

Information about the content

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This specification covers monolithic rotary 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 construction drawings.

2 Physical and mechanical product properties

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

2.1 Surface condition

Appearance: The targets will have no cracks, abrasions and discoloration determined by macroscopic visual inspection.

ID-coating: On the inner diameter (ID) area of the monolithic rotary target a polymer-based protective coating is applied.

For further recommendations please refer to appendix 1.

3 Chemical composition

Main and minor components	Plansee		EU-Directive
	Min. content [%]		RoHS ^{a)}
Mo	99,99 % ^{b)}	99,97 % ^{b)}	-
Impurities	Max. values [$\mu\text{g/g}$]		Max. values [$\mu\text{g/g}$] ^{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	-	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

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

^{**)} 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 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:	OD × ID × L
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 2.2 according to EN 10204:2004.

An inspection certificate 3.1. according to EN 10204:2004 with test results related to the particular production batch (chemical elements see section 3) can be provided upon customer's request (have to be defined when ordering). Extra costs will be charged.

4.2.3 Dimensions

Actual values of length [mm], inner and outer diameter [mm] of the sputtering target.

4.2.4 Weight

Actual measured value [kg].

5 Order instructions

Please quote following information when ordering:

- dimensions
- quality (the number of this specification **must** be mentioned)
- quantity (number of targets)
- type of certificate (2.2 or 3.1 according to EN 10204:2004)
- *for special packing*: specification of packaging

For further information on our delivery possibilities, please look into 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 PSE-660-PS-003 Rev.00:

Changes / adaptations Rev.01:

- Revision of the content
- Adaptation of the layout

Appendix 1:

Use of monolithic rotary molybdenum sputtering targets - Recommendations:

- Molybdenum has a limited corrosion resistance in water. The corrosion rate depends, for example, on the oxygen content, temperature, and the pH-value of the water. Therefore, the usage of appropriate corrosion inhibitors in the cooling water is recommended. The usage of non-treated water (DI- or natural) is not recommended.
- The typical corrosion rate of molybdenum depends on the type of cooling water, type of inhibitors and design of cooling system (water flow speed, atmosphere, closed or looped system). The molybdenum targets should be inspected frequently in areas on which cooling water is applied.
- The cooling water specification of the equipment manufacturer must be followed with respect to the use of monolithic rotary molybdenum targets.
- The control of the water properties (e.g., pH-value, electrical conductivity, cooling water temperature) is recommended to be done frequently.
- More details can be disclosed upon request.