



**PT&B SILCOR GmbH**

Coating Datasheet

***SILCOR®GR***  
***(Electronically highly conductive amorphous carbon)***

SilCor®GR is a three-dimensional cross-linked amorphous graphite film, which is evident from the high fraction of carbon atoms in sp<sup>2</sup>-hybridization (about 90%) and a significant mechanical hardness. The coating is deposited by means of magnetron sputtering, which is a special type of PVD technology. Neither hydrogen nor a metal is added during the coating process. For the sake of increasing the conductivity of the films, usually n-type doping is applied. On request, modification of the coating process by the addition of hydrogen or a metal is optional.

Deposition by magnetron sputtering (PVD) in various types of deposition apparatuses

- (1) stationary mode, 5 inch magnetron within a wafer deposition apparatus
  - (2) stationary or dynamic mode (single or twofold rotation), 30 inch rectangular magnetrons
- metallic adhesion layer of 100nm of chromium (titanium or aluminum on request)

Properties of SilCor®GR

- Film thickness 400 nm (standard), alternative 10 nm to 10.000 nm
- Surface roughness: Ra = 5 nm, Rz = 30 nm (standard coating)
- Plastic universal hardness: U<sub>H</sub> = 10 GPa (5 mN load, standard coating)
- Martens hardness HM = 6 GPa (5 mN load, standard coating)
- Vickers hardness HV<sub>0.005</sub> = 950
- Young's modulus E = 135 GPa
- Elastic deformation: W<sub>E/P</sub> = 55 %
- Specific resistivity 0,01 Ωcm (optimum n-type doping), undoped 10 Ωcm
- Alloying the film with metals or hydrogen results in values of 10<sup>-4</sup> to 10<sup>11</sup> Ωcm
- Temperature coefficient of resistivity about -0,2 10<sup>-3</sup> (standard coating)
- Adhesion according to Rockwell-test HF1
- Distinct electronic field emission ("cold cathode" effect)

Applications

- Electron beam optics and lenses – in general – vacuum electronics, thin film precision resistors, electric conducting paths for high-temperature applications, cold cathode devices

Note:

The given values of specific properties refer to measurements of selected, typical sample test specimens. Because of geometric plasma effects the measured characteristics can vary in particular as a function of the size of the substrates. For the exact determination of the coating characteristics the actual coating goods (substrates) of the customer has to be used.