Information about the content

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This specification covers Niobium ribbons in melting quality.

1 Dimensions and tolerances

Thickness [mm]	Thickness Tolerances [± mm]	Width [mm]	Tolerances ≤ 5 mm [± mm]	Tolerances > 5 - < 100 mm [± mm]	Tolerances ≥ 100 mm [± mm]
0,050 – ≤ 0,080	0,006	2 – 150	0,02	0,05	0,10
> 0,080 – ≤ 0,100	0,006	5 – 150	0,02	0,05	0,10
> 0,100 – ≤ 0,200	0,010	6 – 152,4	-	0,10	0,20
> 0,200 – 0,300	0,012	10 – 152,4	-	0,10	0,20

Other dimensions upon request.

2 Physical and mechanical product properties

Density a)	≥ 8,55 g/cm³			
Hardness Vickers: b)	Thickness ≥ 0,15 mm:	≤ 100 HV		
Tensile Test: c)	**Thickness** [mm]	**Tensile Strength min.** [MPa]	**0,2% Yield Strength min.** [MPa]	**Elongation min.** [%]
	0,050 – 0,120	160	90	15
	≥ 0,120 – 0,300	160	90	20

a) The density cannot be determined with sufficient accuracy for small material thickness below 1 mm. Due to the high degree of deformation during production, it is assumed that the theoretical density (above given value) is achieved.

b) The actual value quoted in certificates corresponds to the mean-value of a representative control sample. Due to the low required test load, hardness is not specified for sheets < 0,15 mm.

c) Samples are taken parallel to the rolling direction.

Remarks: All NbM ribbons are delivered recrystallized (≥ 90 % recrystallized in micrograph).

2.1 Surface condition

Surface:	The material will be of uniform quality, free from foreign matter, splits and fractures. Surface defects and geometric variations are assessed in the frame of visual inspection.	
Surface Roughness:	Cold rolled, bright (Thickness 0,050 – 0,300 mm):	$R_a \leq$ 0,50 µm *)
	Cold rolled, dull (Thickness 0,050 – 0,300 mm):	$R_a \leq$ 1,00 µm *)

*) across rolling direction

3 Chemical composition

Main and minor components	Plansee Content	Standard ASTM B393 Type 1	EU-Directive RoHS [a]
Nb	99,7 [b]	balance	-
Impurities	Max. values [µg/g] Guaranteed	Max. values [µg/g]	Max. values [µg/g]
Al	20	-	-
B	2	-	-
Be	50	-	-
Co	20	-	-
Cr	10	-	-
Fe	50	50	-
Hf	200	200	-
Mo	50	100	-
Ni	50	50	-
Si	50	50	-
Ta	1000	1000	-
Ti	50	200	-
W	100	300	-
Zr	10	200	-
C	50	100	-
H	10	15	-
N	50	100	-
O [c]	150	250	-
Cd	5	-	100
Hg [d]	1	-	1000
Pb	10	-	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 Ta
c) Due to technical measurement reasons the upper specification limit for O can only be determined for the prematerial with a thickness of ≥ 1 mm.
d) Initial value
**) 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 HV-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 ribbons are wound on appropriate spools, depending on their dimension and are sealed in a plastic bag together with a dehydrating agent. The packaging ensures avoidance of mechanical damage, moisture, oxidation and other sources of contamination during transport and handling.

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

Producer's name:	Plansee
Plansee order number:	
Lot number:	
Material number:	
Material:	NbM
Dimension:	thickness, width
Quantity:	Total quantity in kg
Date:	

The material must be kept in a dry place and protected from mechanical damage. It is best to keep the sheets in their original packing until used.

Special packing: (extra costs will be invoiced)

Special packing should be used if the material is stored under unusual conditions or aggressive atmosphere (e.g. sea air, …).

4.2 Inspection documents

Following inspection documents will be supplied upon customer request according to EN 10 204:

Test report 2.2

Plansee confirms with this test report that the delivered product meets the specification and gives details of the material properties according to ongoing production surveillance, not directly related to the particular production batch.

Inspection certificate 3.1 (extra costs will be invoiced)

An inspection officer from Plansee confirms with this inspection certificate that the delivered product meets the specification and gives test results related to the particular production batch.

5 Order instructions

Please quote following information when ordering:

- Product description
- Quality (the number of this specification must be mentioned)
- Thickness, width
- Quantity in kg
- Required certificate and content in case of a 3.1 inspection certificate
- *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	Changes to last version
00	▪ Section 1: maximal width for thickness > 0,10 mm / 152,4 mm