

ALLOY C19010

COPPER-NICKEL-SILICON
Cu-Ni-Si



Exceptional Performance
Versatile Product
Global Availability

Stol76 KHP102 PMC102 XP150



When the heat is on,
the design problem

becomes more complex. In
addition to strength,
formability and conductivity,
stress relaxation is crucial to
your design reliability.

C19010 has been
engineered to meet these
design expectations. C19010
offers excellent formability,
strength, and 150°C stress
relaxation resistance coupled
with excellent conductivity
and plateability so you won't
have to compromise in
design.

Ex·cep·tion·al (ĕk-sĕp'shən-əl) *adj.*

1.) Well above average.

e.g.: C19010

Performance When the Heat is On

With each new generation in connector design, increased performance at elevated temperatures requires designers to be more demanding in alloy selection.

As shown in Figures 1 and 2, C19010 stands up to the test at 150 °C, while maintaining 83% of the initial stress after 1,000 hours (and 77% remaining after 10,000 hours), well above the standard of 70% that many designers require as a minimum.

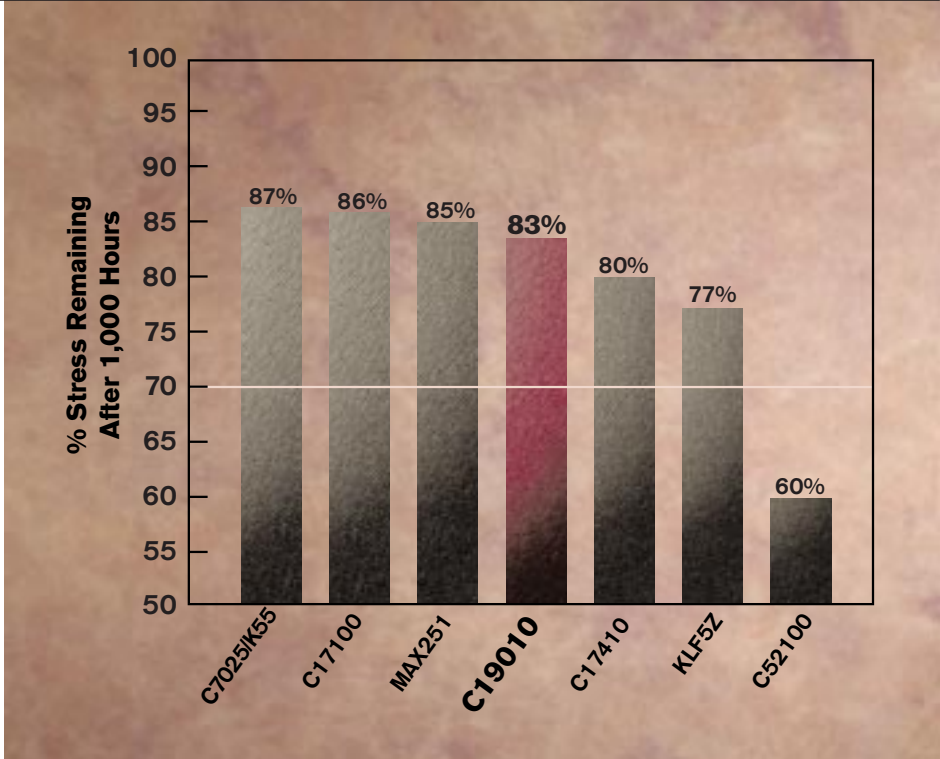


Figure 1
Stress Relaxation Resistance at 150°C
(Initial Nominal Yield Strength 70-90 ksi / 482-620 MPa)

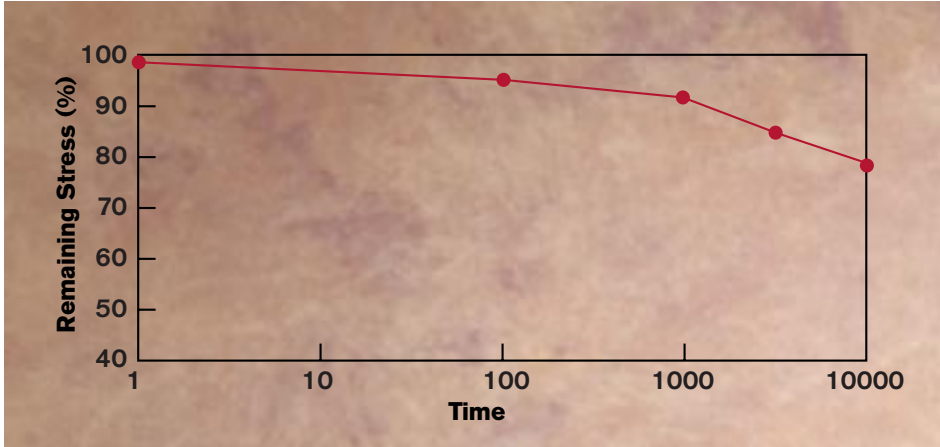


Figure 2
Stress Relaxation Resistance at 150°C



Like most people today
you're looking for that
do-everything tool that lets
you go from design to
implementation with less
worry, little hassle and in less
time than your competition.

While it may not open
your favorite bottle of wine,
C19010 is the versatile alloy
you've been searching for.

With its wide range of
capabilities and world-wide
availability, C19010 makes
designing a finished product
easier, purchasing a global
alloy friendlier and your life a
little bit simpler.

Perhaps you should start
looking for that corkscrew.

Ver·sa·tile (vûr'sə-təl) adj.

1.) Capable of doing many things.
e.g.: C19010

Formable

Bend formability is an important focus as connector designs continue to miniaturize. Unlike many alloys on the market, the increased strength and stress relaxation benefits of C19010 are achieved without sacrificing formability. (Figure 3)

C19010 possesses ideal formability for many of your interconnect products. Minimum specified bend radii are listed below. In many applications, tighter bends may be possible depending on gauge, width of bend, and tooling method. Call the engineering or product specialists at one of our global supply partners for a free consultation on your specific application.

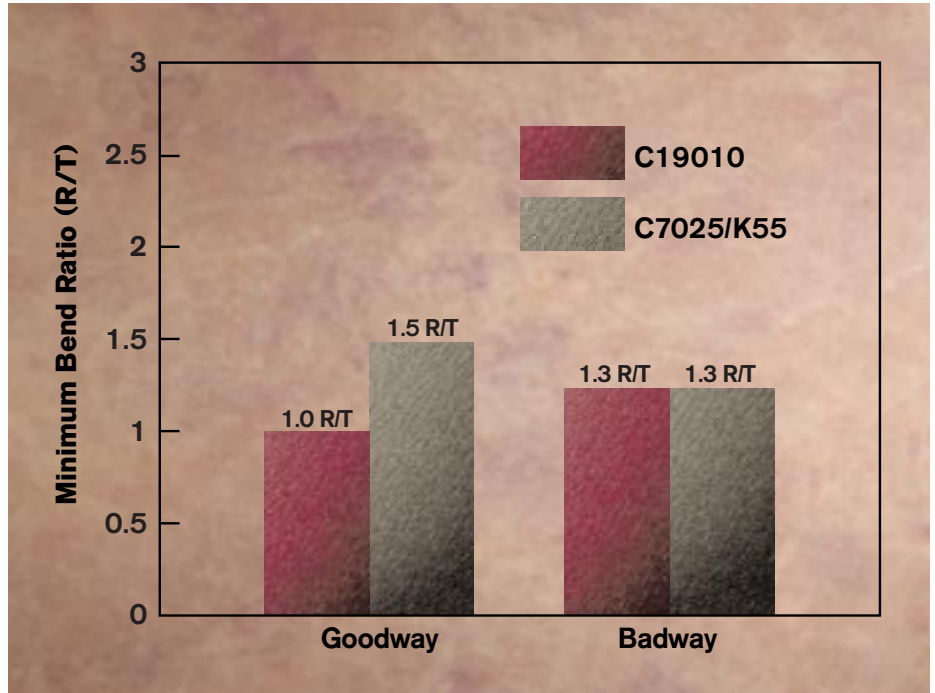


Figure 3
Typical Bend Formability of C19010 and C7025/K55 at 75-80 ksi (515-550 MPa) Yield Strength
 samples 0.69" (17.5mm) in width

Bend Properties

90 Degree Bend	Temper			
	TM03	TM04	TM06	TM08
Goodway - (min. R/T)	0.5	0.8	0.8	1.0
Badway - (min. R/T)	0.8	1.0	1.3	1.5

Samples 0.69" (17.5 mm) in width Data reported from samples <.032" (0.8 mm) in thickness

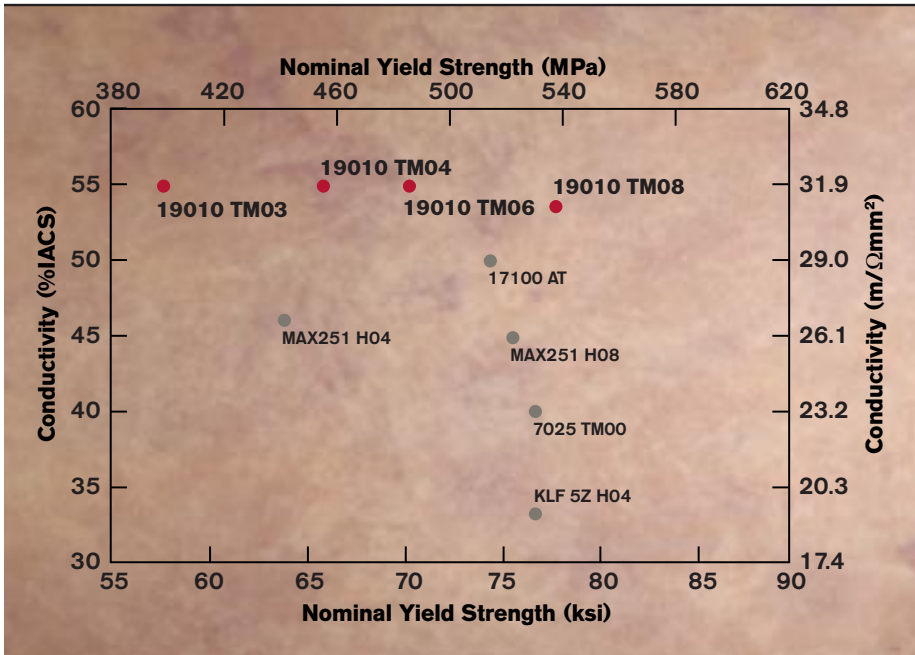


Figure 4

Comparison of Yield Strength to Electrical Conductivity of Various Connector Alloys

Strong Yet Conductive

One of the most discussed aspects of alloy selection is strength versus conductivity. It is often the case that many alloys will sacrifice conductivity for strength. In contrast, alloy C19010 has high conductivity for yield strengths up to 85 ksi. (Figure 4)

Conversions

- 1 psi = 0.00689 MPa
- 1 ksi = 6.895 MPa
- 1% IACS = 0.58 m/Ωmm²

Global (glō'bəl) *adj.*

1.) World wide.

e.g.: C19010

Today's business environment has drastically changed from that of 30, or even 10 years ago. Not only do many companies compete in a global marketplace, but they also design, test, and manufacture products in a "global factory." Competitive pressures continue to shrink new product development cycle time requirements. In this environment, the streamlining of raw materials is an excellent way to shrink time to market while controlling costs. Of all the alloys compared that have good formability and stand up to 150°C temperatures, only C19010 surpasses 50% IACS conductivity, making it an excellent candidate for connector alloy consolidation.

To consolidate and standardize alloys for global manufacture, it is also necessary to have a global supply base for raw materials. Alloy C19010 is available globally; you will find the same uniform properties and tempers, the same quality workmanship and the same exceptional product made to your demanding standards and requirements no matter what corner of the world you are designing in.

Engineers today are looking at products of tomorrow, C19010 has been designed to meet your needs both today and for the future.

C19010

(Cu/1.6Ni/0.3Si)

High Performance Alloy for Elevated Temperature Interconnects

Chemical Composition

	Wt. %
Copper	Balance
Nickel	0.8-1.8
Silicon	0.15-0.35
Phosphorous	0.01-0.05
Other	0.50 max

Physical Properties

	SI Unit	US Customary Unit
Melting Point	1062 (°C)	1944 (°F)
Density	8.9 (gm/cm ³ @ 20°C)	0.322 (lbs/in ³) @68°F
Electrical Conductivity (Annealed)	34.8 (m/Ωmm ²)	60 (%IACS) @68°F
Thermal Conductivity (Annealed)	0.62(cal•cm/cm ³ •sec•°C)@20°C	149 (Btu•ft/ft ² •hr•°F) @68°F
Modulus of Elasticity (Tension)	131,000 MPa	19,000 ksi

Mechanical Properties

SI Unit	Temper(1)			
	TM03	TM04	TM06	TM08
Tensile Strength (MPa)	460-520	490-560	520-580	580 min.
Yield Strength (0.2% Offset, MPa)	340 min.	410 min.	440 min.	510 min.
Elongation (%)	12 min.	10 min.	8 min.	6 min.
Hardness (HV) ref.	135-165	145-175	150-180	170-200
Conductivity (Min m/Ωmm ²)	29	29	29	29
Conductivity (m/Ωmm ² , Typical)	30.2-33.6	30.2-33.6	30.2-33.6	29.6-32.5
US Customary Unit	TM03	TM04	TM06	TM08
Tensile Strength (ksi)	67-77	71-81	75-86	84 min.
Yield Strength (0.2% Offset, ksi)	50 min.	60 min.	64 min.	74 min.
Elongation (%)	12 min.	10 min.	8 min.	6 min.
Hardness (HV) ref.	135-165	145-175	150-180	170-200
Conductivity (Min %IACS)	50	50	50	50
Conductivity (%IACS, Typical)	52-58	52-58	52-58	51-56

Note: (1) Temper TMxx: Mill Hardened by Precipitation Process (from ASTM B-601)

Details released herein are believed to be accurate at the time of issue and are considered for general information only. Use of this information is to be at the consumer's discretion.

Alloy C19010

An Intelligent Solution

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