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APA 7 / APA 8 / APA 9 TECHNICAL DATA

ABA	Ag	Cu	In	Ti	Total
APA 7	59.00%	27.25%	12.50%	1.25%	100.00%
APA 8	60.27%	23.03%	14.70%	2.00%	100.00%
APA 9	43.60%	29.10%	24.30%	3.00%	100.00%

NOMINAL COMPOSITION

Vacuum Grade Trace Elements

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 932°F (such as Mg, Sb, K, Li, Tl, S, Cs, Rb, Se, Te, Sr, and Ca) are limited to 0.001% each for Grade 1 and 0.002% for Grade 2.

PHYSICAL PROPERTIES

ABA	Color	Solidus °F(°C)	Liquidus °F(°C)	Brazing Temperatures °F(°C)	Density
APA 7	Silver Grey	1121 (605)	1319 (715)	1400 – 1500 (760-816)	4.95 Toz./in ³
APA 8	Silver Grey	1120 (604)	1335 (724)	1400 – 1500 (760-816)	4.89 Toz./in ³
APA 9	Silver Grey	910 (488)	1134 (612)	1234 – 1284 (668-696)	4.62 Toz./in ³

Incusil-ABA

CTE, RT-400°C (10⁻⁶/°C)	18.2
Electrical Conductivity (x10⁶/ohm•m)	9.4
Electrical Resistivity (10⁻⁹ ohm•m)	106
Thermal Conductivity (W/m•K)	70
Yield Strength, 0.2% offset (MPa)	338
Tensile Strength (MPa)	455
Young's Modulus (GPa)	76
Elongation, 2" gage length (%)	21
Knoop Hardness (KHN)	100

PHYSICAL PROPERTIES (Cont.)

USES

Most commonly used to braze non-metallic cutting tools (PCD, CBN) to carbide, or for direct wetting to ceramic, graphite, glass & oxide surfaces.

BRAZING CHARACTERISTICS

Incusil-ABA alloys are used because of their ability to wet directly to PCD & CBN at reduced temperatures. Indium is used as a melting point depressant which decreases the liquidus of the filler metal. A braze range of 100-150 °F above the liquidus is beneficial for creating the reaction between the titanium and surface oxides. An increased soak time of 20 minutes also leads to a better reaction, and stronger braze joint. When wetting to a non-metallic surface, these ABA's will wet in-place, but not flow through a joint by capillary, therefore it is recommended that the paste is applied to all surfaces which require wetting, prior to brazing. Suitable for use in all vacuum brazing applications as well as under partial pressure of argon gas. Brazing of active alloys under protective nitrogen atmosphere is not recommended. It is important to maintain a high purity, oxygen-free environment; any oxidation of reactive elements will limit alloy wettability across the non-metallic surface.

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 fall within 0.0015 in. - 0.002 in. (0.038 mm - 0.051 mm.) range.

SPECIFICATIONS

APA 7 conforms to: Incusil-ABA
APA 8 conforms to: Incusil-15-ABA
APA 9 conforms to: Incusil-25-ABA

AVAILABLE FORMS

Wire, strip, engineered preforms, specialty preforms per customer specification, powder and 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:

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