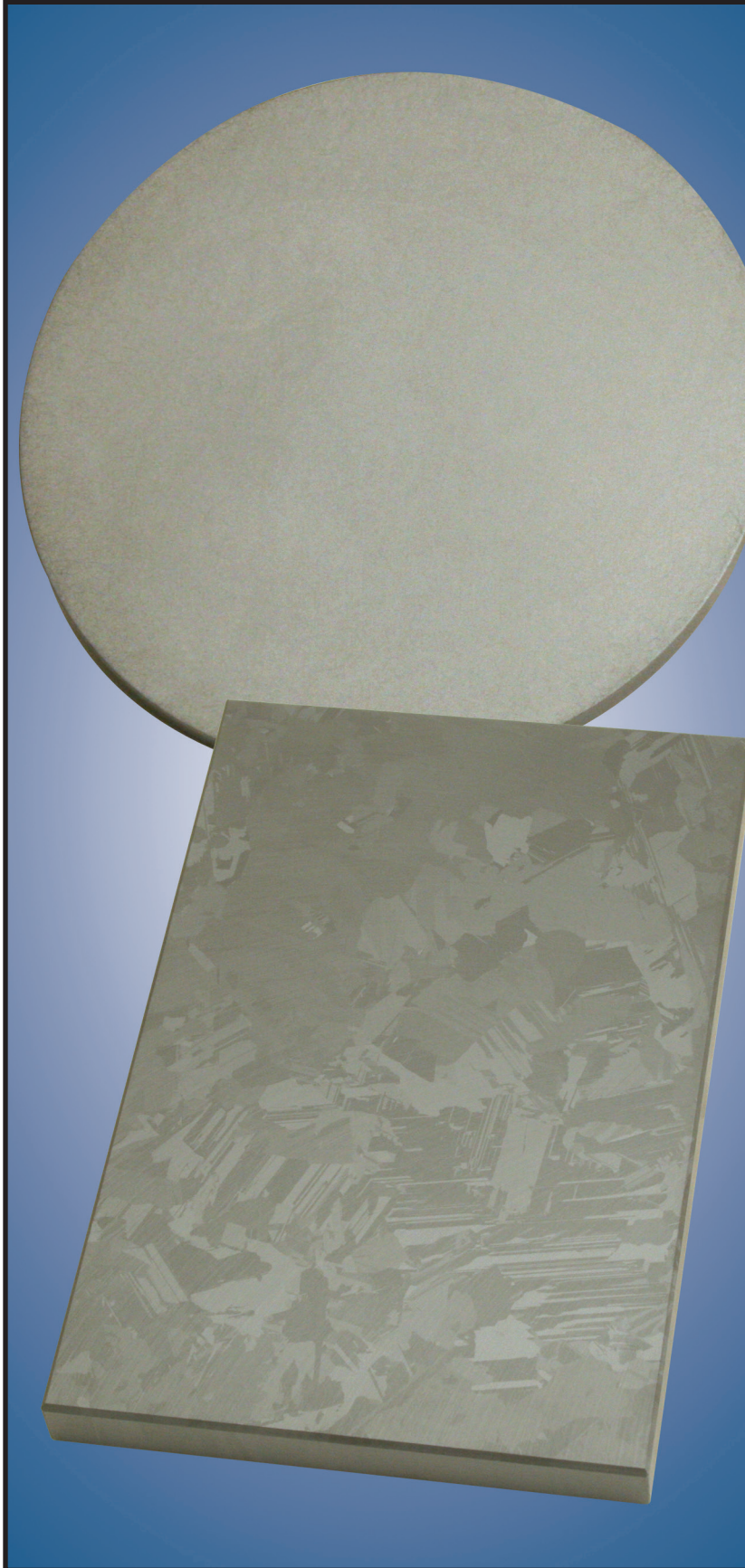


# Silicon

## Sputtering Targets



**Kurt J. Lesker**<sup>®</sup>  
Company

**MATERIALS**<sup>™</sup>  
DIVISION

### Applications

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- Alternating silicon layers in poly-silicon solar cells
  - p-n junction
- Optical coatings
  - Filters
    - Bandpass, dichroic, beamsplitter, etc.
    - Commercial, defense, aerospace, etc.
  - Optical data storage
- Reactively sputtered layers
  - Silicon dioxide ( $\text{SiO}_2$ ), Silicon monoxide ( $\text{SiO}$ ), Silicon nitride ( $\text{Si}_3\text{N}_4$ )
  - Anti-reflective  $\text{SiN}_x\text{O}_y$

### Features

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- Low pricing
- Large diameter monocrystalline (single piece)
- Standard and custom resistivity ranges
- High purity
- High volume capacity

### Manufacturing Process

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- Czochralski (CZ) method for single crystal monocrystalline
- Bridgeman Furnace melting for polycrystalline
- Ingot testing
  - Resistivity measurements taken at numerous ingot locations
  - GDMS performed for chemical analysis
- Wire saw cutting and CNC grinding to final dimensions
- Inspection, Cleaning and Final Packaging
  - Targets inspected to ensure correct dimensions
  - Cleaned for use in vacuum
  - Protects from environmental contaminants and shipment

### Options

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- Monocrystalline or polycrystalline
- P or N type
- Standard low, medium, and high resistivity ranges available
- Up to 16" diameter for monocrystalline
- Virtually any linear target configuration
- In-house indium bonding service

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## Specifications

### Typical Analysis - 99.999%+ (5N+) Purity

Metallic Impurities, ppm by weight

Mg	Al	K	Ca	Ti	Au	Mn	Fe	Ni	Cu	Zn
<0.001	<0.005	<0.005	<0.01	<0.001	<0.01	<0.001	<0.005	<0.005	<0.002	<0.005

Doping	P-type Boron, N-type Phosphorus
Theoretical Density	2.33 g/cm <sup>3</sup>
Relative Density	>99%
Grain Size (polycrystalline)	1-15 mm
Electrical Resistivity	P-type (0.005-0.020 Ω-cm), N-type (<0.1 Ω-cm), Undoped (>1 Ω-cm)
Thermal Conductivity (20°C)	150 W/m-K
Thermal Expansion (0°C)	2.6 x 10 <sup>-6</sup> /K
Melting Point	1410°C
Appearance	Dark Gray

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Kurt J. Lesker Company  
United States - salesus@lesker.com  
412.387.9200  
800.245.1656

Kurt J. Lesker Canada Inc.  
Canada - salescan@lesker.com  
416.588.2610  
800.465.2476

Kurt J. Lesker Company Ltd.  
EMEIA - EMEIASales@lesker.com  
+44 (0) 1424 458100

Kurt.Lesker (Shanghai) Trading Company  
科特·莱思科(上海)商贸有限公司  
Asia - salesasia@lesker.com  
+86 21 50115900