

# SCHOTT Technical Glass Powders

## Product Information

Glass powders offer a broad variety of characteristics depending on:

- Glass composition
- Grain sizes and their distribution
- Further processing technique.

More than one hundred SCHOTT standard glass types as well as different dry and wet grinding methods including SCHOTT patented technologies are utilized and result in a wide range of glass powder products. SCHOTT translates specific physical and chemical requirements into tailor-made solutions for a variety of applications in the electronic and hermetic packaging field.

## Advantages

Glass powders offer a broad variety of characteristics depending on:

- 125 years of melting experience ensure excellent purity and a consistently high quality level
- Large assortment of standard and custom-made glass formulations  
State-of-the-art grinding technologies to ensure application-specific grain size distributions and purity of powders
- Lead-free solutions for all major applications
- Full support from sample quantities to mass production

## Glass Compositions and Applications

**Passivation glasses** protect the sensitive p/n junctions of semiconductors and can serve as hermetic packaging at the same time:

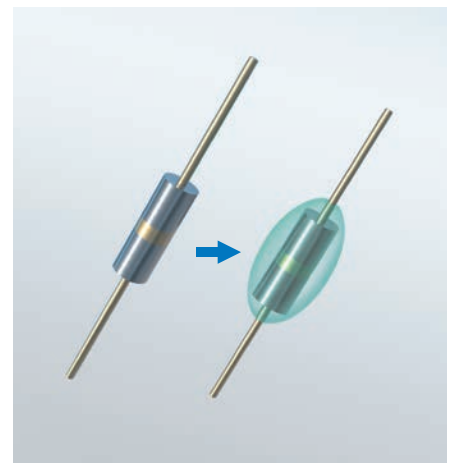
- Sinter glass diodes and rectifiers
- Wafer passivation, i.e. diodes and thyristors
- High-voltage varistors

**Sealing glasses** with defined coefficients of thermal expansion and processing temperatures of 800°C to 1000°C are used to hermetically join together metals and other materials. They meet the requirements of both, matched and compression seals in applications such as:

- Glass-to-metal seals
- Solid oxide fuel cells (SOFC)
- Flash lights
- High-temperature sensors

**Solder glasses** with particularly low softening points (below 550°C) allow the joining of different materials (e.g. glass, ceramics or metals) without thermally damaging the component. To ensure stress-free and hermetic sealing, the coefficient of thermal expansion (CTE) is closely matched to the sealing partners:

- Opto-electronic packaging (window and lens caps)
- MEMS packaging
- Sealing of display devices



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Type	Description	Size	Grain size $d_{50}$ [ $\mu\text{m}$ ]	Grain size $d_{99}$ [ $\mu\text{m}$ ]
K	Standard grind	K1	$30 \pm 10$	$\leq 150$
		K2	$16 \pm 4$	$\leq 100$
		K3	$10 \pm 2$	$\leq 63$
		K4	$7 \pm 1$	$\leq 40$
		K5	$5 \pm 1$	$\leq 40$
		K6	$3 \pm 1$	$\leq 40$
FK	Special grind with low abrasion level	FK3.5	$3.5 \pm 1$	$\leq 20$
		FK2.5	$2.5 \pm 0.5$	$\leq 15$
		FK2.0	$2.0 \pm 0.25$	$\leq 15$
		FK1.5	$1.5 \pm 0.25$	$\leq 10$
SM	Special grind with narrow distribution	SM3.5	$3.5 \pm 1$	$\leq 13$

Grain sizes are defined by the absolute size of the grains as well as grain size distribution:  
 $d_{50}$  = 50 % of measured grains are equal or smaller than the specified value  
 $d_{99}$  = 99 % of measured grains are equal or smaller than the specified value

Individual grain size availability depends on the glass composition.

## Further Processing of Glass Powders by SCHOTT

Glass powders can be further processed into paste, granulate or sintered preforms:

**Glass pastes** consist of glass powder mixed with organic binder and solvent. Featuring a defined viscosity, they are ready to be screen-printed or dispensed for sealing and over-glazing purposes.

**Ready-to-Press** granulates are agglomerates of glass powder held together by an organic binder. Due to their relatively round shape, they easily “flow” into pressing tools for further processing into preforms. Granulates can be supplied in various colors by adding pigments during the process.

**Sintered preforms** are pressed and sintered glass beads, “pearls”, rods or spacers in various shapes. They are mostly used for the production of hermetic glass-to-metal seals.



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