OHARA®

High Quality Silica Glass

# OHARA QUARTZ

## 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 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**

| | Element | Analytical value | Element | Analytical value |
|---|---|---|---|---|
| ppb | Al | <0.2 | Co | <0.01 |
| | Fe | <0.5 | Ni | <1.0 |
| | Ti | <0.1 | P | <1.0 |
| | Ca | <0.5 | B | <0.01 |
| | Mg | <0.1 | Na | <0.5 |
| | Mn | <0.1 | K | <0.2 |
| | Cr | <0.2 | Li | <0.1 |
| | Cu | <0.2 | Zr | <0.1 |
| | OH | <200 (ppm) | | |

**Chemical Resistance**

| Solution | Treatment temperatures (°C) | & hours (H) | Weight loss (mg/cm$^2$) |
|---|---|---|---|
| $H_2O$ | 95 | 45 | 0.0001~0.0002 |
| 1/100 N $HNO_3$ | 115 | 24 | 0.005~0.01 |
| 5% NaOH | 100 | 10 | 1.35 |

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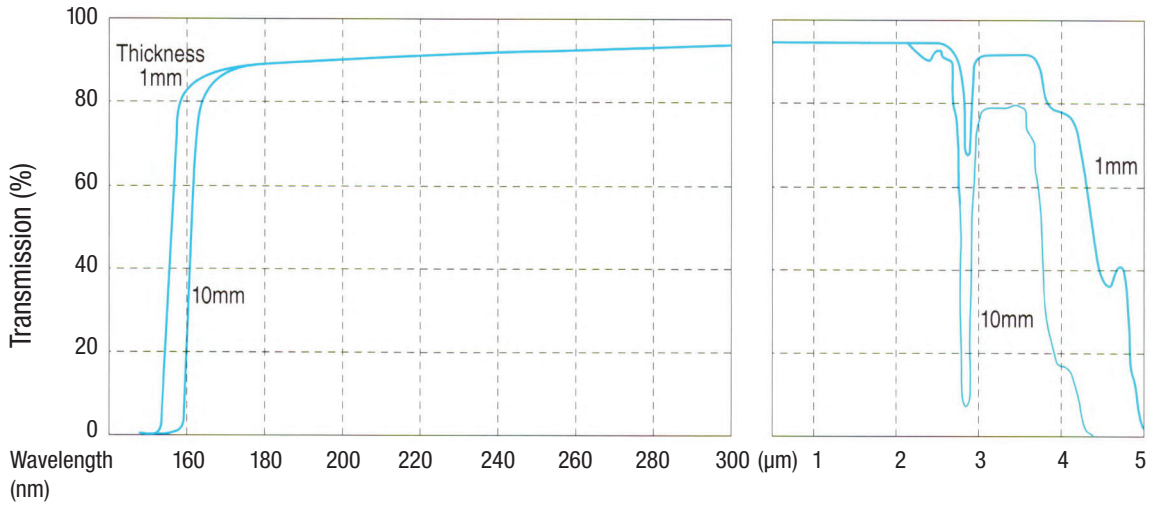
## Transmission




## Refractive Index

| Wavelength (nm, in air) | 25°C in air | 20°C in air |
|---|---|---|
| 365.015(i) | 1.474710 | 1.474655 |
| 404.656(h) | 1.469786 | 1.469731 |
| 435.835(g) | 1.466860 | 1.466807 |
| 486.133(F) | 1.463293 | 1.463240 |
| 546.075(e) | 1.460245 | 1.460194 |
| 587.562(d) | 1.458631 | 1.458580 |
| 656.273(C) | 1.456535 | 1.456484 |

Measuring accuracy ± $1X10^{-6}$

| Wavelength (nm, in air) | 25°C in air dn/dt |
|---|---|
| 365.015(i) | 11.3 |
| 404.656(h) | 11.0 |
| 435.835(g) | 10.7 |
| 486.133(F) | 10.5 |
| 546.075(e) | 10.2 |
| 587.562(d) | 10.3 |
| 656.273(C) | 10.1 |

Measuring accuracy ± $1X10^{-6}$

## Optical Qualities

| Item | Grade |
|---|---|
| Bubbles | 0~0.03mm$^2$/100cm$^3$ |
| Striae | Grade A in one direction (As per Mil-G-174) |
| Birefrengence (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 | $5.5X10^{-7}$ |
| Young's module | kg/mm$^2$ | 7280 | | | |
| Poisson's ratio | | 0.17 | Softening point | °C | 1700 |
| Compression strength | kg/mm$^2$ | 115 | Annealing point | °C | 1160 |
| Bending strength | kg/mm$^2$ | 7.0 | Strain point | °C | 1060 |
| Tensile strength | kg/mm$^2$ | 5.6 | | | |
| Torsional rigidity | kg/mm$^2$ | 3150 | Specific heat (26°C) | cal/g • °C | 0.176 |
| Vickers hardness | kg/mm$^2$ | 900~1030 | Thermal conductivity ratio (26°C) | cal/cm • sec • °C | $2.65X10^{-3}$ |
| Knoop hardness | kg/mm$^2$ | 650~710 | Thermal conductivity ratio (100°C) | cal/cm • sec • °C | $3.27X10^{-3}$ |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