MATERION

Data Sheet

Tin (Sn)

Sputtering Targets for Large Area Coating Applications

Materion is one of the world's leading suppliers of sputtering targets for large area coatings. We manufacture high-quality targets capable of producing uniform thin films to achieve the optimal results required for the deposition process to ensure our products meet or exceed industry standards. Our high-purity Tin (Sn) planar and rotatable sputtering targets are developed to produce low defect and high performance thin films.

Applications

Tin oxide layers reactively sputtered from metallic tin targets have been used for architectural glass coatings for over two decades. These applications are important as protective and interference layers in modern low-e layer systems and in solar control layer stacks.

Target Geometry

Materion produces targets for all commonly used architectural glass coating cathodes with lengths up to 4000 mm and a target thickness up to 30 mm.

Types of Tin Targets

Materion produces standard planar, cast rotatable, and thermally sprayed rotatable sputtering targets.

- Planar tin targets are usually solder-bonded to a copper backing plate at a low temperature. These "pre-shaped" solder bonded targets guarantee the best purity and the most reliable homogeneity of the material.
- For some older cathode types "cast-on-copper" targets are still used. These targets are predominantly designed for lowest cost but lack the high purity and homogeneity standards of bonded targets.
- Modern sputtering plants are usually equipped with rotatable cathodes. Depending on customer requirements two types of Sn rotatable targets, cast and thermally sprayed, are available. In principle the cast version offers high density and low oxygen content, the thermally sprayed version shows smaller microstructure. Both types of targets enable a full reuse of the applied backing tubes.

Target Mounting

Normally, Sn targets are bonded onto copper backing plates. Materion uses a proprietary soldering process. For some older cathode designs, direct castings on copper plates or direct castings into copper boats are used. Clamping of tin without a backing plate is not favorable because of the restrictions in the sputtering power load. For more information, contact your sales representative.

Production Processes

Materion uses proprietary near net shape casting processes with grain-refining technologies. This unique target production technology enables us to produce sputtering targets with perfect homogeneity and high purity. The desired target thickness can be easily adjusted to individual customer demands.

Recycling

Materion offers complete material recycling. Remelt and refine processes guarantee a minimum of waste material, resulting in a lower environmental impact.

Quality Assurance

Materion uses ISO 9001:2015 certified procedures to guarantee the highest and most consistent product reliability. We strive for continuous process improvements using statistical process control. In addition to detailed specifications and sophisticated analytical methods, our employees are dedicated to the highest quality standards.

Benefits

- Solder bonded targets offering high purity and almost perfect homogeneity
- Direct cast on Cu backing plate or Cu boat available
- Proprietary casting processes for refined grain
- Target thickness can be easily customized for customers' requirements
- Targets available for architectural glass coating cathodes with lengths up to 4000 mm and target thickness up to 30 mm
- Company dedicated to Quality Assurance and ISO 9001:2015 certified procedures

Technical Data

	Bonded Targets	Cast On Copper (boats)	Rotatable Targets
Typical Purity	99.9%	99%	99.9%
Grain Size	< 5 mm	–	< 5mm (cast) / < 0.5mm (sprayed)

Major Impurities:			
Copper (Cu)	< 700 ppm	= 0.5 to 1%	< 700 ppm
Bismuth (Bi)	< 200 ppm	< 200 ppm	< 150 ppm
Antimony (Sb)	< 200 ppm	< 200 ppm	< 150 ppm
Lead (Pb)	< 100 ppm	< 100 ppm	< 150 ppm
Total Metallic Impurities	< 1000 ppm	–	< 1000 ppm

Thermal Conductivity	73 W/(m • K)
Thermal Expansion at room temp	~20 $10^{-6}/K^{-1}$
Tensile Strength at room temp	14 MPa
Tensile Strength 100°C	11 MPa
Melting Point °C	232
Solidus Temperature of solder °C	125

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