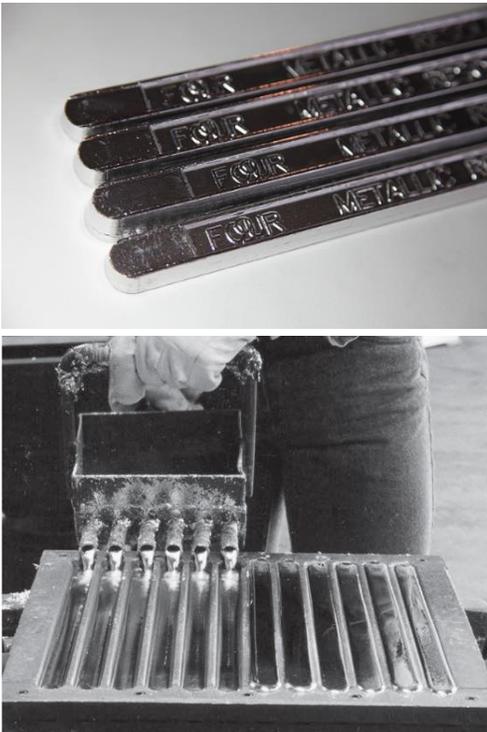


Four 9's® Solder Product Bulletin

Purity Improves Process

Metallic Resources' FOUR 9's premium bar solder is manufactured using a proprietary electrolytic process to create the shiniest and purest possible tin/lead solder which exceeds all specification requirements. FOUR 9's electrolytic solder is compatible with all fluxes, including "no-clean" fluxes.

Standard packaging is 25-pound boxes containing cast bars of Sn63/Pb37 eutectic alloy. Metallic Resources also offers nuggets, ingots, feeder bars, and other metal forms available upon request.



Perfect for Wave Soldering

FOUR 9's premium electrolytic solder is specially designed for use in all wave soldering applications and high production rate operations that require consistent and reliable performance. It is primarily used in printed circuit board fabricating and assembly operations common to the electronics market.

Higher Yield, Less Waste

Independent testing results clearly demonstrate the superiority of FOUR 9's high purity electrolytic solder. It generates the least amount of dross compared to other solders because of its unique oxide structure. Less dross results in more soldered joints per pound of solder and greater cost-effectiveness. Solder pots using FOUR 9's solder can be operated at lower temperatures to provide energy savings, extended pot life, reduced thermal stress, and reduced potential of contamination. Lower viscosity improves the fluidity, which in turn improves the solder's wetting capability.

The electrolytic manufacturing process assures batch-to-batch consistency for predictable solder performance in the solder pot. The process removes metallic and non-metallic impurities often found in "virgin metals" and reclaimed solders to provide the purest tin/lead solder available, which reduces contamination potential. Other benefits include reduced bridging, icicling and cobwebbing commonly occurring in more sluggish, less pure solders.



METALLIC RESOURCES, INC.

Manufacturers of Superior Quality Electrolytic Solders

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Exceeds Industry Standards

FOUR 9's bar solder conforms to the requirements of IPC Specification J-STD-006. It meets or exceeds ASTM B-32, and is approved for military usage. ITAR does not apply to this product.

Certificates of Conformance and Analysis are automatically provided with each shipment.

Physical Properties

Melting Point	361°F
Density	.3032 lbs. per cubic inch
Brinell Hardness	15
Viscosity at 282°C	.0197 poise
Surface Tension at 282°F	490 dyne/cm
Coefficient of Linear Thermal Expansion	0.0000118 per degree F
Electrical Conductivity	69,000 Mho/cm
Electrical Conductivity (expressed as a % of the International Annealed Copper Standard)	11.9% IACS
Electrical Resistivity	0.0000145 Ohm-cm
Thermal Conductivity at 80°F	28.9 BTU/hr.-Ft-per degree F

Technical Specifications

	Four 9's MRI Specification	J-STD-006 Alloy Specification
Sn	63.0 ± 0.5	63.0 ± 0.5
As	.0080 (max)	.0300 (max)
Sb	.0500 (max)	.2000 (max)
Au	.0020 (max)	.0500 (max)
Fe	.0080 (max)	.0200 (max)
Ni	.0080 (max)	.0100 (max)
Bi	.0080 (max)	.1000 (max)
Al	.0005 (max)	.0050 (max)
Cu	.0080 (max)	.0800 (max)
Ag	.0080 (max)	.1000 (max)
Zn	.0008 (max)	.0030 (max)
Cd	.0010 (max)	.0020 (max)
In	.0030 (max)	.1000 (max)
Pb	Balance	Balance

Mechanical Properties

Tensile Strength	7,700 psi
0.1% offset Yield Strength	1,900 psi
0.2% offset Yield Strength	2,300 psi
Tensile Elongation	32%
Shear Strength	5,400 psi
Izod Impact Strength	14 foot-pounds
Stress to Produce a Creep Rate 0.0001 in/in/day	333 psi
Modulus of Elasticity	4,350,000 psi

SolderFour9's 1021

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