	Product Specification RQ 200 UP / RQ 200 UPX	SPEC_Z_LW_21 page 1 of 3
Author: 12.05.2010 Ludwig Stier	Approved: 12.05.2010 Dr. Sigrun Rakus	Released: 12.05.2010 Frithjof Raesch

Introduction:


This kind of quartz is made from 99.99 % of pure quartz (SiO₂). **RQ 200 UP /UPX** is a high temperature and high viscosity melting quartz glass, which is especially designed for very high quality light source applications. **RQ 200 UP /UPX** is not doped.

RQ 200 UP/UPX is produced as burner tubes for:

- Ultra high-pressure lamps
- Ultra high-pressure discharge lamps.

Physical Properties:

Linear thermal expansion coefficient	(20 - 320)°C	[10 ⁻⁶ K ⁻¹]	0.54
Modulus of elasticity		[GPa]	66
Poisson-Number		[1]	0.17
Density		[g cm ⁻³]	2.2
Transformation temperature		[°C]	ca. 1200
Viscosity	[dPas]		[°C]
	10 ^{14.7}	Strain point	1160
	10 ^{13.2}	Annealing point	1255
	10 ^{7.6}	Softening temperature	1760
	10 ⁴	Working temperature	1990
Max. working temperature			[°C]
Permanent with cooling to room temperature			1000
Permanent with cooling to 300°C			1200
Short time			1300
Electrical resistance		[Ωcm]	[°C]
		10 ⁴	1660
		10 ⁶	1000
		10 ⁸	510
Dielectric constant	at 20°C, 1 MHz	[1]	3.7
Dielectric loss factor	at 20°C, 1MHz	[10 ⁻⁴]	< 1
Refractive index	at λ = 587.6 nm	[1]	1.459
Thermal conductivity	at 20°C	[Wm ⁻¹ K ⁻¹]	1.4

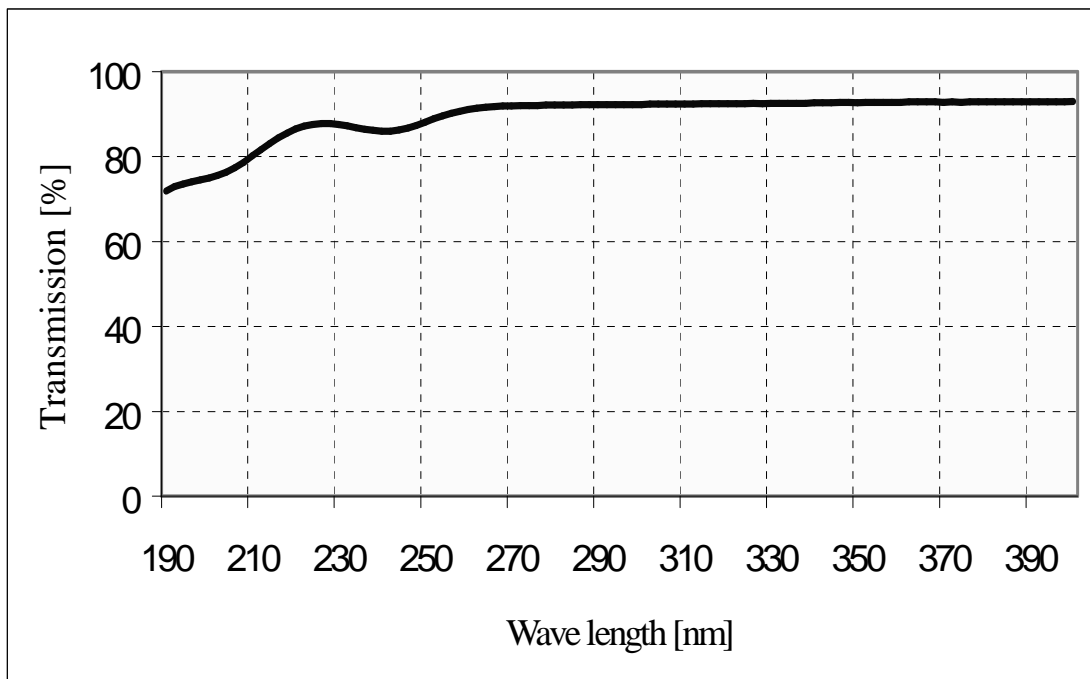
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Transmission Properties:

Limits for transmission values of 1 [mm] wall thickness:

wave length λ [nm]	200	250	360	400
transmission T [%]	> 65	> 85	> 90	> 91

Transmission curve RQ 200 UP /UPX



Chemical Composition:

SiO₂ [%] 99.99

RQ 200 UP / UPX contains the following typical impurities in ppm:


Li	0.2	Zn	< 0.05	Ti	1.4
Na	0.1	Mn	0.08	V	<0.02
K	0.1	Fe	0.2	Cr	0.05
Al	7-9	Co	< 0.0005	Zr	0.4
Ca	0.5	Ni	< 0.05	B	0.03
Cu	< 0.05	Mg	0.1		

Impurities at inner surface
[ng/30 cm]:

Mo < 25 Fe < 15

For the OH⁻ content of **RQ 200 UP** and **RQ 200 UPX** the following value need to apply:

RQ 200 UP	vakuum baked	< 1 ppm
RQ 200 UPX	vakuum baked	< 0.5 ppm

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Quality Criteria and Product Properties:

Geometry and condition (standard):

Outer diameter:	4.35 mm to 9.6 mm + / - 2.5 % of nominal value
Wall thickness:	1.00 mm to 2.3 mm + / - 8 % of nominal value
Length:	standard: 1550 (furnace cut), ± 10 mm other length: 1200 mm to 1550 mm on request fine cut is possible, on request, ± 1mm
Ovality:	max. 2 % of nominal OD
Siding:	max. 5 % of nominal WT
Bow:	2 mm / 1200 mm acceptable

Visual Characteristics:

Airlines:	width of ≤ 0.1 mm negligible width of (0.1 – 0.25) mm total length of airlines up to 20 % of tube length acceptable open airlines are not permitted
Cracks:	failure
End cut cracks:	acceptable if min. length is not violated
Scratches and similar Surface impairments:	≤ 0.2 mm width acceptable total sum of surface impairments up to 25 % of tube length acceptable
Striation	not permitted
Coloured line	not permitted
Cleanliness:	acceptable, if wipe of is possible
Inclusions:	acceptable at outer surface, if diameter ≤ 0.5 mm not permitted at inner surface

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