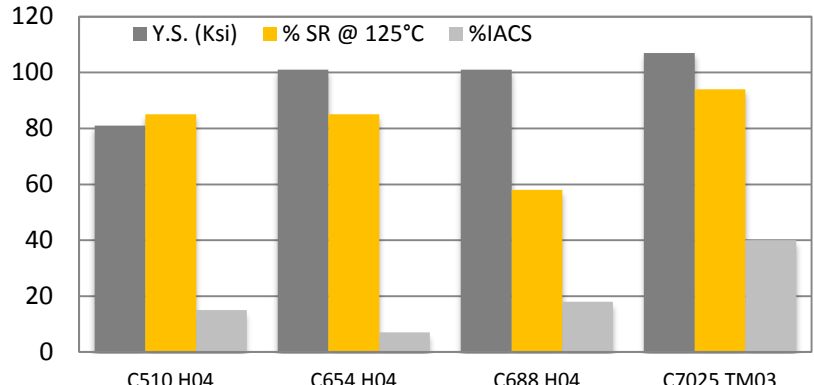


Ultronze or C654 is a silicon bronze that is an excellent candidate for many conventional applications such as terminals, connectors, springs diaphragms, fasteners, lock washers, clamps, etc. The combination of strength, formability, and stress relaxation resistance offered by this alloy exceeds that of most common copper alloys and also makes it highly suitable for a wide variety of specialized applications including semiconductor lead-frames and electronic connectors.

**Chemical Composition**

<b>Copper<sup>1</sup></b>	<b>Remainder</b>
<b>Chromium</b>	<b>0.01-0.12%</b>
<b>Silicon</b>	<b>2.7-3.4%</b>
<b>Tin</b>	<b>1.2-1.9%</b>
<b>Lead</b>	<b>0.05% Max</b>
<b>Zinc</b>	<b>0.50% Max</b>

<sup>1</sup> Cu + Named Elements, 99.5% min



**Figure 1:** Comparison of Yield Strength, Electrical Conductivity and Stress Relaxation(@1000hrs) performance of select high strength connector materials

**Physical Properties**

	English Units	Metric Units
Density	0.309 lb/in <sup>3</sup> @ 68°F	8.55 g/cm <sup>3</sup>
Thermal Conductivity	21.0 BTU-ft/ft <sup>2</sup> -hr-°F	36 W/m <sup>2</sup> K
Electrical Resistivity	148 ohm circ mils/ft	24.6 microhm-cm
Electrical Conductivity (annealed)	7% IACS*	0.041 megamho/cm
Modulus of Elasticity	17,000,000 psi	117 kN/mm <sup>2</sup>
Thermal Capacity(Specific Heat)	0.090 Btu/lb/F° @ 68°F	377.1 J/kg · °C @ 20°C
Coeff. Of Thermal Expansion 68-572°F (20-300°C)	9.7 PPM/°F	17.5 PPM/°C

\*International Annealed Copper Standard

**Mechanical Properties**

Temper <sup>1</sup>	Tensile Strength		Yield Strength <sup>2</sup>		% Elongation <sup>2</sup>	Typical 90° Bend Formability GW/BW <sup>3</sup>	
	ksi	N/mm <sup>2</sup>	ksi	N/mm <sup>2</sup>			
1/4 Hard	75-90	515-620	60	415	33	-	1.0
1/2 Hard	86-101	595-695	79	545	23	0.50	2.0
3/4 Hard	97-112	670-770	92	635	13	1.0	3.0
Hard	108-120	745-825	101	695	6	2.0	3.8
Extra Hard	116-126	800-870	109	750	4	2.5	4.5
Spring	124-133	855-915	117	805	3	3.0	7.0
Extra Spring	131-140	905-965	124	855	2		

<sup>1</sup> Mechanical properties subject to change. All tempers listed are made to a Tensile Strength specification

<sup>2</sup> Nominal Values <sup>3</sup> DATA FOR REFERENCE ONLY. R/T = Bend Radius/Material Thickness <0.016" (0.4mm) thick, 11/16 (17.5mm) wide.

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