

M235 plus

Flame fused doped multi-step quartz tube



Product Overview

M235 plus is a doped (titanium oxide) flame fused quartz made from semi-synthetic grain, designed for demanding lamp requirements. The tube is fabricated using the unique Heraeus multi-step process.

Key Features

- very low bubble content
- nearly blemish free surface
- wide range of geometries

Applications (e.g.)

- short-arc lamp
- laser excitation lamp
- ozone free UV lamp

Geometrical Data

Outer Diameter (OD) [mm]	Tolerance [mm] ¹	Wall Thickness Range [mm]
2 - ≤ 8	± 0.3	≥ 0.4 - ≤ 2.0
> 8 - ≤ 17	± 0.4	≥ 0.8 - ≤ 3.5
> 17 - ≤ 25	± 0.6	≥ 1.0 - ≤ 4.5
> 25 - ≤ 30	± 0.7	≥ 1.2 - ≤ 4.5
> 30 - ≤ 35	± 0.8	> 1.2 - ≤ 4.5
> 35 - ≤ 40	± 1.0	> 1.2 - ≤ 4.5

Wall Thickness (WT) [mm]	Tolerance [mm]	Cumulative length of bubbles ²
≥ 0.4 - ≤ 0.5	± 0.15	< 2.0 %
> 0.5 - ≤ 1.2	± 0.20	< 2.5 %
> 1.2 - ≤ 2.0	± 0.30	< 3.0 %
> 2.0 - ≤ 2.8	± 0.40	< 3.5 %
> 2.8 - ≤ 3.7	± 0.50	< 4.0 %
> 3.7 - ≤ 4.5	± 0.60	< 4.5 %

Feature	Area	Tolerance	Note
Ovality	manufactured length	< ½ OD tolerance	(e.g. ± 0.20 OD tolerance = ovality of 0.20)
Siding	manufactured length	< ½ WT tolerance	(e.g. ± 0.20 WT = siding of 0.20)
Bow	all dimensions	< 1.0mm / 1m < 1.5mm / 1m	not annealed annealed
Length	-	+ 20mm / - 0mm	snap cut ³

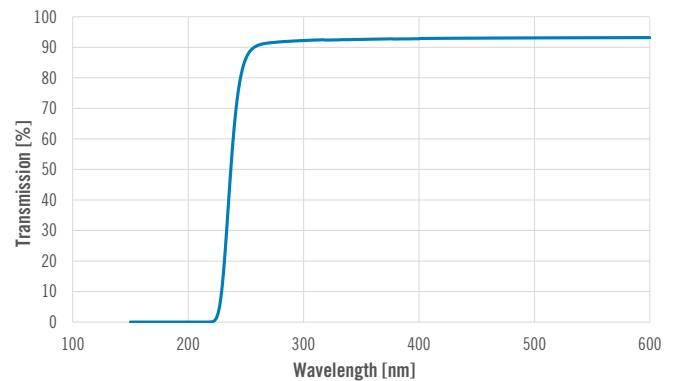
¹ Additional sizes and tolerances are available on request

² Bubbles < 0.5 mm length and < 0.08 mm width are not counted

³ Other cutting methods on request

Optical Properties

Typical transmission values for 2mm wall thickness



Wavelength [nm]	200	235	254	300	400
Transmission [%]	0	40	89	92	93

Visual Features

Tolerance

Outside Surface Distortion	none
Surface Impurities (adherent)	none
Open Bubbles	none
Inclusions	none
Discoloration / Draw Lines	none
Devitrification	none

Chemical Properties

OH Content [ppm]	130 - 220 no change in OH content through annealing										
Chemical Impurities [ppm]	Li	Na	K	Mg	Ca	Fe	Cu	Cr	Mn	Al	Ti
	0.6	0.1	0.05	0.05	0.05	0.1	0.05	0.05	0.05	8	doped

Physical Properties

Softening Temperature	~ 1660°C
Annealing Temperature	~ 1160°C
Strain Temperature	~ 1070°C
Viscosity at 1300°C	~ 11.55 dPas
Maximum Working Temperature	continuous operation ~ 1110°C short-term operation ~ 1250°C
Density	2.2 g/cm ³

CONTACT

Germany

Heraeus Quarzglas GmbH & Co. KG
Heraeus Conamic
+49 (6181) 35-6234
conamic.lampmaterials@heraeus.com
heraeus-conamic.com

USA

Heraeus Quartz North America LLC
Heraeus Conamic
+1 (240) 690-3852
conamic.lampmaterials@heraeus.com
heraeus-conamic.com

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