

S-Bond Technologies, LLC	S-Bond[®] 220M Alloy	Property Bulletin
	Issue Date: 09/08	Bulletin No. SBT-PB-004

Application

S-Bond 220M (patent pending) is a Sn-Ag-Ti based active solder has been specifically optimized for joining to silicon and silicates. However, as an active solder, stemming from the S-Bond 220 alloy base, but with the addition 0.1 – 2w/o Mg, it can join a range of metals and ceramic materials. The magnesium addition promotes even more improved wetting of certain oxides that form on many semiconductors and glass.

Melting Range

- Solidus Temperature: 428° F (221° C)
- Liquidus Temperature: 447° F (232° C)
- Joining Temperature: 482 – 536° F (250 – 280° C)

Physical Properties

- Density: 0.264 lbs/in³ (7.3 g/cc)
- Thermal Coefficient of Expansion from R.T. to 300° F (25 – 150° C): ~19 x 10⁻⁶/°C
- Electrical Resistivity (ρ): 1.6μ–ohm-m
- Thermal Conductivity:
 - Intrinsic: 48 W/mK

Mechanical Properties / Joint Shear Strengths

- Tensile Strengths:

UTS		0.2%Y.S.
➤ 25° C.....	7.8 ksi (53 MPa)	5.6 ksi (38 MPa)
➤ 75° C.....	6.2 ksi (42 MPa)	4.7 ksi (32 MPa)
➤ 175° C.....	3.9 ksi (26 MPa)	3.4 ksi (23 MPa)
➤ 190° C.....	3.9 ksi (26 MPa)	3.0 ksi (20 MPa)
- Joint Strengths (R.T.):
 - Silicon 2.9 – 4.3 ksi (20 – 30 MPa)
 - Glass 2.9 – 7.5 ksi (20 – 52 MPa)
 - Al:SiC to Metals 4.4 – 6.0 ksi (30 – 41 MPa)
 - Glass to Metal 3.5 – 5.1 ksi (24 – 35 MPa)

Joint Sealing Capabilities

- Kovar to Alumina 3.8 x 10⁻⁹ atmospheres / cc sec
- SiC to Invar 5 x 10⁻¹⁰ mbar*L/sec (helium leak rate)
- Silicon and Glass to metals 4.1 x 10⁻⁹ atmospheres / cc sec