

Cupro-Nickels are among the most attractive, durable and versatile copper alloys available. Offering unique properties such as excellent resistance to biological fouling, corrosion and stress corrosion cracking, these alloys are used in a range of applications from heat exchangers, ship components and condenser tubes of power plants to coinage and even touch surface on medical equipment. Nickel additions in these alloys allow designers to benefit from attractive color options ranging from lite rose to silver.

### Chemical Composition

<b>Copper</b> <sup>1</sup>	<b>Remainder</b>
<b>Nickel</b>	<b>9.0 - 11.0%</b>
<b>Iron</b>	<b>1.0 - 1.8%</b>
<b>Manganese</b>	<b>1.0% MAX</b>
<b>Zinc</b>	<b>1.0% MAX</b>
<b>Lead</b>	<b>0.05% MAX</b>

<sup>1</sup> Cu includes Ag; Copper plus named elements, 99.5%

<sup>2</sup> Ni Values Include Co

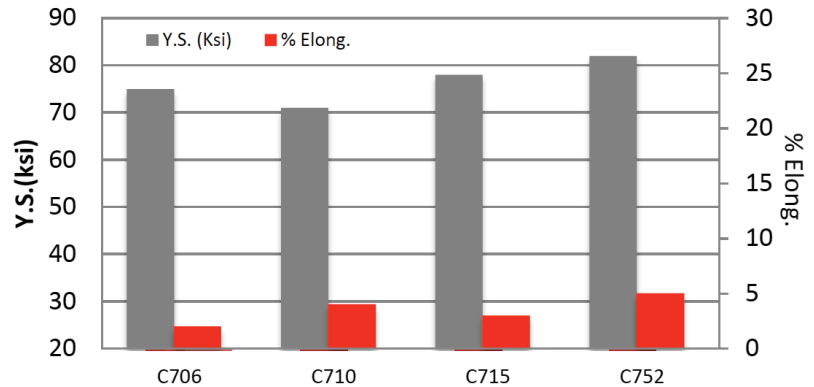


Figure 1: Comparison of Yield Strength and Elongation performance of select Hard temper Cupro-Nickel materials.

### Physical Properties

	English Units	Metric Units
Density	0.323 lb/in <sup>3</sup> @ 68°F	8.94 g/cm <sup>3</sup>
Thermal Conductivity	26 BTU-ft/ft <sup>2</sup> -hr-°F	45 W/mK
Electrical Resistivity	115 ohm circ mils/ft	19.1 microhm-cm
Electrical Conductivity (annealed)	9% IACS	.0522 megamho/cm
Modulus of Elasticity	18,000,000 psi	124 kN/mm <sup>2</sup>
Coeff. Of Thermal Expansion 68-572°F (20-300°C)	9.5 PPM/°F	17.1 PPM/°C

### Mechanical Properties

Temper <sup>1</sup>	Tensile Strength		Yield Strength <sup>2</sup>		% Elongation <sup>3</sup>	Typical 90° Bend Formability GW/BW <sup>4</sup>	
	ksi	N/mm <sup>2</sup>	ksi	N/mm <sup>2</sup>			
Soft (Annealed)	43-50	295-345	19	130	35	-	-
1/4 Hard	51-67	350-460	53	365	12	0.5	0.5
1/2 Hard	58-72	400-495	63	435	5	1.0	1.0
Hard	71-83	490-570	75	515	1 min	2.0	2.0
Extra Hard	73-85	505-585	76	525	1 min	2.5	3.0
Spring	78-88	540-604	76 min	525 min	1 Max	4.0	5.0

<sup>1</sup> Mechanical properties subject to change. All tempers listed are made to Tensile Strength specification unless otherwise noted. <sup>2</sup> Nominal Values

<sup>3</sup> Nominal Values in 2" (51mm) <sup>4</sup> DATA FOR REFERENCE ONLY. R/T = Bend Radius/Material Thickness <0.016" (0.4mm) thick, 11/16 (17.5mm) wide.