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APA 12 (Silver-ABA)
TECHNICAL DATA

NOMINAL COMPOSITION

Silver	92.75% ± 1.0
Copper	5.0% ± 0.5
Aluminum	1.0% ± 0.25
Titanium	1.25% ± 0.25
Cadmium	0.001% max.
Zinc	0.001% max.
Phosphorus	0.002% max.
Lead	0.002% max.
Carbon	0.005% max.
Other volatile elements each*	0.002% max.
Volatile elements total	0.010% max.
Total non-volatile elements (Grade 1)	0.01% max.
Total non-volatile elements (Grade 2)	0.05% max.

*Elements with a vapor pressure higher than 10^{-7} torr at 932ºF (such as Mg, Sb, K, Li,S,Cs,Rb,Se,Te,Sr, and Ca) are limited to 0.001% each for Grade 1 and 0.002% for Grade 2, except for In & Ti.

PHYSICAL PROPERTIES

Color	Silver-Grey
Solidus	1580°F (860°C)
Liquidus	1673°F (912°C)
Recommended Brazing Temperature	1748-1773°F (953-967°C)
Density (Troy oz/in^3)	5.24
CTE (x10^{-6}/°C)	20.7
Thermal Conductivity (W/(m•K))	344
Electrical Conductivity (x10^6/(ohm•m))	45
Electrical Resistivity (x10^{-9} ohm•m)	22
Yield Strength (MPa)	136
Tensile Strength (MPa)	282
Elongation (%)	37
Knoop Hardness (KHN)	87

USES

APA 12 is used as a high temperature silver-based active braze for joining ceramics and other non-metallic components. For best results this alloy should be brazed under argon, hydrogen, or partial pressure of argon or hydrogen in a vacuum furnace. Take care not to outgas silver by brazing under deep vacuum at elevated temperatures.

PROPERTIES OF BRAZED JOINTS

The properties of a brazed joint are dependent upon the base metal, joint design and brazing technique. For controlled atmosphere brazing or vacuum brazing the recommended radial joint clearance for silver base alloys falls within 0.000in – 0.002in (0.00mm – 0.05mm) range. For active brazing, the braze alloy shall be preplaced in locations of desired wetting.

SPECIFICATIONS	APA 12 does not conform to any industry standards. However, the trace elements meet AWS vacuum grade 1 requirements.
AVAILABLE FORMS	Powder & paste
SAFETY INFORMATION	The operation and maintenance of brazing equipment or facility should conform to the provisions of American National Standard (ANSI) Z49.1, “Safety in Welding and Cutting.”

Individuals requiring further information and Engineering Specification Documents may wish to contact the Engineering Society for Advanced Mobility, Land Sea Air and Space, The Society of Automotive Engineers http://www.sae.org/ (SAE AMS) or The American Welding Society (AWS) http://aws.org/

NOTE:

DISCLAIMER

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