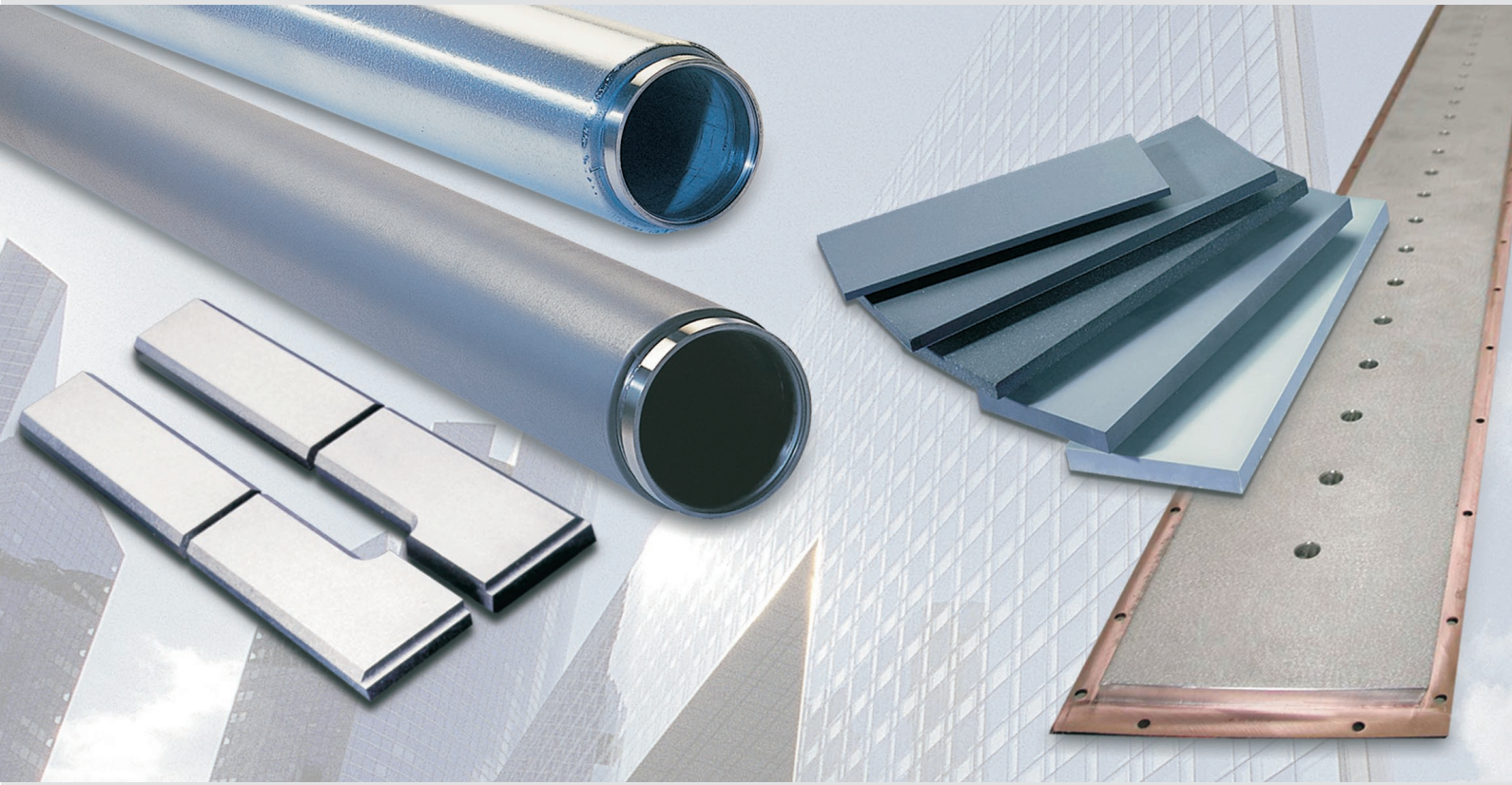


# Heraeus



## Sputtering Targets for Large Area Coating

W. C. Heraeus



Production Technique

Casting Metallurgy

- Open Melting
- Vacuum Induction Melting
- Electron-Beam Melting
- Continuous Casting

Powder Metallurgy

- Cold Isostatic Pressing / CIP
- Sintering
- Hot Pressing
- Hot Isostatic Pressing
- Plasma Spraying

Transformation Technique

- Forging
- Rolling
- Pressing
- Bonding
- Cleaning / Clean Room Packaging



Applications

The large area coating industry includes several market segments and various thin film layer types. From the beginning of industrial glass coating, W.C. Heraeus was involved in development and production as the leading supplier for thin film materials in

- Architectural glass
- Automotive glass
- Mirrors
- CRT's
- Photovoltaics
- Flexible packaging
- Special applications (ARAS, electrochromic, smart windows)

Architectural glass

highly transparent and color neutral, tinted solar-control, low-e/solar control combinations

Materials for low-e glass:

- Sn
- Zn(Al)
- Bi
- SISPA®
- Si
- Ti
- Ag/Ag-alloys
- NiCr
- ZAO™
- (ZnO/Al<sub>2</sub>O<sub>3</sub>)

Materials for solar control:

- Sn
- Zn(Al)
- Ti
- Cr
- Stainless steel
- ZAO™
- (ZnO/Al<sub>2</sub>O<sub>3</sub>)

Automotive glass

highly transparent and electrically conductive, multi-layer coatings for flat and bent glass, solar control glass, mirrors and defrosting layers.

- Sn
- Ti
- ZnSn
- InSn
- Ag/Ag-alloys
- Cr
- Stainless steel
- ZAO™
- (ZnO/Al<sub>2</sub>O<sub>3</sub>)

Photovoltaics

all materials for thin film photovoltaics, e.g. transparent conductive oxides (TCO's), back contacts, etc.

- ZAO™ (ZnO/Al<sub>2</sub>O<sub>3</sub>)
- Ni/NiV
- Al
- Ag
- CuGa
- ZnAl
- Sn
- ITO
- Mo

Special applications (ARAS, electrochromic, smart windows)

special coatings on glass: anti-reflective coatings (AR), flat panel displays (ARAS), electro-chromic coatings, specialty mirrors.

- ITO
- InSn
- Si
- SISPA®
- Al
- Ti
- W
- Nb
- Cr

Other materials on request, target lengths up to 13.2 feet / 4.000 mm

Production Processes

W. C. Heraeus has developed proprietary production processes for all these target materials. This guarantees consistent products, which correspond exactly to our customers specification – lot to lot, target to target.

Dimensions

W. C. Heraeus produces sputtering targets for all existing sputter equipment, e.g.

Applied Films Corp.

Planar Magnetrons (HLK)  
Interpole Targets (ZPT)  
TwinMag, Targets

von Ardenne – BOC

Planar Magnetron  
Dual Magnetron SDM, WDM  
Single Magnetron SSM, WSM  
C-Mag

Other designs on request.

Analysis

All materials are tested in our state-of-the-art analytical laboratories:

- Glow Discharge Mass Spectrometry (GDMS)
- Induction Coupled Plasma Spectroscopy (ICP)
- Hot Gas Extraction (LECO)
- Metallography
- Scanning Electron Microscopy (SEM)
- X-ray Diffraction (XRD)
- Ultrasonic Testing

Quality Assurance

Heraeus TMD uses DIN EN ISO 9001:2000 certified procedures to guarantee the highest and most consistent product reliability. Our teams strive for continuous improvements in our stringent manufacturing processes using statistical process control. Besides detailed process specifications and sophisticated analytical methods, the dedication of each of our team members is the foundation of our quality.

Standard Products

Material		Recom. purity grade	Recom. fixing technique	Density % of theoretical	Thermal conductivity [W/m K]	Melting point [C°]
Targets for Reactive Sputter Processes (planar)						
Tin	Sn	99.9	bonded	100 %	64	232
Zinc	Zn	99.99	bonded	100 %	111	419
Bismuth	Bi	99.99	bonded	>98 %	8	271
Indium-Tin	InSn10	99.9	bonded	100 %	68	~143
Silicon(doped)	Si	99.999	bonded	100 %	126	1412
SISPA®	SiAl	99.9	clamped	>98 %	90	580-1360
Titanium	Ti	99.4	clamped	100 %	21	1668
Targets for Metallic Sputtering Processes (planar)						
Silver	Ag	99.97	clamped	100 %	418	960
Nickel-Chromium	NiCr20	99.9	clamped	100 %	14,6	~1440
Titanium	Ti	99.4	clamped	100 %	21	1668
Chromium	Cr	99.9	clamped	>99 %	69	1863
Stainless Steel	„SST“		clamped	100 %	11	~1300
Gold	Au	99.99	bonded	100 %	310	1064
Rotatable Targets						
Silver	Ag	99.97	bonded	100 %	418	960
Tin	Sn	99.9	cast	100 %	64	232
Zinc(Al) sprayed	Zn(Al)	99	sprayed	approx. 90 %	-	419
Zinc(Al) cast	Zn(Al)	99.99	cast/bonded	100 %	~100	419
Silicium(Al)	Si(Al)	99	sprayed		-	-
Ceramic Targets (conductive)						
Indium Tin Oxide	ITO	99.9	bonded	99 %	14	-
Zinc Al-Oxide	ZAO™	99.9	bonded	98 %	32	-
Titan Oxide	TiO <sub>2</sub>	99	bonded	90 %	4	-



## W. C. Heraeus – TMD offers:

### Reliable and highest quality products

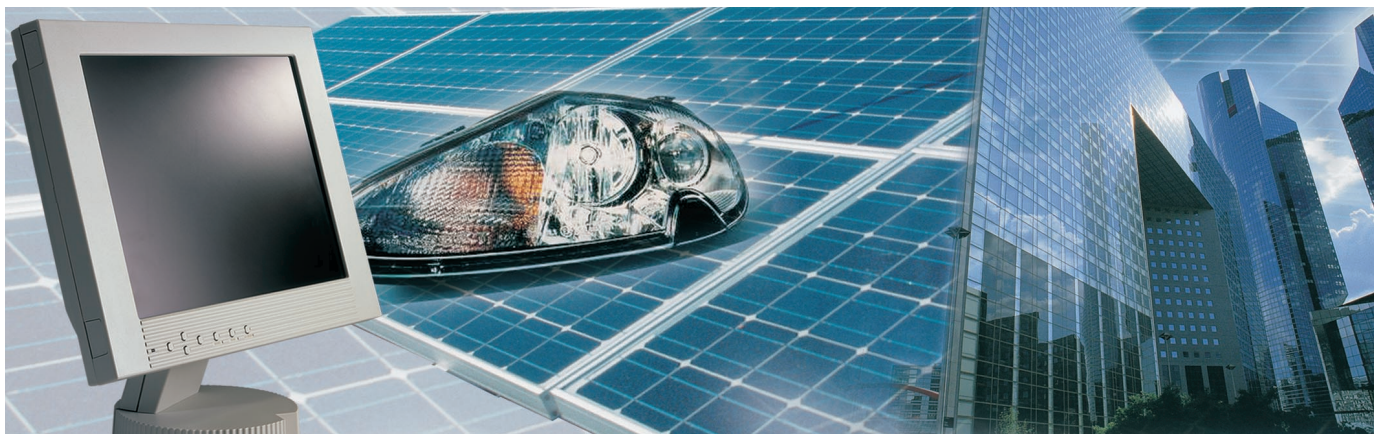
- Modern production facilities
- Targets meet original manufacturer's specifications
- All production and testing ISO 9001:2000 certified

### Innovative products

- Full range of R&D capabilities
- Targets optimized to your production parameters
- Close cooperation with system manufacturers

### Customer support

- Extensive process technology support
- Global network close to you



The Thin Film Materials Division (TMD) of W.C. Heraeus is a recognized leader in the development and manufacture of high purity sputtering targets and evaporation material for the large area coating, semiconductor, and

electronics industries. For the glass coating industry TMD has set technology milestones in Large Area Coating right from the beginning of industrial glass coating, and continues to be a leading innovator today.

The data given here are correct for October 2004.  
We reserve the right to make technical alterations as necessary.

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