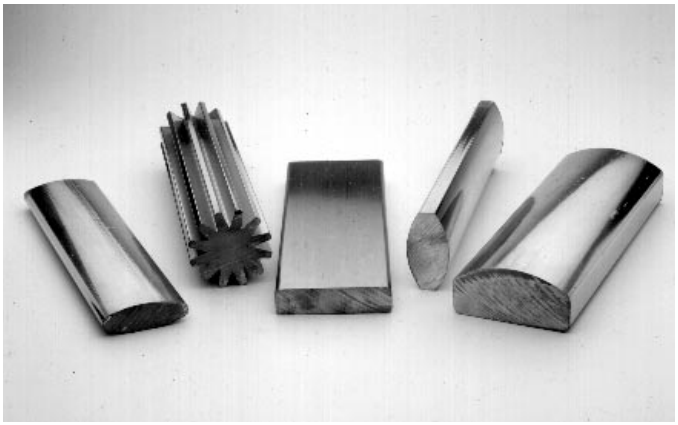
Tin and Tin/Lead Anodes Product Bulletin

Quality Manufacturing

Metallic Resources' cast and extruded plating anodes are manufactured using the purest tin and tin/lead solder alloys. Cast anodes are available in a rectangular shape 1"x4" by specified length (up to 54" long). Extruded anodes are available in a variety of shapes in specified lengths up to 84" long. All anodes are drilled and tapped to accept a 3/8" diameter, 16 threads/inch hook. Plating nugget anodes are also available for basket plating applications.



For Re-Flow and Protection

Metallic Resources' tin and tin/lead anodes are ideally suited for re-flow processing of printed circuit boards. They are also used extensively as an etch resistant material. Plating nugget anodes are specially designed to fit rigid baskets in plating operations. Many general manufacturing plating applications also exist where a soft non-corrosive protection coating of metallic parts is required.

Sludging Dramatically Reduced

Metallic Resources' tin and tin/lead anodes are manufactured from metals exhibiting the highest purity attainable, thus resulting in a dramatic reduction in sludging. Sludging is reduced because all metallic impurities and non-metallic oxides and sulfides are removed by a proprietary manufacturing process prior to casting or extruding. Less sludge generated results in less energy consumption, greater plating process efficiency, less maintenance required for equipment, less need for (or even elimination of) bagging, and lower waste treatment/disposal costs. The manufacturing process also creates product with smaller metal crystals packed into a much tighter crystalline structure. This results in more uniform corrosion of the anode in the bath, and a more even and uniform distribution of metallic ions in the plating bath.

The special shape of anodic plating nuggets are designed to eliminate "hang ups" in basket plating applications. The semi-circle shape allows for more surface contact to bring about greater current efficiency and a more uniform electrical current distribution throughout the basket. The end result is a more uniform deposition of tin and/or tin/lead on the printed circuit board.

Metallic Resources special waffle anodes provide 1.67 times the surface area of a rectangular anode of the same dimensions for an increased anode to cathode ratio.

METALLIC RESOURCES, INC.

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Superior Quality

Metallic Resources unique solders outshine all others to provide greater cost effectiveness, higher finished goods quality, and superior production line performance.

Physical Properties:

Shape	Size	Approximate Weight/Inch (lbs.) Sn	63/37
Rectangle	1"x4"	1.05	1.28
Elliptical	1.5"x3"	0.95	1.12
Oval	1.5"x3"	1.05	1.28
Star	3" (12 pt.)	1.36	1.64
Nugget (Semisphere)			
	1"	0.26*	0.31*
Ball	7/8" dia.	0.09*	0.13*
	2" dia.	1.10*	1.30*
Waffle	1.25" x 6.25"	1.65	1.95*

*Weight per individual object. All dimensions are nominal.

Pure Tin Anodes

	MRI Specification	MRI Typical Analysis
Sn	99.90% (min)	99.96%
As	.0035 (max)	≤.0015
Sb	.0200 (max)	≤.0150
Au	.0003 (max)	≤.0003
Fe	.0050 (max)	≤.0030
Ni	.0060 (max)	≤.0030
Bi	.0100 (max)	≤.0040
Al	.0010 (max)	≤.0001
Cu	.0050 (max)	≤.0025
Ag	.0005 (max)	≤.0003
Zn	.0010 (max)	≤.0005
Cd	.0010 (max)	≤.0005
In	.0060 (max)	≤.0050
Pb	.0500 (max)	≤.0250

Sn63 Anodes

	MRI Specification	MRI Typical Analysis
Sn	62.50-63.50%	63.00%
As	.0020 (max)	≤.0010
Sb	.0050 (max)	≤.0010
Au	.0010 (max)	≤.0003
Fe	.0010 (max)	≤.0005
Ni	.0010 (max)	≤.0005
Bi	.0020 (max)	≤.0010
Al	.0005 (max)	≤.0003
Cu	.0010 (max)	≤.0005
Ag	.0020 (max)	≤.0010
Zn	.0005 (max)	≤.0005
Cd	.0005 (max)	≤.0005
In	.0010 (max)	≤.0010
S	.0030 (max)	≤.0010
P	.0100 (max)	≤.0030
Pb	Balance	Balance

Anodes 1003
Supercedes
Anodes 1001