

OHARA QUARTZ High Quality Silica Glass

OHARAQUARTZ

VAD-process Synthetic Fused Silica **SK-1300**

Our Company successfully developed synthetic fused silica SK-1300 as a result of significant improvements made to the conventional VAD (vapor-phase axial deposition) method of optical fiber manufacturing technology.

SK-1300 is extremely high in purity and much lower in OH content than the traditional direct method, thus making it the first synthetic fused silica usable in the semiconductor and liquid crystal display industries.

SK-1300 is the state-of-the-art technology in optical characteristics because it provides a high ultraviolet transmission, no micro inclusion and a solarization resistance, in addition to heat resistance, mechanical strength, and chemical resistance.

These products can be used in a wide variety of industrial applications for semiconductors, optical and all physical or chemical related research featuring these applications:

1. Wafers for various types of devices such as TFT (poly-Si thin-film transistor LCD.), SOI (Silicon on Insulator) etc.
2. Photomask substrates for ultra-LSI and LCD.
3. Reactor furnace tubes, jigs and tools for ULSI manufacturing processes.
4. Electrical-discharge lamp tubes.
5. Optical elements, lenses, mirrors and windows, for ultraviolet and vacuum ultraviolet.

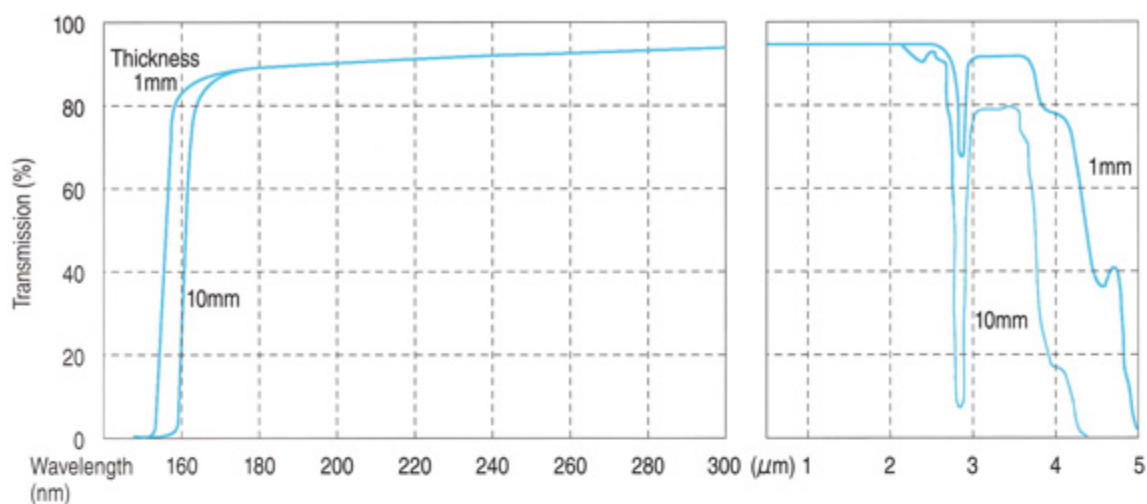
Typical Characteristics

| Typical Impurity Analysis | Typical Characteristics | | | |
|---------------------------|-------------------------|------------------|---------|------------------|
| | Element | Analytical Value | Element | Analytical Value |
| ppm | Al | <0.01 | Co | <0.01 |
| | Fe | <0.01 | Ni | <0.01 |
| | Ti | <0.01 | P | <0.01 |
| | Ca | <0.01 | B | <0.01 |
| | Mg | <0.01 | Na | <0.01 |
| | Mn | <0.01 | K | <0.01 |
| | Cr | <0.01 | Li | <0.01 |
| | Cu | <0.01 | Zr | <0.01 |
| | OH | <200 | Cl | <5 |

Chemical Resistance

| Solution | Treatment temperatures | & hours | Weight loss |
|--------------------------|------------------------|---------|---------------------------------|
| H ₂ O | 95°C | 45H | 0.0001~0.0002mg/cm ² |
| 1/100 N HNO ₃ | 115°C | 24H | 0.005~ 0.01mg/cm ² |
| 5% NaOH | 100°C | 10H | 1.35mg/cm ² |

Transmission



Refractive Index

| Wavelength (nm) | 15°C | 25°C | 35°C |
|-----------------|---------|---------|---------|
| 237.83 | 1.51525 | 1.51538 | 1.51552 |
| 248.20 | 1.50894 | 1.50907 | 1.50920 |
| 274.87 | 1.49644 | 1.49655 | 1.49667 |
| 334.15 | 1.48027 | 1.48036 | 1.48048 |
| 365.48 (i) | 1.47504 | 1.47514 | 1.47524 |
| 404.65 (h) | 1.47011 | 1.47021 | 1.47031 |
| 435.83 (g) | 1.46719 | 1.46728 | 1.46738 |
| 546.07 (e) | 1.46058 | 1.46066 | 1.46075 |

Optical Qualities

| Item | Grade |
|------------------------|---|
| Bubbles | 0~0.03mm ² /100cm ³ |
| Striae | Grade A in one direction (As per Mil-G-174) |
| Birefringence (Strain) | 10nm/cm and under |
| Fluorescence | Not permitted (Excited wavelength 254nm) |

Physical properties

| Item | Unit | Value | Item | Unit | Value |
|----------------------|--------------------|----------|------------------------------------|---------------|-----------------------|
| Density | g/cm ³ | 2.201 | Coefficient of thermal expansion | cm/cm°C | 5.5×10 ⁻⁷ |
| Young's module | kg/mm ² | 7280 | Softening point | °C | 1700 |
| Poisson's ratio | | 0.17 | Annealing point | °C | 1160 |
| Compression strength | kg/mm ² | 115 | Strain point | °C | 1060 |
| Bending strength | kg/mm ² | 7.0 | Specific heat (26°C) | cal/g·°C | 0.176 |
| Tensile strength | kg/mm ² | 5.6 | Thermal conductivity ratio (26°C) | cal/cm·sec·°C | 2.65×10 ⁻³ |
| Torsional rigidity | kg/mm ² | 3150 | Thermal conductivity ratio (100°C) | cal/cm·sec·°C | 3.27×10 ⁻³ |
| Vickers hardness | kg/mm ² | 900~1030 | | | |
| Knoop hardness | kg/mm ² | 650~710 | | | |