

**Suhm Spring Works - Material Properties Chart**

<b>Material</b>	<b>Material Properties</b>	<b>Maximum Working Temp.</b>	<b>Ultimate Tensile Range, MPa</b>	<b>Modulus of Elasticity, MPa</b>	<b>Approx. Design % of Ultimate Tensile (torsional)</b>	<b>Common Sizes, mm</b>
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**Alloy Steel**

<b>Music Wire ASTM A228 UNS K08500 &amp; G10860</b>	Cold drawn. Constant tensile strength. High-quality and good for high cycle spring applications.	121°C	3096/ 1586	(E) 206,8k (G) 79,3k	45%	0,30 to 6,35
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**High Carbon Steel Wire/Bar**

<b>Oil Tempered Wire, Class I ASTM A229 UNS K07001 &amp; G10650</b>	Cold drawn. All purpose spring material. Heat treated before fabrication. Susceptible to hydrogen embrittlement when plated.	121°C	2227/ 862 (class I)	(E) 206,8k (G) 79,3k	45%	0,81 to 15,88
<b>Chrome Vanadium Wire ASTM A-231 Valve Quality: ASTM A-232 AMS 6450</b>	Cold drawn. Good for shock loads and medium elevated temperature applications. Susceptible to hydrogen embrittlement when plated. ( details)	218°C	2241/ 1310	(E) 206,8k (G) 72,3k	45%	0,06 to 11,89
<b>Chrome Silicon Wire ASTM A401 UNS G92540</b>	Cold drawn. Good for shock loads and medium elevated temperature applications. Susceptible to hydrogen embrittlement when plated.	246°C	2068/ 1558	(E) 206,8k (G) 72,3k	45%	0,61 to 15,88

**Hot Rolled Alloy Bar**

<b>5160-H ASTM A689, A29 UNS G516000</b>	Hot-rolled special bar quality, fine grained. Good fatigue life.	204°C	1669/ 1455	(E) 200k (G) 72,4k	45%	11,89 to 31,75
<b>51B60-H ASTM A689, A29 UNS 51601</b>	Hot-rolled special bar quality, fine grained. Good fatigue life.	204°C	1669/ 1455	(E) 207k (G) 75,8k	45%	31,75 to 49,20

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<b>4161-H ASTM A689, A29 UNS 41610</b>	Hot-rolled special bar quality, fine grained. Good fatigue life.	204°C	1669/ 1455	(E) 207k (G) 75,8k	45%	50,80 to 73,03

**Stainless Steel**

<b>AISI 302/304 Stainless Steel Wire ASTM A313 AMS 5688 UNS S30200</b>	Cold drawn. Low cost. Good for general purpose corrosion and elevated temperature applications. Has some magnetism in a spring temper.	260°C	2241/ 896	(E) 193k (G) 67,6k	40%	0,38 to 12,70
<b>AISI 316 Stainless Steel Wire</b>	Cold drawn. Better corrosion resistance than 302/304. Good for elevated temperatures. No magnetism.	285°C	1689/ 758	(E) 193k (G) 67,6k	40%	0,43 to 14,3
<b>T-316 Stainless Steel Bar ASTM A276 Cond B UNS S31600</b>	Cold drawn. Better corrosion resistance than 302/304. Good for elevated temperatures. No magnetism.	288°C	1689/ 759	(E) 193,1k (G) 67,6k	40%	14,27 to 44,45
<b>17-7PH Stainless Steel Wire ASTM A276 Cond B UNS S31600</b>	Cold drawn. Better corrosion resistance than 302/304. Good for elevated temperatures. No magnetism.	288°C	2517/ 1586	(E) 200k (G) 75,8k	45%	0,43 to 14,28
<b>17-4PH Bar ASTM A564 UNS S17400 H900</b>	Age hardened. High tensile strength. Good for general corrosion resistance. No magnetism.	288°C	1310	(E) 200k (G) 77,2K	45%	14,28 to 73,03

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<b>Alloy 20 Spring Tempered Wire ASTM B473 UNS N08020</b>	Excellent mechanical properties and easily fabricated. Moderate to good corrosion resistance. Used extensively in petrochemical and refining applications.	-	1379/ 862	(E) 200k (G) 75,1k	45%	0,64 to 9,20
<b>A-286 Spring Tempered Wire AMS 5734 and others UNS S66286</b>	Age hardened. Good corrosion resistance. Good for use in elevated temperature applications. No magnetism.	482°C	1379/ 1103	(E) 200k (G) 71,7k	45%	1,02 to 7,49

**Copper Base Alloy**

<b>Phosphor Bronze Wire (Grade A) ASTM B159 H08 UNS C51000</b>	Cold drawn. Good electrical conductivity. Good corrosion resistance.	93°C	1000/ 724	(E) 103,4k (G) 43,1k	40%	0,25 to 11,89
<b>Beryllium Copper Wire ASTM B197</b>	Cold drawn. Good electrical conductivity. Good corrosion resistance.	204°C	1586/ 1034	(E) 127,5k (G) 49,6k	45%	.010" to .468"

**Nickel Base Alloy Wire/Bar**

<b>Inconel X-750 Spring Tempered Wire AMS 5698 AMS 5699 UNS N07750</b>	Cold drawn, age hardened. Good corrosion resistance. Good for use in elevated temperature applications. Good for use in Sour-Gas applications.	371°F	1586/ 1241	(E) 200k (G) 77,2k	45%	0,13 to 19,05
<b>Inconel X-750 Bar ASTM B637 UNS N07500</b>	Cold drawn. Good corrosion resistance. Good for use in elevated temperature applications. Good for use in Sour-Gas applications.	371°F	1172	(E) 200k (G) 77,2k	45%	19,05 to 63,50

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<b>Inconel 600 Wire QQ-W-390 UNS N06600</b>	Cold drawn. Good corrosion resistance. Good for use in elevated temperature applications.	371°C	1413/ 827	(E) 200k (G) 75,8k	45%	0,13 to 19,05
<b>Inconel 625 Spring Tempered Wire ASTM B446 UNS N06625</b>	Cold drawn. Good corrosion resistance. Good for use in elevated temperature applications.	700°F	827	(E) 200k (G) 75,8k	45%	0,30 to 19,05
<b>Inconel 718 Spring Tempered Wire ASTM B637 UNS N07718</b>	Cold drawn. Good corrosion resistance. Good for use in elevated temperature applications.	649°C	1379/ 827,4	(E) 200k (G) 77,2k	45%	0,30 to 6,99
<b>Inconel 718 Bar ASTM B637 UNS N07718</b>	Age hardened. Good corrosion resistance. Good for use in elevated temperature applications. No magnetism.	649°C	1724/ 1448	(E) 200k (G) 77,2k	45%	5,94 to 38,10
<b>MP35N Spring Tempered Wire AMS 5844 UNS R30035</b>	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.	260°C	1345/ 965	(E) 179,3k (G) 63,5k	45%	0,46 to 50,80
<b>Elgiloy Spring Tempered Wire AMS 5834 UNS R30003</b>	Cold drawn. Very high fatigue strength and long life.	316°C	2413/ 1517	(E) 203,4k (G) 79,3k	45%	0,13 to 19,05
<b>Monel 400 Spring Tempered Wire AMS 7233 or 4544, ASTM B164 UNS N04400</b>	Cold drawn. Good corrosion resistance. Good for elevated temperature applications.	232°C	1138/827	(E) 179,3k (G) 65,5k	40%	0,36 to 14,27

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<b>Monel K-500 Spring Tempered Wire/Bar QQ-N-286 AMS 4676C UNS N05500</b>	Cold drawn. Very high corrosion resistance. Good for use in elevated temperature applications.	232°C	1138/ 827	(E) 179,3k (G) 65,5k	40%	0,36 to 14,27
<b>Hastelloy C-276 Wire AMS B574 (Chem. only), AMS J470 UNS N10276</b>	Good corrosion resistance to many acids and salts.	-	-	(E) 205,5k (G) 75,2k	-	0,30 to 11,10
<b>Hastelloy B-2 ASTM B335 AMS J470 UNS N10665</b>	Good corrosion resistance to many acids and salts.	-	-	(E) 193,1k (G) 55,2k	-	0,46 to 5,26

**Titanium**

<b>Titanium Beta-C AMS 4957 UNS R58640</b>	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.	316°C	1310/ 1241	(E) 102,6 (G) 40,7k	45%	0,13 to 15,88
<b>Titanium 6Al-4V AMS 4965 UNS R56400</b>	Age hardened. Good ductility and toughness. Good fabricability, and good resistance to general corrosion.	-	1138	(E) 103,4k (G) 34,5k	40%	0,51 to 6,35

**Tool Steel**

<b>H-12 Tungsten Bar ASTM A681 (Chem. only) UNS T20812</b>	Good for high temperature applications.	371°C	1289	(E) 206,8k (G) 75,8k	45%	12,70 to 57,15
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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.