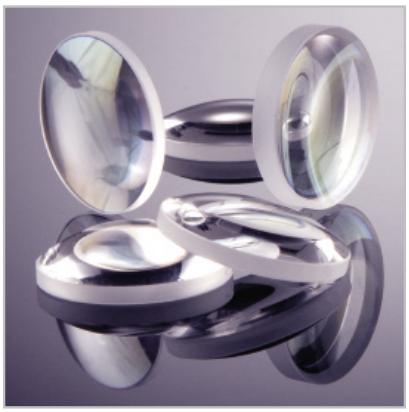
Material



LASER COMPONENTS offers a variety of laser optic substrates. With endless possibilities for the combination of substrates and coatings, a comprehensive range of components is available.

Just as coatings and substrates are both designed for specific applications, for optimal performance of a laser optic they should also be designed to correlate with each other. Most notably the optical characteristics, but also the mechanical characteristics of the substrate are to be considered.

Quality Features

The optics are designed for the highest energy and power densities. As a standard, the surface quality 10-5 scratch-dig according to MIL-O-1380A for substrates with a diameter of 1.0" and planarity λ/10 according to MIL-O-1380A are used.

Materials

In the following, we will introduce the most commonly used materials. The glasses differ primarily in transmission range, but also in hardness, the thermal expansion coefficient, or the resistance to solvents. For applications in laser optics, transmission and the achievable surface quality are of particular interest.

For applications in the visible and near IR range, BK7 in particular has established itself as a standard glass. For applications in the UV range and for very high power densities, synthetic quartz glass (fused silica) such as Suprasil®, Lithosil® Q1, C7980, and JGS1 has been established as excellently suited substrate material. Other popular materials include Infrasil® for the IR range up to ca. 3500 nm and sapphire, which is characterized in particular by its hardness and a wide transparency from 250 nm – 5000 nm. For applications in which the smallest thermal expansion is required, glass ceramics such as Zerodur® can be used.

Certainly we can also offer materials from different glass manufacturers.

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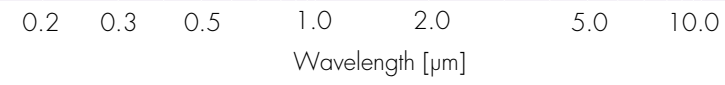
Material

LASER COMPONENTS®

Typical Transmission Range	Description
UV grade fused silica 0.18 µm - 2.0 µm	▪ Commonly used material for high power laser applications ▪ Good transmission values from the UV to NIR range ▪ High stability and low thermal expansion coefficient
Q1, Suprasil® 1 0.18 µm - 2.0 µm	▪ Fused silica with high purity and excellent homogeneity ▪ Low metallic impurities, therefore high UV transmission & minimum fluorescence ▪ No polishing marks and streaks
Infrasil®/Suprasil® 300 0.25 µm - 3.5 µm	▪ Fused silica for IR applications to 3500 nm ▪ Specially treated / manufactured fused silica with < 1 ppm OH contents ▪ No absorption effects at 2700 nm due to low OH content ▪ Reduced UV transmission (due to higher metallic contamination)
BK7 0.35 µm - 2.0 µm	▪ Borosilicate crown glass ▪ Most commonly used material in laser optics ▪ Excellent quality at a low price ▪ Easy to process and to polish to high accuracy
Sapphire 0.25 µm - 5.0 µm	▪ Synthetic, monocrystalline aluminium oxide ▪ Optically strongly anisotropic, shows birefringent effects ▪ Performance depends on orientation of optical axis ▪ High mechanical strength, chemical resistance and thermal stability
CaF_2 0.15 µm - 8.0 µm	▪ Cubic single crystal ▪ Available in different quality levels (IR, UV, VUV-laser–grade) ▪ Popular choice for VUV and Excimer laser optics ▪ Very broad transmission range from UV to IR
MgF_2 0.15 µm - 8.0 µm	▪ Tetragonal positive birefringent crystal ▪ Popular choice for VUV and Excimer laser optics ▪ Material shows birefringent effects ▪ Performance depends on orientation of optical axis



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