Alloy C19210
An Intelligent Solution

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ALLOY C19210

COPPER-IRON Cu-Fe
HIGH CONDUCTIVITY

Exceptional Performance
Versatile Product
Global Availability

XP10 PMC90 KFC K80 KHP10

Searching for stability in your electronic and electrical applications? Look no further than C19210.

The high electrical conductivity of C19210 is critical for applications where high current/amperage is required. This, coupled with the high thermal conductivity, minimizes temperature rise from resistive heating in high current or mixed mode applications. The result is excellent stability with low internal stress, important considerations for precious metal contacts, automotive and electrical connectors.

C19210/XP-10 (Cu/0.1 Fe)

Connector Alloy for Electrical and Electronic Applications

Chemical Composition

	Wt. %
Copper	Balance
Iron	0.050-0.150
Phosphorous	0.025-0.040
Other	0.50 max

Physical Properties

	SI Unit	US Customary Unit
Melting Point	1,082 (˚C)	1,980 (˚F)
Density	8.94 (gm/cm³ @ 20˚C)	0.323 (lbs/in³ @68˚F)
Electrical Conductivity (Annealed)	46.4 (m/Ωmm²)	80 (%IACS @68˚F)
Thermal Conductivity (Annealed)	0.87 (cal•cm/cm³•s•˚C)@20˚C	201 (Btu•ft/ft²•hr•˚F) @68˚F
Modulus of Elasticity (Tension)	118,500 MPa	17,200 ksi

Mechanical Properties

	Temper(1)						
SI Unit	R290	R320	R355	R370	R410	R440	R455
Tensile Strength (MPa)	290-370	320-425	355-425	370-460	410-480	440 min	455 min
Yield Strength (0.2% Offset, MPa)	135-240	310-410	345-425	355-460	400-480	425 min.	440 min.
Elongation (%)	20	5	4	3	2	1	1
C19210 Conductivity (m/Ωmm², Typ.)	46.4	46.4	46.4	46.4	46.4	46.4	46.4
XP-10 Conductivity (m/Ωmm², Typ.)	52.2	52.2	52.2	52.2	52.2	52.2	52.2
US Customary Unit	H010	H020	H030	H040	H060	H080	H100
Tensile Strength (ksi)	40-55	47-60	52-62	56-66	60-70	64 min.	66 min.
Yield Strength (0.2% Offset, ksi)	20-35	44-59	50-62	54-66	58-70	62 min.	64 min.
Elongation (%)	20	5	4	3	2	1	1
C19210 Conductivity (%IACS, Typ.)	80	80	80	80	80	80	80
XP-10 Conductivity (%IACS, Typ.)	90	90	90	90	90	90	90

Note: (1) Temper Hxx: Cold Worked Tempers by Cold Rolling (from ASTM B-601)

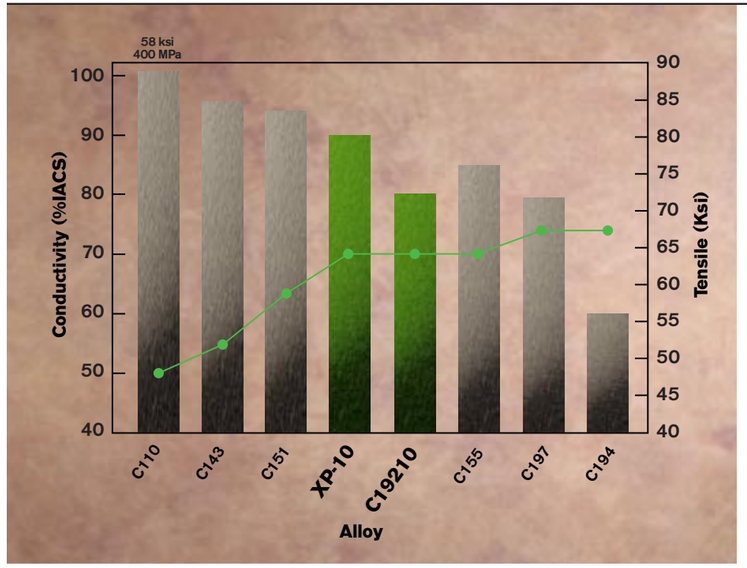

Figure 4
Comparison of Yield Strength to Electrical Conductivity of Various Connector Alloys

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

Strong Yet Conductive

C19210 has higher strengths than many alloys found on the market today, yet due to chemistry and processing, C19210 retains much of the formability and conductivity that is often lost on other copper alloys. This enables you to purchase a material that is superior in strength; allowing higher contact forces, yet retains the formability required to make the part. With special processing, a 90% nominal IACS conductivity can be achieved with no loss in strength, stress relaxation resistance, or bend formability. (Fig. 4)

When ordering or dicussing your application with the global suppliers listed on the back of this brochure, please ask for either high conductivity C19210, or Xtra High conductivity XP-10.

Glob•al (glō'bəl) *adj.*

1.) World wide.
e.g.: C19210

Finally, C19210, like many alloys in the PMX portfolio, is globally available. This global availability provides you with an opportunity to consolidate engineering specifications, purchase specifications, and designs used world wide. The economy of C19210 over competing alloys provides additional benefits.

C19210 combines key elements: physical properties, mechanical properties, global and economical benefits into one complete package to create an engineered product that rivals the value of many alloy's found in today's connector, electrical terminal and integrated circuit leadframe markets.

Engineers today are looking at products of tomorrow, C19210 has been designed to meet your needs both today and for the future.

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

1.) Well above average.
e.g.: C19210

Stability in the Long Run

Maintaining an electrical contact over time and at elevated temperatures is essential in the design of electrical connectors. The chemistry and processing of C19210 have resulted in a resistance to stress relaxation at temperatures of 105˚C +. *(Fig. 1)*

C19210 stands up to the test at 105˚C, while maintaining 75% of the initial stress after 1,000 hours, well above the standard of 70% allowing for higher current flow without contact force degradation.

C19210 has remarkable softening resistance compared to copper and various copper alloys. In tests at temperatures of 350˚C, C19210 was found to have 97% strength remaining after a time of 10 minutes. *(Fig. 2)* This resistance to softening is of particular importance if the material is subjected to elevated temperatures during assembly or packaging, as can occur in the assembly of an integrated circuit leadframe, brazing, soldering, hot tin dipping, or joining.

C19210 provides superior performance over competitive alloys. Such stability allows designers to take advantage of the alloy consolidation opportunities.

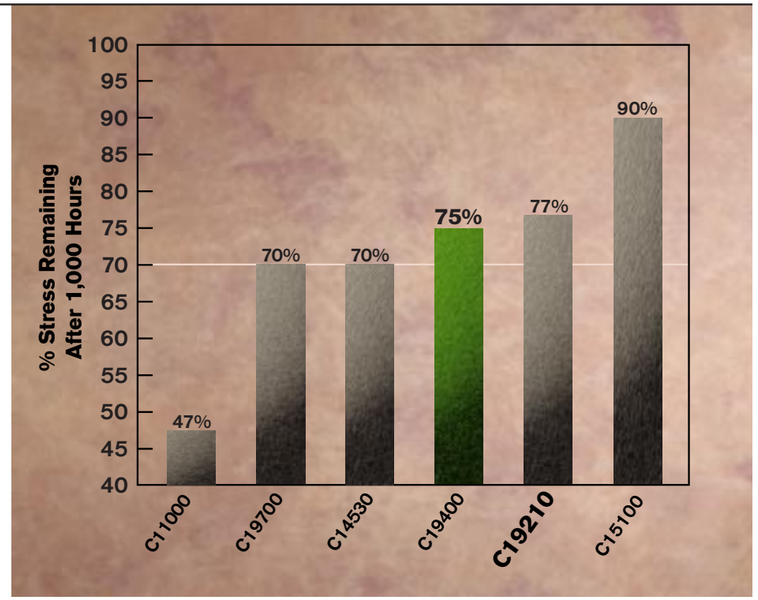

Figure 1
Stress Relaxation Resistance at 105˚C

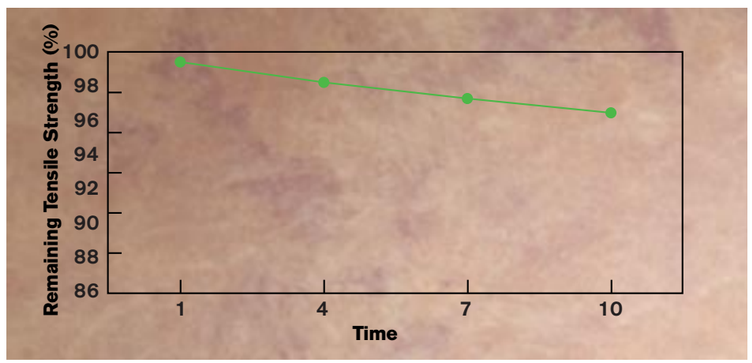

Figure 2
Softening Resistance at 350˚C

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, C19210 is the versatile alloy you've been searching for. With its wide range of capabilities and world-wide availability, C19210 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.: C19210

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 C19210 are achieved without sacrificing formability. *(Fig. 3)*

C19210 possesses ideal formability for many of your electronic products. 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.

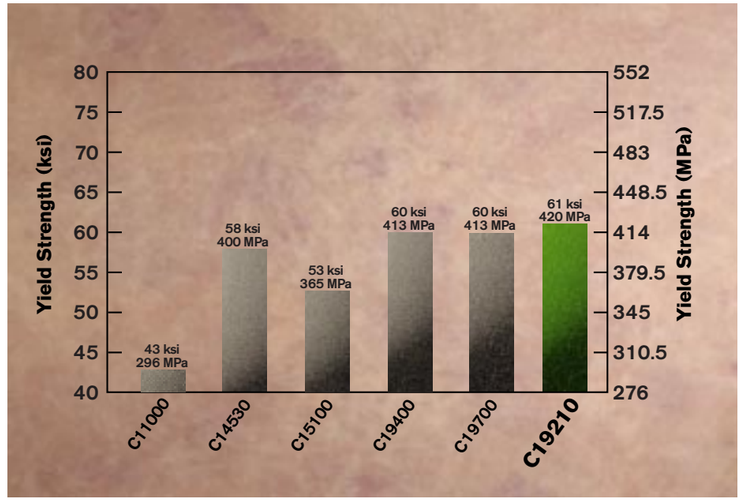

Figure 3

Typical Yield Strength Available at a 1t 90 Degree Goodway Bend

Samples 0.69" (17.5 mm) in width

Bend Properties

	Temper					
	H01	H02	H03	H04	H06	H08
Goodway - (min. R/T)	0.0	0.0	0.0	0.5	1.0	1.5
Badway - (min. R/T)	0.0	0.0	0.0	1.0	1.5	2.0

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