

Information about the content

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|--------------------|-------------|--------------------------|----------------|
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| | | Released: | Wolfgang GLATZ |
| Valid from: | 10-Jun-2021 | Controlled: | PSE-020 |

This document is subject to electronic version control – confirm revision status before using.

This specification covers machined molybdenum sputtering targets.

1 Dimensions and tolerances

The molybdenum sputtering targets are produced according to Plansee SE drawings with the dimensions, tolerances and surface finish specified in these documents.

2 Physical and mechanical product properties

Guaranteed density: $\geq 10,2 \text{ g/cm}^3$ (99,5 % of theoretical density)

Average grain size: $\leq 200 \mu\text{m}^1$
 $\leq 100 \mu\text{m}^2$

1) the average grain size in longitudinal direction (0°) based on ASTM E112

2) the average grain size in longitudinal direction (90°) based on ASTM E112

*) details regarding the measurement of the grain size are available upon request

2.1 Surface condition

Appearance: The targets will have no cracks, abrasions and discoloration.



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3 Chemical composition

| Main and minor components | Plansee | | EU-Directive |
|---|------------------------------|------------------------------|----------------------------------|
| | Min. content [%] | | RoHS ^{a)} |
| Mo | 99.99 % ^{b)} | 99.97 % ^{b)} | - |
| Impurities | Max. values [µg/g] | | Max. values [µg/g] ^{c)} |
| | Typical | Guaranteed | |
| Ag | 5 | 10 | - |
| Al | 1 | 10 | - |
| As | - | 5 | - |
| Ca | 1 | 20 | - |
| Co | 1 | 10 | - |
| Cr | 3 | 20 | - |
| Cu | 2 | 20 | - |
| Fe | 5 | 20 | - |
| K | 6 | 20 | - |
| Mg | 1 | 10 | - |
| Mn | 1 | 2 | - |
| Na | 1 | 10 | - |
| Ni | 1 | 10 | - |
| Si | 2 | 20 | - |
| Sn | 1 | 5 | - |
| Ti | 1 | 10 | - |
| V | 2 | 10 | - |
| W | 169 | 300 | - |
| Zn | 1 | 10 | - |
| C | 13 | 30 | - |
| H | - | 10 | - |
| N | 5 | 10 | - |
| O | 6 | 40 | - |
| Cd | 1 | 5 | 100 |
| Hg ^{d)} | - | 1 | 1000 |
| Pb | - | 5 | 1000 |
| Cr (VI) | - | - | 1000 |
| Organic impurities (e.g. PBB, PBDE, PFOS, PFOA) | - ^{**)} | - ^{**)} | 1000 |

a) EU-directives 2015/863/EU, 2011/65/EU and 2000/53/EC

b) Metallic purity without W



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c) $\mu\text{g/g} \triangleq \text{ppm}$ (mass fraction)

d) Initial value / first up

***) The presence of Cr (VI) and organic impurities can definitely be excluded because of the production process (multiple heat treatments at temperatures above 1000 °C in H₂-atmosphere).

The chemical composition is continuously checked by means of random sampling. The sampling inspection plan, analysis and evaluation methods are determined in the internal instruction PSE-020-WI-003. The application of the measured values for the chemical analysis is defined in PSE-680-WI-001.

Remarks: The specified physical and chemical characteristics are disclosed not regarding measurement accuracy.

4 Packaging, labelling, storage and certification

4.1 Packaging, labelling and storage

Standard individual packing: The target is vacuum-sealed in a vinyl pack, which is put into a transportation box. Alternative customized packaging available.

Each package will be provided with a label with the following information:

| | |
|---|------------|
| producer's name: | Plansee SE |
| product description incl. dimension: | W x L x H |
| part number: | |
| order number: | |
| machining batch no.: | |
| weight: | kg |

The targets must be kept in a dry place and protected from mechanical damage. The shelf time for the vacuum-packed targets shall be 6 months from the shipping date under the following storage conditions ^{a)}. However, the customer is recommended to use the targets within 3 months.

a) **Storage conditions:** temperature: 22 ± 4 °C; relative humidity of the air: ≤ 50 %; atmospheric pressure: approx. 1000 mbar.

4.2 Inspection documents

All targets manufactured by Plansee SE will be certified including the following information:

4.2.1 Identification

The order number, target batch number and target number are indicated.

4.2.2 Chemical composition

Inspection certificate 3.1 according to EN 10204:2004 (chemical elements see section 3).

4.2.3 Grain size

Inspection certificate 2.2 according to EN 10204:2004.



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PRODUCT SPECIFICATION

4.2.4 Dimensions

Actual values of length, width and thickness of the sputtering target.

4.2.5 Weight

Actual measured value.

5 Order instructions

Please quote following information when ordering:

- dimensions
- quality (the number of this specification **must** be mentioned)
- quantity (number of targets)
- *for special packing*: specification of packaging

For further information on our delivery possibilities, please consider our <http://www.plansee.com>

6 Referenced standards

The standards applied for the test methods are listed in the Plansee standard InfoBase and are made available upon request.

Changes to last version:

Replacement for Rev.00:

Changes/Adaptations Rev.01:

- Adaptation chapter 4.1 that specific customized packaging is also available.



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