Suhm Spring Works

Materials

Suhm purchases only the highest quality material, because the superior caliber of each spring produced depends on it. Suhm keeps over 52,000 square feet of popular and exotic raw materials in stock to ensure prompt delivery of your order. Many sizes of virtually all materials listed in the Wire Properties Chart are held in inventory.

Wire Properties Chart

The following chart is a general spring design reference. Because this chart is only a simple reference, and every spring application has its own particular parameters, we suggest you contact a Suhm sales staff member for more information on spring design application and customization.

The Suhm Spring Materials: Sizes and Strength Values book, which consists of the information in this chart along with sizes and tensile strengths for most materials, is available by contacting a Suhm sales staff member.

Material	Material Properties	Maximum Working Temp.	Ultimate Tensile Range (ksi min)	Modulus of Elasticity	Approx. Design % of Ultimate Tensile (torsional)	Common Sizes (inches)
Alloy Steel						
Music Wire ASTM A228 UNS K08500 & G10860	Cold drawn. Constant tensile strength. High-quality and good for high cycle spring applications.	250°F	449/230	(E) 30 (G) 11.5	45%	.012" to .250"
High Carbon Steel Wire/bar						
Oil Tempered Wire, Class I ASTM A229 UNS K07001 & G10650	Cold drawn. All purpose spring material. Heat treated before fabrication. Susceptible to hydrogen embrittlement when plated.	250°F	323/125 (class I)	(E) 30 (G) 11.5	45%	.032" to .625"
Chrome Vanadium ASTM A-231 Valve Quality: ASTM A-232 AMS 6450	Cold drawn. Good for shock loads and medium elevated temperature applications. Susceptible to hydrogen embrittlement when plated.	425°F	325/190	(E) 30 (G) 11.5	45%	.043" to .500"
Chrome Silicon Wire ASTM A401 UNS G92540	Cold drawn. Good for shock loads and medium elevated temperature applications. Susceptible to hydrogen embrittlement when plated.	475°F	300/226	(E) 30 (G) 11.5	45%	.024" to .438"

Material	Material Properties	Maximum Working Temp.	Ultimate Tensile Range (ksi min)	Modulus of Elasticity	Approx. Design % of Ultimate Tensile (torsional)	Common Sizes (inches)
Hot Rolled Alloy Bar						
5160-H .468" to 1.25" ASTM A689, A29 UNS G516000	Hot-rolled special bar quality, fine grained. Good fatigue life.	400°F	242/211	(E) 29 (G) 10.5	45%	.468" to 1.250"
51B60-H 1.25" to 1.937" ASTM A689, A29 UNS 51601	Hot-rolled special bar quality, fine grained. Good fatigue life.	400°F	242/211	(E) 30 (G) 11.0	45%	1.250" to 1.937"
4161-H 2.00" to 2.875" ASTM A689, A29 UNS 41610	Hot-rolled special bar quality, fine grained. Good fatigue life.	400°F	242/211	(E) 30 (G) 11.0	45%	2.00" to 2.875"
Stainless Steel						
AISI 302/304 Stainless Steel Wire ASTM A313 AMS 5688 UNS S30200	Cold drawn. Low cost. Good for general purpose corrosion and elevated temperature applications. Has some magnetism in a spring temper.	500°F	325/130	(E)28 (G)9.8	40%	.015" to .500"
AISI 316 Stainless Steel Wire ASTM A313 UNS S31600	Cold drawn. Better corrosion resistance than 302/304. Good for elevated temperatures. No magnetism.	550°F	245/110	(E) 28 (G) 9.8	40%	.017" to .500"
T-316 SS Bar ASTM A276 Cond B UNS S31600	Cold drawn. Better corrosion resistance than 302/304. Good for elevated temperatures. No magnetism.	550°F	245/110	(E) 28 (G) 9.8	40%	.562" to 1.750"
17-7PH Stainless Steel Wire ASTM A313 AMS 5678 UNS S17700	Age hardened. High tensile strength. Good for general corrosion resistance. No magnetism.	550°F	365/230	(E) 29 (G) 11.0	45%	.017" to .562"
17-4PH Bar ASTM A564 UNS S17400	Age hardened. High tensile strength. Good for general corrosion resistance. No magnetism.	550°F	365/230	(E) 29 (G) 11.2	45%	.562" to 2.875"
Alloy 20 Spring Tempered Wire ASTM B473 UNS N08020	Excellent mechanical properties and easily fabricated. Moderate to good corrosion resistance. Used extensively in petrochemical and refining applications.	-	200/125	(E) 29 (G) 10.9	45%	.025" to .362"
A-286 Spring Tempered Wire AMS 5734 and others UNS S66286	Age hardened. Good corrosion resistance. Good for use in elevated temperature applications. No magnetism.	900°F	200/160	(E) 29.1 (G) 10.4	45%	.040" to .295"

Material	Material Properties	Maximum Working Temp.	Ultimate Tensile Range (ksi min)	Modulus of Elasticity	Approx. Design % of Ultimate Tensile (torsional)	Common Sizes (inches)
Copper Base Alloy						
Phosphor Bronze Wire Grade A ASTM B159 H08 UNS C51000	Cold drawn. Good electrical conductivity. Good corrosion resistance.	200°F	145/105	(E) 15 (G) 6.25	40%	.010" to .468"
Beryllium Copper Wire ASTM B197	Cold drawn. Good electrical conductivity. Good corrosion resistance	400°F	230/150	(E) 18.5 (G) 7.2	45%	.010" to .468"
Nickel Base Alloy Wire/bar						
Inconel X-750 Spring Tempered Wire AMS 5698, AMS 5699 UNS N07750	Cold drawn, age hardened. Good corrosion resistance. Good for use in elevated temperature applications. Good for use in Sour-Gas applications.	700°F	230/180	(E) 29 (G) 11.2	45%	.005" to .750"
Inconel X-750 Bar ASTM B637 UNS N07500	Cold drawn. Good corrosion resistance. Good for use in elevated temperature applications. Good for use in Sour-Gas applications.	700°F	170	(E) 29 (G) 11.2	45%	.750" to 2.500"
Inconel 600 QQ-W-390 UNS N06600	Cold drawn. Good corrosion resistance. Good for use in elevated temperature applications.	700°F	205/120	(E) 29 G) 11.0	45%	.005" to .750"
Inconel 625 Spring Tempered Wire ASTM B446 UNS N06625	Cold drawn. Good corrosion resistance. Good for use in elevated temperature applications.	700°F	205/120	(E) 29 (G) 11.0	45%	.012" to .175"
Inconel 718 Spring Tempered Wire ASTM B637 UNS N07718	Age hardened. Good corrosion resistance. Good for use in elevated temperature applications. No magnetism	1200°F	250/210	(E) 29 (G) 11.2	45%	.012" to .275"
Inconel 718 Bar ASTM B637 UNS N07718	Age hardened. Good corrosion resistance. Good for use in elevated temperature applications. No magnetism	1200°F	250/210	(E) 29 (G) 11.2	45%	.234" to 1.500"
MP35N Spring Tempered Wire AMS 5844 UNS R30035	Cold drawn, age hardened. High strength. High modulus value and corrosion resistance. Great choice for severe spring applications. Good for applications involving the presence of Hydrogen Sulfide.	600°F	330/230	(E) 34 (G) 11.74	45%	.005" to .750"
Elgiloy Spring Tempered Wire AMS 5834 UNS R30003	Cold drawn. Very high fatigue strength and long life.	600°F	350/220	(E) 29.5 (G) 11.5	45%	.005" to .750"
Monel 400 Spring Tempered Wire AMS 7233 or 4544, ASTM B164 UNS N04400	Cold drawn. Good corrosion resistance. Good for elevated temperature applications.	450°F	165/120	(E) 26 (G) 9.5	40%	.014" to .500"
Monel K-500 Spring Tempered Wire/Bar QQ-N-286 AMS 4676C UNS N05500	Cold drawn. Very high corrosion resistance. Good for use in elevated temperature applications.	500°F	195/140	(E) 26 (G) 9.5	40%	.018" to 2.00"

Material	Material Properties	Maximum Working Temp.	Ultimate Tensile Range (ksi min)	Modulus of Elasticity	Approx. Design % of Ultimate Tensile (torsional)	Common Sizes (inches)
Nickel Base Alloy Wire/bar, continued						
Hastelloy C-276 Wire AMS B574 (Chem. only), AMS J470 UNS N10276	Good corrosion resistance to many acids and salts.	-	-	(E) 29.8 (G) 10.9	-	.012" to .437"
Hastelloy B-2 ASTM B335 AMS J470 UNS N10665	Good corrosion resistance to many acids and salts.	-	-	(E) 28 (G) 8.0	-	.018" to .207
Titanium						
Titanium Beta-C AMS 4957 UNS R58640	Age hardened. Good ductility and toughness. Good fabricability, and good resistance to general corrosion. Good for environments containing Ferric Chloride, Sodium Chloride, Carbon Dioxide, and Hydrogen Sulfide	600°F	190/180	(E) 15.4 (G) 5.9	45%	005" to .625"
Titanium 6Al-4V AMS 4965 UNS R56400	Age hardened. Good ductility and toughness. Good fabricability, and good resistance to general corrosion.	-	165	(E) 15 (G) 5.0	40%	.020" to .250"
Tool Steel						
H-12 Tungsten Bar ASTM A681 (Chem. only) UNS T20812	Good for high temperature applications.	700°F	187	(E) 30 (G) 11.0	45%	.500" - 2.250"

These data are provided as a reference guide only and are not intended for design purposes. Strength values and sizes are subject to change. Please check with a Suhm Spring representative for confirmation.