GUIDE TO OPTICAL SILICA

CRYSTRAN
UV · VISIBLE · IR SPECIALIST OPTICS

SILICA OR QUARTZ? These terms are often used very loosely, so let's set down some definitions. Quartz is the crystal form, and Fused Quartz or Silica are the terms for the vitreous or glassy forms.

QUARTZ: This should be the description for crystalline SiO_2. Trigonal and positive birefringent, it is generally used for this property, not for simple transmitting windows.

FUSED QUARTZ: Less expensive vitreous silica formed by fusing naturally occurring quartz crystal or lower grade synthetic stock material. The UV use can be limited and so these materials are generally used for windows covering visible wavelengths. These are typical examples:

UV-VIS grades (0.19 - 2.0μm)		VIS-IR grades (0.27 - 3.3μm)	
HOMOSIL® 101	Heraeus	INFRASIL® 301 & 302	Heraeus
HERASIL® 102	Heraeus	HPFS® 7979	Corning
JGS2	China	JGS3	China
		Vis-IR grades (0.27 - 3.3μm small band 2.7μm)	
		HOQ310	Heraeus
		GE124	General Electric

SILICA / FUSED SILICA: Vitreous silica formed from high purity synthetic material. Generally specified for use in the UV. Typical examples are:

UV-VIS grades (0.16 - 2.0μm)		UV-VIS-IR grades (0.19 - 3.3μm)	
SPECTROSIL® 2000	Heraeus	SUPRASIL® 300	Heraeus
SUPRASIL® 1	Heraeus	HPFS® 7979	Corning
HPFS® 7980	Corning		
JGS1	China		

HIGH PURITY SILICA: Vitreous silica of the highest purity developed for maximum transmission in the VUV and lowest laser damage and fluorescence.

UV-VIS excimer grades (ArF 193nm & KrF 248nm)		
SUPRASIL 1 ArF/KrF	Heraeus	
SQ-E193 & SQ-E248	J-Plasma Jena	
HPFS® 8655	Corning -	*Note that this is also a low OH infra-red material to 3.3μm*

SUB GRADES: Within many of these grades of glass there are often sub divisions which specify homogeneity, striae, and bubble cross-sections which should be considered before final selection.

INFRA-RED GRADES: Fused Quartz & Silica normally contains OH which causes a strong absorption centred on 2.7μm, limiting transmission to 2.0μm and restricting usefulness for IR applications. Grades with low OH (typically <10ppm) are available and they can be used effectively to 3.3μm. There are some grades of fused natural quartz have only a small absorption band at 2.7μm (eg GE 124) and are useful as thin windows.

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