		55	ASL 8 X 55	0.46	22.0		19.8		17.6	
		60	ASL 8 X 60	0.42	24.0		21.6		19.2	
10	5	20	ASL 10 X 20	1.81	8.0		7.2		6.4	
		25	ASL 10 X 25	1.45	10.0		9.0		8.0	
		30	ASL 10 X 30	1.21	12.0		10.8		9.6	
		35	ASL 10 X 35	1.03	14.0		12.6		11.2	
		40	ASL 10 X 40	0.90	16.0		14.4		12.8	
		45	ASL 10 X 45	0.80	18.0		16.2		14.4	
		50	ASL 10 X 50	0.73	20.0	14.5	18.0	13	16.0	11.5
		55	ASL 10 X 55	0.66	22.0	(142.2)	19.8	(127.5)	17.6	(112.8)
		60	ASL 10 X 60	0.60	24.0		21.6		19.2	
		65	ASL 10 X 65	0.55	26.0		23.4		20.8	
		70	ASL 10 X 70	0.51	28.0		25.2		22.4	
		75	ASL 10 X 75	0.48	30.0		27.0		24.0	
		80	ASL 10 X 80	0.45	32.0		28.8		25.6	
12	6	20	ASL 12 X 20	2.63	8.0		7.2		6.4	
		25	ASL 12 X 25	2.10	10.0		9.0		8.0	
		30	ASL 12 X 30	1.75	12.0		10.8		9.6	
		35	ASL 12 X 35	1.50	14.0		12.6		11.2	
		40	ASL 12 X 40	1.32	16.0		14.4		12.8	
		45	ASL 12 X 45	1.17	18.0	21	16.2	19	14.4	17
		50	ASL 12 X 50	1.05	20.0	(206)	18.0	(186.3)	16.0	(166.7)
		55	ASL 12 X 55	0.96	22.0		19.8		17.6	
		60	ASL 12 X 60	0.88	24.0		21.6		19.2	
		65	ASL 12 X 65	0.81	26.0		23.4		20.8	
		70	ASL 12 X 70	0.75	28.0		25.2		22.4	
		75	ASL 12 X 75	0.70	30.0		27.0		24.0	
		80	ASL 12 X 80	0.66	32.0		28.8		25.6	
14	7	25	ASL 14 X 25	2.80	10.0		9.0		8.0	
		30	ASL 14 X 30	2.34	12.0		10.8		9.6	
		35	ASL 14 X 35	2.00	14.0		12.6		11.2	
		40	ASL 14 X 40	1.75	16.0		14.4		12.8	
		45	ASL 14 X 45	1.56	18.0		16.2		14.4	
		50	ASL 14 X 50	1.40	20.0		8.0		16.0	
		55	ASL 14 X 55	1.27	22.0	28	19.8	25	17.6	22
		60	ASL 14 X 60	1.17	24.0	(275)	21.6	(245)	19.2	(216)
		65	ASL 14 X 65	1.08	26.0		23.4		20.8	
		70	ASL 14 X 70	1.00	28.0		25.2		22.4	
		75	ASL 14 X 75	0.93	30.0		27.0		24.0	
		80	ASL 14 X 80	0.87	32.0		28.8		25.6	
		90	ASL 14 X 90	0.77	36.0		32.4		28.8	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® LIGHT DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS)					BLUE					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (40% of free length)		For Long Life (36% of free length)		For Optimal Life (32% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
16	8	25	ASL 16 X 25	3.50	10.0		9.0		8.0	
		30	ASL 16 X 30	2.92	12.0		10.8		9.6	
		35	ASL 16 X 35	2.50	14.0		12.6		11.2	
		40	ASL 16 X 40	2.19	16.0		14.4		12.8	
		45	ASL 16 X 45	1.95	18.0		16.2		14.4	
		50	ASL 16 X 50	1.75	20.0		18.0		16.0	
		55	ASL 16 X 55	1.60	22.0	35	19.8	32	17.6	28
		60	ASL 16 X 60	1.46	24.0	(343)	21.6	(314)	19.2	(275)
		65	ASL 16 X 65	1.35	26.0		23.4		20.8	
		70	ASL 16 X 70	1.25	28.0		25.0		22.4	
		75	ASL 16 X 75	1.17	30.0		27.0		24.0	
		80	ASL 16 X 80	1.10	32.0		28.8		25.6	
18	9	90	ASL 16 X 90	0.98	36.0		32.4		28.8	
		100	ASL 16 X 100	0.88	40.0		36.0		32.0	
		25	ASL 18 X 25	4.30	10.0		9.0		8.0	
		30	ASL 18 X 30	3.58	12.0		10.8		9.6	
		35	ASL 18 X 35	3.07	14.0		12.6		11.2	
		40	ASL 18 X 40	2.69	16.0		14.4		12.8	
		45	ASL 18 X 45	2.39	18.0		16.2		14.4	
		50	ASL 18 X 50	2.15	20.0		18.0		16.0	
		55	ASL 18 X 55	1.96	22.0	43	19.8	39	17.6	34
		60	ASL 18 X 60	1.79	24.0	(422)	21.6	(382)	19.2	(333)
		65	ASL 18 X 65	1.66	26.0		23.4		20.8	
		70	ASL 18 X 70	1.54	28.0		25.2		22.4	
20	10	75	ASL 18 X 75	1.44	30.0		27.0		24.0	
		80	ASL 18 X 80	1.35	32.0		28.8		25.6	
		90	ASL 18 X 90	1.20	36.0		32.4		28.8	
		100	ASL 18 X 100	1.07	40.0		36.0		32.0	
		25	ASL 20 X 25	5.40	10.0		9.0		8.0	
		30	ASL 20 X 30	4.50	12.0		10.8		9.6	
		35	ASL 20 X 35	3.86	14.0		12.6		11.2	
		40	ASL 20 X 40	3.38	16.0		14.4		12.8	
		45	ASL 20 X 45	3.00	18.0		16.2		14.4	
		50	ASL 20 X 50	2.70	20.0		18.0		16.0	
		55	ASL 20 X 55	2.45	22.0	54	19.8	49	17.6	43
		60	ASL 20 X 60	2.25	24.0	(530)	21.6	(481)	19.2	(422)
22	11	65	ASL 20 X 65	2.08	26.0		23.4		20.8	
		70	ASL 20 X 70	1.93	28.0		25.2		22.4	
		75	ASL 20 X 75	1.80	30.0		27.0		24.0	
		80	ASL 20 X 80	1.69	32.0		28.8		25.6	
		90	ASL 20 X 90	1.50	36.0		32.4		28.8	
		100	ASL 20 X 100	1.35	40.0		36.0		32.0	
		125	ASL 20 X 125	1.08	50.0		45.0		40.0	
		150	ASL 20 X 150	0.90	60.0		54.0		48.0	
		25	ASL 22 X 25	6.70	10.0		9.0		8.0	
		30	ASL 22 X 30	5.60	12.0		10.8		9.6	
		35	ASL 22 X 35	4.80	14.0		12.6		11.2	
		40	ASL 22 X 40	4.20	16.0		14.4		12.8	
22	11	45	ASL 22 X 45	3.72	18.0		16.2		14.4	
		50	ASL 22 X 50	3.35	20.0		18.0		16.0	
		55	ASL 22 X 55	3.05	22.0		19.8		17.6	
		60	ASL 22 X 60	2.80	24.0	67	21.6	60	19.2	54
		65	ASL 22 X 65	2.58	26.0	(657)	23.4	(588)	20.8	(530)
		70	ASL 22 X 70	2.40	28.0		25.2		22.4	
		75	ASL 22 X 75	2.23	30.0		27.0		24.0	
		80	ASL 22 X 80	2.10	32.0		28.8		25.6	
		90	ASL 22 X 90	1.86	36.0		32.4		28.8	
		100	ASL 22 X 100	1.68	40.0		36.0		32.0	
		125	ASL 22 X 125	1.34	50.0		45.0		40.0	
		150	ASL 22 X 150	1.12	60.0		54.0		48.0	

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JIS Series

Raymond® LIGHT DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS) BLUE

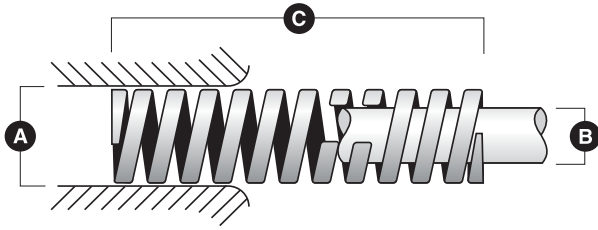
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (40% of free length)		For Long Life (36% of free length)		For Optimal Life (32% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
25	12.5	25	ASL 25 X 25	8.40	10.0		9.0		8.0	
		30	ASL 25 X 30	7.00	12.0		10.8		9.6	
		35	ASL 25 X 35	6.00	14.0		12.6		11.2	
		40	ASL 25 X 40	5.25	16.0		14.4		12.8	
		45	ASL 25 X 45	4.67	18.0		16.2		14.4	
		50	ASL 25 X 50	4.20	20.0		18.0		16.0	
		55	ASL 25 X 55	3.82	22.0		19.8		17.6	
		60	ASL 25 X 60	3.50	24.0		21.6		19.2	
		65	ASL 25 X 65	3.23	26.0	84	23.4	76	20.8	67
		70	ASL 25 X 70	3.00	28.0	(824)	25.2	(745)	22.4	(657)
		75	ASL 25 X 75	2.80	30.0		27.0		24.0	
		80	ASL 25 X 80	2.63	32.0		28.8		25.6	
		90	ASL 25 X 90	2.33	36.0		32.4		28.8	
		100	ASL 25 X 100	2.10	40.0		36.0		32.0	
		125	ASL 25 X 125	1.68	50.0		45.0		40.0	
27	13.5	150	ASL 25 X 150	1.40	60.0		54.0		48.0	
		175	ASL 25 X 175	1.20	70.0		63.0		56.0	
		25	ASL 27 X 25	10.00	10.0		9.0		8.0	
		30	ASL 27 X 30	8.33	12.0		10.8		9.6	
		35	ASL 27 X 35	7.14	14.0		12.6		11.2	
		40	ASL 27 X 40	6.25	16.0		14.4		12.8	
		45	ASL 27 X 45	5.56	18.0		16.2		14.4	
		50	ASL 27 X 50	5.00	20.0		18.0		16.0	
		55	ASL 27 X 55	4.55	22.0		19.8		17.6	
		60	ASL 27 X 60	4.17	24.0		21.6		19.2	
		65	ASL 27 X 65	3.85	26.0	100	23.4	90	20.8	80
		70	ASL 27 X 70	3.57	28.0	(981)	25.2	(883)	22.4	(795)
		75	ASL 27 X 75	3.33	30.0		27.0		24.0	
		80	ASL 27 X 80	3.13	32.0		28.8		25.6	
		90	ASL 27 X 90	2.78	36.0		32.4		28.8	
30	15	100	ASL 27 X 100	2.50	40.0		36.0		32.0	
		125	ASL 27 X 125	2.00	50.0		45.0		40.0	
		150	ASL 27 X 150	1.67	60.0		54.0		48.0	
		175	ASL 27 X 175	1.43	70.0		63.0		56.0	
		25	ASL 30 X 25	12.11	10.0		9.0		8.0	
		30	ASL 30 X 30	10.08	12.0		10.8		9.6	
		35	ASL 30 X 35	8.65	14.0		12.6		11.2	
		40	ASL 30 X 40	7.56	16.0		14.4		12.8	
		45	ASL 30 X 45	6.73	18.0		16.2		14.4	
		50	ASL 30 X 50	6.05	20.0		18.0		16.0	
		55	ASL 30 X 55	5.50	22.0		19.8		17.6	
		60	ASL 30 X 60	5.04	24.0		21.6		19.2	
		65	ASL 30 X 65	4.65	26.0	121	23.4	109	20.8	97
		70	ASL 30 X 70	4.32	28.0	(1,187)	25.2	(1,069)	22.4	(951)
		75	ASL 30 X 75	4.03	30.0		27.0		24.0	
		80	ASL 30 X 80	3.78	32.0		28.8		25.6	
		90	ASL 30 X 90	3.36	36.0		32.4		28.8	
		100	ASL 30 X 100	3.02	40.0		36.0		32.0	
		125	ASL 30 X 125	2.42	50.0		45.0		40.0	
		150	ASL 30 X 150	2.01	60.0		54.0		48.0	

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Raymond® LIGHT DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS)					BLUE					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (40% of free length)		For Long Life (36% of free length)		For Optimal Life (32% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
30	15	175	ASL 30 X 175	1.72	70.0	121	63.0	109	56.0	97
		200	ASL 30 X 200	1.51	80.0	(1,187)	72.0	(1,069)	64.0	(951)
		40	ASL 35 X 40	10.31	16.0		14.4		12.8	
		45	ASL 35 X 45	9.17	18.0		16.2		14.4	
		50	ASL 35 X 50	8.25	20.0		18.0		16.0	
		55	ASL 35 X 55	7.50	22.0		19.8		17.6	
		60	ASL 35 X 60	6.87	24.0		21.6		19.2	
		65	ASL 35 X 65	6.35	26.0		23.4		20.8	
		70	ASL 35 X 70	5.89	28.0		25.2		22.4	
		75	ASL 35 X 75	5.50	30.0	165	27.0	149	24.0	132
		80	ASL 35 X 80	5.15	32.0	(1,618)	28.8	(1,461)	25.6	(1,295)
		90	ASL 35 X 90	4.58	36.0		32.4		28.8	
	17.5	100	ASL 35 X 100	4.12	40.0		36.0		32.0	
		125	ASL 35 X 125	3.30	50.0		45.0		40.0	
		150	ASL 35 X 150	2.75	60.0		54.0		48.0	
		175	ASL 35 X 175	2.35	70.0		63.0		56.0	
		200	ASL 35 X 200	2.06	80.0		72.0		64.0	
		40	ASL 40 X 40	13.50	16.0		14.4		12.8	
		50	ASL 40 X 50	10.80	20.0		18.0		16.0	
		60	ASL 40 X 60	9.00	24.0		21.6		19.2	
		70	ASL 40 X 70	7.71	28.0		25.2		22.4	
		80	ASL 40 X 80	6.75	32.0		28.8		25.6	
40	20	90	ASL 40 X 90	6.00	36.0		32.4		28.8	
		100	ASL 40 X 100	5.40	40.0	216	36.0	194	32.0	173
		125	ASL 40 X 125	4.32	50.0	(2,120)	45.0	(1,903)	40.0	(1,697)
		150	ASL 40 X 150	3.60	60.0		54.0		48.0	
		175	ASL 40 X 175	3.08	70.0		63.0		56.0	
		200	ASL 40 X 200	2.70	80.0		72.0		64.0	
		250	ASL 40 X 250	2.16	100.0		90.0		80.0	
		50	ASL 50 X 50	16.89	20.0		18.0		16.0	
		60	ASL 50 X 60	14.08	24.0		21.6		19.2	
		70	ASL 50 X 70	12.07	28.0		25.2		22.4	
		80	ASL 50 X 80	10.56	32.0		28.8		25.6	
		90	ASL 50 X 90	9.38	36.0		32.4		28.8	
		100	ASL 50 X 100	8.45	40.0		36.0		32.0	
		125	ASL 50 X 125	6.76	50.0		45.0		40.0	
		150	ASL 50 X 150	5.63	60.0	338	54.0	304	48.0	270
		175	ASL 50 X 175	4.82	70.0	(3,310)	63.0	(2,980)	56.0	(2,650)
		200	ASL 50 X 200	4.22	80.0		72.0		64.0	
		250	ASL 50 X 250	3.38	100.0		90.0		80.0	
		300	ASL 50 X 300	2.81	120.0		108.0		96.0	
		350	ASL 50 X 350	2.41	140.0		126.0		112.0	
		400	ASL 50 X 400	2.11	160.0		144.0		128.0	
		450	ASL 50 X 450	1.88	180.0		162.0		144.0	
		500	ASL 50 X 500	1.69	200.0		180.0		160.0	
		60	ASL 60 X 60	20.25	24.0		21.6		19.2	
		70	ASL 60 X 70	17.35	28.0		25.2		22.4	
		80	ASL 60 X 80	15.18	32.0		28.8		25.6	
		90	ASL 60 X 90	13.50	36.0		32.4		28.8	
		100	ASL 60 X 100	12.15	40.0		36.0		32.0	
		125	ASL 60 X 125	9.72	50.0		45.0		40.0	
		150	ASL 60 X 150	8.10	60.0		54.0		48.0	
		175	ASL 60 X 175	6.94	70.0	486	63.0	437	56.0	389
		200	ASL 60 X 200	6.07	80.0	(4,770)	72.0	(4,290)	64.0	(3,810)
		250	ASL 60 X 250	4.86	100.0		90.0		80.0	
		300	ASL 60 X 300	4.05	120.0		108.0		96.0	
		350	ASL 60 X 350	3.47	140.0		126.0		112.0	
		400	ASL 60 X 400	3.04	160.0		144.0		128.0	
		450	ASL 60 X 450	2.70	180.0		162.0		144.0	
		500	ASL 60 X 500	2.43	200.0		180.0		160.0	

*Tabulated deflections shown represent near solid and are for design information only.



JIS Series

Raymond® MEDIUM DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS) RED

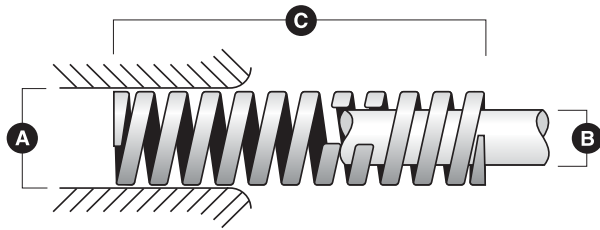
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (32% of free length)		For Long Life (29% of free length)		For Optimal Life (26% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
8	4	10	ASM 8 X 10	4.34	3.2		2.9		2.6	
		15	ASM 8 X 15	2.89	4.8		4.3		3.8	
		20	ASM 8 X 20	2.17	6.4		5.8		5.1	
		25	ASM 8 X 25	1.74	8.0		7.2		6.4	
		30	ASM 8 X 30	1.45	9.6		8.6		7.7	
		35	ASM 8 X 35	1.24	11.2	14	10.1	12.5	9.0	11
		40	ASM 8 X 40	1.09	12.8	(137.3)	11.5	(122.5)	10.2	(107.9)
		45	ASM 8 X 45	0.97	14.4		13.0		11.5	
		50	ASM 8 X 50	0.87	16.0		14.4		12.8	
		55	ASM 8 X 55	0.79	17.6		15.8		14.1	
		60	ASM 8 X 60	0.72	19.2		17.3		15.4	
10	5	20	ASM 10 X 20	3.13	6.4		5.8		5.1	
		25	ASM 10 X 25	2.50	8.0		7.2		6.4	
		30	ASM 10 X 30	2.08	9.6		8.6		7.7	
		35	ASM 10 X 35	1.78	11.2		10.1		9.0	
		40	ASM 10 X 40	1.56	12.8		11.5		10.2	
		45	ASM 10 X 45	1.38	14.4		13.0		11.5	
		50	ASM 10 X 50	1.25	16.0	20	14.4	18	12.8	16
		55	ASM 10 X 55	1.13	17.6	(196.1)	15.8	(176.5)	14.1	(156.9)
		60	ASM 10 X 60	1.04	19.2		17.3		15.4	
		65	ASM 10 X 65	0.96	20.8		18.7		16.6	
		70	ASM 10 X 70	0.89	22.4		20.2		17.9	
		75	ASM 10 X 75	0.83	24.0		21.6		19.2	
		80	ASM 10 X 80	0.78	25.6		23.0		20.5	
12	6	20	ASM 12 X 20	4.53	6.4		5.8		5.1	
		25	ASM 12 X 25	3.62	8.0		7.2		6.4	
		30	ASM 12 X 30	3.02	9.6		8.6		7.7	
		35	ASM 12 X 35	2.58	11.2		10.1		9.0	
		40	ASM 12 X 40	2.27	12.8		11.5		10.2	
		45	ASM 12 X 45	2.01	14.4		13.0		11.5	
		50	ASM 12 X 50	1.81	16.0	29	14.4	26	12.8	23
		55	ASM 12 X 55	1.64	17.6	(284)	15.8	(255)	14.1	(266)
		60	ASM 12 X 60	1.51	19.2		17.3		15.4	
		65	ASM 12 X 65	1.39	20.8		18.7		16.6	
		70	ASM 12 X 70	1.29	22.4		20.2		17.9	
		75	ASM 12 X 75	1.20	24.0		21.6		19.2	
		80	ASM 12 X 80	1.13	25.6		23.0		20.5	
14	7	25	ASM 14 X 25	4.87	8.0		7.2		6.4	
		30	ASM 14 X 30	4.06	9.6		8.6		7.7	
		35	ASM 14 X 35	3.48	11.2		10.1		9.0	
		40	ASM 14 X 40	3.04	12.8		11.5		10.2	
		45	ASM 14 X 45	2.70	14.4		13.0		11.5	
		50	ASM 14 X 50	2.43	16.0		14.4		12.8	
		55	ASM 14 X 55	2.21	17.6	39	15.8	35	14.1	31
		60	ASM 14 X 60	2.03	19.2	(383)	17.3	(343)	15.4	(304)
		65	ASM 14 X 65	1.87	20.8		18.7		16.6	
		70	ASM 14 X 70	1.74	22.4		20.2		17.9	
		75	ASM 14 X 75	1.62	24.0		21.6		19.2	
		80	ASM 14 X 80	1.52	25.6		23.0		20.5	
		90	ASM 14 X 90	1.35	28.8		25.9		23.0	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® MEDIUM DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS) RED										
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (32% of free length)		For Long Life (29% of free length)		For Optimal Life (26% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
16	8	25	ASM 16 X 25	6.39	8.0		7.2		6.4	
		30	ASM 16 X 30	5.32	9.6		8.6		7.7	
		35	ASM 16 X 35	4.65	11.2		10.1		9.0	
		40	ASM 16 X 40	3.98	12.8		11.5		10.2	
		45	ASM 16 X 45	3.54	14.4		13.0		11.5	
		50	ASM 16 X 50	3.18	16.0		14.4		12.8	
		55	ASM 16 X 55	2.89	17.6	51	15.8	46	14.1	41
		60	ASM 16 X 60	2.65	19.2	(500)	17.3	(451)	15.4	(402)
		65	ASM 16 X 65	2.45	20.8		18.7		16.6	
		70	ASM 16 X 70	2.27	22.4		20.2		17.9	
		75	ASM 16 X 75	2.11	24.0		21.6		19.2	
		80	ASM 16 X 80	1.99	25.6		23.0		20.5	
18	9	90	ASM 16 X 90	1.77	28.8		25.9		23.0	
		100	ASM 16 X 100	1.59	32.0		28.8		25.6	
		25	ASM 18 X 25	8.12	8.0		7.2		6.4	
		30	ASM 18 X 30	6.77	9.6		8.6		7.7	
		35	ASM 18 X 35	5.80	11.2		10.1		9.0	
		40	ASM 18 X 40	5.07	12.8		11.5		10.2	
		45	ASM 18 X 45	4.51	14.4		13.0		11.5	
		50	ASM 18 X 50	4.06	16.0		14.4		12.8	
		55	ASM 18 X 55	3.69	17.6	65	15.8	58	14.1	52
		60	ASM 18 X 60	3.38	19.2	(637)	17.3	(569)	15.4	(510)
		65	ASM 18 X 65	3.12	20.8		18.7		16.6	
		70	ASM 18 X 70	2.90	22.4		20.2		17.9	
20	10	75	ASM 18 X 75	2.70	24.0		21.6		19.2	
		80	ASM 18 X 80	2.53	25.6		23.0		20.5	
		90	ASM 18 X 90	2.25	28.8		25.9		23.0	
		100	ASM 18 X 100	2.02	32.0		28.8		25.6	
		25	ASM 20 X 25	10.00	8.0		7.2		6.4	
		30	ASM 20 X 30	8.33	9.6		8.6		7.7	
		35	ASM 20 X 35	7.14	11.2		10.1		9.0	
		40	ASM 20 X 40	6.25	12.8		11.5		10.2	
		45	ASM 20 X 45	5.55	14.4		13.0		11.5	
		50	ASM 20 X 50	5.00	16.0		14.4		12.8	
		55	ASM 20 X 55	4.54	17.6		15.8		14.1	
		60	ASM 20 X 60	4.16	19.2	80	17.3	72	15.4	64
22	11	65	ASM 20 X 65	3.84	20.8	(785)	18.7	(706)	16.6	(628)
		70	ASM 20 X 70	3.57	22.4		20.2		17.9	
		75	ASM 20 X 75	3.33	24.0		21.6		19.2	
		80	ASM 20 X 80	3.12	25.6		23.0		20.5	
		90	ASM 20 X 90	2.77	28.8		25.9		23.0	
		100	ASM 20 X 100	2.50	32.0		28.8		25.6	
		125	ASM 20 X 125	2.00	40.0		36.0		32.0	
		150	ASM 20 X 150	1.67	48.0		43.2		38.4	
		25	ASM 22 X 25	12.13	8.0		7.2		6.4	
		30	ASM 22 X 30	10.10	9.6		8.6		7.7	
		35	ASM 22 X 35	8.65	11.2		10.1		9.0	
		40	ASM 22 X 40	7.57	12.8		11.5		10.2	
22	11	45	ASM 22 X 45	6.74	14.4		13.0		11.5	
		50	ASM 22 X 50	6.06	16.0		14.4		12.8	
		55	ASM 22 X 55	5.50	17.6		15.8		14.1	
		60	ASM 22 X 60	5.05	19.2	97	17.3	87	15.4	78
		65	ASM 22 X 65	4.66	20.8	(951)	18.7	(853)	16.6	(765)
		70	ASM 22 X 70	4.33	22.4		20.2		17.0	
		75	ASM 22 X 75	4.04	24.0		21.6		19.2	
		80	ASM 22 X 80	3.78	25.6		23.0		20.5	
		90	ASM 22 X 90	3.36	28.8		25.9		23.0	
		100	ASM 22 X 100	3.03	32.0		28.8		25.6	
		125	ASM 22 X 125	2.42	40.0		36.0		32.0	
		150	ASM 22 X 150	2.01	48.0		43.2		38.4	

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JIS Series

Raymond® MEDIUM DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS) RED

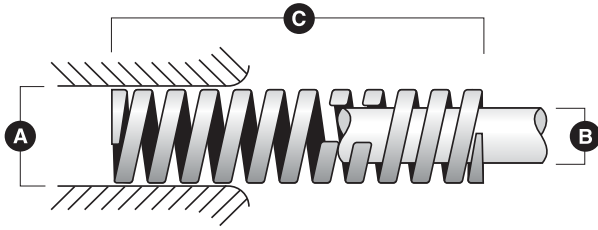
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (32% of free length)		For Long Life (29% of free length)		For Optimal Life (26% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
25	12.5	25	ASM 25 X 25	15.63	8.0		7.2		6.4	
		30	ASM 25 X 30	13.02	9.6		8.6		7.7	
		35	ASM 25 X 35	11.20	11.2		10.0		9.0	
		40	ASM 25 X 40	9.76	12.8		11.5		10.2	
		45	ASM 25 X 45	8.68	14.4		13.0		11.5	
		50	ASM 25 X 50	7.81	16.0		14.4		12.8	
		55	ASM 25 X 55	7.10	17.6		15.8		14.1	
		60	ASM 25 X 60	6.51	19.2		17.3		15.4	
		65	ASM 25 X 65	6.00	20.8	125	18.7	112	16.6	100
		70	ASM 25 X 70	5.58	22.4	(1,226)	20.2	(1,098)	17.9	(981)
		75	ASM 25 X 75	5.21	24.0		21.6		19.2	
		80	ASM 25 X 80	4.88	25.6		23.0		20.5	
		90	ASM 25 X 90	4.34	28.8		25.9		23.0	
		100	ASM 25 X 100	3.90	32.0		28.8		25.6	
		125	ASM 25 X 125	3.12	40.0		36.0		32.0	
27	13.5	150	ASM 25 X 150	2.60	48.0		43.2		38.4	
		175	ASM 25 X 175	2.23	56.0		50.4		44.8	
		25	ASM 27 X 25	18.25	8.0		7.2		6.4	
		30	ASM 27 X 30	15.20	9.6		8.6		7.7	
		35	ASM 27 X 35	13.04	11.2		10.0		9.0	
		40	ASM 27 X 40	11.40	12.8		11.5		10.2	
		45	ASM 27 X 45	10.14	14.4		13.0		11.5	
		50	ASM 27 X 50	9.12	16.0		14.4		12.8	
		55	ASM 27 X 55	8.30	17.6		15.8		14.1	
		60	ASM 27 X 60	7.60	19.2		17.3		15.4	
		65	ASM 27 X 65	7.00	20.8	146	18.7	131	16.6	117
		70	ASM 27 X 70	6.51	22.4	(1,432)	20.2	(1,285)	17.9	(1,147)
		75	ASM 27 X 75	6.08	24.0		21.6		19.2	
		80	ASM 27 X 80	5.70	25.6		23.0		20.5	
		90	ASM 27 X 90	5.06	28.8		25.9		23.0	
30	15	100	ASM 27 X 100	4.56	32.0		28.8		25.7	
		125	ASM 27 X 125	3.65	40.0		36.0		32.0	
		150	ASM 27 X 150	3.04	48.0		43.2		38.4	
		175	ASM 27 X 175	2.61	56.0		50.4		44.8	
		25	ASM 30 X 25	22.50	8.0		7.2		6.4	
		30	ASM 30 X 30	18.75	9.6		8.6		7.7	
		35	ASM 30 X 35	16.10	11.2		10.0		9.0	
		40	ASM 30 X 40	14.06	12.8		11.5		10.2	
		45	ASM 30 X 45	12.50	14.4		13.0		11.5	
		50	ASM 30 X 50	11.25	16.0		14.4		12.8	
		55	ASM 30 X 55	10.23	17.6		15.8		14.1	
		60	ASM 30 X 60	9.37	19.2		17.3		15.4	
		65	ASM 30 X 65	8.65	20.8		18.7		16.6	
		70	ASM 30 X 70	8.03	22.4		20.2		17.9	
		75	ASM 30 X 75	7.50	24.0	180	21.6	161	19.2	144
		80	ASM 30 X 80	7.03	25.6	(1,765)	23.0	(1,579)	20.5	(1,412)
		90	ASM 30 X 90	6.25	28.8		25.9		23.0	
		100	ASM 30 X 100	5.63	32.0		28.8		25.6	
		125	ASM 30 X 125	4.50	40.0		36.0		32.0	
		150	ASM 30 X 150	3.75	48.0		43.2		38.4	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® MEDIUM DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS) RED										
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (32% of free length)		For Long Life (29% of free length)		For Optimal Life (26% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
30	15	175	ASM 30 X 175	3.21	56.0	180	50.4	161	44.8	144
		200	ASM 30 X 200	2.81	64.0	(1,765)	57.6	(1,579)	51.2	(1,412)
		40	ASM 35 X 40	19.14	12.8		11.5		10.2	
		45	ASM 35 X 45	17.01	14.4		13.0		11.5	
		50	ASM 35 X 50	15.31	16.0		14.4		12.8	
		55	ASM 35 X 55	13.92	17.6		15.8		14.0	
		60	ASM 35 X 60	12.76	19.2		17.3		15.4	
		65	ASM 35 X 65	11.77	20.8		18.7		16.6	
		70	ASM 35 X 70	10.93	22.4		20.2		17.9	
		75	ASM 35 X 75	10.20	24.0	245	21.6	220	19.2	195
		80	ASM 35 X 80	9.57	25.6	(2,400)	23.0	(2,160)	20.5	(1,912)
		90	ASM 35 X 90	8.50	28.8		25.9		23.0	
35	17.5	100	ASM 35 X 100	7.65	32.0		28.8		25.6	
		125	ASM 35 X 125	6.12	40.0		36.0		32.0	
		150	ASM 35 X 150	5.10	48.0		43.2		38.4	
		175	ASM 35 X 175	4.37	56.0		50.4		44.8	
		200	ASM 35 X 200	3.82	64.0		57.6		51.2	
		40	ASM 40 X 40	25.02	12.8		11.5		10.2	
		50	ASM 40 X 50	20.00	16.0		14.4		12.8	
		60	ASM 40 X 60	16.60	19.2		17.3		15.4	
		70	ASM 40 X 70	14.28	22.4		20.2		17.9	
		80	ASM 40 X 80	12.50	25.6		23.0		20.5	
40	20	90	ASM 40 X 90	11.11	28.8	320	25.9	288	23.0	256
		100	ASM 40 X 100	10.00	32.0	(3,140)	28.8	(2,820)	25.6	(2,510)
		125	ASM 40 X 125	8.00	40.0		36.0		32.0	
		150	ASM 40 X 150	6.66	48.0		43.2		38.4	
		175	ASM 40 X 175	5.71	56.0		50.4		44.8	
		200	ASM 40 X 200	5.00	64.0		57.6		51.2	
		250	ASM 40 X 250	4.00	80.0		72.0		64.0	
		50	ASM 50 X 50	31.25	16.0		14.4		12.8	
		60	ASM 50 X 60	26.04	19.2		17.3		15.4	
		70	ASM 50 X 70	22.32	22.4		20.2		17.9	
50	25	80	ASM 50 X 80	19.53	25.6		23.0		20.5	
		90	ASM 50 X 90	17.36	28.8		25.9		23.0	
		100	ASM 50 X 100	15.62	32.0		28.8		25.6	
		125	ASM 50 X 125	12.50	40.0	500	36.0	450	32.0	400
		150	ASM 50 X 150	10.41	48.0	(4,900)	43.2	(4,410)	38.4	(3,920)
		175	ASM 50 X 175	8.92	56.0		50.4		44.8	
		200	ASM 50 X 200	7.81	64.0		57.6		51.2	
		250	ASM 50 X 250	6.25	80.0		72.0		64.0	
		300	ASM 50 X 300	5.20	96.0		86.4		76.8	
60	30	60	ASM 60 X 60	37.40	19.2		17.3		15.4	
		70	ASM 60 X 70	32.10	22.4		20.2		17.9	
		80	ASM 60 X 80	28.12	25.6		23.0		20.5	
		90	ASM 60 X 90	25.00	28.8		25.9		23.0	
		100	ASM 60 X 100	22.50	32.0		28.8		25.6	
		125	ASM 60 X 125	18.00	40.0	720	36.0	648	32.0	575
		150	ASM 60 X 150	15.00	48.0	(7,060)	43.2	(6,350)	38.4	(5,640)
		175	ASM 60 X 175	12.85	56.0		50.4		44.8	
		200	ASM 60 X 200	11.25	64.0		57.6		51.2	
		250	ASM 60 X 250	9.00	80.0		72.0		64.0	
		300	ASM 60 X 300	7.50	96.0		86.4		76.8	

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JIS Series

Raymond® HEAVY DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS) GREEN

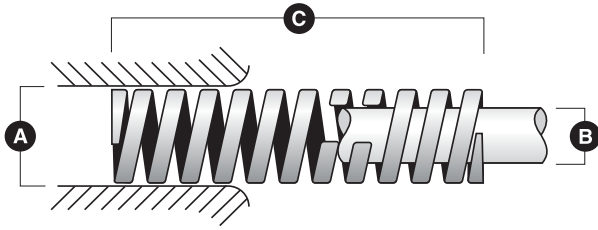
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (24% of free length)		For Long Life (22% of free length)		For Optimal Life (19% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
8	4	10	ASH 8 X 10	8.80	2.4		2.2		1.9	
		15	ASH 8 X 15	5.86	3.6		3.2		2.9	
		20	ASH 8 X 20	4.40	4.8		4.3		3.8	
		25	ASH 8 X 25	3.52	6.0		5.4		4.8	
		30	ASH 8 X 30	2.93	7.2		6.5		5.8	
		35	ASH 8 X 35	2.51	8.4	21	7.5	19	6.7	17
		40	ASH 8 X 40	2.20	9.6	(206)	8.6	(186.3)	7.7	(166.7)
		45	ASH 8 X 45	1.95	10.8		9.7		8.6	
		50	ASH 8 X 50	1.76	12.0		10.8		9.6	
		55	ASH 8 X 55	1.60	13.2		11.8		10.6	
		60	ASH 8 X 60	1.47	14.4		13.0		11.5	
10	5	20	ASH 10 X 20	6.25	4.8		4.3		3.8	
		25	ASH 10 X 25	5.00	6.0		5.4		4.8	
		30	ASH 10 X 30	4.16	7.2		6.5		5.8	
		35	ASH 10 X 35	3.57	8.4		7.5		6.7	
		40	ASH 10 X 40	3.15	9.6		8.6		7.7	
		45	ASH 10 X 45	2.77	10.8		9.7		8.6	
		50	ASH 10 X 50	2.50	12.0	30	10.8	27	9.6	24
		55	ASH 10 X 55	2.27	13.2	(294)	11.8	(265)	10.6	(235)
		60	ASH 10 X 60	2.08	14.4		13.0		11.5	
		65	ASH 10 X 65	1.92	15.6		14.0		12.5	
		70	ASH 10 X 70	1.79	16.8		15.1		13.4	
		75	ASH 10 X 75	1.67	18.0		16.2		14.4	
		80	ASH 10 X 80	1.56	19.2		17.3		15.4	
12	6	20	ASH 12 X 20	8.90	4.8		4.3		3.8	
		25	ASH 12 X 25	7.10	6.0		5.4		4.8	
		30	ASH 12 X 30	5.97	7.2		6.5		5.8	
		35	ASH 12 X 35	5.11	8.4		7.5		6.7	
		40	ASH 12 X 40	4.47	9.6		8.6		7.7	
		45	ASH 12 X 45	3.98	10.8		9.7		8.6	
		50	ASH 12 X 50	3.58	12.0	43	10.8	38	9.6	34
		55	ASH 12 X 55	3.25	13.2	(422)	11.8	(373)	10.6	(333)
		60	ASH 12 X 60	2.98	14.4		13.0		11.5	
		65	ASH 12 X 65	2.74	15.6		14.0		12.5	
		70	ASH 12 X 70	2.54	16.8		15.1		13.4	
		75	ASH 12 X 75	2.37	18.0		16.2		14.4	
		80	ASH 12 X 80	2.21	19.2		17.3		15.4	
14	7	25	ASH 14 X 25	9.83	6.0		5.4		4.8	
		30	ASH 14 X 30	8.19	7.2		6.5		5.8	
		35	ASH 14 X 35	7.02	8.4		7.5		6.7	
		40	ASH 14 X 40	6.14	9.6		8.6		7.7	
		45	ASH 14 X 45	5.46	10.8		9.7		8.6	
		50	ASH 14 X 50	4.91	12.0		10.8		9.6	
		55	ASH 14 X 55	4.46	13.2	59	11.8	53	10.6	47
		60	ASH 14 X 60	4.09	14.4	(579)	13.0	(520)	11.5	(461)
		65	ASH 14 X 65	3.78	15.6		14.0		12.5	
		70	ASH 14 X 70	3.51	16.8		15.1		13.4	
		75	ASH 14 X 75	3.27	18.0		16.2		14.4	
		80	ASH 14 X 80	3.07	19.2		17.3		15.4	
		90	ASH 14 X 90	2.72	21.6		19.4		17.3	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® HEAVY DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS)					GREEN					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (24% of free length)		For Long Life (22% of free length)		For Optimal Life (19% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
16	8	25	ASH 16 X 25	12.83	6.0		5.4		4.8	
		30	ASH 16 X 30	10.69	7.2		6.5		5.8	
		35	ASH 16 X 35	9.16	8.4		7.5		6.7	
		40	ASH 16 X 40	8.02	9.6		8.6		7.7	
		45	ASH 16 X 45	7.12	10.8		9.7		8.6	
		50	ASH 16 X 50	6.41	12.0		10.8		9.6	
		55	ASH 16 X 55	5.83	13.2	77	11.8	69	10.6	62
		60	ASH 16 X 60	5.34	14.4	(755)	13.0	(677)	11.5	(608)
		65	ASH 16 X 65	4.93	15.6		14.0		12.5	
		70	ASH 16 X 70	4.58	16.8		15.1		13.4	
		75	ASH 16 X 75	4.28	18.0		16.2		14.4	
		80	ASH 16 X 80	4.01	19.2		17.3		15.4	
18	9	90	ASH 16 X 90	3.57	21.6		19.4		17.3	
		100	ASH 16 X 100	3.21	24.0		21.6		19.2	
		25	ASH 18 X 25	16.16	6.0		5.4		4.8	
		30	ASH 18 X 30	13.57	7.2		6.5		5.8	
		35	ASH 18 X 35	11.54	8.4		7.5		6.7	
		40	ASH 18 X 40	10.10	9.6		8.6		7.7	
		45	ASH 18 X 45	8.98	10.8		9.7		8.6	
		50	ASH 18 X 50	8.08	12.0		10.8		9.6	
		55	ASH 18 X 55	7.34	13.2		11.8		10.6	
		60	ASH 18 X 60	6.73	14.4	97	13.0	87	11.5	78
		65	ASH 18 X 65	6.21	15.6	(951)	14.0	(853)	12.5	(765)
		70	ASH 18 X 70	5.77	16.8		15.1		13.4	
20	10	75	ASH 18 X 75	5.39	18.0		16.2		14.4	
		80	ASH 18 X 80	5.05	19.2		17.3		15.4	
		90	ASH 18 X 90	4.50	21.6		19.4		17.3	
		100	ASH 18 X 100	4.04	24.0		21.6		19.2	
		25	ASH 20 X 25	20.00	6.0		5.4		4.8	
		30	ASH 20 X 30	16.66	7.2		6.5		5.8	
		35	ASH 20 X 35	14.28	8.4		7.5		6.7	
		40	ASH 20 X 40	12.50	9.6		8.6		7.7	
		45	ASH 20 X 45	11.11	10.8		9.7		8.6	
		50	ASH 20 X 50	10.00	12.0		10.8		9.6	
		55	ASH 20 X 55	9.09	13.2	120	11.8	108	10.6	96
		60	ASH 20 X 60	8.33	14.4	(1,177)	13.0	(1,059)	11.5	(941)
22	11	65	ASH 20 X 65	7.69	15.6		14.0		12.5	
		70	ASH 20 X 70	7.14	16.8		15.1		13.4	
		75	ASH 20 X 75	6.67	18.0		16.2		14.4	
		80	ASH 20 X 80	6.25	19.2		17.3		15.4	
		90	ASH 20 X 90	5.55	21.6		19.4		17.3	
		100	ASH 20 X 100	5.00	24.0		21.6		19.2	
		125	ASH 20 X 125	4.00	30.0		27.0		24.0	
		150	ASH 20 X 150	3.33	36.0		32.4		28.8	
		25	ASH 22 X 25	24.16	6.0		5.40		4.8	
		30	ASH 22 X 30	20.13	7.2		6.50		5.8	
		35	ASH 22 X 35	17.30	8.4		7.50		6.7	
		40	ASH 22 X 40	15.10	9.6		8.60		7.7	
22	11	45	ASH 22 X 45	13.40	10.8		9.70		8.6	
		50	ASH 22 X 50	12.08	12.0		10.80		9.6	
		55	ASH 22 X 55	10.94	13.2		11.90		10.6	
		60	ASH 22 X 60	10.06	14.4	145	13.00	130	11.5	116
		65	ASH 22 X 65	9.28	15.6	(1,422)	14.00	(1,275)	12.5	(1,138)
		70	ASH 22 X 70	8.63	16.8		15.10		13.4	
		75	ASH 22 X 75	8.04	18.0		16.20		14.4	
		80	ASH 22 X 80	7.55	19.2		17.30		15.4	
		90	ASH 22 X 90	6.71	21.6		19.40		17.3	
		100	ASH 22 X 100	6.04	24.0		21.60		19.2	
		125	ASH 22 X 125	4.83	30.0		27.00		24.0	
		150	ASH 22 X 150	4.02	36.0		32.40		28.8	

*Tabulated deflections shown represent near solid and are for design information only.



JIS Series

Raymond® HEAVY DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS) GREEN

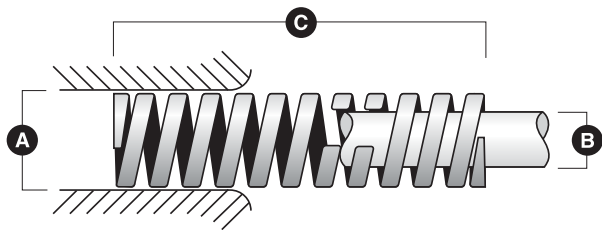
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (24% of free length)		For Long Life (22% of free length)		For Optimal Life (19% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
25	12.5	25	ASH 25 X 25	31.20	6.0		5.40		4.8	
		30	ASH 25 X 30	25.97	7.2		6.50		5.8	
		35	ASH 25 X 35	22.38	8.4		7.50		6.7	
		40	ASH 25 X 40	19.47	9.6		8.60		7.7	
		45	ASH 25 X 45	17.40	10.8		9.70		8.6	
		50	ASH 25 X 50	15.58	12.0		10.80		9.6	
		55	ASH 25 X 55	14.20	13.2		11.90		10.6	
		60	ASH 25 X 60	12.98	14.4	187	13.00	169	11.5	150
		65	ASH 25 X 65	12.00	15.6	(1,834)	14.00	(1,657)	12.5	(1,471)
		70	ASH 25 X 70	11.13	16.8		15.10		13.4	
		75	ASH 25 X 75	10.40	18.0		16.20		14.4	
		80	ASH 25 X 80	9.73	19.2		17.30		15.4	
		90	ASH 25 X 90	8.65	21.6		19.40		17.3	
		100	ASH 25 X 100	7.79	24.0		21.60		19.2	
		125	ASH 25 X 125	6.23	30.0		27.00		24.0	
27	13.5	150	ASH 25 X 150	5.20	36.0		32.40		28.8	
		175	ASH 25 X 175	4.46	42.0		37.80		33.6	
		25	ASH 27 X 25	36.40	6.0		5.40		4.8	
		30	ASH 27 X 30	30.41	7.2		6.50		5.8	
		35	ASH 27 X 35	26.20	8.4		7.50		6.7	
		40	ASH 27 X 40	22.81	9.6		8.60		7.7	
		45	ASH 27 X 45	20.30	10.8		9.70		8.6	
		50	ASH 27 X 50	18.25	12.0		10.80		9.6	
		55	ASH 27 X 55	16.50	13.2		11.90		10.6	
		60	ASH 27 X 60	15.20	14.4	219	13.00	197	11.5	175
		65	ASH 27 X 65	14.00	15.6	(2,150)	14.00	(1,932)	12.5	(1,716)
		70	ASH 27 X 70	13.03	16.8		15.10		13.4	
		75	ASH 27 X 75	12.10	18.0		16.20		14.4	
		80	ASH 27 X 80	11.40	19.2		17.30		15.4	
		90	ASH 27 X 90	10.13	21.6		19.40		17.3	
30	15	100	ASH 27 X 100	9.12	24.0		21.60		19.2	
		125	ASH 27 X 125	7.30	30.0		27.00		24.0	
		150	ASH 27 X 150	6.08	36.0		32.40		28.8	
		175	ASH 27 X 175	5.21	42.0		37.80		33.6	
		25	ASH 30 X 25	45.00	6.0		5.4		4.8	
		30	ASH 30 X 30	37.50	7.2		6.5		5.8	
		35	ASH 30 X 35	32.26	8.4		7.5		6.7	
		40	ASH 30 X 40	28.12	9.6		8.6		7.7	
		45	ASH 30 X 45	25.00	10.6		9.7		8.6	
		50	ASH 30 X 50	22.50	12.0		10.8		9.6	
		55	ASH 30 X 55	20.40	13.2		11.9		10.6	
		60	ASH 30 X 60	18.75	14.4		13.0		11.5	
		65	ASH 30 X 65	17.30	15.6	270	14.0	243	12.5	216
		70	ASH 30 X 70	16.07	16.8	(2,550)	15.1	(2,380)	13.4	(2,120)
		75	ASH 30 X 75	15.00	18.0		16.2		14.4	
		80	ASH 30 X 80	14.06	19.2		17.3		15.4	
		90	ASH 30 X 90	12.50	21.6		19.4		17.3	
		100	ASH 30 X 100	11.25	24.0		21.6		19.2	
		125	ASH 30 X 125	9.00	30.0		27.0		24.0	
		150	ASH 30 X 150	7.50	36.0		32.4		28.8	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® HEAVY DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS)					GREEN					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (24% of free length)		For Long Life (22% of free length)		For Optimal Life (19% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
30	15	175	ASH 30 X 175	6.42	42.0	270	37.8	243	33.6	216
		200	ASH 30 X 200	5.62	48.0	(2,550)	43.2	(2,380)	38.4	(2,120)
		40	ASH 35 X 40	38.22	9.6		8.6		7.7	
		50	ASH 35 X 50	30.58	12.0		10.8		9.6	
		55	ASH 35 X 55	27.80	13.2		11.9		10.6	
		60	ASH 35 X 60	25.48	14.4		13.0		11.5	
		65	ASH 35 X 65	23.53	15.6		14.0		12.5	
		70	ASH 35 X 70	21.84	16.8		15.1		13.4	
		75	ASH 35 X 75	20.39	18.0	367	16.2	330	14.4	293
		80	ASH 35 X 80	19.11	19.2	(3,600)	17.3	(3,240)	15.4	(2,870)
		90	ASH 35 X 90	16.99	21.6		19.4		17.3	
		100	ASH 35 X 100	15.29	24.0		21.6		19.2	
		125	ASH 35 X 125	12.23	30.0		27.0		24.0	
		150	ASH 35 X 150	10.19	36.0		32.4		28.8	
		175	ASH 35 X 175	8.73	42.0		37.8		33.6	
		200	ASH 35 X 200	7.64	48.0		43.2		38.4	
		40	ASH 40 X 40	50.00	9.6		9.6		7.7	
		50	ASH 40 X 50	40.00	12.0		12.0		9.6	
		60	ASH 40 X 60	33.33	14.4		14.4		11.5	
		70	ASH 40 X 70	28.57	16.8		16.8		13.4	
		80	ASH 40 X 80	25.00	18.0	480	19.2	432	15.4	384
		90	ASH 40 X 90	22.22	19.2	(4,170)	21.6	(4,240)	17.3	(3,770)
		100	ASH 40 X 100	20.00	21.6		24.0		19.2	
		125	ASH 40 X 125	16.00	24.0		30.0		24.0	
		150	ASH 40 X 150	13.33	30.0		36.0		28.8	
		175	ASH 40 X 175	11.42	36.0		42.0		33.6	
		200	ASH 40 X 200	10.00	42.0		48.0		38.4	
		250	ASH 40 X 250	8.00	48.0		60.0		48.0	
		50	ASH 50 X 50	62.50	12.0		10.8		9.6	
		60	ASH 50 X 60	52.08	14.4		13.0		11.5	
		70	ASH 50 X 70	44.64	16.8		15.1		13.4	
		80	ASH 50 X 80	39.06	19.2		17.3		15.4	
		90	ASH 50 X 90	34.72	21.6		19.4		17.3	
		100	ASH 50 X 100	31.25	24.0	750	21.6	675	19.2	600
		125	ASH 50 X 125	25.00	30.0	(7,360)	27.0	(6,620)	24.0	(5,880)
		150	ASH 50 X 150	20.83	36.0		32.4		28.8	
		175	ASH 50 X 175	17.85	42.0		37.8		33.6	
		200	ASH 50 X 200	15.62	48.0		43.2		38.4	
		250	ASH 50 X 250	12.50	60.0		54.0		48.0	
		300	ASH 50 X 300	10.41	72.0		64.8		57.6	
		60	ASH 60 X 60	75.00	14.4		13.0		11.5	
		70	ASH 60 X 70	64.28	16.8		15.1		13.4	
		80	ASH 60 X 80	56.25	19.2		17.3		15.4	
		90	ASH 60 X 90	50.00	21.6		19.4		17.3	
		100	ASH 60 X 100	45.00	24.0		21.6		19.2	
		125	ASH 60 X 125	36.00	30.0	1,080	27.0	973	24.0	864
		150	ASH 60 X 150	30.00	36.0	(10,590)	32.4	(9,540)	28.8	(8,470)
		175	ASH 60 X 175	25.71	42.0		37.8		33.6	
		200	ASH 60 X 200	22.50	48.0		43.2		38.4	
		250	ASH 60 X 250	18.00	60.0		54.0		48.0	
		300	ASH 60 X 300	15.00	72.0		64.8		57.6	

*Tabulated deflections shown represent near solid and are for design information only.



JIS Series

Raymond® EXTRA HEAVY DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS) BROWN

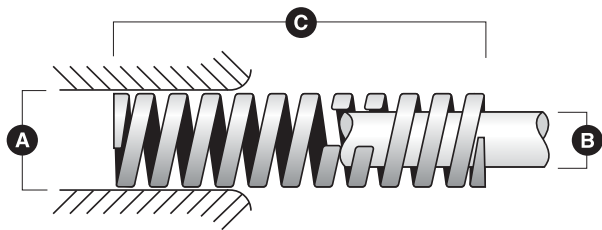
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (20% of free length)		For Long Life (18% of free length)		For Optimal Life (16% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
8	4	10	ASB 8 X 10	16.94	2.0		1.8		1.6	
		15	ASB 8 X 15	11.30	3.0		2.7		2.4	
		20	ASB 8 X 20	8.47	4.0		3.6		3.2	
		25	ASB 8 X 25	6.78	5.0		4.5		4.0	
		30	ASB 8 X 30	5.65	6.0	35	5.4	30.5	4.8	26
		35	ASB 8 X 35	4.84	7.0	(343)	6.3	(299)	5.6	(255)
		40	ASB 8 X 40	4.20	8.0		7.2		6.4	
		45	ASB 8 X 45	3.77	9.0		8.1		7.2	
		50	ASB 8 X 50	3.39	10.0		9.0		8.0	
10	5	55	ASB 8 X 55	3.08	11.0		9.9		8.8	
		60	ASB 8 X 60	2.82	12.0		10.8		9.6	
		20	ASB 10 X 20	11.25	4.0		3.6		3.2	
		25	ASB 10 X 25	9.00	5.0		4.5		4.0	
		30	ASB 10 X 30	7.50	6.0		5.4		4.8	
		35	ASB 10 X 35	6.43	7.0		6.3		5.6	
		40	ASB 10 X 40	5.63	8.0		7.2		6.4	
		45	ASB 10 X 45	5.00	9.0		8.1		7.2	
		50	ASB 10 X 50	4.50	10.0	45	9.0	41	8.0	36
12	6	55	ASB 10 X 55	4.09	11.0	(441)	9.9	(402)	8.8	(353)
		60	ASB 10 X 60	3.75	12.0		10.8		9.6	
		65	ASB 10 X 65	3.47	13.0		11.7		10.4	
		70	ASB 10 X 70	3.21	14.0		12.6		11.2	
		75	ASB 10 X 75	3.00	15.0		13.5		12.0	
		80	ASB 10 X 80	2.82	16.0		14.4		12.8	
		20	ASB 12 X 20	14.50	4.0		3.6		3.2	
		25	ASB 12 X 25	11.60	5.0		4.5		4.0	
		30	ASB 12 X 30	9.67	6.0		5.4		4.8	
14	7	35	ASB 12 X 35	8.29	7.0		6.3		5.6	
		40	ASB 12 X 40	7.25	8.0		7.2		6.4	
		45	ASB 12 X 45	6.44	9.0		8.1		7.2	
		50	ASB 12 X 50	5.80	10.0	58	9.0	52	8.0	46
		55	ASB 12 X 55	5.27	11.0	(569)	9.9	(510)	8.8	(451)
		60	ASB 12 X 60	4.83	12.0		10.8		9.6	
		65	ASB 12 X 65	4.44	13.0		11.7		10.4	
		70	ASB 12 X 70	4.13	14.0		12.6		11.2	
		75	ASB 12 X 75	3.85	15.0		13.5		12.0	
		80	ASB 12 X 80	3.61	16.0		14.4		12.8	
		25	ASB 14 X 25	15.00	5.0		4.5		4.0	
		30	ASB 14 X 30	12.50	6.0		5.4		4.8	
		35	ASB 14 X 35	10.72	7.0		6.3		5.6	
		40	ASB 14 X 40	9.38	8.0		7.2		6.4	
		45	ASB 14 X 45	8.34	9.0		8.1		7.2	
		50	ASB 14 X 50	7.50	10.0		9.0		8.0	
		55	ASB 14 X 55	6.82	11.0	75	9.9	68	8.8	60
		60	ASB 14 X 60	6.25	12.0	(736)	10.8	(667)	9.6	(588)
		65	ASB 14 X 65	5.77	13.0		11.7		10.4	
		70	ASB 14 X 70	5.36	14.0		12.6		11.2	
		75	ASB 14 X 75	5.00	15.0		13.5		12.0	
		80	ASB 14 X 80	4.69	16.0		14.4		12.8	
		90	ASB 14 X 90	4.17	18.0		16.2		14.4	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® EXTRA HEAVY DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS)					BROWN					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (20% of free length)		For Long Life (18% of free length)		For Optimal Life (16% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
16	8	25	ASB 16 X 25	20.00	5.0		4.5		4.0	
		30	ASB 16 X 30	16.67	6.0		5.4		4.8	
		35	ASB 16 X 35	14.29	7.0		6.3		5.6	
		40	ASB 16 X 40	12.50	8.0		7.2		6.4	
		45	ASB 16 X 45	11.11	9.0		8.1		7.2	
		50	ASB 16 X 50	10.00	10.0		9.0		8.0	
		55	ASB 16 X 55	9.09	11.0	100	9.9	90	8.8	80
		60	ASB 16 X 60	8.34	12.0	(981)	10.8	(883)	9.6	(785)
		65	ASB 16 X 65	7.69	13.0		11.7		10.4	
		70	ASB 16 X 70	7.14	14.0		12.6		11.2	
		75	ASB 16 X 75	6.67	15.0		13.5		12.0	
		80	ASB 16 X 80	6.25	16.0		14.4		12.8	
18	9	90	ASB 16 X 90	5.56	18.0		16.2		14.4	
		100	ASB 16 X 100	5.00	20.0		18.0		16.0	
		25	ASB 18 X 25	25.00	5.0		4.5		4.0	
		30	ASB 18 X 30	20.84	6.0		5.4		4.8	
		35	ASB 18 X 35	17.86	7.0		6.3		5.6	
		40	ASB 18 X 40	15.63	8.0		7.2		6.4	
		45	ASB 18 X 45	13.89	9.0		8.1		7.2	
		50	ASB 18 X 50	12.50	10.0		9.0		8.0	
		55	ASB 18 X 55	11.37	11.0	125	9.9	113	8.8	100
		60	ASB 18 X 60	10.42	12.0	(1,226)	10.8	(1,108)	9.6	(981)
		65	ASB 18 X 65	9.62	13.0		11.7		10.4	
		70	ASB 18 X 70	8.93	14.0		12.6		11.2	
20	10	75	ASB 18 X 75	8.34	15.0		13.5		12.0	
		80	ASB 18 X 80	7.82	16.0		14.4		12.8	
		90	ASB 18 X 90	6.95	18.0		16.2		14.4	
		100	ASB 18 X 100	6.26	20.0		18.0		16.0	
		25	ASB 20 X 25	32.00	5.0		4.5		4.0	
		30	ASB 20 X 30	26.67	6.0		5.4		4.8	
		35	ASB 20 X 35	22.86	7.0		6.3		5.6	
		40	ASB 20 X 40	20.00	8.0		7.2		6.4	
		45	ASB 20 X 45	17.78	9.0		8.1		7.2	
		50	ASB 20 X 50	16.00	10.0		9.0		8.0	
		55	ASB 20 X 55	14.55	11.0		9.9		8.8	
		60	ASB 20 X 60	13.33	12.0		10.8		9.6	
22	11	65	ASB 20 X 65	12.31	13.0	160	11.7	144	10.4	128
		70	ASB 20 X 70	11.43	14.0	(1,569)	12.6	(1,412)	11.2	(1,255)
		75	ASB 20 X 75	10.67	15.0		13.5		12.0	
		80	ASB 20 X 80	10.00	16.0		14.4		12.8	
		90	ASB 20 X 90	8.89	18.0		16.2		14.4	
		100	ASB 20 X 100	8.00	20.0		18.0		16.0	
		125	ASB 20 X 125	6.40	25.0		22.5		20.0	
		150	ASB 20 X 150	5.33	30.0		27.0		24.0	
		25	ASB 22 X 25	39.00	5.0		4.5		4.0	
		30	ASB 22 X 30	32.50	6.0		5.4		4.8	
		35	ASB 22 X 35	27.86	7.0		6.3		5.6	
		40	ASB 22 X 40	24.38	8.0		7.2		6.4	
22	11	45	ASB 22 X 45	21.67	9.0		8.1		7.2	
		50	ASB 22 X 50	19.50	10.0		9.0		8.0	
		55	ASB 22 X 55	17.73	11.0		9.9		8.8	
		60	ASB 22 X 60	16.25	12.0	195	10.8	176	9.6	156
		65	ASB 22 X 65	15.00	13.0	(1,912)	11.7	(1,726)	10.4	(1,530)
		70	ASB 22 X 70	13.93	14.0		12.6		11.2	
		75	ASB 22 X 75	13.00	15.0		13.5		12.0	
		80	ASB 22 X 80	12.19	16.0		14.4		12.8	
		90	ASB 22 X 90	10.83	18.0		16.2		14.4	
		100	ASB 22 X 100	9.75	20.0		18.0		16.0	
		125	ASB 22 X 125	7.80	25.0		22.5		20.0	
		150	ASB 22 X 150	6.50	30.0		27.0		24.0	

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JIS Series

Raymond®

EXTRA HEAVY DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS)

BROWN

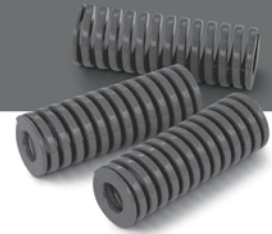
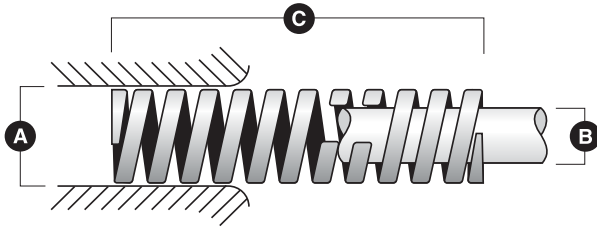
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (20% of free length)		For Long Life (18% of free length)		For Optimal Life (16% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
25	12.5	25	ASB 25 X 25	49.00	5.0		4.5		4.0	
		30	ASB 25 X 30	40.80	6.0		5.4		4.8	
		35	ASB 25 X 35	35.00	7.0		6.3		5.6	
		40	ASB 25 X 40	30.60	8.0		7.2		6.4	
		45	ASB 25 X 45	27.20	9.0		8.1		7.2	
		50	ASB 25 X 50	24.50	10.0		9.0		8.0	
		55	ASB 25 X 55	22.30	11.0		9.9		8.8	
		60	ASB 25 X 60	20.40	12.0		10.8		9.6	
		65	ASB 25 X 65	18.80	13.0	245	11.7	221	10.4	196
		70	ASB 25 X 70	17.50	14.0	(2,400)	12.6	(2,170)	11.2	(1,922)
		75	ASB 25 X 75	16.30	15.0		13.5		12.0	
		80	ASB 25 X 80	15.30	16.0		14.4		12.8	
		90	ASB 25 X 90	13.60	18.0		16.2		14.4	
		100	ASB 25 X 100	12.30	20.0		18.0		16.0	
		125	ASB 25 X 125	9.80	25.0		22.5		20.0	
		150	ASB 25 X 150	8.17	30.0		27.0		24.0	
		175	ASB 25 X 175	7.00	35.0		31.5		28.0	
27	13.5	25	ASB 27 X 25	58.00	5.0		4.5		4.0	
		30	ASB 27 X 30	48.33	6.0		5.4		4.8	
		35	ASB 27 X 35	41.43	7.0		6.3		5.6	
		40	ASB 27 X 40	36.25	8.0		7.2		6.4	
		45	ASB 27 X 45	32.22	9.0		8.1		7.2	
		50	ASB 27 X 50	29.00	10.0		9.0		8.0	
		55	ASB 27 X 55	26.36	11.0		9.9		8.8	
		60	ASB 27 X 60	24.17	12.0		10.8		9.6	
		65	ASB 27 X 65	22.31	13.0	290	11.7	261	10.4	232
		70	ASB 27 X 70	20.71	14.0	(2,840)	12.6	(2,560)	11.2	(2,280)
		75	ASB 27 X 75	19.33	15.0		13.5		12.0	
		80	ASB 27 X 80	18.13	16.0		14.4		12.8	
		90	ASB 27 X 90	16.11	18.0		16.2		14.4	
		100	ASB 27 X 100	14.50	20.0		18.0		16.0	
		125	ASB 27 X 125	11.60	25.0		22.5		20.0	
		150	ASB 27 X 150	9.67	30.0		27.0		24.0	
		175	ASB 27 X 175	8.28	35.0		31.5		28.0	
30	15	25	ASB 30 X 25	72.00	5.0		4.5		4.0	
		30	ASB 30 X 30	60.00	6.0		5.4		4.8	
		35	ASB 30 X 35	51.43	7.0		6.3		5.6	
		40	ASB 30 X 40	45.00	8.0		7.2		6.4	
		45	ASB 30 X 45	40.00	9.0		8.1		7.2	
		50	ASB 30 X 50	36.00	10.0		9.0		8.0	
		55	ASB 30 X 55	32.72	11.0		9.9		8.8	
		60	ASB 30 X 60	30.00	12.0		10.8		9.6	
		65	ASB 30 X 65	27.69	13.0	360	11.7	324	10.4	288
		70	ASB 30 X 70	25.71	14.0	(3,530)	12.6	(3,180)	11.2	(2,820)
		75	ASB 30 X 75	24.00	15.0		13.5		12.0	
		80	ASB 30 X 80	22.50	16.0		14.4		12.8	
		90	ASB 30 X 90	20.00	18.0		16.2		14.4	
		100	ASB 30 X 100	18.00	20.0		18.0		16.0	
		125	ASB 30 X 125	14.40	25.0		22.5		20.0	
		150	ASB 30 X 150	12.00	30.0		27.0		24.0	

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® EXTRA HEAVY DUTY JIS B 5012 SERIES SPRINGS (METRIC DIMENSIONS)					BROWN					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (20% of free length)		For Long Life (18% of free length)		For Optimal Life (16% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
30	15	175	ASB 30 X 175	10.28	35.0	360	31.5	324	28.0	288
		200	ASB 30 X 200	9.00	40.0	(3,530)	36.0	(3,180)	32.0	(2,820)
		40	ASB 35 X 40	61.20	8.0		7.2		6.4	
		45	ASB 35 X 45	54.44	9.0		8.1		7.2	
		50	ASB 35 X 50	49.00	10.0		9.0		8.0	
		55	ASB 35 X 55	44.54	11.0		9.9		8.8	
		60	ASB 35 X 60	40.83	12.0		10.8		9.6	
		65	ASB 35 X 65	37.69	13.0		11.7		10.4	
		70	ASB 35 X 70	35.00	14.0		12.6		11.2	
		75	ASB 35 X 75	32.67	15.0	490	13.5	441	12.0	392
		80	ASB 35 X 80	30.62	16.0	(4,810)	14.4	(4,320)	12.8	(3,840)
		90	ASB 35 X 90	27.22	18.0		16.2		14.4	
	17.5	100	ASB 35 X 100	24.50	20.0		18.0		16.0	
		125	ASB 35 X 125	19.60	25.0		22.5		20.0	
		150	ASB 35 X 150	16.33	30.0		27.0		24.0	
		175	ASB 35 X 175	14.00	35.0		31.5		28.0	
		200	ASB 35 X 200	12.25	40.0		36.0		32.0	
		40	ASB 40 X 40	80.00	8.0		7.2		6.4	
		50	ASB 40 X 50	64.00	10.0		9.0		8.0	
		60	ASB 40 X 60	53.33	12.0		10.8		9.6	
		70	ASB 40 X 70	45.71	14.0		12.6		11.2	
		80	ASB 40 X 80	40.00	16.0		14.4		12.8	
40	20	90	ASB 40 X 90	35.55	18.0	640	16.2	576	14.4	512
		100	ASB 40 X 100	32.00	20.0	(6,280)	18.0	(5,650)	16.0	(5,020)
		125	ASB 40 X 125	25.60	25.0		22.5		20.0	
		150	ASB 40 X 150	21.33	30.0		27.0		24.0	
		175	ASB 40 X 175	18.28	35.0		31.5		28.0	
		200	ASB 40 X 200	15.00	40.0		36.0		32.0	
		250	ASB 40 X 250	12.80	50.0		45.0		40.0	
		50	ASB 50 X 50	100.00	10.0		9.0		8.0	
		60	ASB 50 X 60	83.33	12.0		10.8		9.6	
		70	ASB 50 X 70	71.42	14.0		12.6		11.2	
		80	ASB 50 X 80	62.50	16.0		14.4		12.8	
		90	ASB 50 X 90	55.55	18.0		16.2		14.4	
		100	ASB 50 X 100	50.00	20.0	1,000	18.0	900	16.0	800
		125	ASB 50 X 125	40.00	25.0	(9,810)	22.5	(8,830)	20.0	(7,850)
		150	ASB 50 X 150	33.33	30.0		27.0		24.0	
		175	ASB 50 X 175	27.57	35.0		31.5		28.0	
		200	ASB 50 X 200	25.00	40.0		36.0		32.0	
		250	ASB 50 X 250	20.00	50.0		45.0		40.0	
		300	ASB 50 X 300	16.66	60.0		54.0		48.0	
		60	ASB 60 X 60	120.00	12.0		10.8		9.6	
		70	ASB 60 X 70	102.00	14.0		12.6		11.2	
		80	ASB 60 X 80	90.00	16.0		14.4		12.8	
		90	ASB 60 X 90	80.00	18.0		16.2		14.4	
		100	ASB 60 X 100	72.00	20.0		18.0		16.0	
		125	ASB 60 X 125	57.60	25.0	1,440	22.5	1,296	20.0	1,152
		150	ASB 60 X 150	48.00	30.0	(14,122)	27.0	(12,710)	24.0	(11,300)
		175	ASB 60 X 175	41.14	35.0		31.5		28.0	
		200	ASB 60 X 200	36.00	40.0		36.0		32.0	
		250	ASB 60 X 250	28.80	50.0		45.0		40.0	
60	30	300	ASB 60 X 300	24.00	60.0		54.0		48.0	

*Tabulated deflections shown represent near solid and are for design information only.



Mold Return Springs

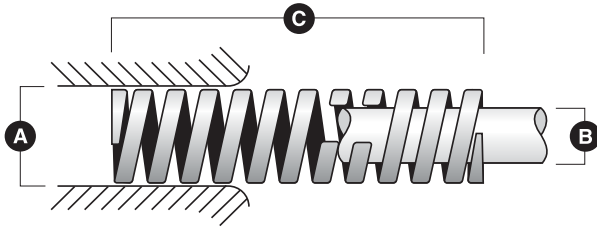
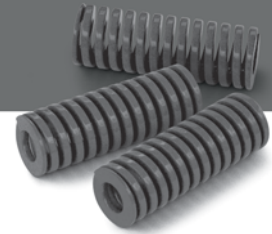
Raymond® MOLD RETURN SPRINGS (INCH DIMENSIONS)					GRAY		
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE		
					For Maximum Operating Def. (50% of free length)		Solid Height
					Deflection (in)	Load (lbs)	
A	B	C					inches
0.571	0.354	0.79	ASR 14.5 X 20	6.3	0.40	25	0.4
		0.98	ASR 14.5 X 25	5.0	0.49		0.4
		1.18	ASR 14.5 X 30	4.2	0.59		0.5
		1.38	ASR 14.5 X 35	3.6	0.69		0.6
		1.57	ASR 14.5 X 40	3.1	0.79		0.7
		1.77	ASR 14.5 X 45	2.8	0.89		0.8
		1.97	ASR 14.5 X 50	2.5	0.99		0.8
		2.17	ASR 14.5 X 55	2.3	1.09		0.9
		2.36	ASR 14.5 X 60	2.1	1.18		1.0
		2.56	ASR 14.5 X 65	1.9	1.28		1.1
		2.76	ASR 14.5 X 70	1.8	1.38		1.2
		2.95	ASR 14.5 X 75	1.7	1.48		1.2
		3.15	ASR 14.5 X 80	1.6	1.58		1.3
		3.54	ASR 14.5 X 90	1.4	1.77		1.5
		3.94	ASR 14.5 X 100	1.3	1.97		1.6
		4.92	ASR 14.5 X 125	1.0	2.46		2.0
0.669	0.433	0.98	ASR 17 X 25	8.7	0.49	43	0.4
		1.18	ASR 17 X 30	7.3	0.59		0.5
		1.38	ASR 17 X 35	6.2	0.69		0.6
		1.57	ASR 17 X 40	5.4	0.79		0.7
		1.77	ASR 17 X 45	4.8	0.89		0.8
		1.97	ASR 17 X 50	4.3	0.99		0.8
		2.17	ASR 17 X 55	3.9	1.09		0.9
		2.36	ASR 17 X 60	3.6	1.18		1.0
		2.56	ASR 17 X 65	3.3	1.28		1.1
		2.76	ASR 17 X 70	3.1	1.38		1.2
		2.95	ASR 17 X 75	2.9	1.48		1.2
		3.15	ASR 17 X 80	2.7	1.58		1.3
		3.54	ASR 17 X 90	2.4	1.77		1.5
		3.94	ASR 17 X 100	2.2	1.97		1.6
		4.92	ASR 17 X 125	1.7	2.46		2.0
		5.91	ASR 17 X 150	1.4	2.96		2.4
0.827	0.512	1.18	ASR 21 X 30	8.0	0.59	47	0.5
		1.38	ASR 21 X 35	6.9	0.69		0.6
		1.57	ASR 21 X 40	6.0	0.79		0.7
		1.77	ASR 21 X 45	5.3	0.89		0.8
		1.97	ASR 21 X 50	4.8	0.99		0.8
		2.17	ASR 21 X 55	4.3	1.09		0.9
		2.36	ASR 21 X 60	4.0	1.18		1.0
		2.56	ASR 21 X 65	3.7	1.28		1.1
		2.76	ASR 21 X 70	3.4	1.38		1.2
		2.95	ASR 21 X 75	3.2	1.48		1.2
		3.15	ASR 21 X 80	3.0	1.58		1.3
		3.54	ASR 21 X 90	2.7	1.77		1.5
		3.94	ASR 21 X 100	2.4	1.97		1.6
		4.92	ASR 21 X 125	1.9	2.46		2.0
		5.91	ASR 21 X 150	1.6	2.96		2.4
1.024	0.650	1.18	ASR 26 X 30	15.6	0.59	92	0.5
		1.38	ASR 26 X 35	13.4	0.69		0.6
		1.57	ASR 26 X 40	11.7	0.79		0.7

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® MOLD RETURN SPRINGS (INCH DIMENSIONS)					GRAY		
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE		
					For Maximum Operating Def. (50% of free length)		Solid Height
					Deflection (in)	Load (lbs)	
A	B	C					inches
1.024	0.650	1.77	ASR 26 X 45	10.4	0.89	92	0.8
		1.97	ASR 26 X 50	9.4	0.99		0.8
		2.17	ASR 26 X 55	8.5	1.09		0.9
		2.36	ASR 26 X 60	7.8	1.18		1.0
		2.56	ASR 26 X 65	7.2	1.28		1.1
		2.76	ASR 26 X 70	6.7	1.38		1.2
		2.95	ASR 26 X 75	6.2	1.48		1.2
		3.15	ASR 26 X 80	5.9	1.58		1.3
		3.54	ASR 26 X 90	5.2	1.77		1.5
		3.94	ASR 26 X 100	4.7	1.97		1.5
		4.33	ASR 26 X 110	4.3	2.17		1.8
		4.92	ASR 26 X 125	3.8	2.46		2.0
		5.91	ASR 26 X 150	3.1	2.96		2.4
		6.89	ASR 26 X 175	2.7	3.45		2.8
		7.87	ASR 26 X 200	2.3	3.94		3.2
1.260	0.827	1.57	ASR 32 X 40	14.6	0.79	115	0.7
		1.77	ASR 32 X 45	13.0	0.89		0.8
		1.97	ASR 32 X 50	11.7	0.99		0.8
		2.36	ASR 32 X 60	9.7	1.18		1.0
		2.76	ASR 32 X 70	8.3	1.38		1.2
		3.15	ASR 32 X 80	7.3	1.58		1.3
		3.54	ASR 32 X 90	6.5	1.77		1.5
		3.94	ASR 32 X 100	5.8	1.97		1.6
		4.33	ASR 32 X 110	5.3	2.17		1.8
		4.92	ASR 32 X 125	4.7	2.46		2.0
		5.91	ASR 32 X 150	3.9	2.96		2.4
		6.89	ASR 32 X 175	3.3	3.45		2.8
		7.87	ASR 32 X 200	2.9	3.94		3.2
		9.84	ASR 32 X 250	2.3	4.92		4.0
		11.81	ASR 32 X 300	1.9	5.91		4.8
1.535	1.024	1.57	ASR 39 X 40	15.7	0.79	124	0.7
		1.77	ASR 39 X 45	13.9	0.89		0.8
		1.97	ASR 39 X 50	12.6	0.99		0.8
		2.36	ASR 39 X 60	10.5	1.18		1.0
		2.76	ASR 39 X 70	9.0	1.38		1.2
		3.15	ASR 39 X 80	7.9	1.58		1.3
		3.54	ASR 39 X 90	7.0	1.77		1.5
		3.94	ASR 39 X 100	6.3	1.97		1.6
		4.33	ASR 39 X 110	5.7	2.17		1.8
		4.92	ASR 39 X 125	5.0	2.46		2.0
		5.91	ASR 39 X 150	4.2	2.96		2.4
		6.89	ASR 39 X 175	3.6	3.45		2.8
		7.87	ASR 39 X 200	3.1	3.94		3.2
		9.84	ASR 39 X 250	2.5	4.92		4.0
		11.81	ASR 39 X 300	2.1	5.91		4.8
1.811	1.260	1.97	ASR 46 X 50	14.2	0.99	140	0.8
		2.36	ASR 46 X 60	11.8	1.18		1.0
		2.76	ASR 46 X 70	10.1	1.38		1.2
		3.15	ASR 46 X 80	8.9	1.58		1.3
		3.54	ASR 46 X 90	7.9	1.77		1.5
		3.94	ASR 46 X 100	7.1	1.97		1.6
		4.33	ASR 46 X 110	6.5	2.17		1.8
		4.92	ASR 46 X 125	5.7	2.46		2.0
		5.91	ASR 46 X 150	4.7	2.96		2.4
		6.89	ASR 46 X 175	4.1	3.45		2.8
		7.87	ASR 46 X 200	3.5	3.94		3.2
		9.84	ASR 46 X 250	2.9	4.92		4.0
		11.81	ASR 46 X 300	2.3	5.91		4.8

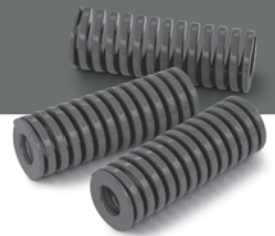
*Tabulated deflections shown represent near solid and are for design information only.



Mold Return Springs

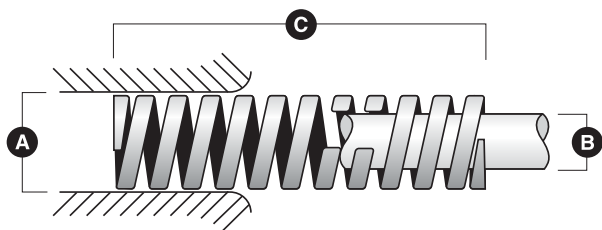
Raymond® MOLD RETURN SPRINGS (METRIC DIMENSIONS)					GRAY		
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE		
					For Maximum Operating Def. (50% of free length)		Solid Height
					Deflection (mm)	Load kgf (N)	
14.5	9	20	ASR 14.5 X 20	1.10	10.0	11 (107.9)	8
		25	ASR 14.5 X 25	0.88	12.5		10
		30	ASR 14.5 X 30	0.73	15.0		12
		35	ASR 14.5 X 35	0.63	17.5		14
		40	ASR 14.5 X 40	0.55	20.0		16
		45	ASR 14.5 X 45	0.49	22.5		18
		50	ASR 14.5 X 50	0.44	25.0		20
		55	ASR 14.5 X 55	0.40	27.5		22
		60	ASR 14.5 X 60	0.37	30.0		24
		65	ASR 14.5 X 65	0.34	32.5		26
		70	ASR 14.5 X 70	0.31	35.0		28
		75	ASR 14.5 X 75	0.29	37.5		30
		80	ASR 14.5 X 80	0.28	40.0		32
		90	ASR 14.5 X 90	0.24	45.0		36
		100	ASR 14.5 X 100	0.22	50.0		40
		125	ASR 14.5 X 125	0.18	62.5		50
17	11	25	ASR 17 X 25	1.52	12.5	19 (186.3)	10
		30	ASR 17 X 30	1.27	15.0		12
		35	ASR 17 X 35	1.09	17.5		14
		40	ASR 17 X 40	0.95	20.0		16
		45	ASR 17 X 45	0.84	22.5		18
		50	ASR 17 X 50	0.76	25.0		20
		55	ASR 17 X 55	0.69	27.5		22
		60	ASR 17 X 60	0.63	30.0		24
		65	ASR 17 X 65	0.58	32.5		26
		70	ASR 17 X 70	0.54	35.0		28
		75	ASR 17 X 75	0.51	37.5		30
		80	ASR 17 X 80	0.48	40.0		32
		90	ASR 17 X 90	0.42	45.0		36
		100	ASR 17 X 100	0.38	50.0		40
		125	ASR 17 X 125	0.30	62.5		50
		150	ASR 17 X 150	0.25	75.0		60
21	13	30	ASR 21 X 30	1.40	15.0	21 (206.0)	12
		35	ASR 21 X 35	1.20	17.5		14
		40	ASR 21 X 40	1.05	20.0		16
		45	ASR 21 X 45	0.93	22.5		18
		50	ASR 21 X 50	0.84	25.0		20
		55	ASR 21 X 55	0.76	27.5		22
		60	ASR 21 X 60	0.70	30.0		24
		65	ASR 21 X 65	0.65	32.5		26
		70	ASR 21 X 70	0.60	35.0		28
		75	ASR 21 X 75	0.56	37.5		30
		80	ASR 21 X 80	0.53	40.0		32
		90	ASR 21 X 90	0.47	45.0		36
		100	ASR 21 X 100	0.42	50.0		40
		125	ASR 21 X 125	0.34	62.5		50
		150	ASR 21 X 150	0.28	75.0		60
26	16.5	30	ASR 26 X 30	2.73	18.0	41 (402)	12
		35	ASR 26 X 35	2.34	21.0		14
		40	ASR 26 X 40	2.05	24.0		16

*Tabulated deflections shown represent near solid and are for design information only.



Raymond® MOLD RETURN SPRINGS (METRIC DIMENSIONS)					GRAY		
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE		
					For Maximum Operating Def. (50% of free length)		Solid Height
					Deflection (mm)	Load kgf (N)	
26	16.5	45	ASR 26 X 45	1.82	27.0	41 (402)	18
		50	ASR 26 X 50	1.64	30.0		20
		55	ASR 26 X 55	1.49	33.0		22
		60	ASR 26 X 60	1.37	36.0		24
		65	ASR 26 X 65	1.26	39.0		26
		70	ASR 26 X 70	1.17	42.0		28
		75	ASR 26 X 75	1.09	45.0		30
		80	ASR 26 X 80	1.03	48.0		32
		90	ASR 26 X 90	0.91	54.0		36
		100	ASR 26 X 100	0.82	60.0		38
		110	ASR 26 X 110	0.75	66.0		44
		125	ASR 26 X 125	0.66	75.0		50
		150	ASR 26 X 150	0.55	90.0		60
		175	ASR 26 X 175	0.47	105.0		70
		200	ASR 26 X 200	0.41	120.0		80
32	21	40	ASR 32 X 40	2.55	24.0	51 (500)	16
		45	ASR 32 X 45	2.27	27.0		18
		50	ASR 32 X 50	2.04	30.0		20
		60	ASR 32 X 60	1.70	36.0		24
		70	ASR 32 X 70	1.46	42.0		28
		80	ASR 32 X 80	1.28	48.0		32
		90	ASR 32 X 90	1.13	54.0		36
		100	ASR 32 X 100	1.02	60.0		40
		110	ASR 32 X 110	0.93	66.0		44
		125	ASR 32 X 125	0.82	75.0		50
		150	ASR 32 X 150	0.68	90.0		60
		175	ASR 32 X 175	0.58	105.0		70
		200	ASR 32 X 200	0.51	120.0		80
		250	ASR 32 X 250	0.41	150.0		100
		300	ASR 32 X 300	0.34	180.0		120
39	26	40	ASR 39 X 40	2.75	24.0	55 (539)	16
		45	ASR 39 X 45	2.44	27.0		18
		50	ASR 39 X 50	2.20	30.0		20
		60	ASR 39 X 60	1.83	36.0		24
		70	ASR 39 X 70	1.57	42.0		28
		80	ASR 39 X 80	1.38	48.0		32
		90	ASR 39 X 90	1.22	54.0		36
		100	ASR 39 X 100	1.10	60.0		40
		110	ASR 39 X 110	1.00	66.0		44
		125	ASR 39 X 125	0.88	75.0		50
		150	ASR 39 X 150	0.73	90.0		60
		175	ASR 39 X 175	0.63	105.0		70
		200	ASR 39 X 200	0.55	120.0		80
		250	ASR 39 X 250	0.44	150.0		100
		300	ASR 39 X 300	0.37	180.0		120
46	32	50	ASR 46 X 50	2.48	25.0	62 (608)	20
		60	ASR 46 X 60	2.07	30.0		24
		70	ASR 46 X 70	1.77	35.0		28
		80	ASR 46 X 80	1.55	40.0		32
		90	ASR 46 X 90	1.38	45.0		36
		100	ASR 46 X 100	1.24	50.0		40
		110	ASR 46 X 110	1.13	55.0		44
		125	ASR 46 X 125	0.99	62.5		50
		150	ASR 46 X 150	0.83	75.0		60
		175	ASR 46 X 175	0.72	87.5		70
		200	ASR 46 X 200	0.62	100.0		80
		250	ASR 46 X 250	0.5	125.0		100
		300	ASR 46 X 300	0.41	150.0		120

*Tabulated deflections shown represent near solid and are for design information only.



Mega Coil Springs

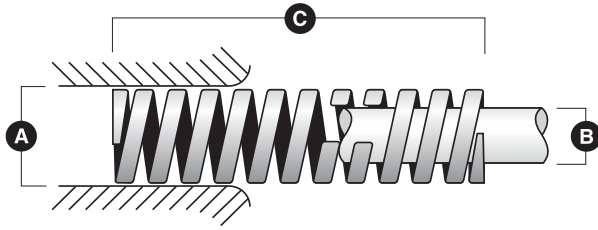
Raymond® MEGA COIL SPRINGS (INCH DIMENSIONS)					1 TON (RED)					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (32% of free length)		For Long Life (28.8% of free length)		For Optimal Life (25.6% of free length)	
A	B	C			Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
2.835	1.732	3.94	ASMH 72 X 100	203.3	1.26		1.13		1.01	
		4.92	ASMH 72 X 125	162.7	1.58		1.42		1.26	
		5.91	ASMH 72 X 150	135.3	1.89		1.70		1.51	
		6.89	ASMH 72 X 175	115.9	2.21	2561	1.98	2305	1.76	2049
		7.87	ASMH 72 X 200	101.6	2.52		2.27		2.02	
		9.84	ASMH 72 X 250	81.1	3.15		2.84		2.52	
		11.81	ASMH 72 X 300	68.0	3.78		3.40		3.02	

Raymond® MEGA COIL SPRINGS (INCH DIMENSIONS)					1.5 TON (YELLOW)					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (24% of free length)		For Long Life (21.6% of free length)		For Optimal Life (19.2% of free length)	
A	B	C			Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
2.835	1.594	3.94	ASMB 72 X 100	395.1	0.95		0.85		0.76	
		4.92	ASMB 72 X 125	316.3	1.18		1.06		0.95	
		5.91	ASMB 72 X 150	263.8	1.42		1.28		1.13	
		6.89	ASMB 72 X 175	226.1	1.65	3734	1.49	3359	1.32	2987
		7.87	ASMB 72 X 200	197.6	1.89		1.70		1.51	
		9.84	ASMB 72 X 250	158.2	2.36		2.13		1.89	
		11.81	ASMB 72 X 300	131.9	2.84		2.55		2.27	

Raymond® MEGA COIL SPRINGS (INCH DIMENSIONS)					2 TON (BROWN)					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (20% of free length)		For Long Life (18% of free length)		For Optimal Life (16% of free length)	
A	B	C			Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
2.835	1.516	3.94	ASMV 72 X 100	571.0	0.79		0.71		0.63	
		4.92	ASMV 72 X 125	456.8	0.98		0.89		0.79	
		5.91	ASMV 72 X 150	380.7	1.18		1.06		0.95	
		6.89	ASMV 72 X 175	326.3	1.38	4494	1.24	4049	1.10	3597
		7.87	ASMV 72 X 200	285.5	1.58		1.42		1.26	
		9.84	ASMV 72 X 250	228.4	1.97		1.77		1.58	
		11.81	ASMV 72 X 300	190.3	2.36		2.13		1.89	

Raymond® MEGA COIL SPRINGS (INCH DIMENSIONS)					3 TON (BLACK)					
Outer Dia. (in)	Inner Dia. (in)	Free Length (in)	CATALOG NUMBER	Load at 1/10 in Def. (lbs)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (30% of free length)		For Long Life (25% of free length)		For Optimal Life (20% of free length)	
A	B	C			Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)
3.819	2.224	5.91	ASMZ 97 X 150	380.9	1.77		1.48		1.18	
		6.89	ASMZ 97 X 175	326.1	2.07		1.72		1.38	
		7.87	ASMZ 97 X 200	285.5	2.36	6749	1.97	5625	1.58	4498
		9.84	ASMZ 97 X 250	228.4	2.95		2.46		1.97	
		11.81	ASMZ 97 X 300	190.2	3.54		2.95		2.36	

*Tabulated deflections shown represent near solid and are for design information only.



Mega Coil Springs

Raymond® MEGA COIL SPRINGS (METRIC DIMENSIONS)					1 TON (RED)					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (32% of free length)		For Long Life (28.8% of free length)		For Optimal Life (25.6% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
72	44.0	100	ASMH 72 X 100	35.6	32.0		28.8		25.6	
		125	ASMH 72 X 125	28.5	40.0		36.0		32.0	
		150	ASMH 72 X 150	23.7	48.0		43.2		38.4	
		175	ASMH 72 X 175	20.3	56.0	1,139	50.4	1,025	44.8	911
		200	ASMH 72 X 200	17.8	64.0	(11,170)	57.6	(10,050)	51.2	(8,935)
		250	ASMH 72 X 250	14.2	80.0		72.0		64.0	
		300	ASMH 72 X 300	11.9	96.0		86.4		76.8	

Raymond® MEGA COIL SPRINGS (METRIC DIMENSIONS)					1.5 TON (YELLOW)					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (24% of free length)		For Long Life (21.6% of free length)		For Optimal Life (19.2% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
72	40.5	100	ASMB 72 X 100	69.2	24.0		21.6		19.2	
		125	ASMB 72 X 125	55.4	30.0		27.0		24.0	
		150	ASMB 72 X 150	46.2	36.0	1,661	32.4	1,495	28.8	1,329
		175	ASMB 72 X 175	39.6	42.0	(16,290)	37.8	(14,660)	33.6	(13,035)
		200	ASMB 72 X 200	34.6	48.0		43.2		38.4	
		250	ASMB 72 X 250	27.7	60.0		54.0		48.0	
		300	ASMB 72 X 300	23.1	72.0		64.8		57.6	

Raymond® MEGA COIL SPRINGS (METRIC DIMENSIONS)					2 TON (BROWN)					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (20% of free length)		For Long Life (18% of free length)		For Optimal Life (16% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
72	38.5	100	ASMV 72 X 100	100.0	20.0		18.0		16.0	
		125	ASMV 72 X 125	80.0	25.0		22.5		20.0	
		150	ASMV 72 X 150	66.7	30.0	2,000	27.0	1,800	24.0	1,600
		175	ASMV 72 X 175	57.1	35.0	(19,615)	31.5	(17,650)	28.0	(15,690)
		200	ASMV 72 X 200	50.0	40.0		36.0		32.0	
		250	ASMV 72 X 250	40.0	50.0		45.0		40.0	
		300	ASMV 72 X 300	33.0	60.0		54.0		48.0	

Raymond® MEGA COIL SPRINGS (METRIC DIMENSIONS)					3 TON (BLACK)					
Outer Dia. (mm)	Inner Dia. (mm)	Free Length (mm)	CATALOG NUMBER	Load at 1/10 in Def. (kgf)	LOAD DEFLECTION TABLE					
					For Maximum Operating Def. (30% of free length)		For Long Life (25% of free length)		For Optimal Life (20% of free length)	
					Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)	Deflection (mm)	Load (kgf)
97	56.5	150	ASMZ 97 X 150	66.7	45.0		37.5		30.0	
		175	ASMZ 97 X 175	57.1	52.5		43.8		35.0	
		200	ASMZ 97 X 200	50.0	60.0	3,000	50.0	2,500	40.0	2,000
		250	ASMZ 97 X 250	40.0	75.0	(29,421)	62.5	(24,500)	50.0	(19,615)
		300	ASMZ 97 X 300	33.3	90.0		75.0		60.0	

*Tabulated deflections shown represent near solid and are for design information only.

Common Die Spring Terminology



HOLE DIAMETER This identifies the outside diameter (OD) of the die spring. Raymond die springs are available in eight different hole sizes matched to standard drill sizes. Each spring is made to fit in the hole, so the OD of the spring is actually less than the hole diameter.

ROD DIAMETER This is a nominal identification of the inside diameter (ID) of the die spring. Raymond die springs are available in eight different hole sizes matched to standard stripper bolts. Each spring is made to fit over the rod, so the ID of the springs is actually greater than the rod diameter.

FREE LENGTH The length of a die spring before it is subject to any operating force or load.

PRELOAD The distance the free length of the die spring is reduced by the pressure of assembled tool.

OPERATING TRAVEL The distance which is subtracted from the spring length after operating force has been applied.

DEFLECTION The amount of change in spring length after operating force has been applied. The compressed length is computed by subtracting the initial compression and the operating travel from the free length.

SOLID HEIGHT The length of a spring when it is compressed by enough load to bring all the coils into contact with each other.

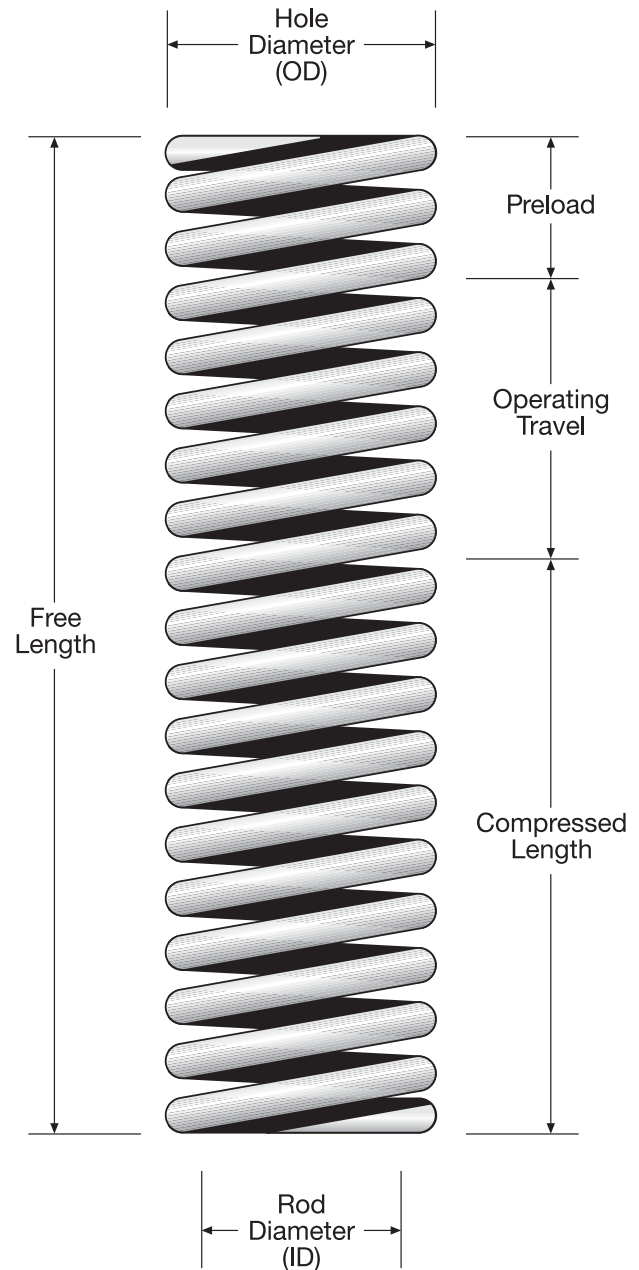
REMOVE SET The manufacturing process of closing a compression spring to solid to eliminate load loss in operation.

PERMANENT SET This happens when the elastic limits are exceeded and the spring does not return to its original length when the load is released.

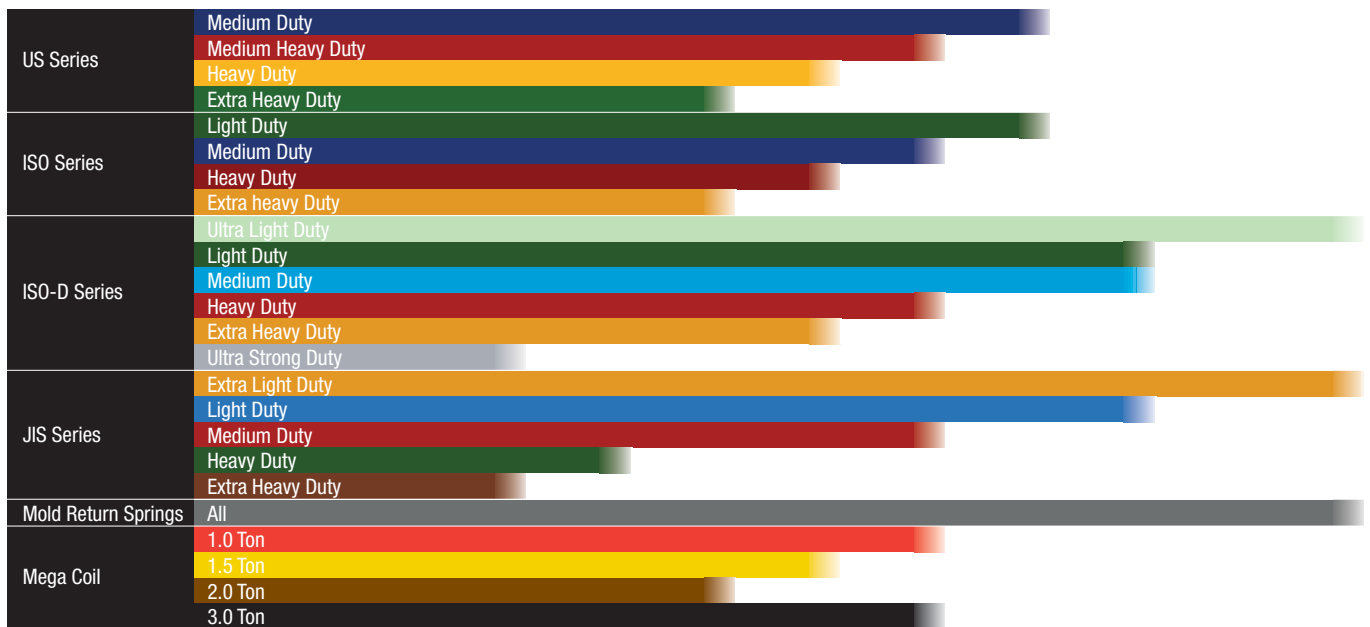
ELASTIC LIMIT The maximum compression stress that a die spring can endure without taking permanent set.

LOAD This is the force built up by compressing the spring. Load is expressed in terms of total Newtons, which is the load on the spring per a specific unit of deflection. Load is generated and stress on the coils increases.

STRESS In a spring, this describes the internal force that resists deflection under load. This force is equal to, and in the opposite direction of, the external load. Stress is expressed in Newtons per square millimeter of sectional area.



Deflection to Compressed Length Conversion Tables



Raymond® DEFLECTION IN % FREE LENGTH (INCH DIMENSIONS)											
Free Length (in)	10%	13.50%	15%	17%	20%	25%	30%	35%	40%	45%	50%
1	0.90	0.87	0.85	0.83	0.80	0.75	0.70	0.65	0.60	0.55	0.50
1.25	1.13	1.08	1.06	1.04	1.00	0.94	0.88	0.81	0.75	0.69	0.63
1.5	1.35	1.30	1.28	1.25	1.20	1.13	1.05	0.98	0.90	0.83	0.75
1.75	1.58	1.51	1.49	1.45	1.40	1.31	1.23	1.14	1.05	0.96	0.88
2	1.80	1.73	1.70	1.66	1.60	1.50	1.40	1.30	1.20	1.10	1.00
2.5	2.25	2.16	2.13	2.08	2.00	1.88	1.75	1.63	1.50	1.38	1.25
3	2.70	2.60	2.55	2.49	2.40	2.25	2.10	1.95	1.80	1.65	1.50
3.5	3.15	3.03	2.98	2.91	2.80	2.63	2.45	2.28	2.10	1.93	1.75
4	3.60	3.46	3.40	3.32	3.20	3.00	2.80	2.60	2.40	2.20	2.00
4.5	4.05	3.89	3.83	3.74	3.60	3.38	3.15	2.93	2.70	2.48	2.25
5	4.50	4.33	4.25	4.15	4.00	3.75	3.50	3.25	3.00	2.75	2.50
5.5	4.95	4.76	4.68	4.57	4.40	4.13	3.85	3.58	3.30	3.03	2.75
6	5.40	5.19	5.10	4.98	4.80	4.50	4.20	3.90	3.60	3.30	3.00
6.5	5.85	5.62	5.53	5.40	5.20	4.88	4.55	4.23	3.90	3.58	3.25
7	6.30	6.06	5.95	5.81	5.60	5.25	4.90	4.55	4.20	3.85	3.50
7.5	6.75	6.49	6.38	6.23	6.00	5.63	5.25	4.88	4.50	4.13	3.75
8	7.20	6.92	6.80	6.64	6.40	6.00	5.60	5.20	4.80	4.40	4.00
10	9.00	8.65	8.50	8.30	8.00	7.50	7.00	6.50	6.00	5.50	5.00
12	10.80	10.38	10.20	9.96	9.60	9.00	8.40	7.80	7.20	6.60	6.00

Compressed Height in Inches

Raymond® DEFLECTION IN % FREE LENGTH (METRIC DIMENSIONS)											
Free Length (mm)	10%	13.50%	15%	17%	20%	25%	30%	35%	40%	45%	50%
25	22.5	21.6	21.3	20.8	20.0	18.8	17.5	16.3	15.0	13.8	12.5
32	28.8	27.7	27.2	26.6	25.6	24.0	22.4	20.8	19.2	17.6	16.0
38	34.2	32.9	32.3	31.5	30.4	28.5	26.6	24.7	22.8	20.9	19.0
44	39.6	38.1	37.4	36.5	35.2	33.0	30.8	28.6	26.4	24.2	22.0
51	45.9	44.1	43.4	42.3	40.8	38.3	35.7	33.2	30.6	28.1	25.5
64	57.6	55.4	54.4	53.1	51.2	48.0	44.8	41.6	38.4	35.2	32.0
76	68.4	65.7	64.6	63.1	60.8	57.0	53.2	49.4	45.6	41.8	38.0
89	80.1	77.0	75.7	73.9	71.2	66.8	62.3	57.9	53.4	49.0	44.5
102	91.8	88.2	86.7	84.7	81.6	76.5	71.4	66.3	61.2	56.1	51.0
114	102.6	98.6	96.9	94.6	91.2	85.5	79.8	74.1	68.4	62.7	57.0
127	114.3	109.9	108.0	105.4	101.6	95.3	88.9	82.6	76.2	69.9	63.5
140	126.0	121.1	119.0	116.2	112.0	105.0	98.0	91.0	84.0	77.0	70.0
152	136.8	131.5	129.2	126.2	121.6	114.0	106.4	98.8	91.2	83.6	76.0
165	148.5	142.7	140.3	137.0	132.0	123.8	115.5	107.3	99.0	90.8	82.5
178	160.2	154.0	151.3	147.7	142.4	133.5	124.6	115.7	106.8	97.9	89.0
191	171.9	165.2	162.4	158.5	152.8	143.3	133.7	124.2	114.6	105.1	95.5
203	182.7	175.6	172.6	168.5	162.4	152.3	142.1	132.0	121.8	111.7	101.5
254	228.6	219.7	215.9	210.8	203.2	190.5	177.8	165.1	152.4	139.7	127.0
305	274.5	263.8	259.3	253.2	244.0	228.8	213.5	198.3	183.0	167.8	152.5

Compressed Height in Millimeters



Problems & Answers

Most problems that arise in the use of die springs usually result from improper application... failure to take advantage of and protect the features engineered into the spring.

Spring Failure

Raymond die springs are produced under such careful controls that manufacturing problems have virtually been eliminated. Die spring failure is usually due to either poor spring design and manufacture or incorrect application of the spring. The most common problem source is the use of die springs too close to, or beyond, the springs' physical limitations. The solution, of course, lies with careful selection of die springs for each application.

Other solutions to common spring problems are as follows:

Spring Guidance

Raymond die springs are manufactured with ends ground and squared so that they stand on their own base and compress evenly under load. There is a positive relationship between the spring's outside diameter and total length which determines whether or not a spring will buckle under load.

Generally, if the free length is more than four times the mean diameter of the spring, it could have a buckling problem under compression. This is solved by providing guidance by a pocket, a rod, or both to reduce buckling. It is always recommended to provide guidance for any die spring.

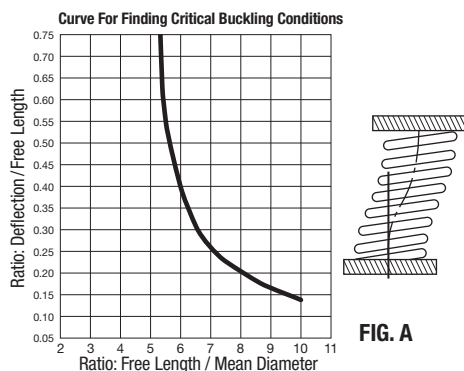


FIG. A

Fig. A (below left) provides information as to whether a specific spring with squared, ground ends is subject to buckling. The curve indicates that buckling may occur to a squared-and-ground spring, both ends of which are compressed against parallel plates, if the values fall above and to the right of the curve.

Holes and Rods

Holes or pockets provided in the die for springs must be the specified size listed on pages 6 to 28. Springs increase in diameter as they are compressed. If the hole is undersized, a wearing or binding action will produce early spring failure.

Holes also must have flat bottoms with square corners. This will allow the spring to work on a flat surface and provide uniform stress on the coils when the spring is compressed.

Working a spring over a rod also provides good protection against buckling. Care should be taken to be sure the rod is smooth. If the rod is shorter than the spring, it should have a tapered nose so that there is no danger of the spring coils coming in contact with a sharp edge.

Alignment

Care should be taken to make certain that whatever device is used to contain or guide the spring is properly aligned on both sides of the die. Holes or rods that do not match can cause problems that create spring failure and damage to the tool.

Temperature

Heat is a frequently ignored factor in spring failure or load loss. The maximum rated service temperature for our chromium alloy steel is 230°C. **Fig. B (below)** shows the percentage of load-loss due to heat and stress

combinations. Thought should be given to the heat generated by the working die which can be significant in many applications. Heat absorbed by the tool can be transferred to the springs resulting in a loss of load and premature spring failure.

Deflection

Deflection beyond the manufacturer's recommendation can cause early spring failure. Check the press or die travel to be sure of the actual deflection to which the spring will be subjected. If it is beyond a safe limit, changes should be made without delay.

Spring Alteration

Each Raymond die spring is carefully engineered to perform within specific areas of work. Altering the spring such as reducing its length or number of coils, grinding the inside or outside diameter, or placing restrictions on the movement of the coils can cause early spring failure. Trying to alter a spring by grinding down its ends can change the temper of the material and negatively affect spring performance.

Altering springs from their manufactured state almost invariably leads to problems and failure. Don't gamble an expensive die for the small amount saved on a cheap alteration.

Corrosion

Frequently, spring failure can be traced to corrosive elements. Reduction of material or pitting of the spring will reduce its useful life. Be alert to conditions that may effect the spring's surface such as rust, lubricants, soaps, chemicals, etc. Clean, protected springs give the best job performance.

Load Loss vs. Temperature

INITIAL STRESS P.S.I./bar	CARBON STEEL			CHROMIUM ALLOY		
	Approximate Percent Loss of Load			Approximate Percent Loss of Load		
	Degrees F/C°			Degrees F/C°		
	250/121°	350/177°	400/204°	250/121°	350/177°	450/232°
40,000/2,760	2.0	3.5	4.5	1.0	2.0	5.0
50,000/3,450	2.0	4.0	5.0	1.0	2.0	5.0
60,000/4,400	2.5	4.5	5.5	1.0	2.0	5.5
70,000/4,830	3.0	5.5	6.5	1.0	2.5	6.0
80,000/5,515	3.0	6.0	8.0	1.5	2.5	6.0
90,000/6,205	4.0	8.0	9.0	1.5	3.0	7.0
100,000/6,895	4.5	9.5	10.5	2.0	4.0	8.0
110,000/7,585	7.0	11.5	14.0	2.0	5.0	10.0
120,000/8,275	9.5	13.0	17.5	3.5	8.0	13.0

FIG. B

Proper Die Spring Application



The most common die spring problems are generally the most basic – the result of improper selection and application. But trying to save a few pennies on die springs or a few minutes on selection can result in enormous expenses in terms of premature spring failure, increased maintenance costs and lost productivity. That's why making sure you have the best die spring for every application is truly a wise investment.



DO make spring selection a part of the early design function, and work within the spring's physical limits. It's best to determine which springs and how many are needed for the job before the die is built.



DO preload each spring into the assembled tool to prevent the possibility of shock loading, which causes a stress surge in the vibration frequency and may result in early spring failure.



DO provide safeguards from adverse external elements such as heat, corrosive atmosphere, metal chips and other obstructions



DO provide proper guidance on all springs to reduce the chance of buckling. As a general rule, if the free length is more than four times the mean diameter of the spring, it could have a buckling problem under compression. This is solved by using a guide rod, boring a pocket, or both.



DO deepen spring pockets proportionately when the die is sharpened to maintain the same spring travel and load level. Each spring pocket needs to have a flat bottom and square corners, so the spring will provide uniform stress on each coil as it is compressed.



DO perform preventative maintenance on a regularly scheduled basis. Keep records on the number of cycles each die performs, and replace all the die springs at predetermined intervals.



DON'T replace only one spring, or mix springs of assorted lengths and deflection ranges on a die. Instead of using an unbalanced, mixed assembly of old and new springs, replace all of the springs to distribute the load evenly.



DON'T alter a die spring by cutting off coils or grinding the inside or outside diameter. Altering a die spring causes early failure and creates the potential for damaging the die.



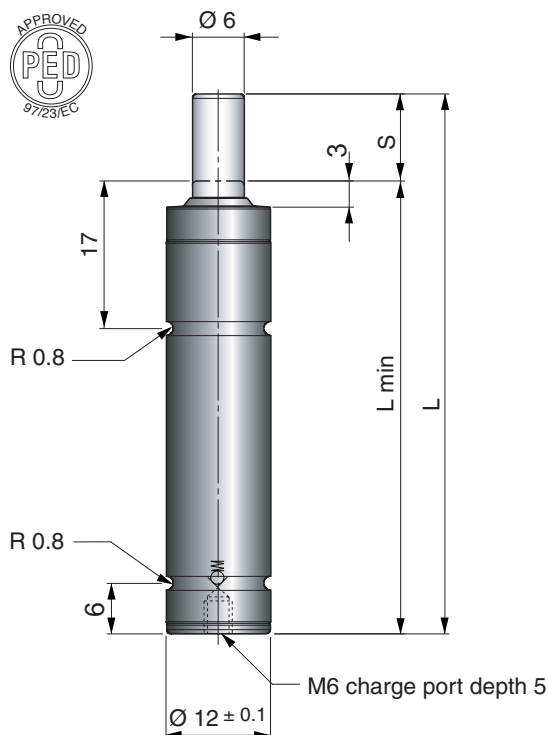
DON'T expect maximum performance life from a spring that is producing at maximum load. Although die springs are designed to produce maximum load, they are highly stressed when maximum loads are met.



DON'T wait – make spring selection a part of the early design function, and work within the spring's physical limits. It's best to determine which springs and how many are needed for the job before the die is built.



DO call – our knowledgeable customer service and engineering professionals are always available to assist you with everything from custom sizes and special materials to technical questions and unusual applications.



Model	Pounds Force (lbF) at +20°C	Color	Charging Pressure (psi)	Pounds Force (lbF) at + 20°C at full stroke
	Initial			
R12	29	Green	652	40
R12	56	Blue	1279	81
R12	85	Red	1958	121
R12	112	Yellow	2610	164
R12*	13-112	Black	290-2610	19-164

* User specified charge pressure.

How to order

Model **R12 63.5 RE**

Stroke Length (mm) **63.5**

Color: Green - GR
Blue - BL
Red - RE
Yellow - YE
Black - BK

BASIC INFORMATION

Pressure medium Nitrogen
Max. charging pressure 180 bar/2610 psi
Min. charging pressure 20 bar/290 psi
Operating temperature 0 - 80°C/ 0 - 176°F
Force increase by temperature ±0.3%/°C
Recommended max strokes/min ~40-100 (at 20°C)
Max piston rod velocity 1.6 m/s
Rod surface Nitrided
Tube surface Black oxide
Not repairable

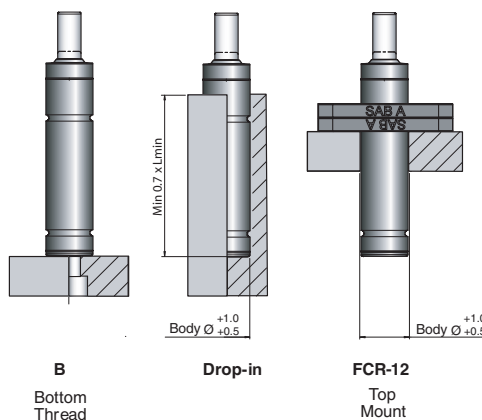
R12 gas springs are available in four pre-charged models. All R12s are adjustable by the end user. Black is used to denote charging pressures in between or below the standard color pressure codes.

An upper and lower C-groove together with threaded bottom hole allow various mounting possibilities using the new FCR-12 flange mount.

R12 gas springs can be hoses together using the M6 port and Micro-Hose™ system.

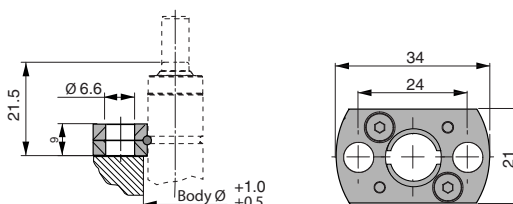
S Stroke	L ±0.25	L min	Gas vol. [l]	Weight [kg]
7	56	49	0.001	0.03
10	62	52	0.001	0.03
12.7	67.4	54.7	0.001	0.03
15	72	57	0.002	0.03
19	80	61	0.002	0.04
25	92	67	0.002	0.04
38	118	80	0.003	0.04
50	142	92	0.004	0.05
63.5	172	108.5	0.005	0.06
75	195	120	0.006	0.06
80	205	122	0.006	0.07
100	245	145	0.008	0.07
125	295	170	0.010	0.09

MOUNTING POSSIBILITIES



FCR-12

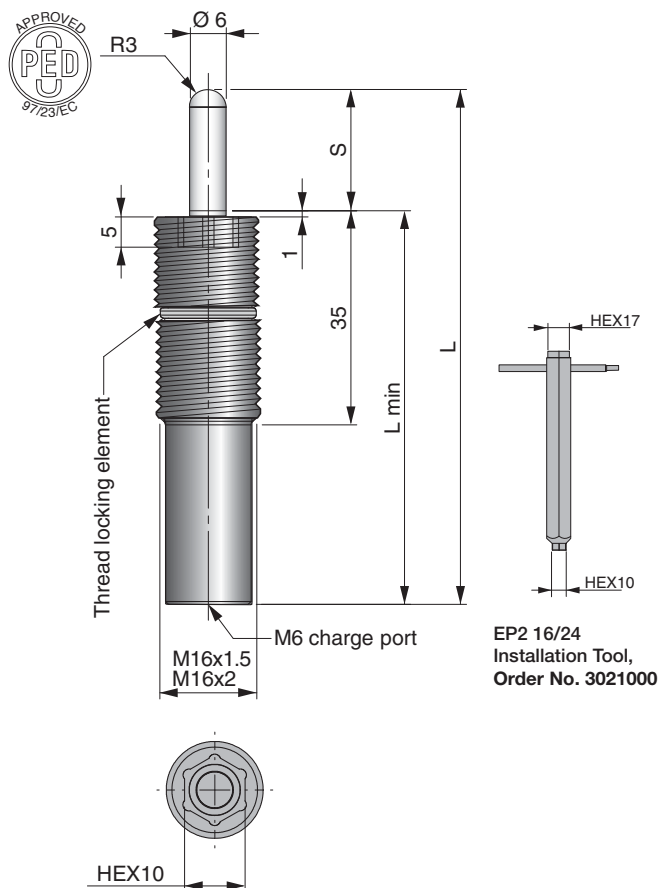
Order No: FCR-12



We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.

All dimensions are nominal unless tolerance is stated.



Millimeters to Inches: mm ÷ 25.4 = inches

Kilograms to Pounds: Kg ÷ 0.45 = pounds

Pounds Force to DecaNewtons:
LbF x 0.4448 = decaNewtons

EP2 16 gas springs (Ejector Pin with an M16 thread) are available in M16x1.5 and M16x2 thread sizes.

In each thread size, five models are available. Four preset models (Green, Blue, Red & Yellow) and one adjustable model (Black).

They are all color-coded to help identify the force rating and can be adjusted and recharged to meet individual force requirements.

How to order

EP2 16x1.5 10 BL

Model: EP2 16x1.5 10 BL

Thread: x1.5 = M16x1.5
x2 = M16x2

Stroke Length (mm) 10

Color: Green - GR
Blue - BL
Red - RE
Yellow - YE
Black - BK

Model	Pounds Force (lbF) at +20°C	Color	Charging pressure (psi)	End Force in Pounds (lbF) at + 20°C, at full stroke
	Initial			
EP2 16	13	Green	290	20
EP2 16	25	Blue	580	40
EP2 16	47	Red	1015	100
EP2 16	95	Yellow	2175	150
EP2 16*	13-95	Black	87-2175	20-150

* User specified charge pressure.

S Stroke	L ±0.25	L min	Gas vol. (l)	Weight (kg)
10	65	55	0.002	0.06
20	85	65	0.003	0.07
30	105	75	0.003	0.07
40	125	85	0.004	0.08
50	145	95	0.005	0.08
60	165	105	0.006	0.09
70	185	115	0.007	0.10
80	205	125	0.008	0.11
100	245	145	0.009	0.11
125	295	170	1.012	0.13

BASIC INFORMATION

Pressure medium Nitrogen

Max. charging pressure 150 bar/2175 psi

Min. charging pressure 6 bar/87 psi

Operating temperature 0 - 80°C/0 - 176°F

Force increase by temperature ± 0.3%/°C

Recommended max strokes/min..... ~ 100 (at 20°C)

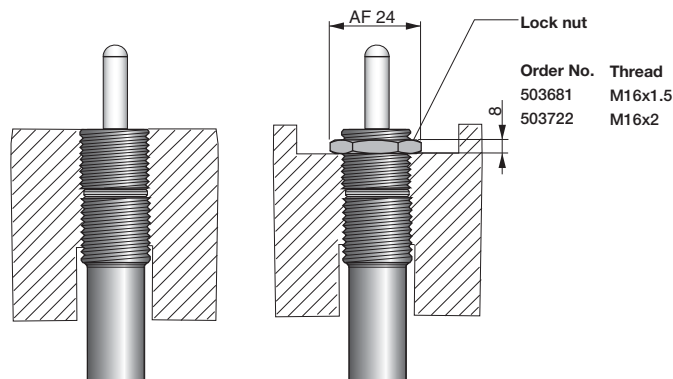
Max piston rod velocity..... 1.6 m/s

Rod surface Nitrided

Tube surface Black Oxide

Not repairable

MOUNTING POSSIBILITIES



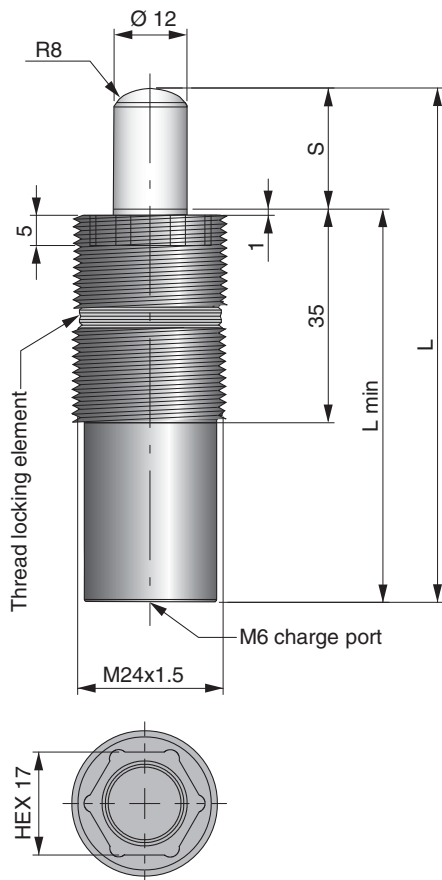
We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.

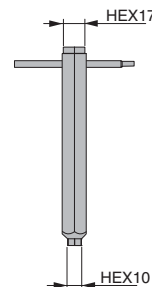
All dimensions are nominal unless tolerance is stated.

Associated Spring
RAYMOND

A business of BARNES GROUP INC



EP2 24 (Ejector Pin with an M24 thread) is available with four pre-set models. Each model is color-coded for easy identification of force rating. If needed, these models can be recharged or adjusted to meet individual force requirements.



EP2 16/24 Installation Tool,
Order No. 3021000

How to order

EP2 24 10 YE

Model: _____
Stroke: _____
Length (mm): _____

Color: Green - GR
Blue - BL
Red - RE
Yellow - YE
Black - BK

Model	Pounds Force (lbF) at +20°C	Color	Charging pressure (psi)	End Force in Pounds (lbF) at +20°C, at full stroke
	Initial			
EP2 24	52	Green	290	90
EP2 24	101	Blue	580	180
EP2 24	191	Red	1015	340
EP2 24	382	Yellow	2610	650
EP2 24*	52-382	Black	87-2610	25-650

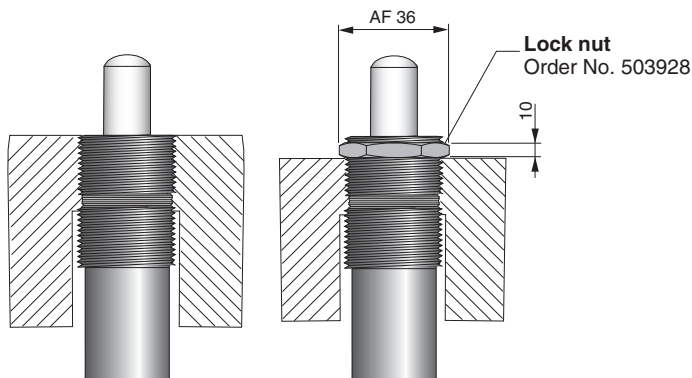
* User specified charge pressure.

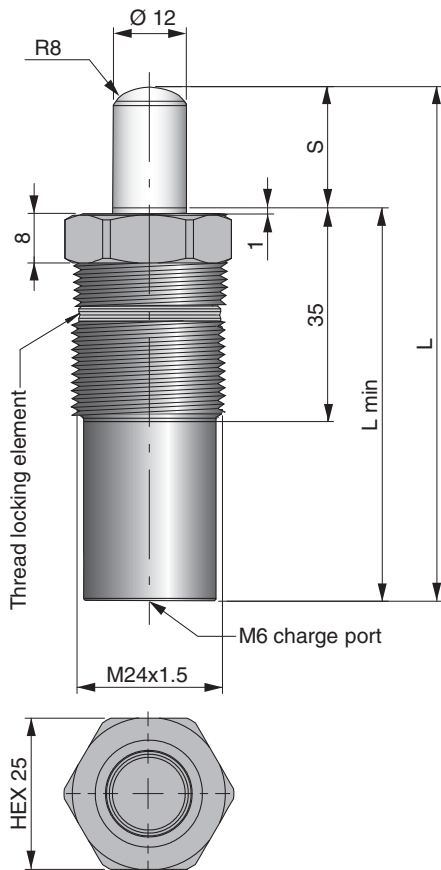
S Stroke	L ±0.25	L min	Gas vol. (l)	Weight (kg)
10	65	55	0.05	0.13
20	85	65	0.07	0.15
30	105	75	0.10	0.17
40	125	85	0.12	0.19
50	145	95	0.14	0.21
60	165	105	0.17	0.23
70	185	115	0.19	0.25
80	205	125	0.22	0.27
100	245	145	0.26	0.31
125	295	170	0.32	0.35

BASIC INFORMATION

Pressure medium Nitrogen
Max. charging pressure 180 bar/2610 psi
Min. charging pressure 6 bar/87 psi
Operating temperature 0 - 80°C/0 - 176°F
Force increase by temperature ± 0.3%/°C
Recommended max strokes/min..... ~ 30-80 (at 20°C)
Max piston rod velocity..... 1.6 m/s
Rod surface Nitrided
Tube surface Black Oxide
Not repairable

MOUNTING POSSIBILITIES





How to order

EPS2 24 10 BK

Model: _____

Stroke Length (mm) _____

Color: Green - GR
Blue - BL
Red - RE
Yellow - YE
Black - BK

EPS2 24 (Ejector Pin Special with an M24 thread) is available with four pre-set models. Each model is color-coded for easy identification of force rating. If needed, these models can be recharged or adjusted to meet individual force requirements.

Also available is a model (black) which is delivered with a precharge of 73-140 psi, intended to be adjusted to the desired force.

The EPS2 24 is based on FORD's WDX3580-19XX XX XX gas spring standard.

Millimeters to Inches: mm ÷ 25.4 = inches

Kilograms to Pounds: Kg ÷ 0.45 = pounds

Pounds Force to DecaNewtons:

LbF x 0.4448 = decaNewtons

Model	Pounds Force (lbF) at +20°C	Color	Charging pressure (psi)	End Force in Pounds (lbF) at +20°C, at full stroke
	Initial			
EPS2 24	52	Green	290	90
EPS2 24	101	Blue	580	180
EPS2 24	191	Red	1015	340
EPS2 24	382	Yellow	2610	650
EPS2 24*	52-382	Black	87-2610	25-650

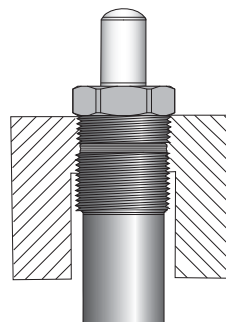
* User specified charge pressure.

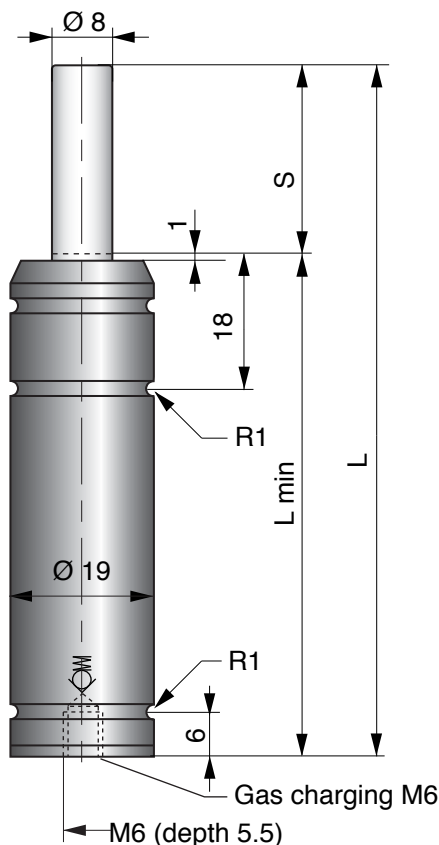
S Stroke	L ±0.25	L min	Gas vol. (l)	Weight (kg)
10	65	55	0.05	0.15
16	77	61	0.06	0.16
20	85	65	0.07	0.17
25	95	70	0.08	0.18
30	105	75	0.10	0.19
38	121	83	0.11	0.21
40	125	85	0.12	0.21
50	145	95	0.14	0.23
60	165	105	0.17	0.25
70	185	115	0.19	0.27
80	205	125	0.22	0.29
100	245	145	0.26	0.33
125	295	170	0.32	0.37

BASIC INFORMATION

Pressure medium Nitrogen
Max. charging pressure 180 bar/2610 psi
Min. charging pressure 6 bar/87 psi
Operating temperature 0 - 80°C/0 - 176°F
Force increase by temperature ± 0.3%/°C
Recommended max strokes/min..... ~ 30-80 (at 20°C)
Max piston rod velocity..... 1.6 m/s
Rod surface Nitrided
Tube surface Black Oxide
Not repairable

MOUNTING POSSIBILITIES





The R19 Gas Springs are available in four preset models. Each spring is color-coded for easy identification of force rating.

The R19 is rechargeable but cannot be rebuilt as the spring body is roll formed around the internal components.

There are two types of mountings for the R19: the BF 19 used at the lower body groove location and the FCR 19 used at the upper groove. The M6 thread in the base of the spring is used for filling and is also a mounting option.

How to order

Model: R19 **R19 63.5 BL**

Stroke Length (mm) **63.5** **BL**

Color: Green - GR
Blue - BL
Red - RE
Yellow - YE
Black - BK

Model	Charging pressure (psi)	Color	Pounds Force (lbF)
			Initial
R19	870	Green	67
R19	1450	Blue	112
R19	2030	Red	157
R19	2610	Yellow	202
R19*	650-2610	Black	67-202

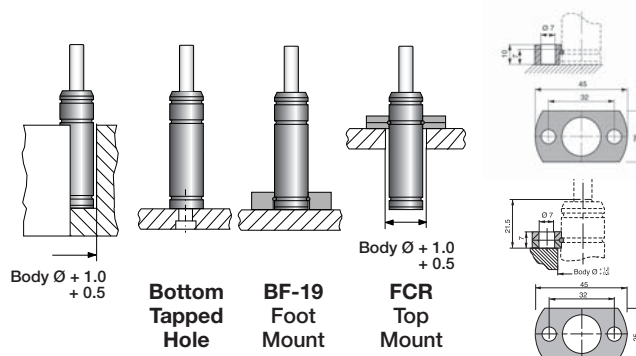
* User specified charge pressure.

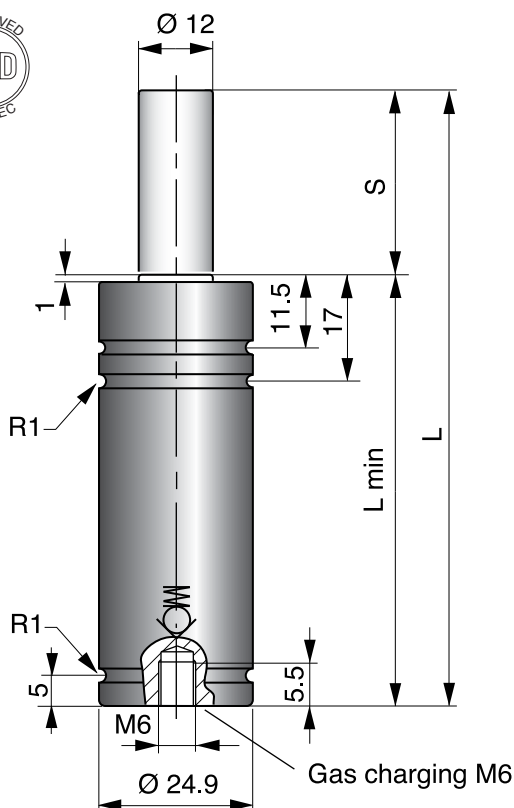
S Stroke	Pounds Force (lbF) at full stroke				L ±0.25	L min
	R19 Green	R19 Blue	R19 Red	R19 Yellow		
7	119	199	270	360	56	49
10	105	175	247	315	62	52
15	99	164	225	292	72	57
25	94	157	220	292	92	67
38	92	155	218	270	118	80
50	92	152	216	270	142	92
63.5	92	152	214	270	169	105.5
80	92	152	214	270	202	122
100	92	152	214	270	245	145
125	92	152	214	270	295	170

BASIC INFORMATION

Pressure medium Nitrogen
Max. charging pressure 180 bar/2610 psi
Min. charging pressure 45 bar/650 psi
Operating temperature 0 - 80°C/0 - 176°F
Force increase by temperature ± 0.3%/°C
Recommended max strokes/min..... ~ 100-150
Max piston rod velocity..... 1.6 m/s
Tube Black oxide
Not repairable

MOUNTING POSSIBILITIES





The M2 is available in four preset models, with initial forces from 110 to 450 lbF. Each spring is color-coded for easy identification of force rating.

The M2 spring can in many cases directly replace mechanical die springs of 25 mm (1 inch) diameter.

All M2 springs can be repaired and recharged.

The spring can be used attached to the tool, using a mount (FCR or SM). The M6 thread in the base of the spring is used for filling and is also a mounting option.

How to order

Model **M2** **63.5** **RE**

Stroke Length (mm) **Color:** Green - GR
Blue - BL
Red - RE
Yellow - YE
Black - BK

Model	Charging pressure (psi)	Color	Pounds Force (lbF)
			Initial
M2	650	Green	110
M2	1300	Blue	225
M2	1960	Red	340
M2	2610	Yellow	450
M2*	360-2610	Black	110-450

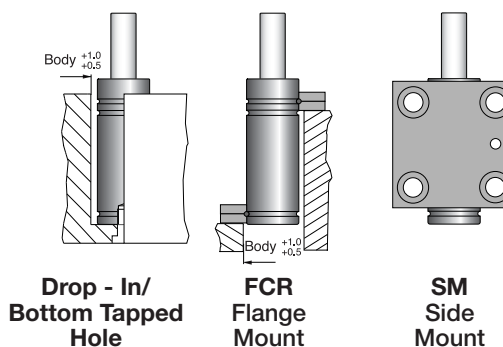
* User specified charge pressure.

S Stroke	Pounds Force (lbF) at full stroke				L ± 0.25	L min	Gas vol. (l)	Weight (kg)
	M2 Green	M2 Blue	M2 Red	M2 Yellow				
7	173	344	517	689	56	49	0.005	0.13
10	173	344	517	689	62	52	0.005	0.14
12.7	173	344	517	690	67.4	54.7	0.006	0.15
15	173	346	519	690	72	57	0.007	0.16
16	173	346	519	690	74	58	0.007	0.16
25	173	346	519	692	92	67	0.010	0.18
38.1	173	346	522	695	118.2	80.1	0.015	0.20
50	173	346	522	695	142	92	0.019	0.22
63.5	17	342	510	679	172	108.5	0.024	0.26
80	171	342	513	683	205	125	0.029	0.30
100	171	342	515	686	245	145	0.036	0.33
125	171	344	515	689	295	170	0.044	0.39

BASIC INFORMATION

Pressure medium	Nitrogen
Max. charging pressure	180 bar/2610 psi
Min. charging pressure	25 bar/360 psi
Operating temperature	0 - 80°C/0 - 176°F
Force increase by temperature	±0.3%/°C
Recommended max strokes/min	~ 80-100
Max piston rod velocity.....	1.6 m/s
Tube	Black oxide
Repair kit M2	

MOUNTING POSSIBILITIES



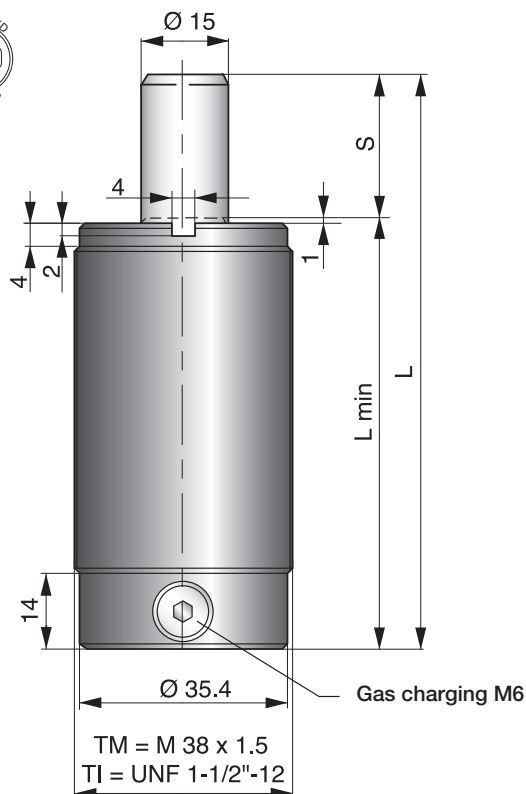
We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.

All dimensions are nominal unless tolerance is stated.

Associated Spring
RAYMOND

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The TM and TI are threaded body 250 springs with the same length as the TU 250.

The TM spring has a metric thread M38 x 1.5.

The TI spring has an inch thread 1½-12 UNF.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$

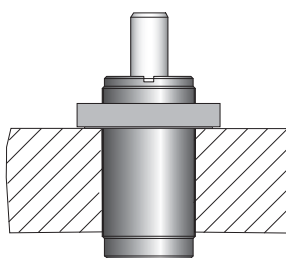
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force*				
TM/TI 250-012	12.7	600	765	75.4	62.7	0.015	0.37
TM/TI 250-025	25		765	100	75	0.024	0.42
TM/TI 250-038	38.1		765	126.2	88.1	0.033	0.47
TM/TI 250-050	50		765	150	100	0.042	0.52
TM/TI 250-063	63.5		790	177	113.5	0.052	0.57
TM/TI 250-080	80		790	210	130	0.063	0.64
TM/TI 250-100	100		790	250	150	0.078	0.72
TM/TI 250-125	125		790	300	175	TC	TC

* = at full stroke

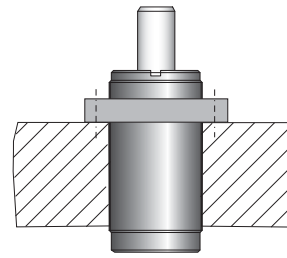
BASIC INFORMATION

Pressure medium Nitrogen
Max. charging pressure 150 bar/2175 psi
Min. charging pressure 50 bar/725 psi
Operating temperature 0 - 80°C/0 - 176°F
Force increase by temperature ±0.3%/°C
Recommended max strokes/min ~ 80-100
Max piston rod velocity..... 1.6 m/s
Tube Black oxide
Repair kit TU 250

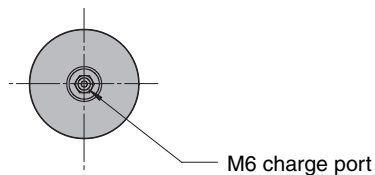
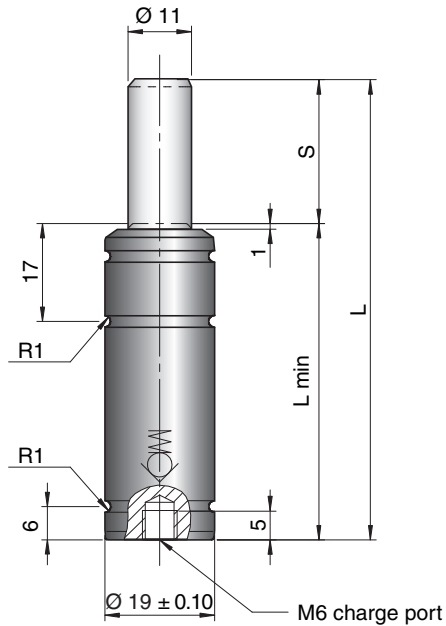
MOUNTING POSSIBILITIES



FRM, FRI,
FHM, FHI
Lock nut



FTM, FTI
Flange mount



The Powerline series is our shortest and most powerful piston rod sealed gas spring, giving you a great deal of force in a very small amount of space.

The X springs are available with stroke lengths between 7 and 125 mm.

The X 170 has a bottom port for gas charging that can also be used to connect to a Micro Hose™ hose system.

The X 170 has an upper ISO-Standard C-groove and a lower C-groove which together with a threaded bottom hole offer various mounting possibilities.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$

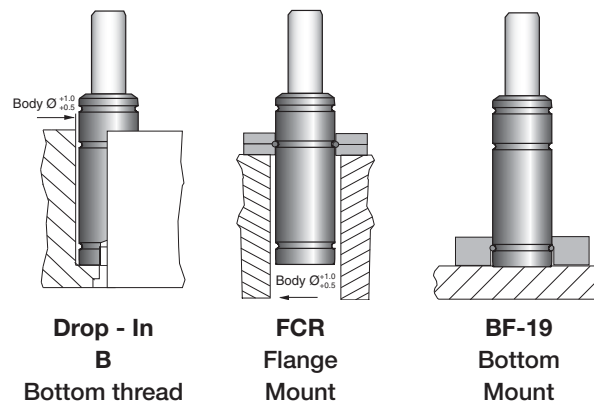
Order No.	S Stroke	Pounds Force (lbF) at 2610 psi		L ± 0.25	L min
		Initial	End force*		
X 170-007	7	382	630	44	37
X 170-010	10			50	40
X 170-015	15			60	45
X 170-019	19			68	49
X 170-025	25			80	55
X 170-038	38			106	68
X 170-050	50			130	80
X 170-063	63			156	93
X 170-075	75			185	110
X 170-080	80			195	115
X 170-100	100			235	135
X 170-125	125			285	160

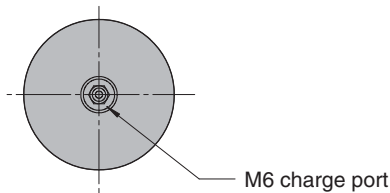
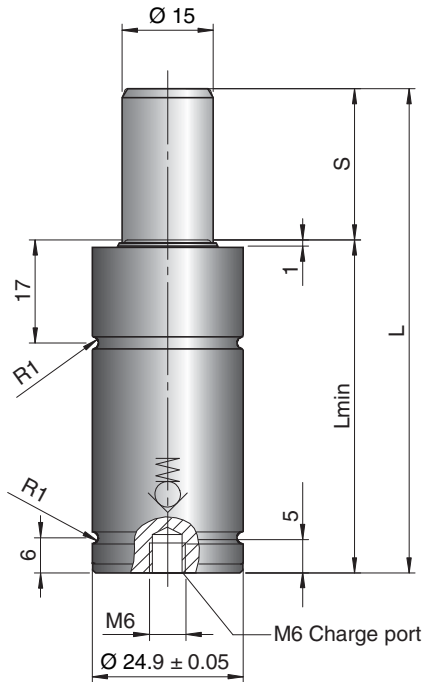
* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 180 bar/2610 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 40-100 (at 20°C)
 Max piston rod velocity 1.6 m/s
 Rod surface Nitrided
 Tube surface Black oxide
 Not repairable

MOUNTING POSSIBILITIES





The Powerline Series is our shortest and most powerful piston rod sealed gas spring, giving you a great deal of force in a very small amount of space.

The Powerline springs are available with stroke lengths between 7 and 125 mm.

The X 320 has a bottom port for gas charging that can also be used to connect to a Micro Hose™ hose system.

The X 320 has an upper ISO-Standard C-groove that together with a threaded bottom hole offer various mounting possibilities using our standard mounts.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$

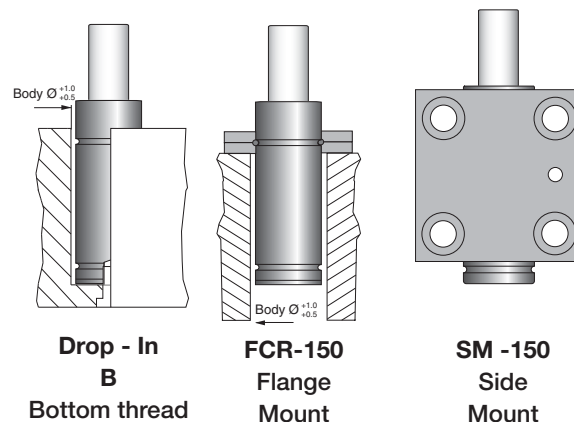
Order No.	S Stroke	Pounds Force (lbf) at 2610 psi		L ± 0.25	L min
		Initial	End force*		
X 320-007	7	720	1080	44	37
X 320-010	10		1100	50	40
X 320-015	15		1150	60	45
X 320-019	19		1150	68	49
X 320-025	25		1170	80	55
X 320-038	38		1190	106	68
X 320-050	50		1190	130	80
X 320-063	63		1190	156	93
X 320-075	75		1190	185	110
X 320-080	80		1190	195	115
X 320-100	100		1190	235	135
X 320-125	125		1190	285	160

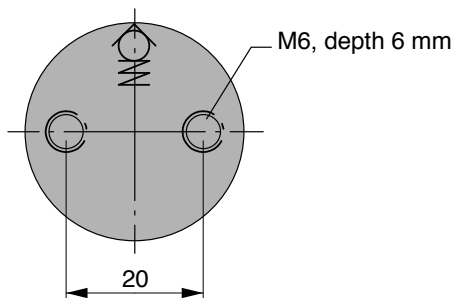
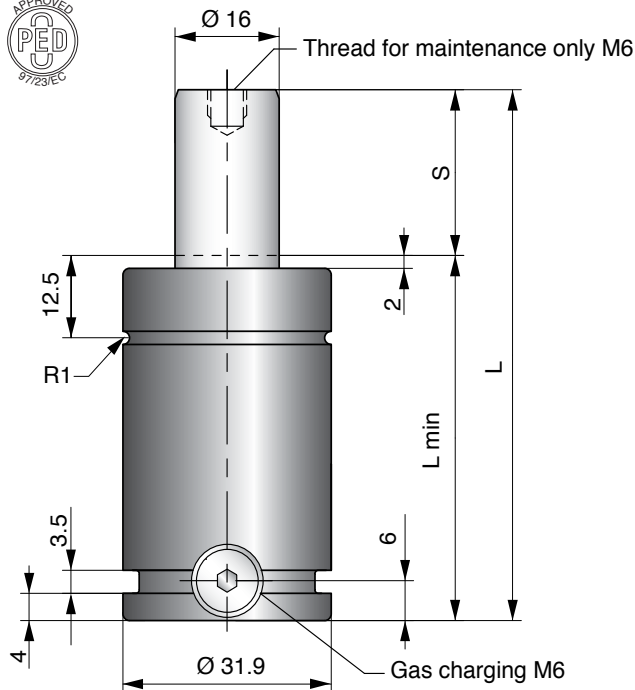
* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 180 bar/2610 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 40-100 (at 20°C)
 Max piston rod velocity..... 1.6 m/s
 Rod surface Nitrided
 Tube surface Black oxide
 Not repairable

MOUNTING POSSIBILITIES





The Powerline gas springs are our shortest, with more power to give you a great deal of force in a very small amount of space.

There is a side port for gas filling that can also be used to connect a hose system.

An upper C-groove, lower U-groove together with two M6 threaded holes allow various mounting possibilities using our standard mounts.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$

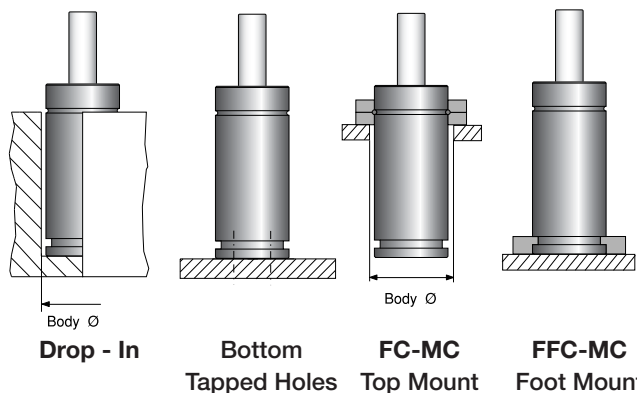
Order No.	S Stroke	Pounds Force (lbF) at 2610 psi		L ± 0.25	L min
		Initial	End force*		
X 350-010	10	810	1330	50	40
X 350-013	13		1190	56	43
X 350-016	16		1210	62	46
X 350-019	19		1260	68	49
X 350-025	25		1260	80	55
X 350-032	32		1260	94	62
X 350-038	38		1240	106	68
X 350-050	50		1260	130	80
X 350-063	63		1260	156	93
X 350-075	75		1260	180	105
X 350-080	80		1240	190	110
X 350-100	100		1240	230	130
X 350-125	125		1240	280	155

* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 180 bar/2610 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 170°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 50-100
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit X 350

MOUNTING POSSIBILITIES



We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.

All dimensions are nominal unless tolerance is stated.

The Powerline gas springs are a new series.

These gas springs are our shortest, with more power to give you a great deal of force in a very small amount of space.

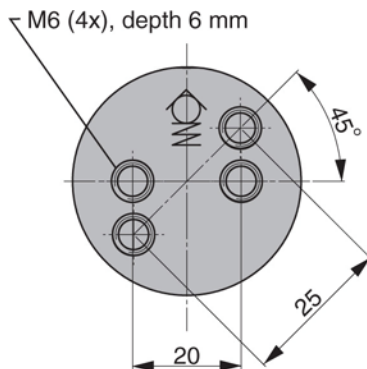
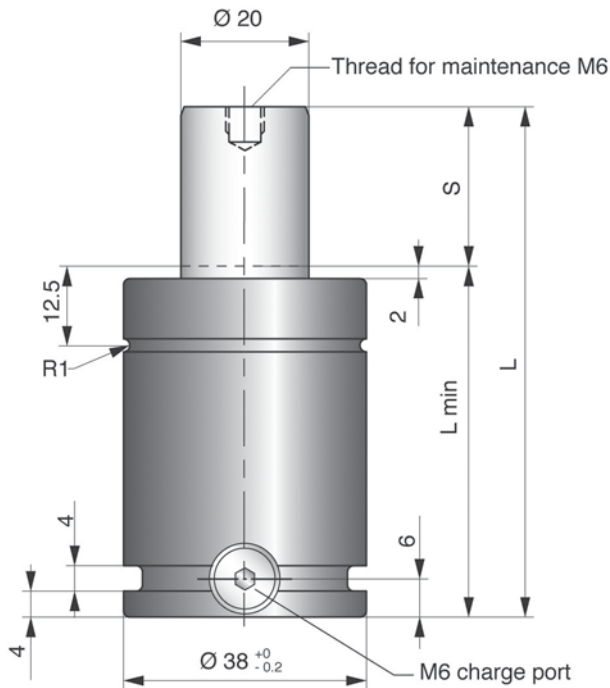
There is a side port for gas filling that can also be used to connect a hose system.

An upper C-groove, lower U-groove together with two M6 threaded holes allow various mounting possibilities using our standard mounts.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$



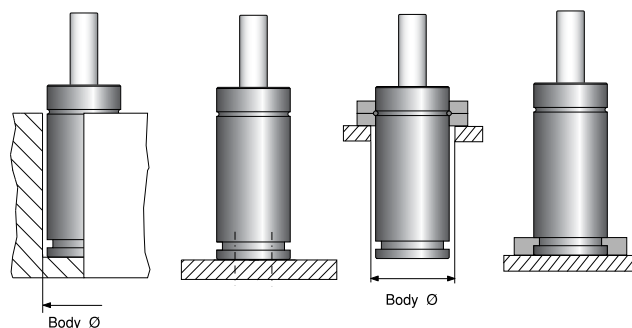
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min
		Initial	End force*		
X 500-010	10	1060	1620	50	40
X 500-013	13		1600	56	43
X 500-016	16		1620	62	46
X 500-019	19		1660	68	49
X 500-025	25		1640	80	55
X 500-032	32		1620	94	62
X 500-038	38		1620	106	68
X 500-050	50		1620	130	80
X 500-063	63		1620	156	93
X 500-075	75		1600	180	105
X 500-080	80		1600	190	110
X 500-100	100		1600	230	130
X 500-125	125		1600	280	155

* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 170°F
 Force increase by temperature $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min ~ 50-100
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit X 500

MOUNTING POSSIBILITIES



Drop - In

B
Bottom
Tapped Holes

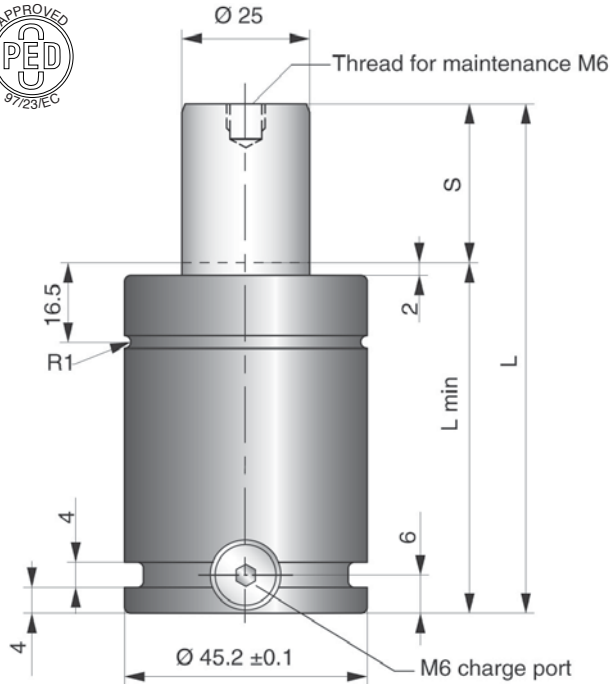
FC, FCS
Top Mount

FFC
Foot Mount

We reserve the right to add, delete or modify components without notification.

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The Powerline gas springs are our shortest, with more power to give you a great deal of force in a very small amount of space.

There is a side port for gas filling that can also be used to connect a hose system.

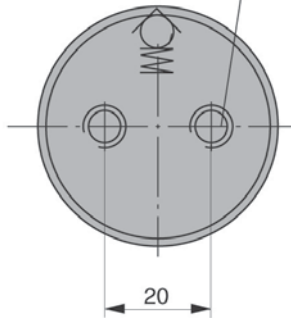
An upper C-groove, lower U-groove together with two M8 threaded holes allow various mounting possibilities using our standard mounts.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$

M8 (2x), depth 6 mm



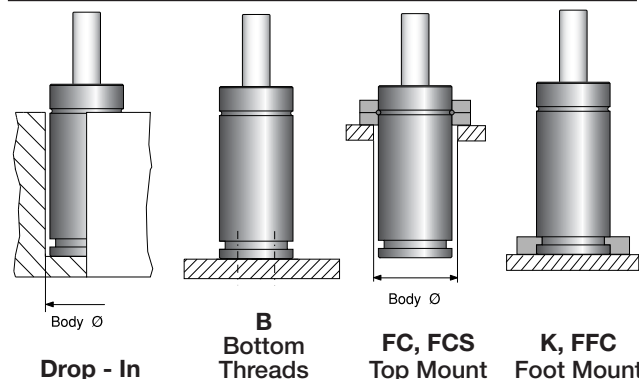
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force*				
X 750-010	10	1665	2720	52	42	0.02	0.37
X 750-013	13		2720	58	45	0.02	0.39
X 750-016	16		2720	64	48	0.03	0.41
X 750-019	1		2630	70	51	0.03	0.41
X 750-025	25		2650	82	57	0.04	0.45
X 750-032	32		2650	96	64	0.05	0.50
X 750-038	38		2650	108	70	0.05	0.53
X 750-050	50		2650	132	82	0.07	0.61
X 750-063	63		2650	158	95	0.09	0.69
X 750-075	75		2675	182	107	0.10	0.77
X 750-080	80		2675	192	112	0.11	0.80
X 750-100	100		2675	232	132	0.13	0.93
X 750-125	125		2675	282	157	0.17	1.09

* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/32 - 176°F
 Force increase by temperature $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min ~ 50-100
 Max piston rod velocity 1.6 m/s
 Rod surface Nitrided
 Tube surface Black oxide
 Repair kit X 750

MOUNTING POSSIBILITIES

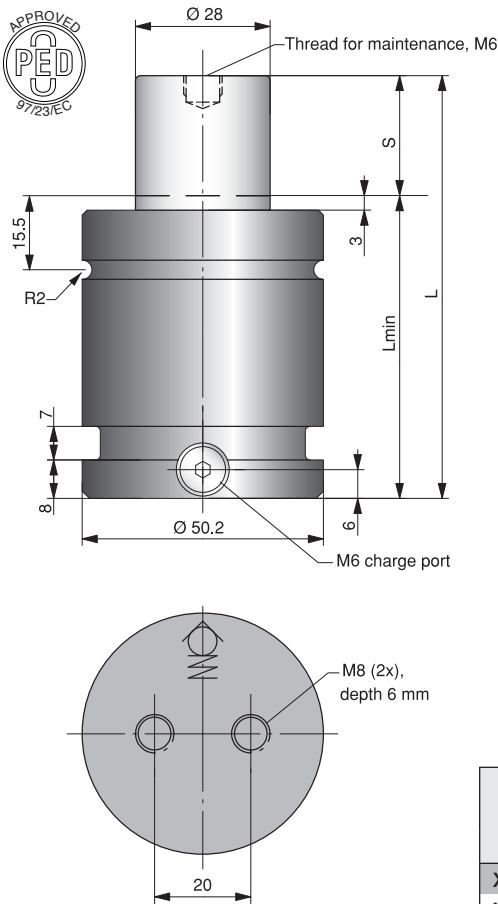


We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.

All dimensions are nominal unless tolerance is stated.

Associated Spring
RAYMOND
 A business of BARNES GROUP INC



Powerline springs are piston rod sealed gas springs, our shortest and most powerful, giving you a great deal of force in a very small amount of space.

There is a side port for gas filling that can also be used to connect to a hose system.

An upper C-groove, lower U-groove together with two M8 threaded holes allow various mounting possibilities using our standard mounts.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

**Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$**

The X 1000 model is also available equipped with an M16 threaded tap for mounting. When ordering this version **XMS 1000-xxx** must be stated on the order.

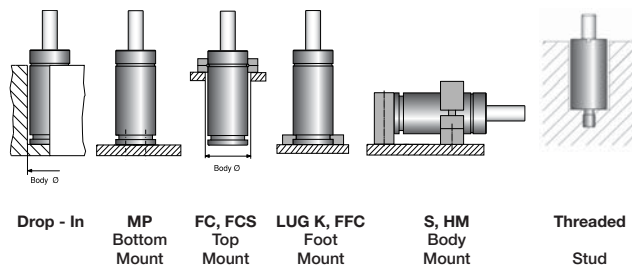
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force*				
X/XMS 1000-013	13	2068	3103	64	51	0.03	0.52
X/XMS 1000-016	16		3103	70	54	0.04	0.54
X/XMS 1000-019	19		3147	76	57	0.04	0.56
X/XMS 1000-025	25		3192	88	63	0.05	0.61
X/XMS 1000-032	32		3215	102	70	0.06	0.66
X/XMS 1000-038	38		3260	114	76	0.07	0.71
X/XMS 1000-050	50		3282	138	88	0.09	0.81
X/XMS 1000-063	63		3305	164	101	0.11	0.91
X/XMS 1000-075	75		3305	188	113	0.13	1.02
X/XMS 1000-080	80		3327	198	118	0.14	1.05
X/XMS 1000-100	100		3327	238	138	0.17	1.20
X/XMS 1000-125	125		3327	288	163	0.21	1.40

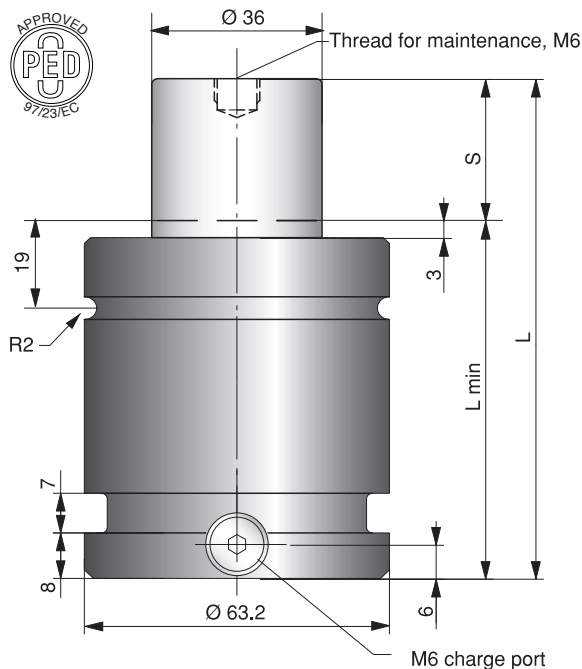
* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min ~ 50-100
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit X 1000

MOUNTING POSSIBILITIES





The Powerline gas springs are a new series.

These gas springs are our shortest, with more power to give you a great deal of force in a very small amount of space.

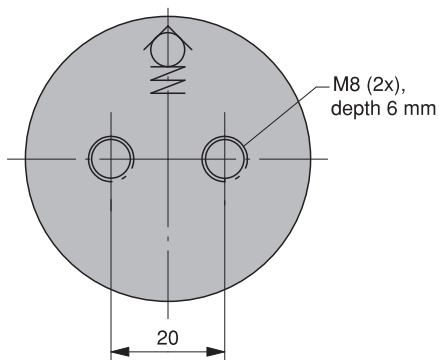
There is a side port for gas filling that can also be used to connect a hose system.

An upper C-groove, lower U-groove together with two M8 threaded holes allow various mounting possibilities using our standard mounts.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$



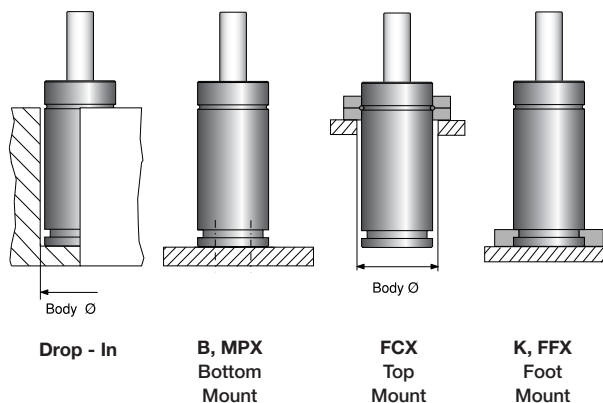
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force*				
X 1500-013	13	3375	5395	70	57	0.05	0.9
X 1500-016	16		5420	76	60	0.06	0.9
X 1500-019	19		5440	82	63	0.07	1.0
X 1500-025	25		5365	94	69	0.08	1.0
X 1500-032	32		5355	108	76	0.11	1.1
X 1500-038	38		5375	120	82	0.12	1.2
X 1500-050	50		5395	144	94	0.15	1.3
X 1500-063	63		5420	170	107	0.19	1.4
X 1500-075	75		5440	194	119	0.22	1.4
X 1500-080	80		5440	204	124	0.24	1.4
X 1500-100	100		5465	244	144	0.29	1.9
X 1500-125	125		5465	294	169	0.36	2.2

* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 50-100
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit X 1500

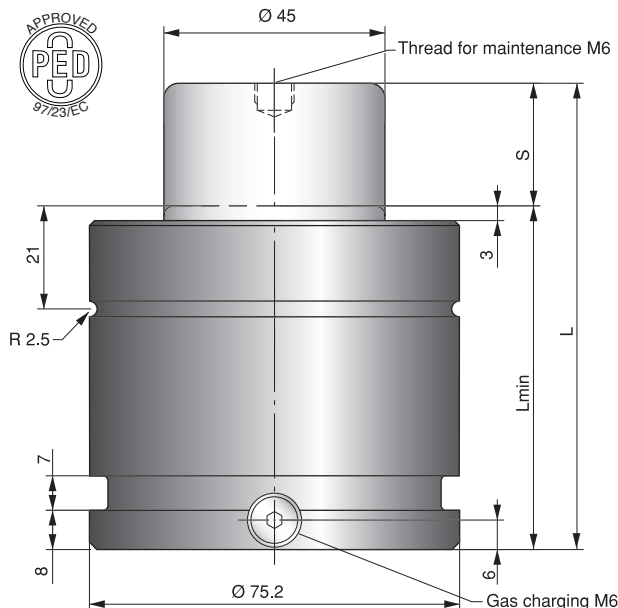
MOUNTING POSSIBILITIES



We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.

All dimensions are nominal unless tolerance is stated.



Powerline springs are Piston Rod Sealed that are our shortest and most powerful, giving you a great deal of force in a very small amount of space.

There is a side port for gas filling that can also be used to connect to a hose system.

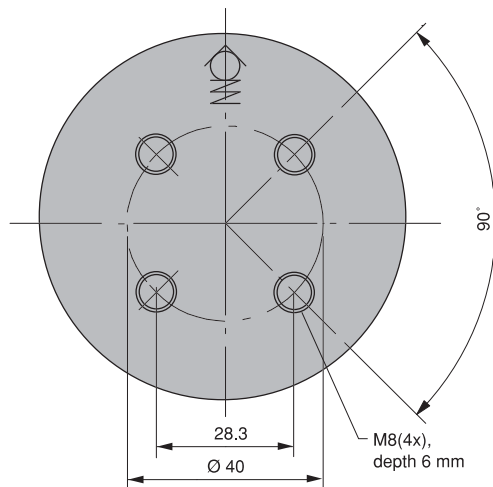
An upper C-groove, lower U-groove together with four M8 threaded holes allow various mounting possibilities using our standard mounts.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$



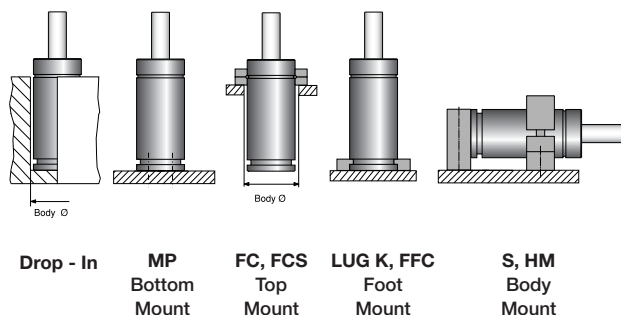
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force*				
X 2400-016	16	5396	8611	77	61	0.09	1.4
X 2400-019	19		8656	83	64	0.10	1.44
X 2400-025	25		8701	95	70	0.13	1.54
X 2400-032	32		8678	109	77	0.16	1.63
X 2400-038	38		8633	121	83	0.18	1.71
X 2400-050	50		8813	145	95	0.23	1.89
X 2400-063	63		8813	171	108	0.28	2.09
X 2400-075	75		8813	195	120	0.33	2.30
X 2400-080	80		8813	205	125	0.35	2.35
X 2400-100	100		8835	245	145	0.43	2.66
X 2400-125	125		8835	295	170	0.54	3.04

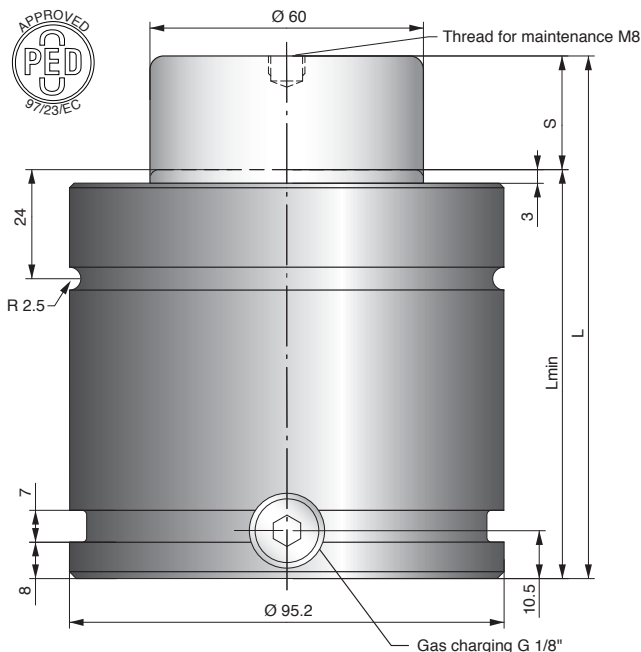
* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 50-100
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit X 2400 (Note: Stroke length 16 not repairable.)

MOUNTING POSSIBILITIES





Powerline springs are piston rod sealed gas springs, our shortest and most powerful, giving you a great deal of force in a very small amount of space.

There is a side port for gas filling that can also be used to connect to a hose system.

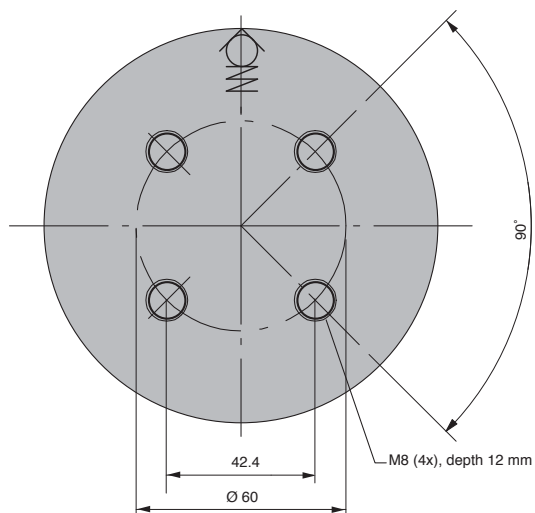
An upper C-groove, lower U-groove together with four M8 threaded holes allow various mounting possibilities using our standard mounts.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$



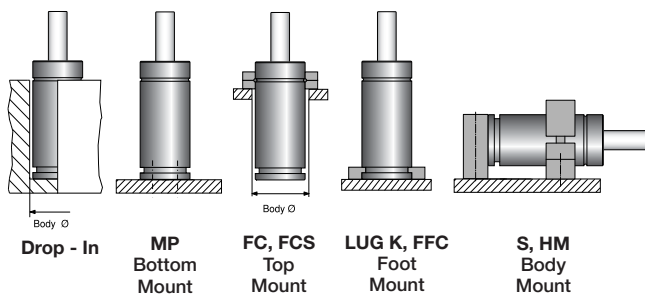
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force*				
X 4200-016	16	9440	13870	90	74	0.15	2.60
X 4200-019	19		14320	96	77	0.18	2.70
X 4200-025	25		13670	108	83	0.26	2.90
X 4200-032	32		14455	122	90	0.30	3.05
X 4200-038	38		14790	134	96	0.32	3.20
X 4200-050	50		15060	15	108	0.40	3.50
X 4200-063	63		15240	184	121	0.49	3.80
X 4200-075	75		15285	208	133	0.58	4.20
X 4200-080	80		15420	218	138	0.61	4.40
X 4200-100	100		15535	258	158	0.74	4.90
X 4200-125	125		15645	308	170	0.91	5.40

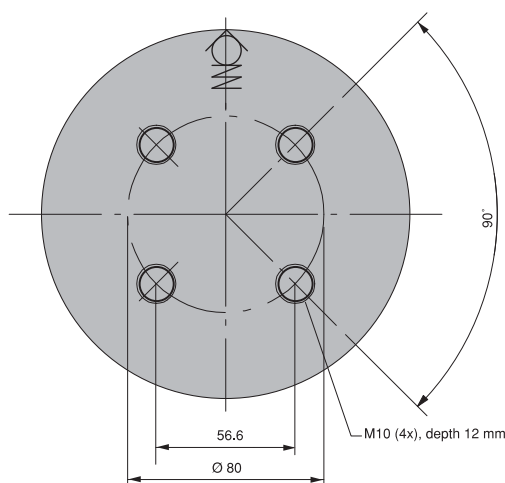
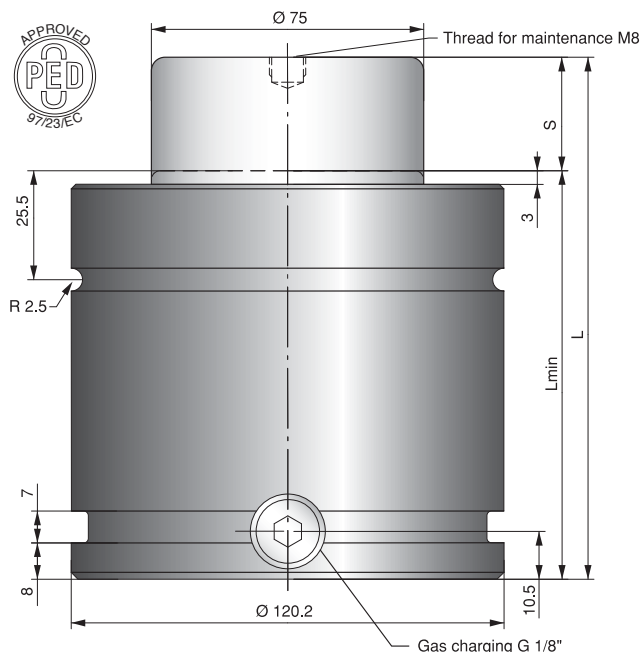
* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature +0.3%/°C
 Recommended max strokes/min ~ 30-100
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit X 4200

MOUNTING POSSIBILITIES





* = at full stroke

The Powerline gas springs are a new series.

These gas springs are our shortest, with more power to give you a great deal of force in a very small amount of space.

There is a side port for gas filling that can also be used to connect a hose system.

An upper C-groove, lower U-groove together with four M10 threaded holes allow various mounting possibilities using our standard mounts.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

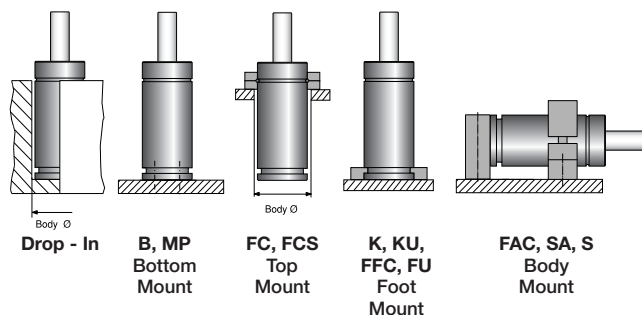
LbF x 0.4448 = decaNewtons

Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force*				
X 6600-016	16	14905	20010	100	84	0.32	4.97
X 6600-019	19		20460	106	87	0.35	5.09
X 6600-025	25		21110	118	93	0.42	5.31
X 6600-032	32		21605	132	100	0.49	5.58
X 6600-038	38		22075	144	106	0.56	5.81
X 6600-050	50		22615	168	118	0.69	6.22
X 6600-063	63		23020	194	131	0.83	6.78
X 6600-075	75		23245	218	143	0.90	7.05
X 6600-080	80		23400	228	148	1.01	7.43
X 6600-100	100		23700	268	168	1.23	8.20
X 6600-125	125	23940	318	193	1.50	9.16	

BASIC INFORMATION

Pressure medium	Nitrogen
Max. charging pressure	150 bar/2175 psi
Min. charging pressure	25 bar/360 psi
Operating temperature	0 - 80°C/0 - 176°F
Force increase by temperature	±0.3%/°C
Recommended max strokes/min	~ 50-100
Max piston rod velocity	1.6 m/s
Tube	Black oxide
Repair kit X 6600	

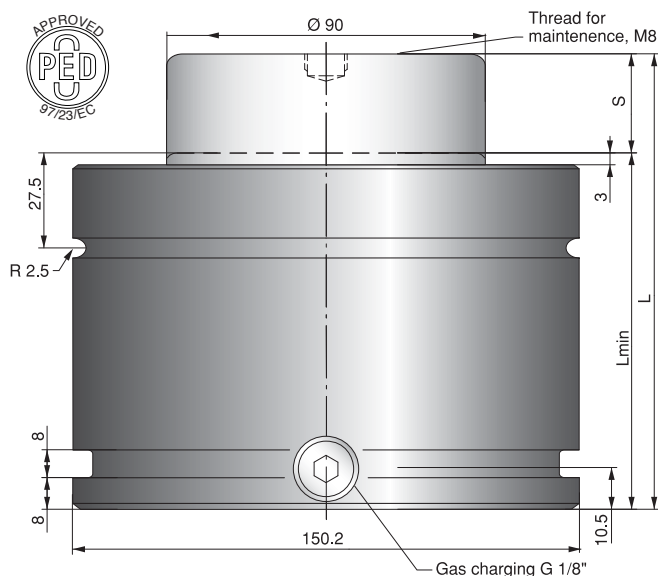
MOUNTING POSSIBILITIES



We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.

All dimensions are nominal unless tolerance is stated.



The Powerline gas springs are a new series.

These gas springs are our shortest, with more power to give you a great deal of force in a very small amount of space.

There is a side port for gas filling that can also be used to connect a hose system.

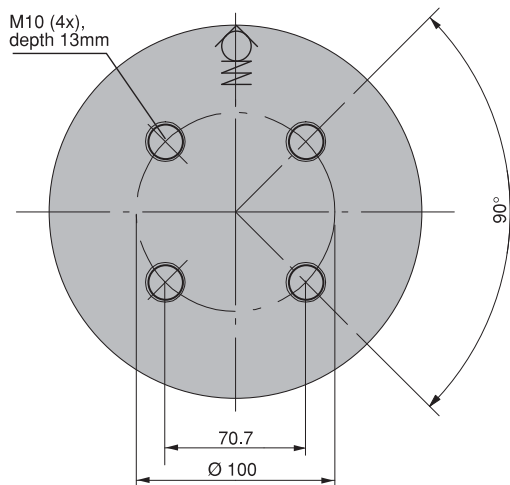
An upper C-groove, lower U-groove together with four M10 threaded holes allow various mounting possibilities using our standard mounts.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$



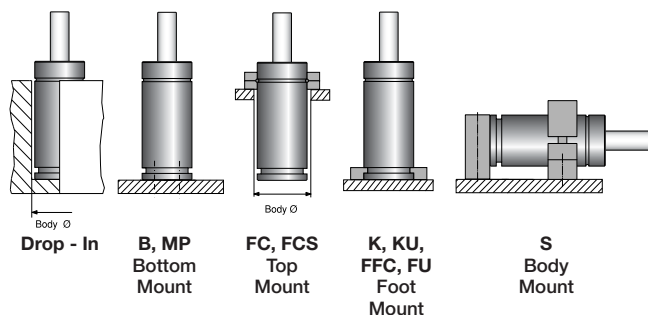
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force*				
X 9500-019	19	21400	30370	116	97	0.49	9.78
X 9500-025	25		31270	128	103	0.58	10.1
X 9500-032	32		31945	142	110	0.70	10.6
X 9500-038	38		32170	154	116	0.80	11.0
X 9500-050	50		32845	178	128	0.99	11.7
X 9500-063	63		33295	204	141	1.20	12.5
X 9500-075	75		33520	228	153	1.39	13.3
X 9500-080	80		33745	238	158	1.47	13.6
X 9500-100	100		33970	278	178	1.79	14.8
X 9500-125	125		34195	328	203	2.20	16.4

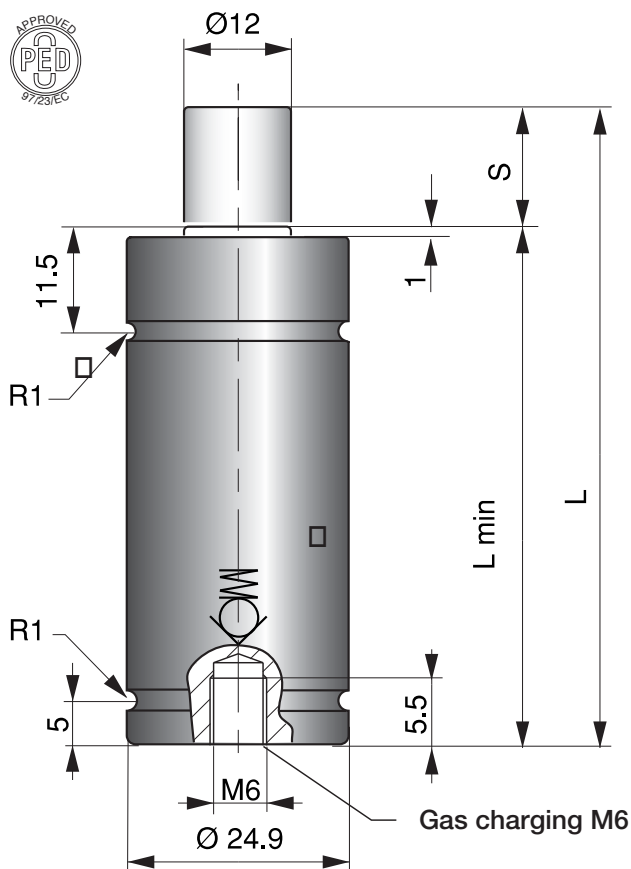
* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 50-100
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit X 9500

MOUNTING POSSIBILITIES





As with all of the CU springs, the CU 420 has a very high force compared to its outer diameter.

The max. recommended frequency for the spring is 100 strokes/minute. The M6 thread in the base of the spring is used for filling and is also a mounting option.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$

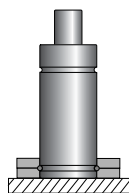
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force*				
CU 420-006	6	950	1575	56	50	0.003	0.13
CU 420-010	10		1550	70	60	0.005	0.15
CU 420-016	16		1550	91	75	0.008	0.18
CU 420-025	25		1550	120	95	0.011	0.22
CU 420-032	32		1700	140	108	0.021	0.24
CU 420-040	40		1700	165	125	0.026	0.27
CU 420-050	50		1700	195	145	0.032	0.31

* = at full stroke

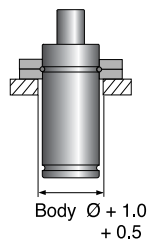
BASIC INFORMATION

Pressure medium..... Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature..... $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min..... ~100
 Max piston rod velocity..... 0.5 m/s
 Rod surface Black Nitride
 Tube surface Black Nitride
 Not repairable

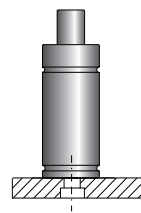
MOUNTING POSSIBILITIES



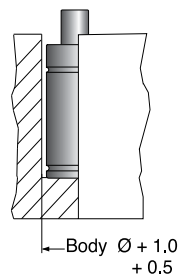
**FCR
Foot
Mount**



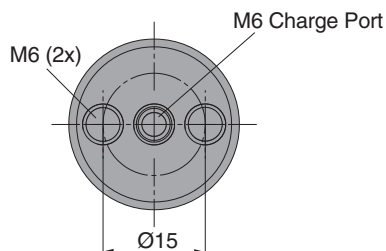
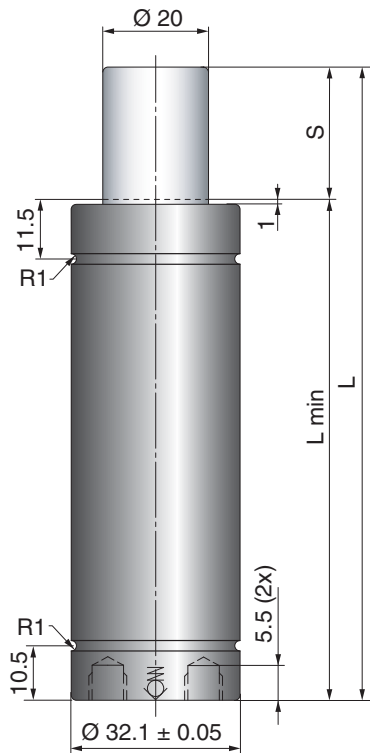
**FCR
Top
Mount**



**Bottom
Tapped Hole**



Drop - In



The CU gas spring is a very compact bore sealed gas spring that gives a high force in a limited space.

Springs with stroke lengths over 25 mm should always be attached to the tool, using a flange or the tapped holes in the bottom of the spring. We also recommend shorter stroke springs be fastened for optimal service life.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$

Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force**				
CU 740-006	6	1660	2200	63	57	0.012	0.20
CU 740-010	10		2250	75	65	0.017	0.24
CU 740-016	16		2475	93	77	0.024	0.28
CU 740-025	25		2700	120	95	0.034	0.33
CU 740-032	32*		2700	140	108	0.042	0.37
CU 740-040	40*		2700	165	125	0.052	0.42
CU 740-050	50*		2700	195	145	0.063	0.48

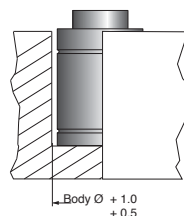
* = Should always be attached to the tool using the tapped holes in the bottom or a flange

** = at full stroke

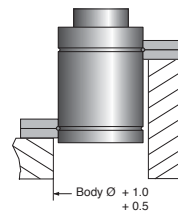
BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 50-100 (at 20°C)
 Max piston rod velocity 0.5 m/s
 Rod surface Nitrided
 Tube surface Nitrided
 Not repairable

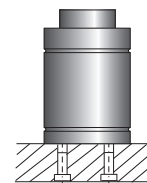
MOUNTING POSSIBILITIES



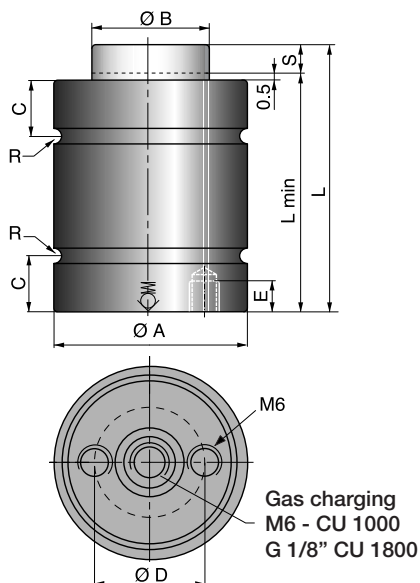
Drop - In



FC-MC
Top
Mount



B
Bottom
thread



The CU gas spring is a very compact bore sealed gas spring, that gives a high force in a limited space. The max. frequency for the spring is 100 strokes/minute.

Springs with stroke lengths over 25 mm should always be attached to the tool, using a flange or the tapped holes in the bottom of the spring. We also recommend shorter stroke springs to be fastened for optimal service-life.

As an option, the CU springs can be delivered with a side-port plate for applications where a side port is needed, i.e. for use in hose systems.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$

Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	$\varnothing A$ ± 0.1	$\varnothing B$	C	$\varnothing D$	E	R	Gas vol. (l)	Weight (kg)
		Initial	End force**										
CU 1000-006	6	2380	3595	61	55	37.9	20	10.5	17	6.5	1	0.014	0.3
CU 1000-010	10			78	68							0.024	0.4
CU 1000-016	16			100	84							0.036	0.5
CU 1000-025	25			135	110							0.056	0.6
CU 1000-032	32*			167	135							0.074	0.7
CU 1000-040	40*			195	155							0.092	0.8
CU 1000-050	50*			230	180							0.110	0.9
CU 1800-006	6	4045	5620	66	60	50.2	30	14.5	26	6.5	2	0.030	0.6
CU 1800-010	10		5845	80	70							0.044	0.7
CU 1800-016	16		5845	106	90							0.072	0.8
CU 1800-025	25		6070	135	110							0.100	1.0
CU 1800-032	32*		6070	162	130							0.126	1.2
CU 1800-040	40*		6295	190	150							0.150	1.4
CU 1800-050	50*		6520	220	170							0.179	1.6

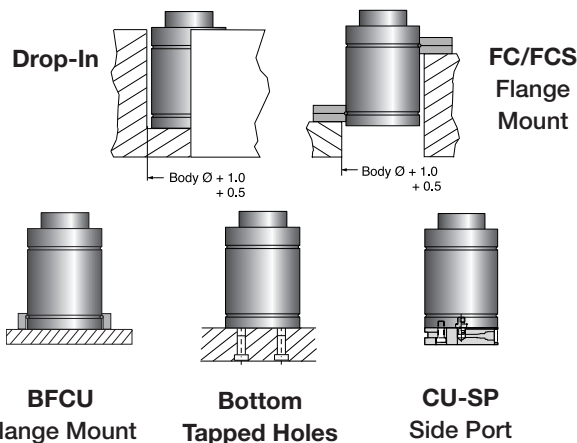
* = Should always be attached to the tool using the tapped holes in the bottom or a flange

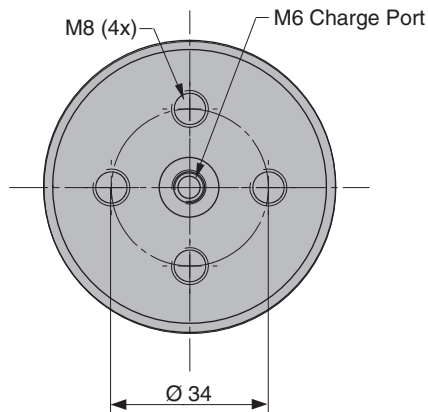
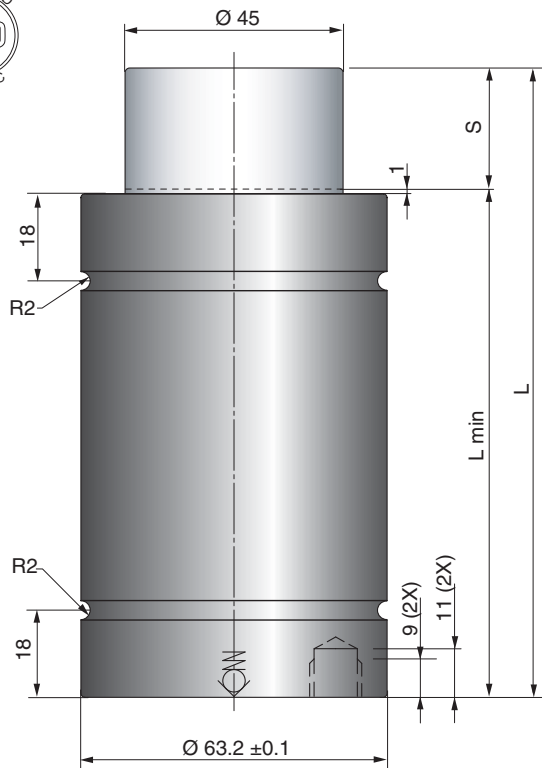
** = at full stroke

BASIC INFORMATION

Pressure medium.....Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature..... $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min.....~100
 Max piston rod velocity.....0.5 m/s
 Rod surfaceBlack Nitride
 Tube surfaceBlack Nitride
 Repair kit CU 1000
 Repair kit CU 1800

MOUNTING POSSIBILITIES





The CU gas spring is a very compact bore sealed gas spring, that gives a high force in a limited space.

Springs with stroke lengths over 25 mm should always be attached to the tool, using a flange or the tapped holes in the bottom of the spring. We also recommend shorter stroke springs to be fastened for optimal service-life.

As an option, this CU spring can be delivered with a side-port plate (SP) for applications where a side port is needed (i.e. for use in hose systems).

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$

Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)
		Initial	End force**				
CU 2900-010	10	6630	8655	85	75	0.08	1.1
CU 2900-016	16		9215	103	87	0.12	1.3
CU 2900-025	25		9665	130	105	0.16	1.5
CU 2900-032	32*		9935	150	118	0.20	1.6
CU 2900-040	40*		10160	175	135	0.24	1.8
CU 2900-050	50*		10295	205	155	0.29	2.1

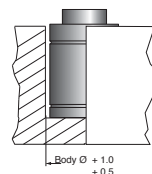
* = Should always be attached to the tool using the tapped holes in the bottom or a flange

** = at full stroke

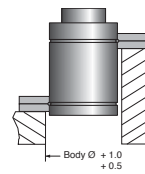
BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 80-100 (at 20°C)
 Max piston rod velocity 0.5 m/s
 Rod surface Nitrided
 Tube surface Nitrided
 Repair kit CU 2900

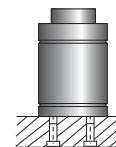
MOUNTING POSSIBILITIES



Drop-In



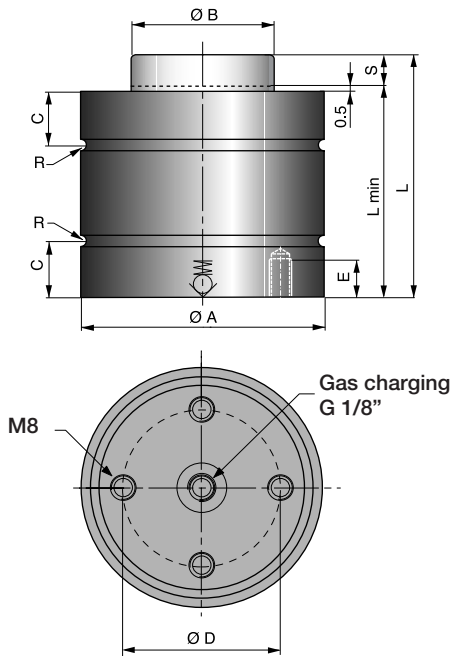
FCX
Flange
Mount



B
Bottom
thread



CU-SP
Side port



The CU gas spring is a very compact bore sealed gas spring, that gives a high force in a limited space. The max. frequency for the spring is 100 strokes/minute.

Springs with stroke lengths over 25 mm should always be attached to the tool, using a flange or the tapped holes in the bottom of the spring. We also recommend shorter stroke springs to be fastened for optimal service-life.

As an option, the CU springs can be delivered with a side-port plate for applications where a side port is needed, i.e. for use in hose systems.

Millimeters to Inches: $mm \div 25.4 = \text{inches}$

Kilograms to Pounds: $Kg \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $LbF \times 0.4448 = \text{decaNewtons}$

Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	$\varnothing A$ ± 0.1	$\varnothing B$	C	$\varnothing D$	E	R	Gas vol. (l)	Weight (kg)
		Initial	End force**										
CU 4700-010	10	10570	15100	80	70	75.2	50	18	40	9	1.5	0.10	1.4
CU 4700-016	16		14800	106	90							0.17	1.7
CU 4700-025	25		15300	135	110							0.24	2.0
CU 4700-032	32*		15100	167	135							0.32	2.4
CU 4700-040	40*		15100	200	160							0.41	2.8
CU 4700-050	50*		15100	240	190							0.52	3.3

* = Should always be attached to the tool using the tapped holes in the bottom or a flange

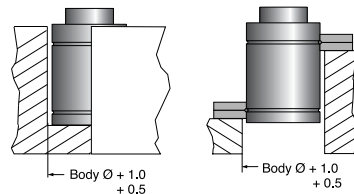
** = at full stroke

BASIC INFORMATION

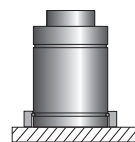
Pressure medium.....Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature..... $\pm 0.3\%/^{\circ}C$
 Recommended max strokes/min.....~80-100
 Max piston rod velocity.....0.5 m/s
 Rod surfaceBlack Nitride
 Tube surfaceBlack Nitride
 Repair kit CU 4700

MOUNTING POSSIBILITIES

Drop-In

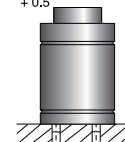


FK
Flange
Mount



BFP

Flange Mount



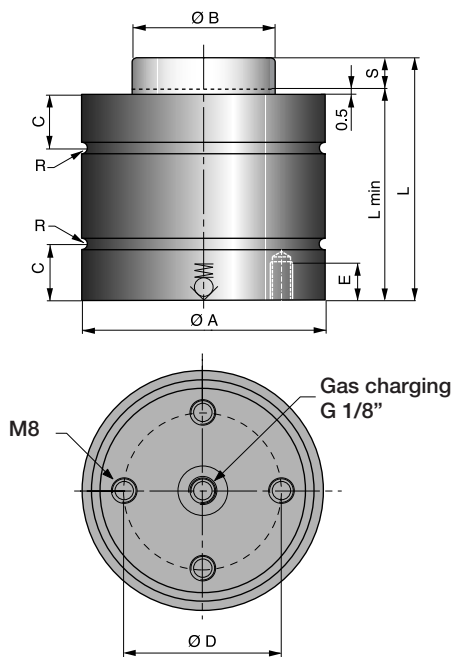
Bottom

Tapped Holes



CU-SP

Side Port



The CU gas spring is a very compact bore sealed gas spring, that gives a high force in a limited space. The max. frequency for the spring is 100 strokes/minute.

Springs with stroke lengths over 25 mm should always be attached to the tool, using a flange or the tapped holes in the bottom of the spring. We also recommend shorter stroke springs to be fastened for optimal service-life.

As an option, the CU springs can be delivered with a side-port plate for applications where a side port is needed, i.e. for use in hose systems.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$

Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	$\varnothing A$ ± 0.1	$\varnothing B$	C	$\varnothing D$	E	R	Gas vol. (l)	Weight (kg)
		Initial	End force**										
CU 7500-010	10	16860	23400	90	80	95.2	55	21	52	9	1.5	0.18	2.8
CU 7500-016	16		23400	116	100							0.30	3.2
CU 7500-025	25		24500	145	120							0.41	3.7
CU 7500-032	32*		23600	182	150							0.57	4.4
CU 7500-040	40*		24000	210	170							0.68	4.8
CU 7500-050	50*		23800	255	205							0.87	5.6

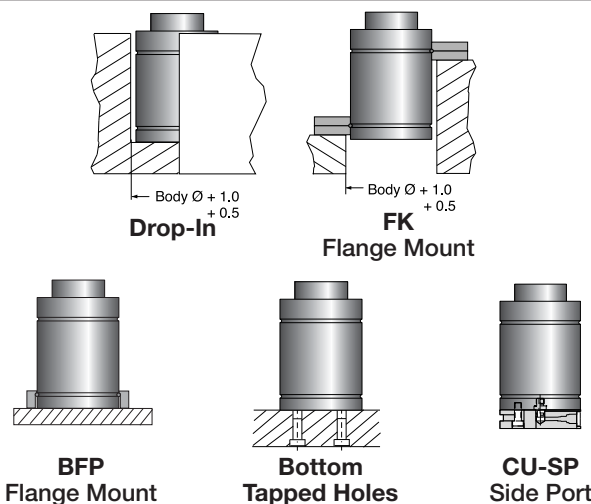
* = Should always be attached to the tool using the tapped holes in the bottom or a flange

** = at full stroke

BASIC INFORMATION

Pressure medium..... Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature..... $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min..... ~80-100
 Max piston rod velocity..... 0.5 m/s
 Rod surface Black Nitride
 Tube surface Black Nitride
 Repair kit CU 7500

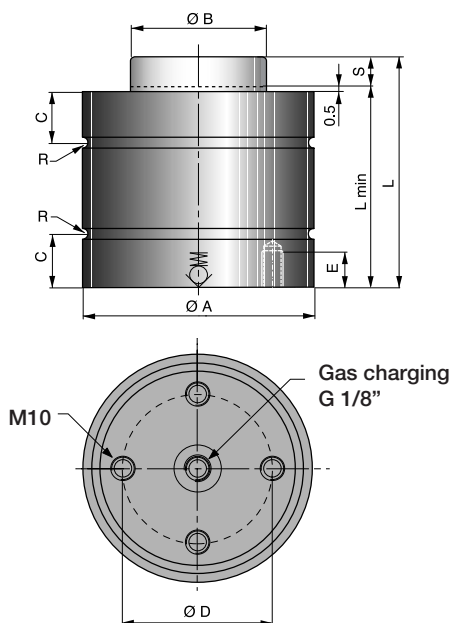
MOUNTING POSSIBILITIES



We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.

All dimensions are nominal unless tolerance is stated.



The CU gas spring is a very compact bore sealed gas spring, that gives a high force in a limited space.

The max. frequency for the spring is 100 strokes/minute.

Springs with stroke lengths over 25 mm should always be attached to the tool, using a flange or the tapped holes in the bottom of the spring. We also recommend shorter stroke springs to be fastened for optimal service-life.

As an option, the CU springs can be delivered with a side-port plate for applications where a side port is needed, i.e. for use in hose systems.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$

Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	$\varnothing A$ ± 0.1	$\varnothing B$	C	$\varnothing D$	E	R	Gas vol. (l)	Weight (kg)
		Initial	End force**										
CU 11800-010	10	26530	34800	100	90	120.2	70	22.5	68	11	2.5	0.33	5.4
CU 11800-016	16		35500	126	110							0.50	6.0
CU 11800-025	25		38200	155	130							0.68	6.9
CU 11800-032	32*		36900	187	155							0.88	7.8
CU 11800-040	40*		37100	220	180							1.00	8.7
CU 11800-050	50*		37300	260	210							1.35	9.9
CU 18300-010	10	41140	52800	110	100	150.2	90	24.5	90	11	2.5	0.56	9.5
CU 18300-016	16		56600	136	120							0.84	10.4
CU 18300-025	25		57100	165	140							1.13	11.8
CU 18300-032	32*		56400	197	165							1.45	13.3
CU 18300-040	40*		56200	235	195							1.86	15.0
CU 18300-050	50*		57300	270	220							2.19	16.5

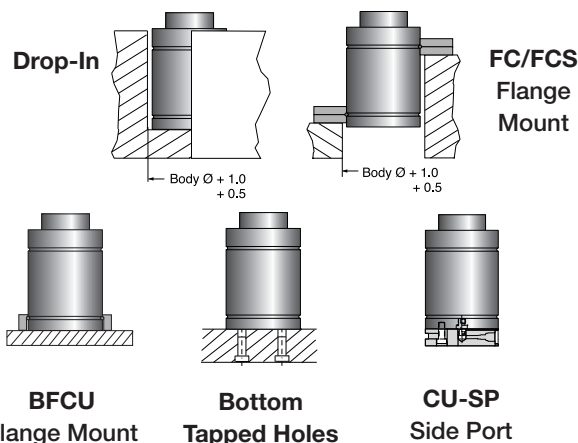
* = Should always be attached to the tool using the tapped holes in the bottom or a flange

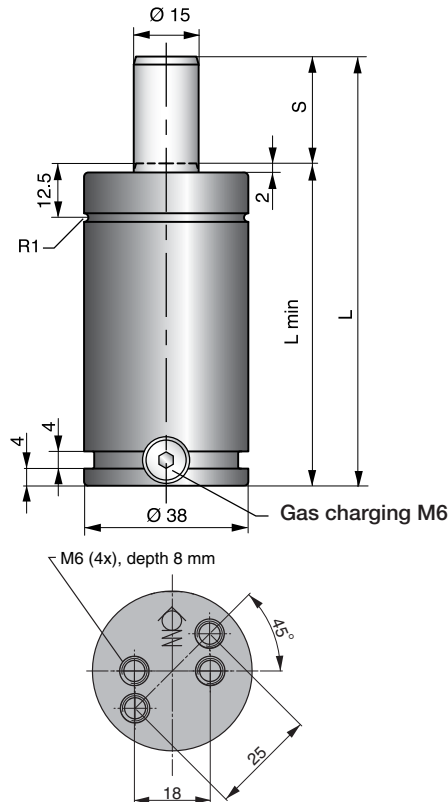
** = at full stroke

BASIC INFORMATION

Pressure medium..... Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature..... $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min..... ~80-100
 Max piston rod velocity..... 0.8 m/s
 Rod surface Black Nitride
 Tube surface Black Nitride
 Repair kit CU 11800
 Repair kit CU 18300

MOUNTING POSSIBILITIES





The basic line of gas springs is the TU line. Sizes 250 to 7500 correspond to the ISO 11901 standard for gas springs.

The total length is 50 mm + (2 x stroke).

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$

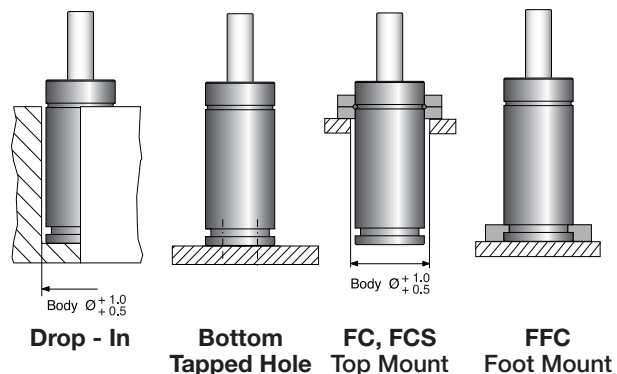
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)	
		Initial	End force*					
TU 250-010	10	600	790	70	60	0.011	0.43	✓
TU 250-012	12.7		790	75.4	62.7	0.013	0.44	
TU 250-016	16		790	82	66	0.016	0.46	✓
TU 250-019	19		790	88	69	0.019	0.48	✓
TU 250-025	25		790	100	75	0.023	0.50	✓
TU 250-038	38.1		790	126.2	86.1	0.032	0.54	
TU 250-050	50		790	150	100	0.041	0.58	✓
TU 250-063	63.5		790	177	113.5	0.051	0.67	
TU 250-080	80		790	210	130	0.062	0.72	✓
TU 250-100	100		790	250	150	0.077	0.83	
TU 250-125	125		790	300	175	0.089	0.98	

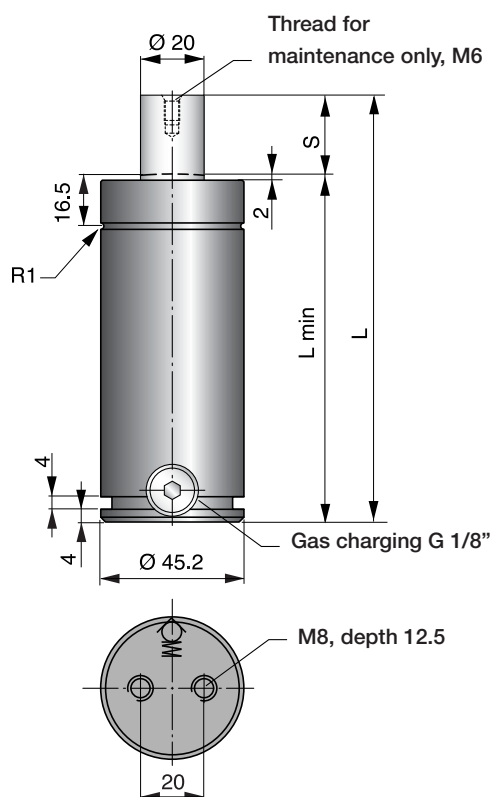
* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 50 bar/725 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min ~ 80-100
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit TU 250

MOUNTING POSSIBILITIES





The basic line of gas springs is the TU- line. Sizes 250 to 7500 correspond to the ISO 11901 standard for gas springs.

The TU 500 has a total length of 85 mm + (2 x stroke).

The thread in the piston rod top is to be used for maintenance only.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
LbF x 0.4448 = decaNewtons

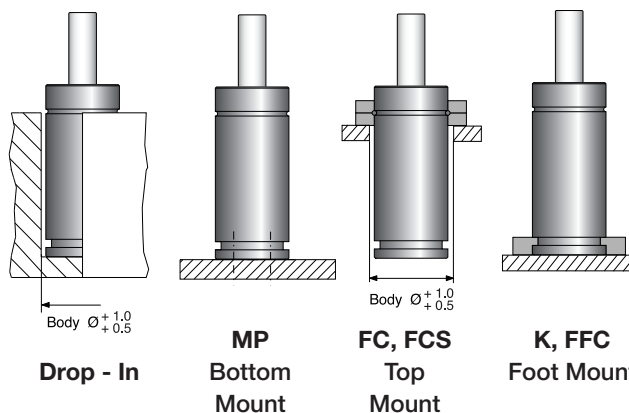
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)	
		Initial	End force*					
TU 500-010	10	1055	1350	105	95	0.023	0.96	
TU 500-012	12.7		1370	110.4	97.7	0.025	1.04	
TU 500-025	25		1440	135	110	0.038	1.13	✓
TU 500-038	38.1		1460	161.2	123.1	0.051	1.22	
TU 500-050	50		1480	185	135	0.063	1.30	✓
TU 500-063	63.5		1480	212	148.5	0.077	1.41	
TU 500-080	80		1510	245	165	0.093	1.55	✓
TU 500-100	100		1510	285	185	0.114	1.72	

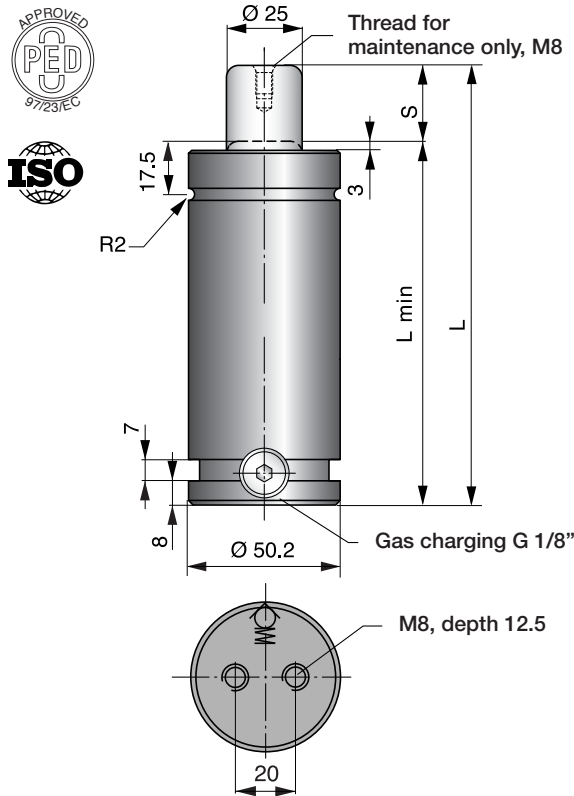
* = at full stroke

BASIC INFORMATION

Pressure medium	Nitrogen
Max. charging pressure	150 bar/2175 psi
Min. charging pressure	25 bar/360 psi
Operating temperature	0 - 80°C/0 - 176°F
Force increase by temperature	±0.3%/°C
Recommended max strokes/min	~ 40-80
Max piston rod velocity	1.6 m/s
Tube	Black oxide
Repair kit TU 500	

MOUNTING POSSIBILITIES





The basic line of gas springs is the TU line. Sizes 250 to 7500 correspond to the ISO 11 901 standard for gas springs.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$

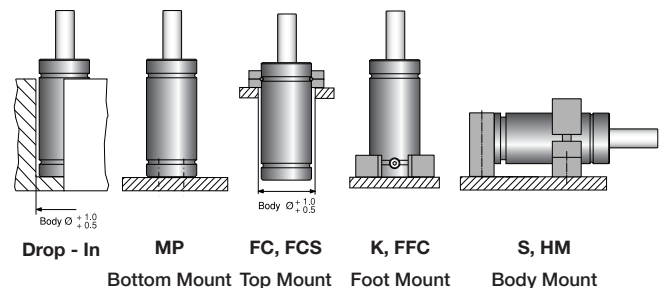
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)	ISO
		Initial	End force*					
TU 750-012	12.7	1665	2700	120.4	107.7	0.03	1.30	
TU 750-025	25		2700	145	120	0.04	1.45	✓
TU 750-038	38.1		2700	171.2	133.1	0.06	1.50	
TU 750-050	50		2700	195	145	0.07	1.70	✓
TU 750-063	63.5		2700	222	158.5	0.09	1.75	
TU 750-075	75		2700	245	170	0.10	1.85	
TU 750-080	80		2700	255	175	0.11	1.95	✓
TU 750-100	100		2700	295	195	0.14	2.15	✓
TU 750-125	125		2720	345	220	0.17	2.40	✓
TU 750-160	160		2720	415	255	0.21	2.70	✓
TU 750-200	200		2720	495	295	0.26	3.10	
TU 750-250	250		2720	595	345	0.33	3.60	
TU 750-300	300		2720	695	395	0.39	4.10	

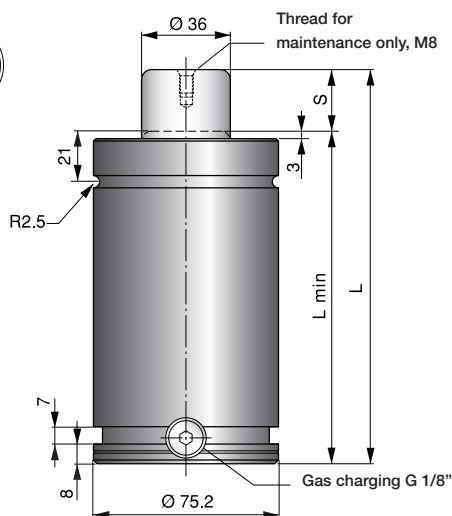
* = at full stroke

BASIC INFORMATION

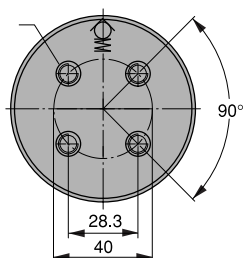
Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit TU 750

MOUNTING POSSIBILITIES





M8, depth 13 mm



The basic line of gas springs is the TU line. Sizes 250 to 7500 correspond to the ISO 11901 standard for gas springs.

The thread in the piston rod top is to be used for maintenance only.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$

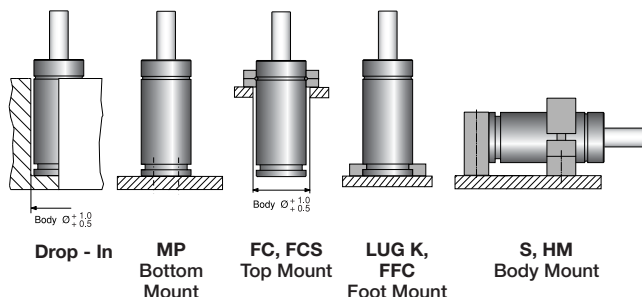
Order No.	S Stroke	Pounds Force (lbf) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)	ISO
		Initial	End force*					
TU 1500-025	25	3375	5170	160	135	0.10	3.75	✓
TU 1500-038	38.1		5170	186.2	148.1	0.15	3.95	
TU 1500-050	50		5170	210	160	0.18	4.15	✓
TU 1500-063	63.5		5170	237	173.5	0.22	4.40	
TU 1500-075	75		5170	260	185	0.26	4.55	
TU 1500-080	80		5170	270	190	0.28	4.70	✓
TU 1500-100	100		5170	310	210	0.34	5.10	✓
TU 1500-125	125		5170	360	235	0.42	5.55	✓
TU 1500-150	150		5170	410	260	0.50	6.10	
TU 1500-160	160		5170	430	270	0.53	6.25	✓
TU 1500-200	200		5170	510	310	0.68	6.90	
TU 1500-250	250		5170	610	360	0.81	7.80	
TU 1500-300	300		5170	710	410	0.96	8.90	

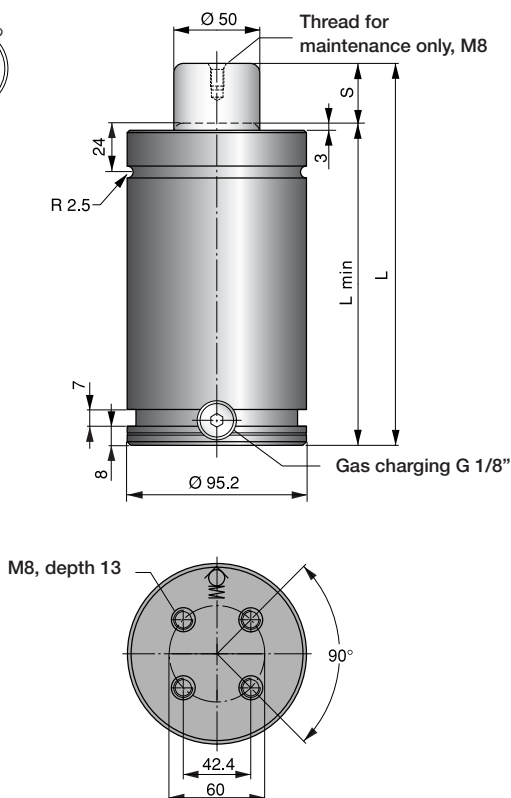
* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min ~ 15-40
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit TU 1500

MOUNTING POSSIBILITIES





The basic line of gas springs is the TU line. Sizes 250 to 7500 correspond to the ISO 11901 standard for gas springs.

The thread in the piston rod top is to be used for maintenance only.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:
LbF x 0.4448 = decaNewtons

Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)	
		Initial	End force*					
TU 3000-025	25	6750	9440	170	145	0.20	6.35	✓
TU 3000-038	38.1		9670	196.2	158.1	0.26	6.75	
TU 3000-050	50		9890	220	170	0.32	7.50	✓
TU 3000-063	63.5		10100	247	183.5	0.38	7.70	
TU 3000-075	75		10250	270	195	0.43	7.95	
TU 3000-080	80		10340	280	200	0.46	8.10	✓
TU 3000-100	100		10570	320	220	0.56	8.85	✓
TU 3000-125	125		10570	370	245	0.69	9.90	✓
TU 3000-160	160		10570	440	280	0.87	10.80	✓
TU 3000-200	200		10790	520	320	1.07	12.20	
TU 3000-250	250		10790	620	370	1.32	13.7	
TU 3000-300	300		10790	720	420	1.57	15.3	

* = at full stroke

BASIC INFORMATION

Pressure medium	Nitrogen
Max. charging pressure	150 bar/2175 psi
Min. charging pressure	25 bar/360 psi
Operating temperature	0 - 80°C/0 - 176°F
Force increase by temperature	±0.3%/°C
Recommended max strokes/min	~ 15-40
Max piston rod velocity.....	1.6 m/s
Tube	Black oxide
Repair kits.....	*New version (PED) 3019025
	Old version 2014068-03

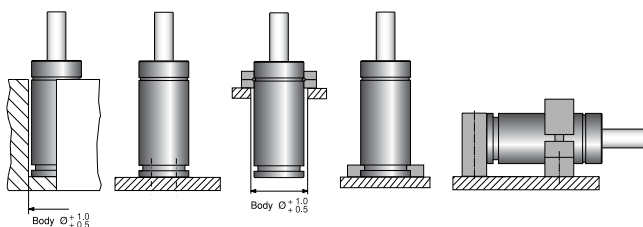
*New version identified by circular rings on top of tube, guide and rod.

We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.

All dimensions are nominal unless tolerance is stated.

MOUNTING POSSIBILITIES



Drop - In

B, MP

Bottom

Tapped Hole

FC, FCS

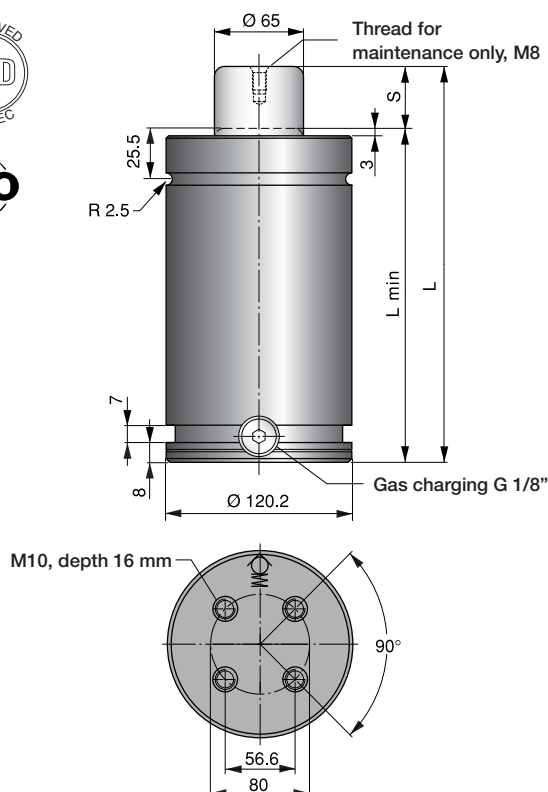
Top Moun

LUG K, FFC

Foot Mount

S, HM

Body Mount



The basic line of gas springs is the TU line. Sizes 250 to 7500 correspond to the ISO 11901 standard for gas springs.

The thread in the piston rod top is to be used for maintenance only.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

LbF x 0.4448 = decaNewtons

Order No.	S Stroke	Pounds Force (lbf) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)	
		Initial	End force*					
TU 5000-025	25	11240	15960	190	165	0.32	12.00	✓
TU 5000-038	38.1		16860	216.2	178.1	0.42	12.65	
TU 5000-050	50		17310	240	190	0.51	13.30	✓
TU 5000-063	63.5		17990	267	203.5	0.60	14.46	
TU 5000-075	75		18205	251.6	176.6	0.69	14.85	
TU 5000-080	80		18210	300	220	0.73	15.05	✓
TU 5000-100	100		18430	340	240	0.89	16.15	✓
TU 5000-125	125		18430	390	265	1.09	16.96	✓
TU 5000-160	160		18660	460	300	1.36	19.40	✓
TU 5000-200	200		18880	540	340	1.68	20.70	
TU 5000-250	250		18880	640	390	2.07	22.40	
TU 5000-300	300		18880	740	440	2.46	24.66	

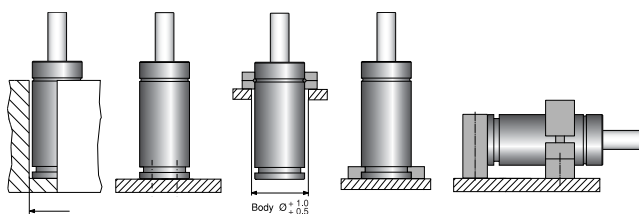
* = at full stroke

BASIC INFORMATION

Pressure medium	Nitrogen
Max. charging pressure	150 bar/2175 psi
Min. charging pressure	25 bar/360 psi
Operating temperature	0 - 80°C/0 - 176°F
Force increase by temperature	+0.3%/°C
Recommended max strokes/min	~ 15-40
Max piston rod velocity	1.6 m/s
Tube	Black oxide
Repair kits	*New version (PED) 3018876
	Old version 2014068-04

*New version identified by circular rings on top of tube, guide and rod.

MOUNTING POSSIBILITIES



Drop - In

MP

Bottom

Tapped Hole

FC, FCS

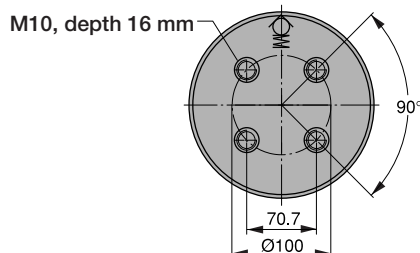
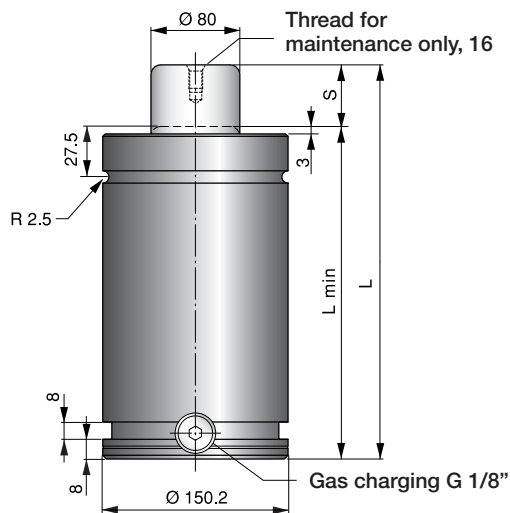
Top Mount

LUG K, FFC

Foot Mount

S

Body Mount



The basic line of gas springs is the TU line. Sizes 250 to 7500 correspond to the ISO 11901 standard for gas springs.

The thread in the piston rod top is to be used for maintenance only.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$

Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)	ISO
		Initial	End Force*					
TU 7500-025	25	16860	23600	205	180	0.51	19.2	✓
TU 7500-038	38.1		24730	231.2	193.1	0.67	20.0	
TU 7500-050	50		25400	255	205	0.81	20.9	✓
TU 7500-063	63.5		25850	282	218.5	0.98	21.8	
TU 7500-075	75		26150	305	230	1.11	22.5	
TU 7500-080	80		26300	315	235	1.18	22.9	✓
TU 7500-100	100		26750	355	255	1.43	24.3	✓
TU 7500-125	125		27200	405	280	1.74	26.0	✓
TU 7500-160	160		27430	475	315	2.17	28.4	✓
TU 7500-200	200		27650	555	355	2.66	31.1	
TU 7500-250	250		27880	655	405	3.27	34.5	
TU 7500-300	300		27880	755	455	3.88	37.9	

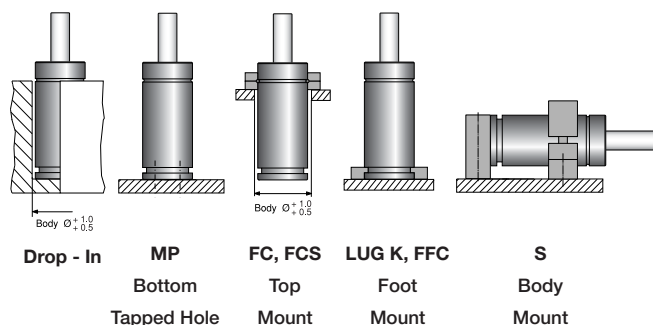
* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min ~ 15-40
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kits *New version (PED) 3018877
 Old version 2014068-09

*New version identified by circular rings on top of tube, guide and rod.

MOUNTING POSSIBILITIES



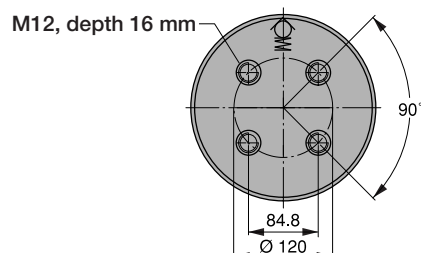
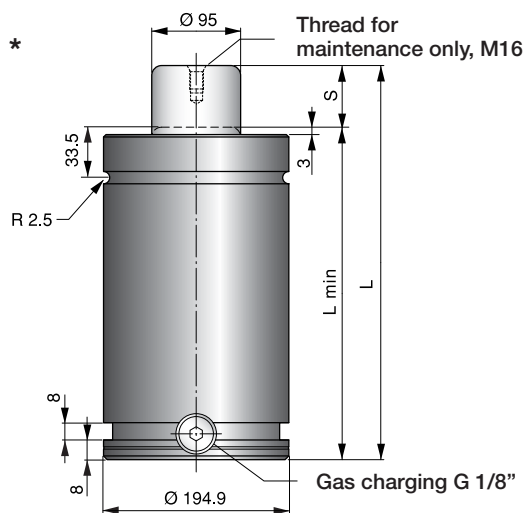
We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.

All dimensions are nominal unless tolerance is stated.



*



* TU 10000's outer dimensions according to ISO 11901 standard.

The thread in the piston rod top is to be used for maintenance only.

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$

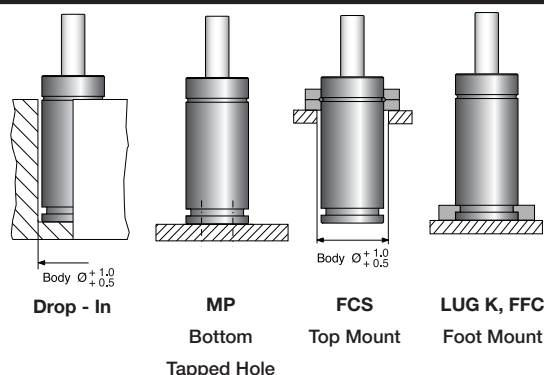
Order No.	S Stroke	Pounds Force (lbF) at 2175 psi		L ± 0.25	L min	Gas vol. (l)	Weight (kg)	ISO
		Initial	End force**					
TU 10000-025	25	23830	31020	210	185	0.87	36.5	
TU 10000-038	38.1		32150	236.2	198.1	1.13	38.5	
TU 10000-050	50		33050	260	210	1.37	40.0	✓
TU 10000-063	63.5		33720	287	223.5	1.64	42.0	
TU 10000-080	80		34170	320	240	1.98	44.0	✓
TU 10000-100	100		35070	360	260	2.38	46.5	✓
TU 10000-125	125		35300	410	285	2.88	50.0	✓
TU 10000-160	160		35520	480	320	3.59	54.5	✓
TU 10000-200	200		35970	560	360	4.39	60.0	✓
TU 10000-250	250		35970	660	410	5.40	66.5	✓
TU 10000-300	300		35970	760	460	6.40	73.0	✓

** = at full stroke

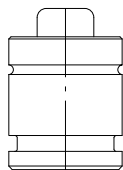
BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature $\pm 0.3\%/^{\circ}\text{C}$
 Recommended max strokes/min ~ 15-40
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit TU 10000

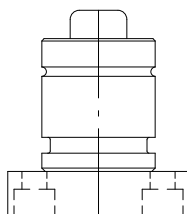
MOUNTING POSSIBILITIES



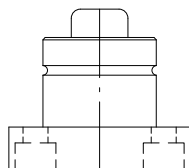
The Ford Motor Company has their own WDX3560 World Standard for gas springs, mounts and accessories supplied to Ford, based on the KALLER TU and LCF series.



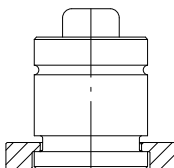
WDX356015-XX-XX-DMS¹, (TU 750-7500)
WDX356025-XX-XX-DMS¹, (LCF 750-7500)
¹= Self contained (S) only



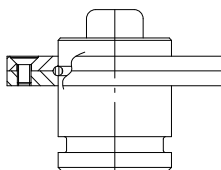
WDX356016-XX-XX-PM¹, (TU 750-7500 with MP plate)
¹= Self contained (S) or Piped system (P).
Note! Piped system (P) supplied with adapter 4017764.



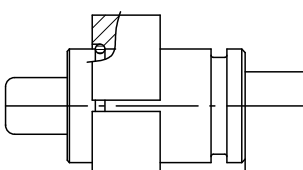
WDX356017-XX-XX-SW¹, (TU 750-7500 with square welded flange)
WDX356026-XX-XX-SM¹, (LCF 750-7500 with square welded flange)
¹= Self contained (S) or Piped system (P).
Note! Piped system (P) supplied with adapter 4017764.



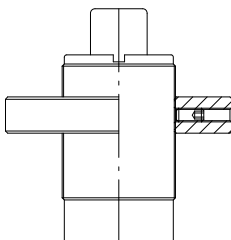
WDX356018-XX-XX-SLS¹, (TU 750-7500 with FFC³ flange)
¹= Self contained (S) only
³= 750 size requires special FFC flange.



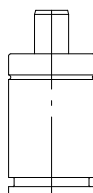
WDX3560019-XX-XX-TMS¹, (TU 750-7500 with FC⁴ flange)
¹= Self contained (S) only
⁴= 750 size requires special FC flange.



WDX3560020-XX-XX-HM¹, (TU 750-3000 with horizontal foot mount)
¹= Self contained (S) or Piped system (P).
Note! Piped system (P) supplied with adapter 4017764.

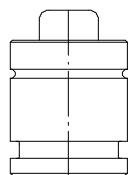


WDX3560021-07-XX-TB, (KM 750 with FTM 750 mount)

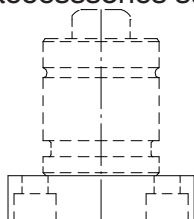


WDX3560022-03-XX-DM, (TU 250)

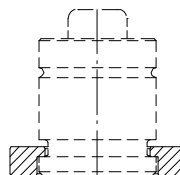
General Motors has their own M-1500 North American Standard and 90.25 Global Die Standard for gas springs, mounts and accessories supplied to GM, based on the KALLER TU series.



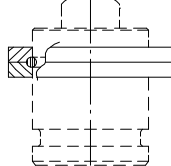
M1500-XX-XX, (TU 750-7500)
90.25.00-XX-XX, (TU 750-7500)



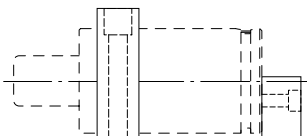
M1501-XX-01, (Mount only, MP plate 750-7500)
90.25.04-XX, (Mount only, MP plate 750-7500)



M1501-XX-02, (Mount only, FFC-flange 750-7500)
90.25.01-XX, (Mount only, FFC-flange 750-7500)



M1501-XX-03, (Mount only, FCS-flange 750-7500)
90.25.02-XX, (Mount only, FCS-flange 750-7500)



M1501-XX-04, (Mount only, Horizontal foot mount 750-3000)
90.25.06-XX, (Mount only, Horizontal foot mount 750-3000)

We reserve the right to add, delete or modify components without notification.
All dimensions are stated in mm.
All dimensions are nominal unless tolerance is stated.



Extension Springs

Raymond® EXTENSION SPRINGS (INCH DIMENSIONS)

PART NUMBER	Free Length (in)	Body Diameter (in)	Wire Diameter (in)	Reference Extension Length (in)	Approximate Load @ Reference Length (in)	Spring Rate (lbs/in)	Finish	End Configuration
020-137	0.62	0.120	0.016	1.07	1.69	3.22	Zinc Plate	FULL TWIST LOOPS
020-138	0.75	0.120	0.016	1.34	1.90	2.79	Zinc Plate	FULL TWIST LOOPS
020-139	0.88	0.120	0.016	1.62	1.74	2.02	Zinc Plate	FULL TWIST LOOPS
020-140	1.00	0.180	0.022	1.86	2.77	2.75	Zinc Plate	FULL TWIST LOOPS
020-042	1.00	0.188	0.014	1.50	0.14	0.15	OIL	NONE
020-039 **	1.05	0.296	0.040	1.20	2.61	7.80	PLAIN	FULL TWIST LOOPS
020-040	1.09	0.234	0.020	1.63	0.53	0.69	OIL	FULL TWIST LOOPS
020-141	1.12	0.180	0.022	2.13	2.97	2.55	Zinc Plate	FULL TWIST LOOPS
020-142	1.25	0.180	0.022	2.43	2.80	2.03	Zinc Plate	FULL TWIST LOOPS
020-037	1.34	0.344	0.048	1.72	8.54	16.10	OIL	MACHINE HALF LOOP - OPEN
020-143	1.37	0.240	0.026	2.96	3.21	1.74	Zinc Plate	FULL TWIST LOOPS
020-144	1.50	0.240	0.026	2.96	2.90	1.68	Zinc Plate	FULL TWIST LOOPS
020-146	1.50	0.360	0.037	3.06	5.90	3.26	Zinc Plate	FULL TWIST LOOPS
020-034	1.63	0.500	0.080	1.88	26.10	72.25	OIL	MACHINE HALF LOOP - OPEN
020-145	1.75	0.24	0.026	3.95	3.21	1.25	Zinc Plate	FULL TWIST LOOPS
020-147	1.75	0.360	0.037	3.77	6.09	2.62	Zinc Plate	FULL TWIST LOOPS
020-095	1.79	0.718	0.105	2.29	57.00	90.00	OIL	MACHINE HALF LOOP - OPEN
020-148	2.00	0.360	0.037	4.44	6.00	2.13	Zinc Plate	FULL TWIST LOOPS
020-035 **	2.02	0.156	0.020	2.81	0.74	0.53	PLAIN	FULL TWIST LOOPS
020-032	2.38	0.750	0.105	2.76	29.50	39.00	OIL	MACHINE HALF LOOP - OPEN
020-033	2.50	0.750	0.080	3.50	14.30	10.30	OIL	MACHINE HALF LOOP - OPEN
020-097	2.79	0.718	0.105	3.79	71.35	58.35	OIL	MACHINE HALF LOOP - OPEN
020-019	3.17	0.375	0.041	4.17	3.25	1.76	OIL	FULL TWIST LOOPS
020-099	3.67	0.687	0.105	4.17	31.00	32.00	OIL	MACHINE HALF LOOP - OPEN
020-113	3.77	0.625	0.113	4.77	92.42	68.40	OIL	FULL TWIST LOOPS
020-024	3.79	0.718	0.105	5.00	44.30	28.09	OIL	MACHINE HALF LOOP - OPEN
020-023	3.97	0.734	0.062	4.69	2.75	1.66	OIL	FULL TWIST LOOPS
020-020	4.00	0.250	0.028	5.00	1.15	0.65	OIL	FULL TWIST LOOPS
020-022	4.38	0.484	0.062	6.38	14.00	4.86	OIL	MACHINE HALF LOOP - OPEN
020-026	4.92	0.313	0.041	6.50	3.91	1.81	OIL	FULL TWIST LOOPS
020-028	5.13	0.437	0.062	6.13	10.30	5.71	OIL	FULL TWIST LOOPS
020-025	5.25	0.531	0.062	6.25	8.50	5.00	BLACK DYKEM	SWIVEL HOOKS - OPEN
020-018	5.26	0.242	0.041	6.26	6.72	4.30	OIL	FULL TWIST LOOPS
020-027	5.28	0.344	0.047	7.28	7.25	2.63	OIL	FULL TWIST LOOPS
020-013	5.34	0.562	0.080	6.34	16.82	9.00	OIL	MACHINE HALF LOOP - OPEN
020-014	5.39	0.375	0.054	6.39	7.71	4.06	OIL	FULL TWIST LOOPS
020-012	5.47	0.546	0.080	7.47	24.00	10.00	OIL	FULL TWIST LOOPS
020-029	5.66	0.875	0.120	6.66	35.00	17.76	OIL	MACHINE HALF LOOP - OPEN
020-017	5.69	0.250	0.028	7.96	1.68	0.43	OIL	FULL TWIST LOOPS
020-015	5.75	0.297	0.047	6.75	5.75	4.13	OIL	SIDE LOOPS
020-112	5.88	0.734	0.062	7.88	3.32	0.91	OIL	MACHINE HALF LOOP - OPEN
020-016	6.06	0.265	0.035	7.06	2.35	1.10	OIL	SIDE LOOPS
020-111	6.09	0.750	0.080	8.09	11.10	3.30	OIL	FULL TWIST LOOPS
020-010	6.43	0.328	0.035	7.43	1.31	0.51	OIL	FULL TWIST LOOPS
020-009	6.44	0.437	0.047	8.34	4.20	1.10	OIL	FULL TWIST LOOPS
020-116	6.57	0.906	0.091	7.57	8.14	3.14	OIL	FULL TWIST LOOPS
020-011	6.63	0.156	0.026	8.63	3.47	1.20	OIL	FULL TWIST LOOPS
020-104	7.21	1.250	0.207	8.21	162.70	87.66	OIL	MACHINE HALF LOOP - OPEN
020-030	7.73	1.062	0.135	8.73	30.00	12.20	OIL	MACHINE HALF LOOP - OPEN

Raymond® EXTENSION SPRINGS (INCH DIMENSIONS)								
PART NUMBER	Free Length (in)	Body Diameter (in)	Wire Diameter (in)	Reference Extension Length (in)	Approximate Load @ Reference Length (in)	Spring Rate (lbs/in)	Finish	End Configuration
020-031	8.04	1.000	0.105	10.04	16.75	3.90	OIL	MACHINE HALF LOOP - OPEN
020-007	8.13	0.343	0.047	9.13	4.50	1.70	OIL	FULL TWIST LOOPS
020-105	8.19	1.812	0.250	10.19	194.12	64.06	OIL	MACHINE HALF LOOP - OPEN
020-008	9.06	0.172	0.028	11.13	3.50	1.00	OIL	FULL TWIST LOOPS
020-100	9.70	1.125	0.148	10.70	35.50	13.50	OIL	MACHINE HALF LOOP - OPEN
020-001	9.82	0.875	0.091	12.82	11.46	2.15	OIL	MACHINE HALF LOOP - OPEN
020-002	9.86	0.812	0.072	11.85	5.60	0.75	OIL	MACHINE HALF LOOP - OPEN
020-004	9.88	0.500	0.062	10.88	6.50	1.71	OIL	FULL TWIST LOOPS
020-005	9.89	0.359	0.054	12.89	11.02	2.50	OIL	FULL TWIST LOOPS
020-006	10.00	0.375	0.047	13.00	5.28	1.32	OIL	FULL TWIST LOOPS
020-003	10.00	0.625	0.072	13.00	8.80	1.80	OIL	FULL TWIST LOOPS
020-101	11.68	1.250	0.162	14.68	66.00	13.00	OIL	MACHINE HALF LOOP - OPEN
020-102	13.65	1.375	0.177	14.65	27.00	15.00	OIL	MACHINE HALF LOOP - OPEN
020-158	15.13	0.984	0.080	16.13	2.95	0.46	OIL	MACHINE HALF LOOP - OPEN
020-103	15.59	1.560	0.207	17.69	78.72	16.06	OIL	MACHINE HALF LOOP - OPEN
020-108	15.79	1.125	0.105	17.79	8.45	1.22	OIL	DOUBLE TWIST LOOP
020-156	15.86	0.437	0.072	16.86	11.72	3.72	OIL	FULL TWIST LOOPS
020-154	15.89	0.375	0.054	16.89	4.95	1.30	OIL	DOUBLE TWIST LOOP
020-152	16.00	0.296	0.041	17.00	2.64	0.64	OIL	DOUBLE TWIST LOOP
020-153	16.00	0.344	0.047	18.00	3.67	0.84	OIL	DOUBLE TWIST LOOP
020-155	16.00	0.421	0.062	17.00	6.90	2.20	OIL	DOUBLE TWIST LOOP

Associated Spring Raymond has capabilities well beyond the catalog components shown. We supply custom components and functional assemblies. If you simply need a Raymond® die spring or other spring type with a different finish this can be easily done.

Some common finishes are:

- Plain
- Dacromet®
- Geomet®
- Zinc
- Black Oxide
- Temperature Indicating
- Teflon®

Additional catalogs are available for other catalog stocked parts for:



CloverDome

m-Struts®



Our engineers can also customize the dimensions and/or rates for your OEM or aftermarket application based on the design constraints. Even further we can design and supply functional sub-assemblies for new designs or cost reduction efforts. Contact Associated Spring Raymond to learn more about the possibilities for your application:

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Raymond® COMPRESSION SPRINGS (INCH DIMENSIONS)

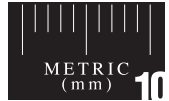
PART NUMBER	End Finish	Free Length (in)	Outer Dia. (in)	Wire Diameter (in)	Spring Rate (lbs/in)	Approximate Solid Height (in)	Finish
020-077	PLAIN	0.22	0.172	0.012	0.9	0.11	OIL
020-074	PLAIN	0.53	0.078	0.012	6.1	0.22	OIL
020-073	PLAIN	0.56	0.078	0.011	3.48	0.23	OIL
020-076	PLAIN	0.81	0.109	0.018	12.4	0.31	OIL
020-075	PLAIN	0.91	0.109	0.018	9.89	0.38	OIL
020-084	PLAIN	0.94	0.187	0.012	0.29	0.24	OIL
020-070 **	PLAIN	1.09	0.843	0.080	15.4	0.44	PLAIN
020-080	PLAIN	1.25	0.281	0.04	17.5	0.64	OIL
020-079	PLAIN	1.31	0.281	0.04	20.2	0.56	OIL
020-082 **	PLAIN	2.44	0.325	0.032	1.4	0.77	OIL
107-010	PLAIN	10.00	0.087	0.010	0.12	2.80	OIL
107-011	PLAIN	10.00	0.087	0.014	0.50	3.99	OIL
107-020	PLAIN	10.00	0.117	0.012	0.11	3.00	OIL
107-021	PLAIN	10.00	0.117	0.016	0.38	4.00	OIL
107-032	PLAIN	10.00	0.179	0.026	1.39	3.38	OIL
107-031	PLAIN	10.00	0.179	0.018	0.26	2.52	OIL
020-056	PLAIN	10.00	0.179	0.014	0.08	1.97	OIL
107-030	PLAIN	10.00	0.179	0.014	0.08	1.96	OIL
107-033	PLAIN	10.00	0.180	0.035	3.84	6.65	OIL
020-055	PLAIN	10.00	0.235	0.022	0.32	2.44	OIL
107-045	PLAIN	10.00	0.239	0.041	5.83	3.69	OIL
107-042	PLAIN	10.00	0.239	0.026	0.69	2.47	OIL
107-040	PLAIN	10.00	0.240	0.018	0.14	1.71	OIL
107-043	PLAIN	10.00	0.240	0.031	1.46	3.10	OIL
107-046	PLAIN	10.00	0.240	0.047	9.35	4.70	OIL
107-041	PLAIN	10.00	0.241	0.022	0.26	2.53	OIL
107-044	PLAIN	10.00	0.241	0.035	1.82	4.55	OIL
107-054	PLAIN	10.00	0.297	0.047	6.06	3.53	OIL
107-055	PLAIN	10.00	0.298	0.055	11.45	4.40	OIL
107-053	PLAIN	10.00	0.298	0.041	2.88	3.28	OIL
107-050	PLAIN	10.00	0.299	0.022	0.15	2.20	OIL
107-051	PLAIN	10.00	0.300	0.031	0.63	3.41	OIL
107-052	PLAIN	10.00	0.300	0.037	1.35	4.07	OIL
020-054	PLAIN	10.00	0.300	0.022	0.13	2.65	OIL
107-065	PLAIN	10.00	0.360	0.062	12.36	4.03	OIL
107-064	PLAIN	10.00	0.360	0.055	7.03	3.30	OIL
107-062	PLAIN	10.00	0.360	0.043	2.19	3.01	OIL
107-066	PLAIN	10.00	0.361	0.075	27.77	5.25	OIL
107-063	PLAIN	10.00	0.362	0.047	2.67	4.00	OIL
107-061	PLAIN	10.00	0.363	0.035	0.61	3.50	OIL
107-060	PLAIN	10.00	0.363	0.031	0.33	3.41	OIL
107-074	PLAIN	10.00	0.422	0.075	19.81	4.13	OIL
107-072	PLAIN	10.00	0.423	0.055	4.49	3.30	OIL
107-075	PLAIN	10.00	0.424	0.085	31.15	5.10	OIL
107-073	PLAIN	10.00	0.424	0.062	6.90	4.03	OIL
107-070	PLAIN	10.00	0.424	0.035	0.54	2.45	OIL
107-071	PLAIN	10.00	0.424	0.047	1.87	3.29	OIL
107-083	PLAIN	10.00	0.480	0.062	7.11	2.40	OIL
107-084	PLAIN	10.00	0.482	0.075	15.03	3.38	OIL
107-085	PLAIN	10.00	0.484	0.091	32.54	4.55	OIL

Raymond® COMPRESSION SPRINGS (INCH DIMENSIONS)							
PART NUMBER	End Finish	Free Length (in)	Outer Dia. (in)	Wire Diameter (in)	Spring Rate (lbs/in)	Approximate Solid Height (in)	Finish
107-086	PLAIN	10.00	0.486	0.115	91.47	6.33	OIL
107-082	PLAIN	10.00	0.487	0.055	2.33	3.85	OIL
107-081	PLAIN	10.00	0.487	0.047	1.10	3.53	OIL
107-080	PLAIN	10.00	0.488	0.035	0.25	3.15	OIL
020-048	PLAIN	10.00	0.875	0.080	3.40	3.00	OIL
020-052	PLAIN	11.50	0.375	0.047	2.30	4.16	OIL
020-050	PLAIN	11.50	0.625	0.054	1.00	3.65	OIL
020-053	PLAIN	12.00	0.359	0.048	2.20	5.63	OIL
020-051	PLAIN	12.00	0.515	0.062	2.80	5.18	OIL
020-049	PLAIN	12.00	0.734	0.080	3.50	4.97	OIL
107-509-100	PLAIN	18.00	0.472	0.054	2.32	3.89	OIL
107-509-000	PLAIN	18.00	0.475	0.041	0.61	3.32	OIL
107-509-300	PLAIN	18.00	0.536	0.072	5.30	5.18	OIL
107-509-200	PLAIN	18.00	0.541	0.062	1.86	6.42	OIL
107-510-000	PLAIN	18.00	0.593	0.054	1.42	2.92	OIL
107-510-100	PLAIN	18.00	0.657	0.062	1.87	3.35	OIL
107-510-200	PLAIN	18.00	0.660	0.072	3.17	4.21	OIL
107-510-300	PLAIN	18.00	0.662	0.068	2.26	4.28	OIL
107-511-100	PLAIN	18.00	0.778	0.080	3.85	3.60	OIL
107-511-000	PLAIN	18.00	0.779	0.062	1.25	2.79	OIL
107-511-200	PLAIN	18.00	0.839	0.098	7.95	3.97	OIL
107-512-100	PLAIN	18.00	0.907	0.080	2.32	3.53	OIL
107-511-300	PLAIN	18.00	0.910	0.125	14.52	6.19	OIL
107-512-200	PLAIN	18.00	0.961	0.098	5.72	3.44	OIL
107-512-300	PLAIN	18.00	1.020	0.125	13.61	4.50	OIL
107-513-000	PLAIN	18.00	1.025	0.085	2.21	7.29	OIL
107-512-000	PLAIN	18.00	1.093	0.125	7.89	3.60	OIL
107-512-400	PLAIN	18.00	1.095	0.135	9.98	6.19	OIL
107-514-000	PLAIN	18.00	1.143	0.092	2.77	2.84	OIL
107-513-100	PLAIN	18.00	1.148	0.125	9.10	4.50	OIL
107-514-100	PLAIN	18.00	1.349	0.148	12.83	4.46	OIL
107-515-000	PLAIN	18.00	1.597	0.148	8.09	3.99	OIL
107-516-000	PLAIN	18.00	1.814	0.148	4.66	4.66	OIL
020-124	SQUARED & GROUND	0.75	0.953	0.141 X 0.187	1632	0.49	OIL
020-086 **	SQUARED & GROUND	0.78	0.375	0.040	7.3	0.36	PLAIN
020-115	SQUARED & GROUND	0.88	0.719	0.125	559	0.63	OIL
020-060 *	SQUARED & GROUND	0.97	0.500	0.072	59.50	0.54	PLAIN
107-100	SQUARED & GROUND	1.00	0.343	0.042	20.0	0.44	OIL
107-105	SQUARED & GROUND	1.00	0.471	0.062	58.0	0.49	OIL
107-111	SQUARED & GROUND	1.00	0.592	0.072	57.0	0.42	OIL
020-119	SQUARED & GROUND	1.00	0.937	0.207	3015	0.88	PLAIN
020-121	SQUARED & GROUND	1.06	0.688	0.148	1255	0.81	OIL
020-118	SQUARED & GROUND	1.06	1.171	0.225	2487	0.85	OIL
020-117	SQUARED & GROUND	1.25	1.468	0.281 x 0.281	3911	1.21	OIL
107-101	SQUARED & GROUND	1.50	0.341	0.042	14.0	0.65	OIL
107-106	SQUARED & GROUND	1.50	0.468	0.062	42.0	0.69	OIL
107-112	SQUARED & GROUND	1.50	0.595	0.072	34.0	0.59	OIL
020-123	SQUARED & GROUND	1.50	0.600	0.07	38.6	0.56	OIL
020-114	SQUARED & GROUND	1.75	0.750	0.125	221	1.06	OIL
107-102	SQUARED & GROUND	2.00	0.342	0.042	12.0	0.84	OIL
107-107	SQUARED & GROUND	2.00	0.466	0.062	32.0	0.92	OIL
107-113	SQUARED & GROUND	2.00	0.594	0.072	32.0	0.81	OIL
020-065	SQUARED & GROUND	2.00	0.875	0.120	108	1.01	OIL
020-063	SQUARED & GROUND	2.03	0.935	0.080	15.70	0.64	OIL
020-088	SQUARED & GROUND	2.03	0.375	0.047	10.5	0.99	OIL
020-094	SQUARED & GROUND	2.21	0.375	0.062	42	1.15	OIL
107-103	SQUARED & GROUND	2.50	0.342	0.042	8.0	1.03	OIL
107-108	SQUARED & GROUND	2.50	0.468	0.062	25.0	1.05	OIL
020-090	SQUARED & GROUND	2.50	0.469	0.054	11.4	0.92	OIL
020-091	SQUARED & GROUND	2.50	0.500	0.062	18	1.00	OIL

Parts are made of spring steel except where noted
 * Ph. Bronze
 ** Brass

Raymond® COMPRESSION SPRINGS (INCH DIMENSIONS)							
PART NUMBER	End Finish	Free Length (in)	Outer Dia. (in)	Wire Diameter (in)	Spring Rate (lbs/in)	Approximate Solid Height (in)	Finish
107-114	SQUARED & GROUND	2.50	0.591	0.072	26.0	0.92	OIL
020-122	SQUARED & GROUND	2.50	0.995	0.145	129	1.45	OIL
020-062	SQUARED & GROUND	2.56	1.015	0.120	55.44	1.15	OIL
020-066 ***	SQUARED & GROUND	2.59	0.858	0.135	158	1.35	PLAIN
020-089	SQUARED & GROUND	2.63	0.437	0.047	6.6	0.95	OIL
020-072	SQUARED & GROUND	2.63	0.750	0.105	72	1.17	OIL
020-068	SQUARED & GROUND	2.84	0.625	0.080	31	1.08	OIL
107-104	SQUARED & GROUND	3.00	0.345	0.042	6.0	1.21	OIL
107-109	SQUARED & GROUND	3.00	0.469	0.062	24.0	1.24	OIL
107-115	SQUARED & GROUND	3.00	0.593	0.072	20.0	1.07	OIL
020-064	SQUARED & GROUND	3.06	0.875	0.091	20.50	1.09	OIL
107-110	SQUARED & GROUND	3.50	0.466	0.062	18.0	1.50	OIL
107-116	SQUARED & GROUND	3.50	0.586	0.072	18.0	1.28	OIL
107-117	SQUARED & GROUND	4.00	0.591	0.072	16.0	1.60	OIL
020-067	SQUARED & GROUND	4.06	0.687	0.105	53.7	1.95	OIL
020-109 *	SQUARED & GROUND	4.38	0.562	0.102	41.2	2.34	PLAIN
020-125 ***	SQUARED UNGROUND	0.62	0.120	0.016	6.6	0.25	PLAIN
020-126 ***	SQUARED UNGROUND	0.75	0.120	0.016	5.3	0.30	PLAIN
020-127 ***	SQUARED UNGROUND	0.75	0.180	0.022	8.7	0.28	PLAIN
020-085 *	SQUARED UNGROUND	0.88	0.312	0.025	2.6	0.20	PLAIN
020-087 *	SQUARED UNGROUND	0.91	0.531	0.072	56	0.52	PLAIN
020-128 ***	SQUARED UNGROUND	1.00	0.180	0.022	6.5	0.35	PLAIN
020-131 ***	SQUARED UNGROUND	1.00	0.240	0.026	7.4	0.31	PLAIN
020-059	SQUARED UNGROUND	1.03	0.531	0.105	491.00	0.80	OIL
020-129 ***	SQUARED UNGROUND	1.12	0.180	0.022	5.8	0.33	PLAIN
020-130 ***	SQUARED UNGROUND	1.25	0.180	0.022	5.2	0.42	PLAIN
020-132 ***	SQUARED UNGROUND	1.25	0.240	0.026	5.9	0.40	PLAIN
020-120	SQUARED UNGROUND	1.25	1.312	0.125	120	0.59	OIL
020-083 **	SQUARED UNGROUND	1.44	0.312	0.028	0.958	0.67	PLAIN
020-133 ***	SQUARED UNGROUND	1.50	0.240	0.026	4.9	0.45	PLAIN
020-134 ***	SQUARED UNGROUND	1.50	0.360	0.035	7.3	0.42	PLAIN
020-135 ***	SQUARED UNGROUND	1.75	0.360	0.035	6.3	0.45	PLAIN
020-081	SQUARED UNGROUND	1.97	0.312	0.022	0.66	0.53	OIL
020-136 ***	SQUARED UNGROUND	2.00	0.360	0.035	5.4	0.56	PLAIN
020-093	SQUARED UNGROUND	2.00	0.437	0.054	14.5	0.97	OIL
020-098 *	SQUARED UNGROUND	2.06	0.281	0.020	0.31	0.51	PLAIN
020-092	SQUARED UNGROUND	2.06	0.500	0.047	5.4	0.81	OIL
020-069	SQUARED UNGROUND	2.19	0.590	0.041	3.8	0.38	OIL
020-071	SQUARED UNGROUND	2.56	0.437	0.041	2.7	1.12	OIL
020-047	SQUARED UNGROUND	12.00	0.875	0.105	8.00	5.23	OIL

Raymond® MISCELLANEOUS COMPRESSION SPRINGS (INCH DIMENSIONS)								
PART NUMBER	Style	Material	Ends	Body Diameter (in)	Wire Diameter (in)	Free Length (in)	Approximate Solid Height (in)	Spring Rate (lbs/in)
020-061	Barrell Compression Spring	Spring Steel	Plain	0.531 - 1.031 - 0.859	0.051	3.50	0.71	1.8
020-057	Conical Compression Spring	Ph. Bronze	Plain	0.656 - 0.937	0.057	0.94	0.30	6.0
020-058	Conical Compression Spring	Brass	Plain	0.625 - 0.750	0.080	1.00	0.51	31.0
020-078	Conical Compression Spring	Spring Steel	Plain	0.156 - 0.281	0.013	0.50	0.07	0.8



Extension Springs

Raymond® EXTENSION SPRINGS (METRIC DIMENSIONS)								
PART NUMBER	Free Length (mm)	Body Diameter (mm)	Wire Diameter (mm)	Reference Extension Length (mm)	Approximate Load @ Reference Length (N)	Spring Rate (N/mm)	Finish	End Configuration
020-137	16	3.05	0.41	27	7.52	0.56	Zinc Plate	FULL TWIST LOOPS
020-138	19	3.05	0.41	34	8.45	0.49	Zinc Plate	FULL TWIST LOOPS
020-139	22	3.05	0.41	41	7.74	0.35	Zinc Plate	FULL TWIST LOOPS
020-140	25	4.57	0.56	47	12.32	0.48	Zinc Plate	FULL TWIST LOOPS
020-042	25	4.76	0.36	38	0.62	0.03	OIL	NONE
020-039 **	27	7.52	1.02	30	11.61	1.37	PLAIN	FULL TWIST LOOPS
020-040	28	5.95	0.51	41	2.36	0.12	OIL	FULL TWIST LOOPS
020-141	28	4.57	0.56	54	13.21	0.45	Zinc Plate	FULL TWIST LOOPS
020-142	32	4.57	0.56	62	12.45	0.36	Zinc Plate	FULL TWIST LOOPS
020-037	34	8.73	1.21	44	37.99	2.82	OIL	MACHINE HALF LOOP - OPEN
020-143	35	6.10	0.66	75	14.28	0.30	Zinc Plate	FULL TWIST LOOPS
020-144	38	6.10	0.66	75	12.90	0.29	Zinc Plate	FULL TWIST LOOPS
020-146	38	9.14	0.94	78	26.24	0.57	Zinc Plate	FULL TWIST LOOPS
020-034	41	12.70	2.03	48	116.09	12.65	OIL	MACHINE HALF LOOP - OPEN
020-145	44	6.10	0.66	100	14.28	0.22	Zinc Plate	FULL TWIST LOOPS
020-147	44	9.14	0.94	96	27.09	0.46	Zinc Plate	FULL TWIST LOOPS
020-095	45	18.24	2.67	58	253.54	15.76	OIL	MACHINE HALF LOOP - OPEN
020-148	51	9.14	0.94	113	26.69	0.37	Zinc Plate	FULL TWIST LOOPS
020-035 **	51	3.97	0.51	71	3.29	0.09	PLAIN	FULL TWIST LOOPS
020-032	60	19.05	2.67	70	131.22	6.83	OIL	MACHINE HALF LOOP - OPEN
020-033	64	19.05	2.03	89	63.61	1.80	OIL	MACHINE HALF LOOP - OPEN
020-097	71	18.24	2.67	96	317.36	10.22	OIL	MACHINE HALF LOOP - OPEN
020-019	81	9.53	1.04	106	14.46	0.31	OIL	FULL TWIST LOOPS
020-099	93	17.45	2.67	106	137.89	5.60	OIL	MACHINE HALF LOOP - OPEN
020-113	96	15.88	2.87	121	411.08	11.98	OIL	FULL TWIST LOOPS
020-024	96	18.24	2.67	127	197.05	4.92	OIL	MACHINE HALF LOOP - OPEN
020-023	101	18.65	1.57	119	12.23	0.29	OIL	FULL TWIST LOOPS
020-020	102	6.35	0.71	127	5.12	0.11	OIL	FULL TWIST LOOPS
020-022	111	12.29	1.57	162	62.27	0.85	OIL	MACHINE HALF LOOP - OPEN
020-026	125	7.95	1.04	165	17.39	0.32	OIL	FULL TWIST LOOPS
020-028	130	11.10	1.57	156	45.81	1.00	OIL	FULL TWIST LOOPS
020-025	133	13.49	1.57	159	37.81	0.88	BLACK DYKEM	SWIVEL HOOKS - OPEN
020-018	134	6.15	1.04	159	29.89	0.75	OIL	FULL TWIST LOOPS
020-027	134	8.74	1.19	185	32.25	0.46	OIL	FULL TWIST LOOPS
020-013	136	14.27	2.03	161	74.82	1.58	OIL	MACHINE HALF LOOP - OPEN
020-014	137	9.53	1.37	162	34.29	0.71	OIL	FULL TWIST LOOPS
020-012	139	13.87	2.03	190	106.75	1.75	OIL	FULL TWIST LOOPS
020-029	144	22.23	3.05	169	155.68	3.11	OIL	MACHINE HALF LOOP - OPEN
020-017	145	6.35	0.71	202	7.47	0.08	OIL	FULL TWIST LOOPS
020-015	146	7.54	1.19	171	25.58	0.72	OIL	SIDE LOOPS
020-112	149	18.65	1.57	200	14.77	0.16	OIL	MACHINE HALF LOOP - OPEN
020-016	154	6.73	0.89	179	10.45	0.19	OIL	SIDE LOOPS
020-111	155	19.05	2.03	205	49.37	0.58	OIL	FULL TWIST LOOPS
020-010	163	8.33	0.89	189	5.83	0.09	OIL	FULL TWIST LOOPS
020-009	163	11.10	1.19	212	18.68	0.19	OIL	FULL TWIST LOOPS
020-116	167	23.02	2.31	192	36.21	0.55	OIL	FULL TWIST LOOPS
020-011	168	3.96	0.66	219	15.43	0.21	OIL	FULL TWIST LOOPS
020-104	183	31.75	5.26	209	723.69	15.35	OIL	MACHINE HALF LOOP - OPEN
020-030	196	26.97	3.43	222	133.44	2.14	OIL	MACHINE HALF LOOP - OPEN

Parts are made of Spring Steel Except Where Noted
 ** Brass

Raymond® EXTENSION SPRINGS (METRIC DIMENSIONS)								
PART NUMBER	Free Length (mm)	Body Diameter (mm)	Wire Diameter (mm)	Reference Extension Length (mm)	Approximate Load @ Reference Length (N)	Spring Rate (N/mm)	Finish	End Configuration
020-031	204	25.40	2.67	255	74.50	0.68	OIL	MACHINE HALF LOOP - OPEN
020-007	206	8.71	1.19	232	20.02	0.30	OIL	FULL TWIST LOOPS
020-105	208	46.02	6.35	259	863.45	11.22	OIL	MACHINE HALF LOOP - OPEN
020-008	230	4.37	0.71	283	15.57	0.18	OIL	FULL TWIST LOOPS
020-100	246	28.58	3.77	272	157.90	2.36	OIL	MACHINE HALF LOOP - OPEN
020-001	249	22.23	2.31	326	50.97	0.38	OIL	MACHINE HALF LOOP - OPEN
020-002	250	20.62	1.83	301	24.91	0.13	OIL	MACHINE HALF LOOP - OPEN
020-004	251	12.70	1.57	276	28.91	0.30	OIL	FULL TWIST LOOPS
020-005	251	9.13	1.37	327	49.02	0.44	OIL	FULL TWIST LOOPS
020-006	254	9.53	1.19	330	23.49	0.23	OIL	FULL TWIST LOOPS
020-003	254	15.88	1.83	330	39.14	0.32	OIL	FULL TWIST LOOPS
020-101	297	31.75	4.11	373	293.57	2.28	OIL	MACHINE HALF LOOP - OPEN
020-102	347	34.93	4.50	372	120.10	2.63	OIL	MACHINE HALF LOOP - OPEN
020-158	384	24.99	2.03	410	13.12	0.08	OIL	MACHINE HALF LOOP - OPEN
020-103	396	39.62	5.26	449	350.15	2.81	OIL	MACHINE HALF LOOP - OPEN
020-108	401	28.58	2.67	452	37.59	0.21	OIL	DOUBLE TWIST LOOP
020-156	403	11.10	1.83	428	52.13	0.65	OIL	FULL TWIST LOOPS
020-154	404	9.53	1.37	429	22.02	0.23	OIL	DOUBLE TWIST LOOP
020-152	406	7.52	1.04	432	11.74	0.11	OIL	DOUBLE TWIST LOOP
020-153	406	8.74	1.19	457	16.32	0.15	OIL	DOUBLE TWIST LOOP
020-155	406	10.69	1.57	432	30.69	0.39	OIL	DOUBLE TWIST LOOP

Associated Spring Raymond

has capabilities well beyond the catalog components shown. We supply custom components and functional assemblies. If you simply need a Raymond® die spring or other spring type with a different finish this can be easily done.

Some common finishes are:

- Plain
- Dacromet®
- Geomet®
- Zinc
- Black Oxide
- Temperature Indicating
- Teflon®

Additional catalogs are available for other catalog stocked parts for:



CloverDome

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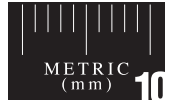


Our engineers can also customize the dimensions and/or rates for your OEM or aftermarket application based on the design constraints. Even further we can design and supply functional sub-assemblies for new designs or cost reduction efforts. Contact Associated Spring Raymond to learn more about the possibilities for your application:

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Raymond® COMPRESSION SPRINGS (METRIC DIMENSIONS)							
PART NUMBER	End Finish	Free Length (mm)	Outer Dia. (mm)	Wire Diameter (mm)	Spring Rate (N/mm)	Approximate Solid Height (mm)	Finish
020-077	PLAIN	5.6	4.37	0.30	0.2	2.7	OIL
020-074	PLAIN	13.5	1.98	0.30	1.1	5.6	OIL
020-073	PLAIN	14.3	1.98	0.28	0.6	5.9	OIL
020-076	PLAIN	20.6	2.78	0.46	2.2	7.9	OIL
020-075	PLAIN	23.0	2.78	0.46	1.7	9.7	OIL
020-084	PLAIN	23.8	4.75	0.30	0.1	6.1	OIL
020-070 **	PLAIN	27.8	21.41	2.03	2.7	11.2	PLAIN
020-080	PLAIN	31.8	7.14	1.02	3.1	16.3	OIL
020-079	PLAIN	33.3	7.14	1.02	3.5	14.2	OIL
020-082 **	PLAIN	61.9	8.26	0.81	0.2	19.5	OIL
107-010	PLAIN	254.0	2.20	0.25	0.0	71.1	OIL
107-011	PLAIN	254.0	2.21	0.36	0.1	101.3	OIL
107-020	PLAIN	254.0	2.97	0.30	0.0	76.2	OIL
107-021	PLAIN	254.0	2.97	0.41	0.1	101.6	OIL
107-032	PLAIN	254.0	4.53	0.66	0.2	85.9	OIL
107-031	PLAIN	254.0	4.54	0.46	0.0	64.0	OIL
020-056	PLAIN	254.0	4.55	0.36	0.0	50.0	OIL
107-030	PLAIN	254.0	4.55	0.36	0.0	49.8	OIL
107-033	PLAIN	254.0	4.57	0.89	0.7	168.9	OIL
020-055	PLAIN	254.0	5.97	0.56	0.1	62.0	OIL
107-045	PLAIN	254.0	6.07	1.04	1.0	93.7	OIL
107-042	PLAIN	254.0	6.08	0.66	0.1	62.7	OIL
107-040	PLAIN	254.0	6.09	0.46	0.0	43.4	OIL
107-043	PLAIN	254.0	6.09	0.79	0.3	78.7	OIL
107-046	PLAIN	254.0	6.10	1.19	1.6	119.4	OIL
107-041	PLAIN	254.0	6.12	0.56	0.0	64.3	OIL
107-044	PLAIN	254.0	6.13	0.89	0.3	115.6	OIL
107-054	PLAIN	254.0	7.55	1.19	1.1	89.7	OIL
107-055	PLAIN	254.0	7.57	1.40	2.0	111.8	OIL
107-053	PLAIN	254.0	7.57	1.04	0.5	83.3	OIL
107-050	PLAIN	254.0	7.61	0.56	0.0	55.9	OIL
107-051	PLAIN	254.0	7.62	0.79	0.1	86.6	OIL
107-052	PLAIN	254.0	7.62	0.94	0.2	103.4	OIL
020-054	PLAIN	254.0	7.62	0.56	0.0	67.3	OIL
107-065	PLAIN	254.0	9.14	1.57	2.2	102.4	OIL
107-064	PLAIN	254.0	9.14	1.40	1.2	83.8	OIL
107-062	PLAIN	254.0	9.16	1.09	0.4	76.5	OIL
107-066	PLAIN	254.0	9.17	1.91	4.9	133.4	OIL
107-063	PLAIN	254.0	9.20	1.19	0.5	101.6	OIL
107-061	PLAIN	254.0	9.22	0.89	0.1	88.9	OIL
107-060	PLAIN	254.0	9.23	0.79	0.1	86.6	OIL
107-074	PLAIN	254.0	10.72	1.91	3.5	104.8	OIL
107-072	PLAIN	254.0	10.73	1.40	0.8	83.8	OIL
107-075	PLAIN	254.0	10.76	2.16	5.5	129.5	OIL
107-073	PLAIN	254.0	10.76	1.57	1.2	102.4	OIL
107-070	PLAIN	254.0	10.77	0.89	0.1	62.2	OIL
107-071	PLAIN	254.0	10.78	1.19	0.3	83.6	OIL
107-083	PLAIN	254.0	12.18	1.57	1.2	61.0	OIL
107-084	PLAIN	254.0	12.23	1.91	2.6	85.7	OIL
107-085	PLAIN	254.0	12.29	2.31	5.7	115.6	OIL

Raymond® COMPRESSION SPRINGS (METRIC DIMENSIONS)							
PART NUMBER	End Finish	Free Length (mm)	Outer Dia. (mm)	Wire Diameter (mm)	Spring Rate (N/mm)	Approximate Solid Height (mm)	Finish
107-086	PLAIN	254.0	12.33	2.92	16.0	160.7	OIL
107-082	PLAIN	254.0	12.37	1.40	0.4	97.8	OIL
107-081	PLAIN	254.0	12.38	1.19	0.2	89.7	OIL
107-080	PLAIN	254.0	12.40	0.89	0.0	80.0	OIL
020-048	PLAIN	254.0	22.23	2.03	0.6	76.2	OIL
020-052	PLAIN	292.1	9.53	1.19	0.4	105.7	OIL
020-050	PLAIN	292.1	15.88	1.37	0.2	92.7	OIL
020-053	PLAIN	304.8	9.13	1.21	0.4	143.0	OIL
020-051	PLAIN	304.8	13.08	1.57	0.5	131.6	OIL
020-049	PLAIN	304.8	18.65	2.03	0.6	126.2	OIL
107-509-100	PLAIN	457.2	11.99	1.37	0.4	98.8	OIL
107-509-000	PLAIN	457.2	12.06	1.04	0.1	84.3	OIL
107-509-300	PLAIN	457.2	13.61	1.83	0.9	131.6	OIL
107-509-200	PLAIN	457.2	13.74	1.57	0.3	163.1	OIL
107-510-000	PLAIN	457.2	15.07	1.37	0.2	74.2	OIL
107-510-100	PLAIN	457.2	16.69	1.57	0.3	85.1	OIL
107-510-200	PLAIN	457.2	16.76	1.83	0.6	106.9	OIL
107-510-300	PLAIN	457.2	16.81	1.73	0.4	108.7	OIL
107-511-100	PLAIN	457.2	19.76	2.03	0.7	91.4	OIL
107-511-000	PLAIN	457.2	19.79	1.57	0.2	70.9	OIL
107-511-200	PLAIN	457.2	21.31	2.49	1.4	100.8	OIL
107-512-100	PLAIN	457.2	23.03	2.03	0.4	89.7	OIL
107-511-300	PLAIN	457.2	23.11	3.18	2.5	157.2	OIL
107-512-200	PLAIN	457.2	24.42	2.49	1.0	87.4	OIL
107-512-300	PLAIN	457.2	25.90	3.18	2.4	114.3	OIL
107-513-000	PLAIN	457.2	26.03	2.16	0.4	185.2	OIL
107-512-000	PLAIN	457.2	27.77	3.18	1.4	91.4	OIL
107-512-400	PLAIN	457.2	27.83	3.43	1.7	157.2	OIL
107-514-000	PLAIN	457.2	29.04	2.34	0.5	72.1	OIL
107-513-100	PLAIN	457.2	29.17	3.18	1.6	114.3	OIL
107-514-100	PLAIN	457.2	34.27	3.76	2.2	113.3	OIL
107-515-000	PLAIN	457.2	40.57	3.76	1.4	101.3	OIL
107-516-000	PLAIN	457.2	46.08	3.76	0.8	118.4	OIL
020-124	SQUARED & GROUND	19.1	24.21	3.6 x 4.7	285.8	12.5	OIL
020-086 **	SQUARED & GROUND	19.8	9.53	1.02	1.3	9.1	PLAIN
020-115	SQUARED & GROUND	22.4	18.26	3.18	97.9	15.9	OIL
020-060 *	SQUARED & GROUND	24.6	12.70	1.83	10.4	13.7	PLAIN
107-100	SQUARED & GROUND	25.4	8.71	1.07	3.5	11.2	OIL
107-105	SQUARED & GROUND	25.4	11.96	1.57	10.2	12.4	OIL
107-111	SQUARED & GROUND	25.4	15.04	1.83	10.0	10.7	OIL
020-119	SQUARED & GROUND	25.4	23.80	5.26	528.0	22.4	PLAIN
020-121	SQUARED & GROUND	27.0	17.46	3.76	219.8	20.7	OIL
020-118	SQUARED & GROUND	27.0	29.74	5.72	435.5	21.5	OIL
020-117	SQUARED & GROUND	31.8	37.29	7.1 x 7.1	684.9	30.7	OIL
107-101	SQUARED & GROUND	38.1	8.66	1.07	2.5	16.5	OIL
107-106	SQUARED & GROUND	38.1	11.89	1.57	7.4	17.5	OIL
107-112	SQUARED & GROUND	38.1	15.11	1.83	6.0	14.9	OIL
020-123	SQUARED & GROUND	38.1	15.24	1.78	6.8	14.2	OIL
020-114	SQUARED & GROUND	44.5	19.05	3.18	38.7	27.0	OIL
107-102	SQUARED & GROUND	50.8	8.69	1.07	2.1	21.3	OIL
107-107	SQUARED & GROUND	50.8	11.84	1.57	5.6	23.2	OIL
107-113	SQUARED & GROUND	50.8	15.09	1.83	5.6	20.6	OIL
020-065	SQUARED & GROUND	50.8	22.23	3.05	18.9	25.7	OIL
020-063	SQUARED & GROUND	51.6	23.75	2.03	2.7	16.3	OIL
020-088	SQUARED & GROUND	51.6	9.53	1.19	1.8	25.1	OIL
020-094	SQUARED & GROUND	56.1	9.53	1.57	7.4	29.1	OIL
107-103	SQUARED & GROUND	63.5	8.69	1.07	1.4	26.2	OIL
107-108	SQUARED & GROUND	63.5	11.89	1.57	4.4	26.7	OIL
020-090	SQUARED & GROUND	63.5	11.91	1.37	2.0	23.3	OIL
020-091	SQUARED & GROUND	63.5	12.70	1.57	3.2	25.4	OIL

Raymond® COMPRESSION SPRINGS (METRIC DIMENSIONS)							
PART NUMBER	End Finish	Free Length (mm)	Outer Dia. (mm)	Wire Diameter (mm)	Spring Rate (N/mm)	Approximate Solid Height (mm)	Finish
107-114	SQUARED & GROUND	63.5	15.01	1.83	4.6	23.4	OIL
020-122	SQUARED & GROUND	63.5	25.27	3.68	22.6	36.8	OIL
020-062	SQUARED & GROUND	65.1	25.78	3.05	9.7	29.2	OIL
020-066 ***	SQUARED & GROUND	65.9	21.79	3.43	27.7	34.3	PLAIN
020-089	SQUARED & GROUND	66.7	11.10	1.19	1.2	24.1	OIL
020-072	SQUARED & GROUND	66.7	19.05	2.67	12.6	29.6	OIL
020-068	SQUARED & GROUND	72.2	15.88	2.03	5.4	27.4	OIL
107-104	SQUARED & GROUND	76.2	8.76	1.07	1.1	30.7	OIL
107-109	SQUARED & GROUND	76.2	11.91	1.57	4.2	31.4	OIL
107-115	SQUARED & GROUND	76.2	15.06	1.83	3.5	27.2	OIL
020-064	SQUARED & GROUND	77.7	22.23	2.31	3.6	27.7	OIL
107-110	SQUARED & GROUND	88.9	11.84	1.57	3.2	38.1	OIL
107-116	SQUARED & GROUND	88.9	14.88	1.83	3.2	32.5	OIL
107-117	SQUARED & GROUND	101.6	15.01	1.83	2.8	40.6	OIL
020-067	SQUARED & GROUND	103.2	17.45	2.67	9.4	49.6	OIL
020-109 *	SQUARED & GROUND	111.3	14.27	2.59	7.2	59.5	PLAIN
020-125 ***	SQUARED UNGROUND	15.7	3.05	0.41	1.2	6.4	PLAIN
020-126 ***	SQUARED UNGROUND	19.1	3.05	0.41	0.9	7.7	PLAIN
020-127 ***	SQUARED UNGROUND	19.1	4.57	0.56	1.5	7.1	PLAIN
020-085 *	SQUARED UNGROUND	22.4	7.92	0.64	0.5	5.1	PLAIN
020-087 *	SQUARED UNGROUND	23.0	13.49	1.83	9.8	13.3	PLAIN
020-128 ***	SQUARED UNGROUND	25.4	4.57	0.56	1.1	8.9	PLAIN
020-131 ***	SQUARED UNGROUND	25.4	6.10	0.66	1.3	7.8	PLAIN
020-059	SQUARED UNGROUND	26.2	13.49	2.67	86.0	20.3	OIL
020-129 ***	SQUARED UNGROUND	28.4	4.57	0.56	1.0	8.4	PLAIN
020-130 ***	SQUARED UNGROUND	31.8	4.57	0.56	0.9	10.8	PLAIN
020-132 ***	SQUARED UNGROUND	31.8	6.10	0.66	1.0	10.2	PLAIN
020-120	SQUARED UNGROUND	31.8	33.32	3.18	21.0	15.0	OIL
020-083 **	SQUARED UNGROUND	36.5	7.92	0.71	0.2	17.1	PLAIN
020-133 ***	SQUARED UNGROUND	38.1	6.10	0.66	0.9	11.3	PLAIN
020-134 ***	SQUARED UNGROUND	38.1	9.14	0.89	1.3	10.6	PLAIN
020-135 ***	SQUARED UNGROUND	44.5	9.14	0.89	1.1	11.3	PLAIN
020-081	SQUARED UNGROUND	50.0	7.92	0.56	0.1	13.4	OIL
020-136 ***	SQUARED UNGROUND	50.8	9.14	0.89	0.9	14.2	PLAIN
020-093	SQUARED UNGROUND	50.8	11.10	1.37	2.5	24.7	OIL
020-098 *	SQUARED UNGROUND	52.3	7.14	0.51	0.1	13.0	PLAIN
020-092	SQUARED UNGROUND	52.3	12.70	1.19	0.9	20.5	OIL
020-069	SQUARED UNGROUND	55.7	14.99	1.04	0.7	9.7	OIL
020-071	SQUARED UNGROUND	65.1	11.10	1.04	0.5	28.4	OIL
020-047	SQUARED UNGROUND	304.8	22.23	2.67	1.4	132.8	OIL

Raymond® MISCELLANEOUS COMPRESSION SPRINGS (METRIC DIMENSIONS)								
PART NUMBER	Style	Material	Ends	Body Diameter (mm)	Wire Diameter (mm)	Free Length (mm)	Approximate Solid Height (mm)	Spring Rate (N/mm)
020-061	Barrell Compression Spring	Spring Steel	Plain	13.5 - 26.2 - 21.8	1.30	88.9	18.1	0.32
020-057	Conical Compression Spring	Ph. Bronze	Plain	16.7 - 23.8	1.45	23.9	7.6	1.05
020-058	Conical Compression Spring	Brass	Plain	15.9 - 19.05	2.03	25.4	13.0	5.43
020-078	Conical Compression Spring	Spring Steel	Plain	4.0 - 7.1	0.33	12.7	1.8	0.14

Parts are made of Spring Steel Except Where Noted
 * Ph. Bronze
 ** Brass
 *** Stainless Steel



Associated Spring Raymond now offers a proprietary line of mechanical coil spring struts. We designed our struts to meet demanding, maintenance free applications where conventional gas struts fail. Made of corrosion-resistant stainless steel, and unlike gas and pneumatic models, our struts have no internal gases or seals to fail.



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Typical Applications:

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- Heating, Ventilation & Aeration
- Motion Control & Dampening
- Clean Room

Typical Industries:

- Automotive
- Medical, Pharmaceutical & Chemical
- Marine
- Defense
- Nuclear
- Agriculture & Construction

Patents 6,773,002, 7,066,455 and 7,174,804

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