Material Specifications and Tolerances

Stock Spring Material Specifications:

Steel springs up to 0.062:
Music wire (ASTM A228/QQW-470).
Steel springs over 0.062:
either Music wire or Oil Tempered material as available.

Stainless Steel springs up to 0.062:
302 stainless (ASTM 313/QQW423).
Stainless Steel springs over 0.062:
either 302 Stainless or 316 Stainless as available.

NOTE: Unlike annealed stainless, spring tempered stainless is somewhat magnetic.

COMMON MATERIALS

	Custom Springs	Stock Springs
Carbon Steels: (All have similar stiffness)		
Music Wire: Very high quality carbon steel spring wire. Standard on springs with wire diameters below .135	☐	☐
Oil Temper: High quality, more economical steel spring wire. Standard on springs with wire diameters .135 and greater.	☐	☐
Chrome Silicon/Chrome Vanadium: High strength (about 25% higher than music wire). Available in valve and commercial qualities; but not as readily available as music wire. These steels are also more susceptible to hydrogen embrittlement, and must be heat treated promptly after forming.	☐	*
Stainless Steels (All about 83% as stiff as carbon steels)		
302 SS: Industry standard, very high quality stainless steel. Unlike annealed 300 series steels, spring tempered 302 steel is slightly magnetic.	☐	☐
316 SS: Less readily available than 302. Provides better corrosion in salt water. Unlike annealed 300 series steels, spring tempered 302 steel is slightly magnetic.	☐	*
17-7PH: A more expensive stainless that tolerates higher temperatures.	☐	*
Non-Ferrous Materials (Varying stiffness and strength)		
Inconel: Corrosion resistant, tolerates high temperatures, and is non-magnetic.	☐	*
Beryllium Copper: Used for electrical conductivity, where springs do not need to be as stiff as steel.	☐	*

* Special Order

Outside and Inside Diameters:

The outside diameter is always the inside diameter plus two times the wire diameter.
To determine "fits in hole" sizes, add twice the tolerance to the Outside diameter.
To determine "fits on rod" sizes, subtract twice the tolerance from the Inside diameter.

Diameter	Tolerance	Diameter	Tolerance
0.051 - 0.075	+/- 0.003	0.501 - 1.000	+/- 0.015
0.076 - 0.113	+/- 0.004	1.001 - 1.225	+/- 0.020
0.114 - 0.240	+/- 0.005	1.226 - 1.460	+/- 0.030
0.241 - 0.500	+/- 0.008	1.461 - 2.000	+/- 0.040

Spring Rates and Loads:

All Stock springs have a tolerance of +/- 10% on spring rates and loads.

The amount of change in the load for a given deflection (change in length) can be calculated easily. Just multiply the spring rate by the change in the length.

Extension springs also have an "initial tension" that holds the coils together (so that the spring doesn't flop over when held at one end). The initial tension must be overcome before the spring will move. If you need details, call.

Free Lengths:

Free Length tolerances are relatively large to allow for variations in material properties.

Free Length	Tolerance	Free Length	Tolerance
0.000 - 0.500	+/- 0.015	2.001 - 4.000	+/- 0.050
0.501 - 1.000	+/- 0.020	4.001 - 8.000	+/- 0.093
1.001 - 2.000	+/- 0.030	8.001 - 10.000	+/- 0.156

End Treatments:

Stock compression springs with wire diameters over 0.012 have their ends ground to provide a flat, square (within 3 degrees) load bearing surface. Stock compression springs with wire diameters of 0.012 or less are closed; but not ground.

Stock Extension springs have loops that are the same diameter as the body of the spring. They are formed over the center of the spring, and are normally in line within 20 degrees. Springs with specified loop openings or specified loop orientation are special orders.

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Have you been converting your own part numbers to a stock spring so that you can get a lower price?
Call us, we'll take orders to your part number, give you stock spring prices, plus report both numbers on every packing slip and invoice.