Copper Clad Aluminum and Other Clad Metals

Clad metals are two distinct metals or alloys that are metallurgically bonded together for achieving specific functional properties. It is a composite wire composed of multiple metallic phases and allows greater amount of material in contrast to plating metals. Copper clad aluminum (CCA) is an electrical conductor having a copper sleeve bonded to a solid aluminum core, manufactured in compliance with ASTM B-566. The copper clad accounts for either 10% or 15% of the wire's cross-sectional area and assures excellent conductivity and solderability, whereas the aluminum core contributes to lower weights. CCA exhibits AC conductivity equal to solid copper at frequencies greater than 5 MHz. Another example is copper clad steel (CCS) which is a conductor having a copper sleeve bonded to a solid low-carbon steel core. CCS is a high-strength conductor manufactured in accordance with ASTM B-452, where the cladded copper provides a superior electrical conductivity, and the steel core contributes to greater tensile strength and fatigue resistance. For certain medical applications, these CCS conductors can be made substantially stronger and corrosive-resistant by using a 300 series core instead, referred to as copper-clad stainless steel (CCSS) per ASTM B-910. Nickel clad copper (NCC) accounts for 27% Nickel clad per ASTM B-355 is used in applications where high temperatures, oxidizing, or corrosive atmospheres exist. It has electrical conductivity approximately 70% that of copper and the corrosion resistance of pure nickel. Dumet is a Copper clad Nickel-Iron alloy widely used to obtain hermetic seals in soft glass. This is possible because the thermal expansion of the Ni-Fe alloy closely matches to that of glass, and the material "wets" well to bond with the glass. The copper clad around contributes to its electrical conductivity, solderability, ductility and the ability to be supplied electroplated with gold, tin, or solder. Dumet conforms to ASTM F29-63T and its typical applications include electronic wire leads of all varieties. MWS produces clad metals in insulated and bare sizes from 14 through 44 AWG. For insulation data, see pages 4 and 5.

Clad Metals

MATERIAL	RESISTIVITY	CONDUCTIVITY	TENSILE STRENGTH NOMINAL (KPSI)		DENSITY	MAGNETIC ATTRACTION
	Ohms/CMF	IACS	Soft	Hard	lb/in³	
Copper Clad Aluminum 10%	16.50	62.9%	25	30	0.120	Non-Magnetic
Copper Clad Aluminum 15%	16.10	64.4%	25	30	0.131	Non-Magnetic
Nickel Clad Copper	14.61	71%	55	85	0.321	Magnetic
Copper Clad Steel 40%	26.45	40%	50	110	0.294	Magnetic
Copper Clad Stainless Steel (CCSS)	27.97	37%	106	200	0.300	Non-Magnetic
Copper Clad Nickel Iron Alloy (Dumet)	58	17%	80	120	0.298	Magnetic