合成石英 AQシリーズ　Synthetic Fused Silica Glass AQ Series

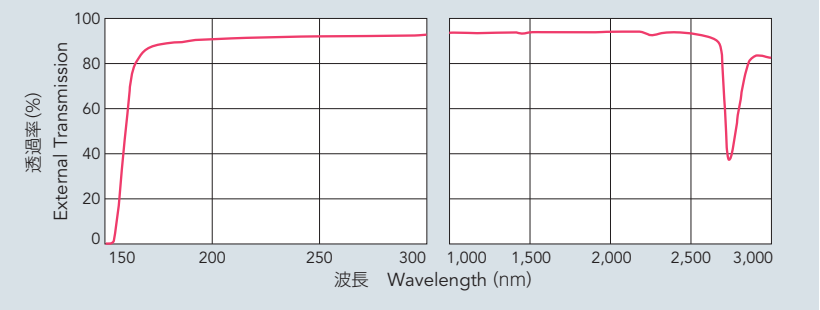
AQT・AQR

AQR、AQTはAGCの合成石英ガラスの中でもハイエンドなグレードとなっており、非常に高いエキシマレーザー耐久性、優れた深紫外透過率・屈折率均質性、極限まで抑えられた複屈折を兼ね備えています。ArF液浸スキャナ用レンズ材として、AQRは照明系、AQTは投影系材料に最適化しております。その他の深紫外領域用途にも使用可能です。

AQR and AQT, the highest grades among AGC's synthetic quartz glass, feature very high resistance to excimer laser beams, highly uniform transmittance and refractive index for deep ultraviolet, and extremely low birefringence. Designed as the lens material for ArF immersion scanners, AQR and AQT are optimized for illumination and projection optics, respectively. They are, of course, suitable for other deep ultraviolet applications.

* 全てのデータは参考値であり、保証値ではありません。
* All data is for reference, not guaranteed.

透過率　Transmittance



波長(nm) Wavelength	AQT, AQR
3,000	82.4
2,900	83.7
2,800	66.7
2,720	37.7
2,700	50.4
2,600	91.6
2,500	93.1
2,400	93.7
2,300	93.6
2,210	92.4
2,200	92.8

波長(nm) Wavelength	AQT, AQR
2,100	94.1
2,000	94.0
1,900	93.9
1,800	93.8
1,700	93.8
1,600	93.8
1,500	93.7
1,400	93.5
1,380	93.3
1,300	93.7
1,200	93.7

波長(nm) Wavelength	AQT, AQR
1,100	93.6
1,000	93.7
900	93.6
800	93.6
400	93.0
380	93.0
360	92.9
340	92.8
320	92.7
300	92.6
280	92.4

波長(nm) Wavelength	AQT, AQR
260	92.2
240	91.9
220	91.5
200	90.8
190	90.5
180	89.2
170	86.9
160	59.3

表面反射によるロスを含む　厚み: 10mm
Included surface reflection loss　thickness: 10mm

屈折率 Refractive Index

波長(nm) Wavelength	AQT, AQR
2,326.05	1.43300
2,058.65	1.43728
1,970.63	1.43857
1,813.57	1.44075
1,530.00	1.44431
1,128.95	1.44891
1,064.00	1.44967
1,060.00	1.44972
t 1,013.98	1.45028

波長(nm) Wavelength	AQT, AQR
s 852.11	1.45250
r 706.52	1.45518
c 656.27	1.45640
c' 643.85	1.45674
He-Ne 632.80	1.45706
D 589.29	1.45844
d 587.56	1.45850
e 546.07	1.46012
F 486.13	1.46317

波長(nm) Wavelength	AQT, AQR
g 435.83	1.46674
h 404.66	1.46966
i 365.01	1.47459
334.24	1.47980
312.66	1.48452
253.73	1.50555
KrF 248.30	1.50846
248.00	1.50863
228.87	1.52118

波長(nm) Wavelength	AQT, AQR
214.51	1.53374
206.27	1.54268
194.23	1.55893
ArF 193.40	1.56022
193.00	1.56086
184.95	1.57504

20˚C, Nitrogen 1atm +/-0.00001

諸特性 General Properties

Grade		AQT	AQR
泡・内部欠陥 Bubbles and inclusions		なし Free	
金属不純物 Metalic Impurity	wtppb	<10	<10
歪点 Strain Pont (Viscosity=10^14.5dPa*s)	°C	1060	
熱膨張係数 CTE	ppm/K (50-200°C)	0.5-0.7	
密度 Density	g/cm^3	2.20	
ヤング率 Young's modulus	GPa	72	
熱伝導率 Heat conductivity	K(W/m-°C) at 25°C	1.46	
比熱 Specific heat	J/(g · K) at 25℃	0.75	
体積低効率 Bulk resistivity	Log(Ω*cm) at 200°C	12.5	
誘電率 Dielectric Constant	at 1MHz, 25°C	4.0	
耐酸・耐アルカリ性 Chemical resistance	Acid resistance	<0.05μg/cm^2/hr by HCl 1mol/L at 90°C	
	Alkali resistance	<30μg/cm^2/hr by NaOH 0.1mol/L at 90°C	

光学特性 Optical Properties

Grade		AQT	AQR
初期内部透過率 Initial transmission, internal		>99.9%/cm, at 193nm	
脈理 Striae		3方向フリー 3-direction Free	
屈折率 Refractive Index (at 589nm)		1.46	
蛍光 Fluorescence		なし none	
レーザー耐久性 Laser durability	感光変化 Solarization	なし none	
	透過率劣化 Degradation of Transmission	<1.0%/cm by 193nm, 20mJ/cm^2/pls x 5Mpls	<0.5%/cm by 193nm, 20mJ/cm^2/pls x 5Mpls
均質性 Homogeneity removed tilt and power components, measured at 632.8nm		<0.5ppm	<2ppm
複屈折 Birefringence, measured at 632.8nm, stress induced		<1nm/cm	<1nm/cm