SEMI-FINISHED BONDED SUBSTRATES CONSISTING OF PHOTOSENSITIVE FOTURAN® AND BOROFLOAT 33®

Fraunhofer ENAS produces these semi-finished bonded substrates with diameters of 4” and 6” and thicknesses from 300 µm up. The precise specifications of each wafer have to be determined specifically, depending on the intended application.

**Materials**
Fraunhofer ENAS uses special glass Foturan® and standard Borofloat® wafers for the fabrication, which are available on the market. Their specifications can be chosen to match the requirements.

**Foturan:**
- **Type**: Foturan®
- **Thicknesses range**: 150 – 1200 µm
- **Coefficient of thermal expansion in 10⁻⁶·K⁻¹**: 8.6
- **Refractive index**: 1.515
- **Electrical Resistance in Ω·cm**: > 10⁷
- **Dielectric constant (1 MHz; 20 °C)**: 6.5
- **Main characteristics**: photosensitive glass, wet chemical etching, directly bondable

**Glass:**
- **Type**: Borofloat®
- **Thicknesses range**: 150 – 3000 µm
- **Coefficient of thermal expansion in 10⁻⁶·K⁻¹**: 3.25
- **Refractive index**: 1.471
- **Electrical Resistance in Ω·cm**: > 10⁷
- **Dielectric constant (1 MHz; 20 °C)**: 4.6
- **Main characteristics**: anodic and directly bondable

**Dimensions**
Fraunhofer ENAS offers these semi-finished bonded substrates with either ground or polished surfaces as required. The surface texture can be selected depending on the intended application (anodic bonding, direct bonding, etching, need for hydrophobic or hydrophilic surfaces etc.). With specially developed polishing techniques low surface roughness can be achieved within Angström range. The combination of polished and ground surfaces within semi-finished bonded substrates is possible.

**Surfaces**
- **Polished surfaces**
  - **Roughness**: Rₚ < 0.5 nm
  - **Availability**: Single- and double-sided
  - **Application**: Direct bonding and etching
  - **Adhesion processes**
- **Ground surfaces**
  - **Roughness**: Rₚ > 0.1 µm
  - **Availability**: Single- and double-sided
  - **Application**: Adhesion processes

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