



Vital Thin Film Materials

Sputtering Targets

About Vital Materials

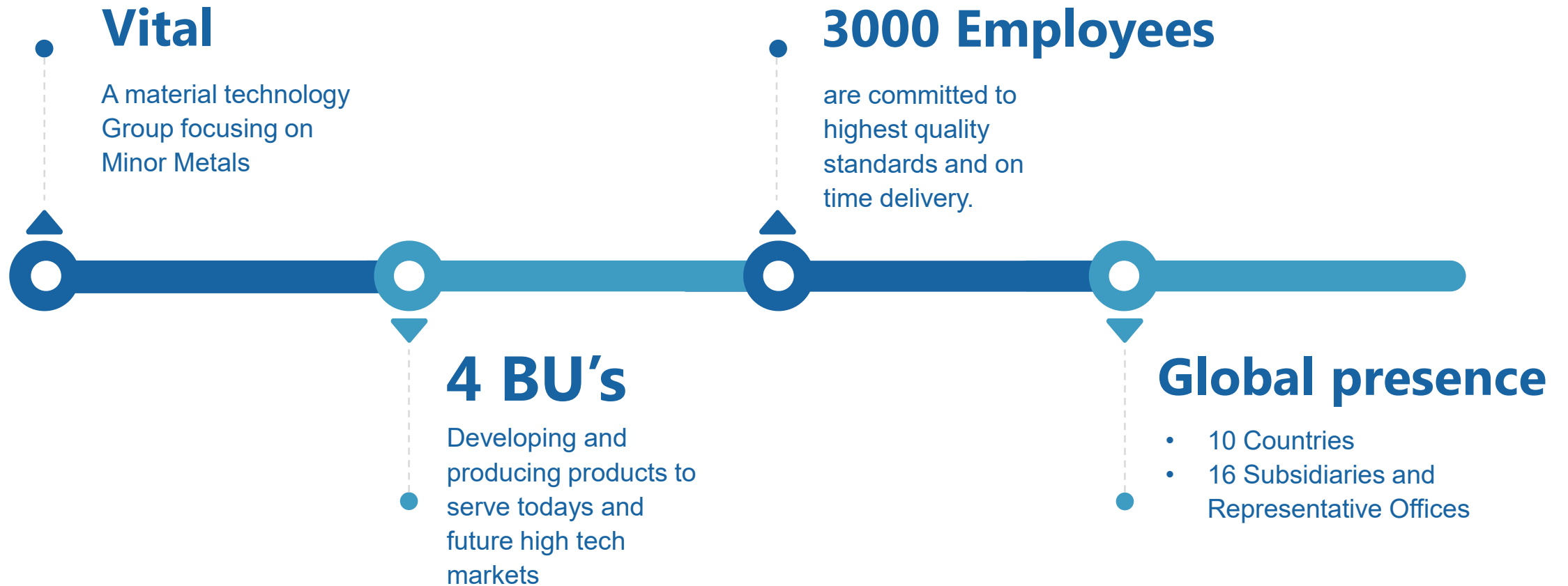


*We close the Material-loop to secure
Recourses for todays and future technology!*



About Vital Materials

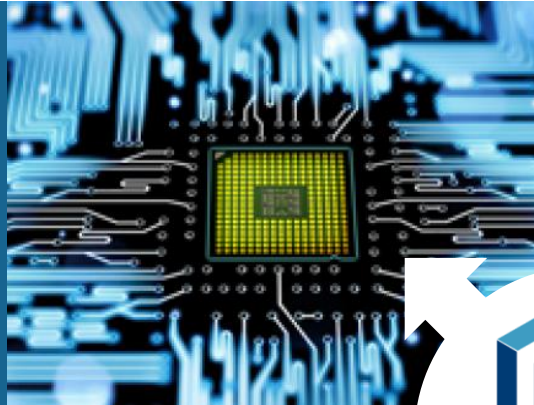
FACTS AND FIGURES



Vital Business Units

Compound Semiconductors

Specialized semiconductor wafers, metal-organic compounds, electronic gases and technical ceramics for various industrial use.



Thin Film

Vital provides products for vacuum system applications employed in thin film coating processing.

Infrared & Lasers

Infrared (IR) materials for thermal imaging infrared cameras and industrial laser applications.

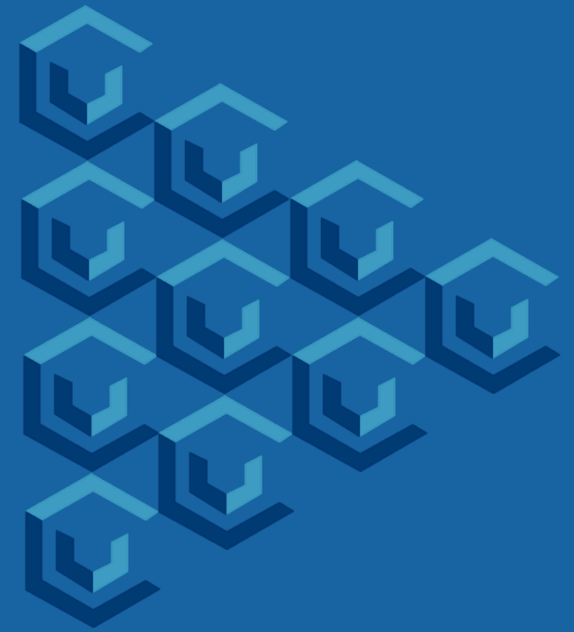


Rare Metals & Recycling

Vital provides a broad portfolio of Rare metal (RM) products with form of metals, chemicals, and alloys



VITAL Thin Film Materials



Vital Thin Film Materials

OUR MARKETS

Display, OLED & Touch Panel

ITO, IGZO, Si and Metal Targets

Photovoltaic

ITO, ZnTe, CdS,
CuGa, CuGaIn,
CuGaInSe, In
Targets,
Evaporation
Materials

Glass & Smart Glass

ITO, Metal & Ceramic
Targets

EMI Shielding

ITO Targets

Semiconductor

High purity Metals,
Targets, Substrates and
Gasses

LED

ITO, Precious Metals,
Metal Alloys, Targets and
Substrates

Data Storage

Precious Metals, Metal
Alloy

Optics

Evaporation Material,
Sputtering Targets,
Accessories



Vital Thin Film Materials Technologies



Powder Metallurgy

- Vacuum Hot Press (VHP)
- Cold Isostatic Pressing (CIP)
- Hot Isostatic Pressing (HIP)
- Gas Atomization (GA)
- Spark Plasma Sintering (SPS)
- Axial-Press & Sintering
- Cold Spray
- Plasma Spray



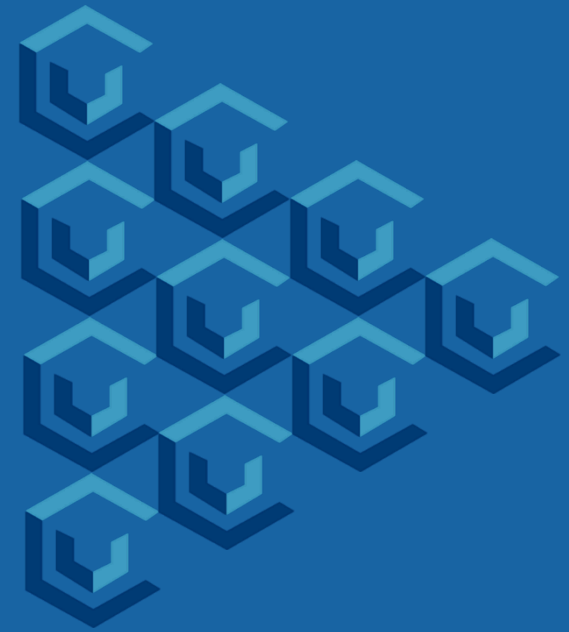
Casting Metallurgy

- Vacuum Induction Melting (VIM)
- E-Beam Melting (EBM)

Transformation Techniques

- Forging
- Rolling (Hot & Cold)
- Water Jet
- CNC Machining – Turning, Milling, Grinding

Products



Silver Rotary

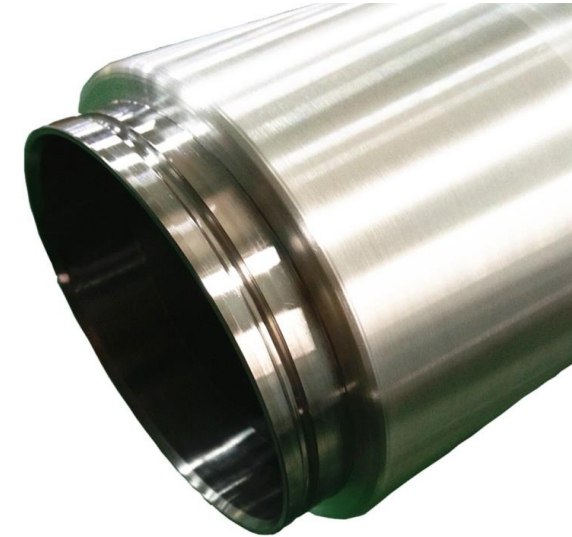
Physical & Chemical Properties

- ❖ Material: Ag
- ❖ Process: Cold Spray
- ❖ Density: 10.5g/cm³ (≥95%), (100%)
- ❖ Purity: 99.99%
- ❖ Maximum Impurities content: (≤ ppm)
Total Metallic Impurities ≤ 100ppm

Fe	Ga	Al	Cu	Zn	N	O	Ti
40	ND	10	50	ND	200	500	ND

Application:

- ❖ Low-E glass film
- ❖ Photovoltaic
- ❖ TFT-LCD
- ❖ Semiconductor



Maximum Dimensions:

Length 4000mm, thick 6-13mm
 Straight and dog-bone

Silver Planar

Physical & Chemical Properties

- ❖ Material: Ag
- ❖ Process: melting / rolling
- ❖ Density: 10.5g/cm³ (100%)
- ❖ Purity: 99.99%
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities \leq 100ppm



Application:

- ❖ Low-E glass film
- ❖ Photovoltaic
- ❖ Optical Mirrors
- ❖ Semiconductor

Maximum Dimensions:

1500mm x 250mm x 30mm

Aluminum Rotary

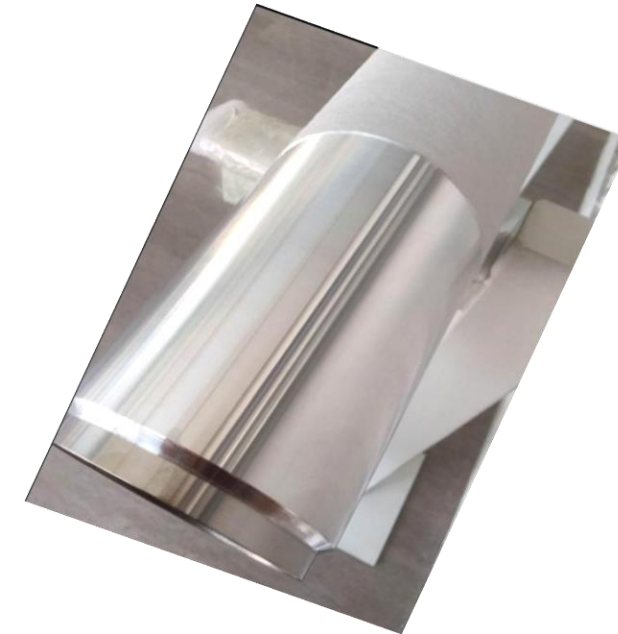
Physical & Chemical Properties

- ❖ Material: Al
- ❖ Process: Cold Spray
- ❖ Density: 2.6g/cm^3 ($\geq 95\%$)
- ❖ Purity: 99.9% - 99.99%
- ❖ Maximum Impurities content: ($\leq \text{ppm}$)
Total Metallic Impurities $\leq 500\text{ppm}$

Fe	Cu	Ni	Sn	Zn	N	O
200	100	100	50	50	200	1500

Application:

- ❖ Decorative coating
- ❖ TFT-LCD
- ❖ Semiconductor



Maximum Dimensions:

Length 4000mm, thick 6-15mm
Straight and dog-bone

Aluminum Rotary

Physical & Chemical Properties

- ❖ Material: Al
- ❖ Process: Extruded / machined
- ❖ Density: 2.7g/cm^3 (100%)
- ❖ Purity: 99.99%
- ❖ Maximum Impurities content: ($\leq\text{ppm}$)
Total Metallic Impurities $\leq 100\text{ppm}$

Ti
100

Application:

- ❖ Decorative coating
- ❖ TFT-LCD
- ❖ Semiconductor



Maximum Dimensions:

Length 4000mm, thick 6-15mm
Straight and dog-bone

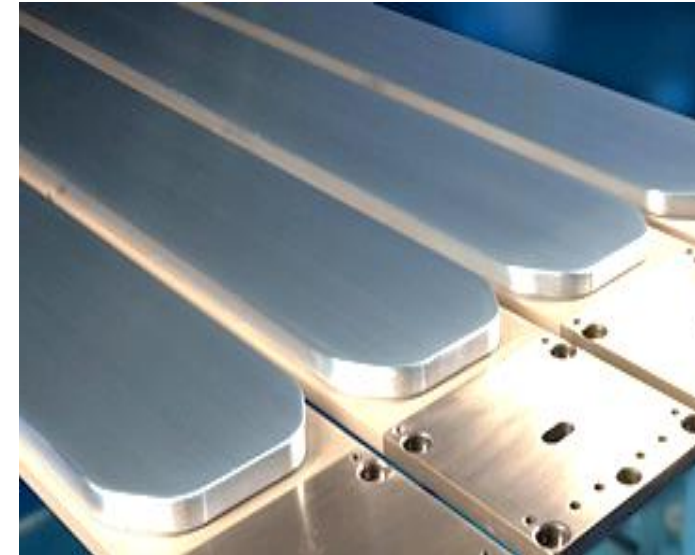
Aluminum Planar

Physical & Chemical Properties

- ❖ Material: Al
- ❖ Process: melted / rolled
- ❖ Density: 2.7g/cm^3 (100%)
- ❖ Purity: up to 99.9995%
- ❖ Maximum Impurities content: ($\leq\text{ppm}$)
Total Metallic Impurities depending on purity

Application:

- ❖ Decorative coating
- ❖ TFT-LCD
- ❖ Semiconductor



Maximum Dimensions:

2000mm x 500mm x 30mm

Copper Rotary

Physical & Chemical Properties

- ❖ Material: Cu
- ❖ Process: Cold spray
- ❖ Density: 8.57g/cm³ (≥97%)
- ❖ Purity: 99.9% - 99.99%
- ❖ Maximum Impurities content: (≤ ppm)
 Total Metallic Impurities ≤ 5000ppm

Fe	Ni	Zn	Ca	Sn	O	N
200	50	200	50	50	7000	300

Application:

- ❖ Touch Panel
- ❖ Semiconductor
- ❖ Decorative coating



Maximum Dimensions:

Length 4000mm, thick 6-13mm
 Straight and dog-bone

Copper Planar

Physical & Chemical Properties

- ❖ Material: Cu
- ❖ Process: Melted, rolled
- ❖ Density: 8.7g/cm³ ($\geq 100\%$)
- ❖ Purity: up to 99.9999%
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities depending on purity



Application:

- ❖ Touch Panel
- ❖ Semiconductor
- ❖ Decorative coating

Maximum Dimensions:

2000mm x 500mm x 30mm

Chromium Rotary

Physical & Chemical Properties

- ❖ Material: Cr
- ❖ Process: Thermal spray
- ❖ Density: 6.47g/cm³ (≥95%)
- ❖ Purity: 99.5%
- ❖ Maximum Impurities content: (≤ ppm)
 Total Metallic Impurities ≤ 5000ppm

Fe	Si	Al	N	O
2400	2000	600	300	10000

Application:

- ❖ Decorative coating
- ❖ Functional coating
- ❖ Low-E glass
- ❖ Semiconductor



Maximum Dimensions:

Length 4000mm, thick 6-10mm
 Straight and dog-bone

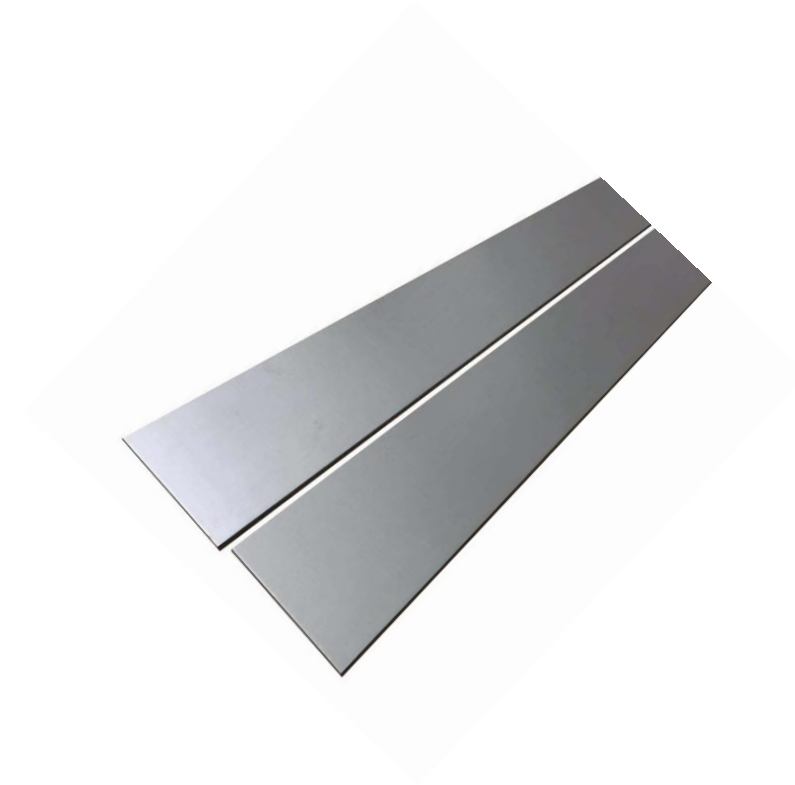
Chromium Planar

Physical & Chemical Properties

- ❖ Material: Cr
- ❖ Process: HIP
- ❖ Density: 7.15g/cm³ (≥99.5%)
- ❖ Purity: up to 99.99%
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities depending on purity

Application:

- ❖ Decorative coating
- ❖ Functional coating
- ❖ Low-E glass
- ❖ Semiconductor



Maximum Dimensions:

2000mm x 500mm x 30mm

Indium Rotary

Physical & Chemical Properties

- ❖ Material: In
- ❖ Process: Casted
- ❖ Density: 7.3g/cm³ (100%)
- ❖ Purity: 99.99%
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities \leq 100ppm



Application:

- ❖ Photovoltaics
- ❖ Low-E glass
- ❖ Semiconductor

Maximum Dimensions:

Length 4000mm, thick 6-14mm
Straight and dog-bone

Indium Planar

Physical & Chemical Properties

- ❖ Material: In
- ❖ Process: Casted
- ❖ Density: 7.3g/cm³ (100%)
- ❖ Purity: 99.99%
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities \leq 100ppm



Application:

- ❖ Photovoltaics
- ❖ Low-E glass
- ❖ Semiconductor

Maximum Dimensions:

2000mm x 500mm x 30mm

Molybdenum Rotary

Physical & Chemical Properties

- ❖ Material: Mo
- ❖ Process: Sintering
- ❖ Density: 10.2g/cm³ (≥97%)
- ❖ Purity: 99.99%
- ❖ Maximum Impurities content: (≤ 100ppm)

Fe	Si	Al	C	O	N	Ni
30	30	20	50	60	20	20

Application:

- ❖ Display
- ❖ Photovoltaics
- ❖ Optical Glass



Maximum Dimensions:

Length 4000mm, thick 6-13mm
Straight and dog-bone

Molybdenum Planar

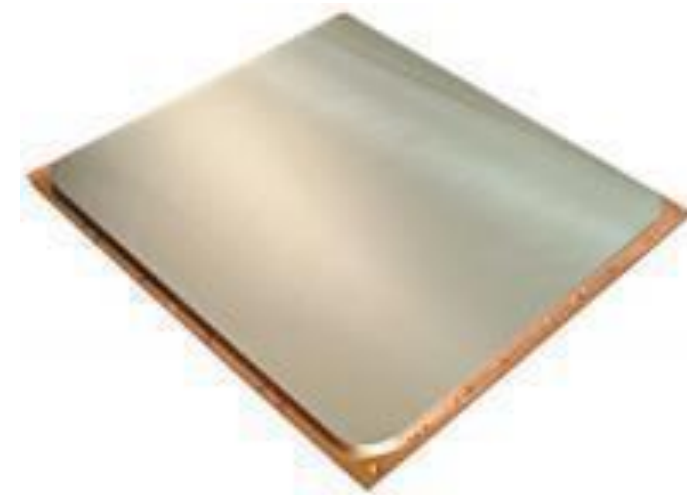
Physical & Chemical Properties

- ❖ Material: Mo
- ❖ Process: Sintering
- ❖ Density: 10.2g/cm³ (≥97%)
- ❖ Purity: 99.99%
- ❖ Maximum Impurities content: (≤ 100ppm)

Fe	Si	Al	C	O	N	Ni
30	30	20	50	60	20	20

Application:

- ❖ Display
- ❖ Photovoltaics
- ❖ Optical Glass



Maximum Dimensions:

2000mm x 500mm x 30mm

Molybdenum Niobium Rotary

Physical & Chemical Properties

- ❖ Material: MoNb
- ❖ Process: bonded on backing Tube
- ❖ Density: 10.2g/cm³ (≥97%)
- ❖ Purity: 99.99%
- ❖ Maximum Impurities content: (≤ 100ppm)

Fe	Si	C	Ni	O	N
100	100	100	50	70	20

Application:

- ❖ Display
- ❖ Photovoltaics
- ❖ Optical Glass



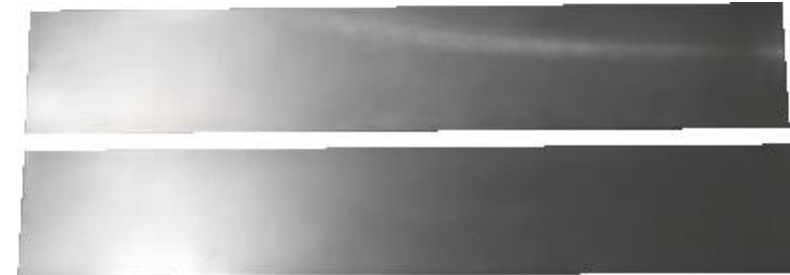
Maximum Dimensions:

Length 4000mm, thick 6-13mm
 Straight and dog-bone

Molybdenum Niobium Planar

Physical & Chemical Properties

- ❖ Material: MoNb
- ❖ Process: Sintering
- ❖ Density: 10.2g/cm³ (≥97%)
- ❖ Purity: 99.99%
- ❖ Maximum Impurities content: (≤ 100ppm)



Fe	Si	C	Ni	O	N
100	100	100	50	70	20

Application:

- ❖ Display
- ❖ Photovoltaics
- ❖ Optical Glass

Maximum Dimensions:

2000mm x 500mm x 30mm

Nickel Chromium Planar

Physical & Chemical Properties

- ❖ Material: NiCr 60/40, 80/20 wt%
- ❖ Process: Vacuum Melting
- ❖ Density: 8.2g/cm³ (≥95%)
- ❖ Purity: 99.9%
- ❖ Maximum Impurities content: (\leq 1000ppm)



Application:

- ❖ Decorative coating
- ❖ Functional coating
- ❖ Automotive Glass

Maximum Dimensions:

2000mm x 500mm x 30mm

Niobium Rotary

Physical & Chemical Properties

- ❖ Material: Nb
- ❖ Process: Thermal spray
- ❖ Density: 8.5g/cm³ (≥99%)
- ❖ Purity: 99.95%
- ❖ Resistivity: $\leq 9.9 \times 10^{-5} \Omega \cdot \text{cm}$ (20° C)
- ❖ Maximum Impurities content: (\leq ppm)
 Total Metallic Impurities $\leq 1000\text{ppm}$

Zn	Ta	Si	W	Cr	O	N
400	100	100	50	50	1000	300

Application:

- ❖ Touch Panel
- ❖ Semiconductor
- ❖ Low-E glass
- ❖ AR Coating



Maximum Dimensions:

Length 4000mm, thick 6-13mm
 Straight and dog-bone

Niobium Planar

Physical & Chemical Properties

- ❖ Material: Nb
- ❖ Process: E-Beam melted, rolled, annealed (Grain Size <50 μ m)
- ❖ Density: 8.6g/cm³ (100%)
- ❖ Purity: up to 99.99%
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities depending on purity



Application:

- ❖ Photonics
- ❖ Semiconductor
- ❖ Precision Optics
- ❖ AR Coating

Maximum Dimensions:

2000mm x 500mm x 30mm

Niobium Oxide Rotary

Physical & Chemical Properties

- ❖ Material: NbO_x (4.3<x<4.9)
- ❖ Process: Thermal Spray
- ❖ Density: 4.3g/cm³ (≥99.5%)
- ❖ Purity: 99.95%
- ❖ Resistivity: (20° C) ≤0.1 Ω. Cm
- ❖ Maximum Impurities content: (≤ 500ppm)



Al	Cr	Cu	Fe	Mn	Mo	Ni	Si	Ta
≤120	≤10	≤5	≤10	≤5	≤45	≤5	≤10	≤45

Application:

- ❖ Touch Panel
- ❖ Semiconductor
- ❖ Low-E glass
- ❖ AR Coating

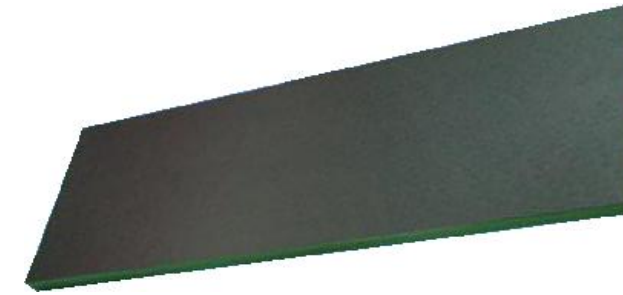
Maximum Dimensions:

Length 4000mm, thick 6-10mm
 Straight and dog-bone

Niobium Oxide Planar

Physical & Chemical Properties

- ❖ Material: NbOx
- ❖ Process: Sintering
- ❖ Density: 4.45g/cm³ (≥99.5%)
- ❖ Purity: 99.99%
- ❖ Resistivity: (20° C) ≤ 1 Ω. Cm
- ❖ Maximum Impurities content: (≤ 100ppm)



Al	Cr	Cu	Fe	Mn	Mo	Ni	Si	Ta	Ti
≤5	≤3	≤5	≤5	≤3	≤3	≤3	≤13	≤1	≤3

Application:

- ❖ Touch Panel
- ❖ Optical coating
- ❖ Low-E glass

Maximum Dimensions:

300mm x 300mm x 10mm

Silicon Aluminum Rotary

Physical & Chemical Properties

- ❖ Material: SiAl
- ❖ Process: Thermal Spray
 - ❖ (98/2wt%, 90/10wt%, 96/4wt%, 25/75wt%)
- ❖ Density: 2.2g/cm³ (≥94%)
- ❖ Purity: 99.9%
- ❖ Maximum Impurities content: (≤ ppm)
 Total Metallic Impurities ≤ 1000ppm

Fe	Ga	Ni	Cu	Zn	N	Ca	Ti	O
300	25	30	40	70	300	60	20	6000

Application:

- ❖ Low-E glass
- ❖ AR Coating



Maximum Dimensions:

Length 4000mm, thick 6-15mm
 Straight and dog-bone

Silicon Rotary

Physical & Chemical Properties

- ❖ Material: Si
- ❖ Process: Thermal spray
- ❖ Density: 2.26g/cm³ (≥95%)
- ❖ Purity: 99.95%
- ❖ Resistivity: ≤ 0.01-400Ω. cm (20° C)
- ❖ Maximum Impurities content: (≤ ppm)
Total Metallic Impurities ≤ 500ppm

Al	B	Fe	Cu	Ca	Mg	O	N
≤200	≤100	≤500	≤20	≤20	≤20	≤2500	≤500

Application:

- ❖ Touch Panel
- ❖ Low-E glass
- ❖ AR Coating



Maximum Dimensions:

Length 4000mm, thick 6-10mm
 Straight and dog-bone

Silicon Rotary

Physical & Chemical Properties

- ❖ Material: Si
- ❖ Process: casted and bonded
- ❖ Density: 2.33g/cm³ (≥99.8%)
- ❖ Purity: >99.99%
- ❖ Resistivity: $\leq 0.002\Omega \cdot \text{cm}$ (20° C)
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities $\leq 100\text{ppm}$



Application:

- ❖ Photonics
- ❖ Optics
- ❖ Semiconductor
- ❖ Touch Panel

Maximum Dimensions:

Length 4000mm, thick 14mm, Segmented
Straight and dog-bone

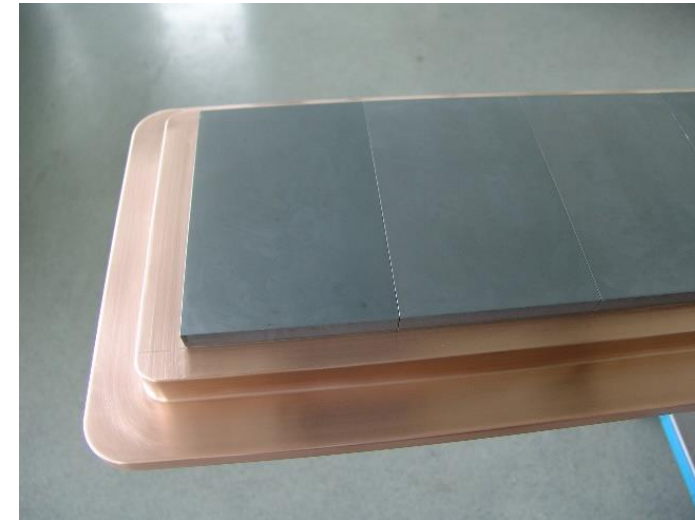
Silicon Planar

Physical & Chemical Properties

- ❖ Material: Si
- ❖ Process: casted and bonded
- ❖ Density: 2.33g/cm³ (≥99.8%)
- ❖ Purity: >99.99%
- ❖ Resistivity: $\leq 0.002 \text{ } \Omega \cdot \text{cm}$ (20° C)
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities $\leq 100\text{ppm}$

Application:

- ❖ Photonics
- ❖ Optics
- ❖ Semiconductor
- ❖ Touch Panel



Maximum Dimensions:

500mm x 500mm x 30mm

Titanium Rotary

Physical & Chemical Properties

- ❖ Material: Ti
- ❖ Process: extruded, annealed
- ❖ Density: 4.05g/cm³ (≥95%)
- ❖ Purity: 99.6%
- ❖ Resistivity (20° C) : ≤ 0.3 Ω. cm
- ❖ Maximum Impurities content: (≤ ppm)
 Total Metallic Impurities ≤ 5000ppm

Si	Nb	Fe	Al
1000	200	500	500

Application:

- ❖ Low-E glass
- ❖ AR Coating



Maximum Dimensions:

Length 4000mm, thick 6-10mm
 Straight and dog-bone

Titanium Planar

Physical & Chemical Properties

- ❖ Material: Ti
- ❖ Process: E-beam melted, rolled, annealed (Grain Size $<30\mu\text{m}$)
- ❖ Grainsize
- ❖ Density: 4.5g/cm^3 ($\geq 100\%$)
- ❖ Purity: up to 99.995%
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities depending on purity

Application:

- ❖ Low-E glass
- ❖ AR Coating



Maximum Dimensions:

2000mm x 500mm x 30mm

Titanium Oxide Rotary

Physical & Chemical Properties

- ❖ Material: TiO_x ($1.7 < x < 1.9$)
- ❖ Process: Thermal Spray
- ❖ Density: 4.05 g/cm^3 ($\geq 95\%$)
- ❖ Purity: 99.6%
- ❖ Resistivity (20° C) : $\leq 0.3 \Omega \cdot \text{cm}$
- ❖ Maximum Impurities content: ($\leq \text{ppm}$)
 Total Metallic Impurities $\leq 5000 \text{ ppm}$

Si	Nb	Fe	Al
1000	200	500	500

Application:

- ❖ Low-E glass
- ❖ AR Coating



Maximum Dimensions:

Length 4000mm, thick 6-10mm
 Straight and dog-bone

Titanium Oxide Planar

Physical & Chemical Properties

- ❖ Material: TiO_x ($x < 2$)
- ❖ Process: Sintering
- ❖ Density: 4.13g/cm^3 ($\geq 96\%$)
- ❖ Purity: 99.9%
- ❖ Resistivity (20°C) : $\leq 1\ \Omega\cdot\text{cm}$
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities $\leq 1000\text{ppm}$

Al	As	Fe	Mg	Na	Nb	Sb	Si	W
1	1.5	17	4	35	5	2	45	1

Application:

- ❖ Touch Panel
- ❖ Optical coating
- ❖ AR Coating



Maximum Dimensions:

300mm x 300mm x 10mm

Titanium Aluminum Rotary

Physical & Chemical Properties

- ❖ Material: TiAl 50/50
- ❖ Process: Cold Spray
- ❖ Density: 3.5g/cm³ (≥99.5%)
- ❖ Purity: 99.5%
- ❖ Maximum Impurities content: (≤ ppm)
Total Metallic Impurities ≤ 5000ppm



Fe	Co	N	Cr	Cu	Ni	Mn	O
800	1200	100	200	1200	100	100	1000

Application:

- ❖ Decorative coating
- ❖ Functional coating

Maximum Dimensions:

Length 4000mm, thick 6-10mm
 Straight and dog-bone

Titanium Aluminum Planar

Physical & Chemical Properties

- ❖ Material: TiAl 50/50, 67/33, 70/30at%
- ❖ Process: HIP
- ❖ Density: 3.5g/cm³ (≥99.5%)
- ❖ Purity: 99.7%
- ❖ Maximum Impurities content: (≤ ppm)
Total Metallic Impurities ≤ 3000ppm

Fe	Si	N	O	H	C
1000	600	300	3000	100	300

Application:

- ❖ Decorative coating
- ❖ Functional coating



Maximum Dimensions:

2000mm x 500mm x 30mm

Zinc Aluminum Rotary

Physical & Chemical Properties

- ❖ Material: ZnAl
- ❖ Process: Cold Spray
- ❖ Density: $>5.8\text{g/cm}^3$
- ❖ Purity: 99.9%
- ❖ Maximum Impurities content: (\leq ppm)
 Total Metallic Impurities $\leq 500\text{ppm}$

Fe	Ti	Sn	Cu	O	N
100	50	100	100	1500	500

Application:

- ❖ Low-E glass
- ❖ Heat reflective Glass
- ❖ TCO



Maximum Dimensions:

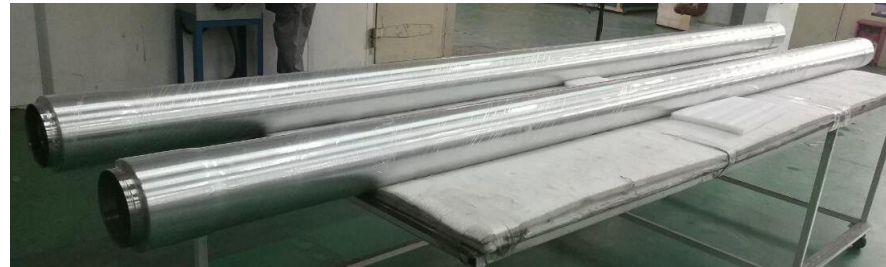
Length 4000mm, thick 6-15mm
 Straight and dog-bone

Zinc Tin Rotary

Physical & Chemical Properties

- ❖ Material: ZnSn
- ❖ Process: Cold Spray
- ❖ Density: $>6.7\text{g/cm}^3$
- ❖ Purity: 99.9%
- ❖ Maximum Impurities content: (\leq ppm)
 Total Metallic Impurities $\leq 500\text{ppm}$

Fe	Cu	Ti	Al	O	N
100	100	50	150	3000	1500



Application:

- ❖ Low-E glass
- ❖ Photovoltaic
- ❖ Conductive Glass

Maximum Dimensions:

Length 4000mm, thick 6-13mm
 Straight and dog-bone

Zirconium Oxide Rotary

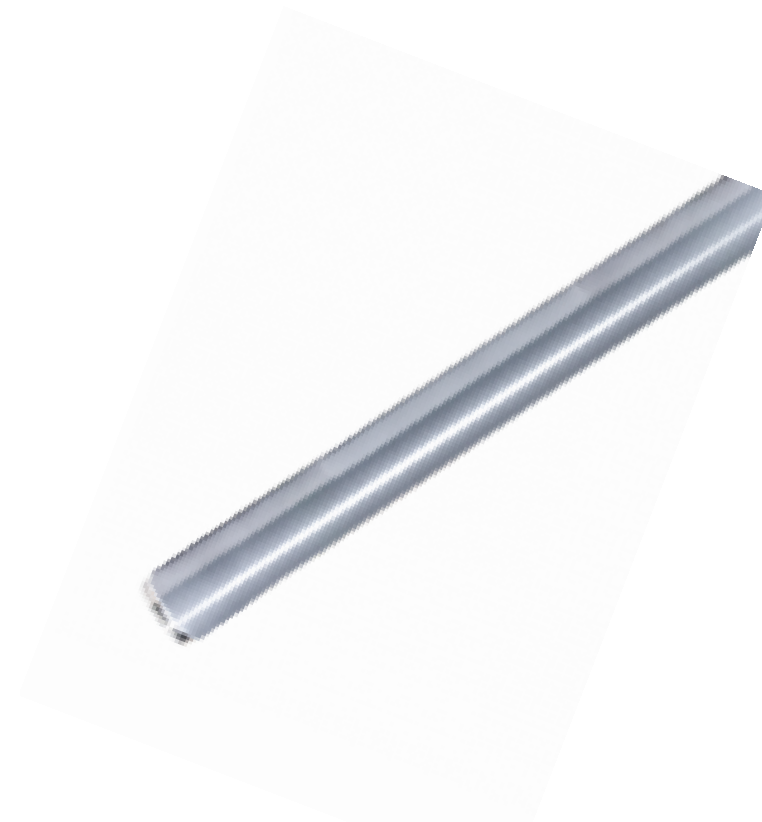
Physical & Chemical Properties

- ❖ Material: ZrO_x ($1.5 < x < 1.9$)
- ❖ Process: Thermal spray
- ❖ Density: 5.45 g/cm^3 ($\geq 95\%$)
- ❖ Purity: 99.7% (incl. Hf)
- ❖ Maximum Impurities content: (\leq ppm)
Total Metallic Impurities $\leq 1000 \text{ ppm}$

Al	Si	Fe	Hf
≤ 100	≤ 100	≤ 400	≤ 23000

Application:

- ❖ AR Coating
- ❖ Low-E glass
- ❖ Decorative coating



Maximum Dimensions:

Length 4000mm, thick 6-8mm
Straight and dog-bone



Contact Us

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Scan Contact



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