



SUPERSiC® DUMMY WAFERS

Overview

Entegris' portfolio of SUPERSiC® silicon carbide dummy wafers provides the user with maximum flexibility while meeting SEMI® standard wafer dimensions. Wafers can be specified as full round or with user defined notches or flats. They are available in sizes up to 300 mm.

Entegris also offers user defined serialization on each wafer regardless of size or thickness. Custom laser engraving eliminates the risk of cross contamination in the fab.

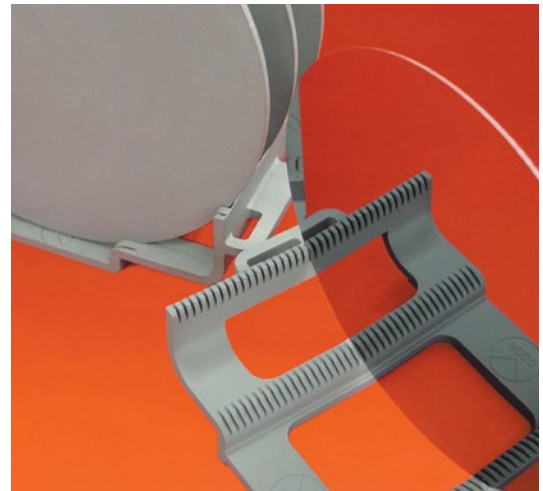
SUPERSiC dummy wafers contain no silicon backfill and have high purity and durability. Due to their acid resistance and ability to withstand extended high temperature cycling, SUPERSiC wafers can be cleaned and reused indefinitely in Low-pressure Chemical Vapor Deposition (LPCVD) or diffusion processes.

SUPERSiC Benefit

It is still common for silicon dummy wafers to be made from reclaimed Silicon (Si) material. Si reclaimed wafers require recovery, cleaning, protection, and tracking. Costs for reclaimed Si wafers can exceed \$100,000 per year, depending on the size of the fab.

The lifetime of a Si reclaimed dummy wafer is determined by its cleaning frequency. Each cleaning cycle reduces the life of the Si reclaimed wafer which results in the continuous purchase of more reclaimed Si wafers to replace those lost. SUPERSiC dummy wafers remain unchanged cycle after cycle.

Lifetimes for SUPERSiC dummy wafers have been reported to be in excess of 3 years. Due to the better match between the Coefficient of Thermal Expansion (CTE) of Silicon Carbide (SiC) and typical depositions, the film thickness that can be deposited is thicker for SiC than reclaimed Si. Also the surface roughness of SUPERSiC dummy



wafers is higher than that of reclaimed Si which improves adhesion of the deposited film to support the growth of thicker deposits before a clean is needed. Depending upon material and process, deposition films of up to 10x the thickness of those produced with reclaimed Si wafers can be grown using SUPERSiC dummy wafers.

SUPERSiC dummy wafers can be custom engraved to avoid any crossover of dummy wafers between various processes which helps to avoid cross-contamination. Engraving is done by laser for easy reading and recognition. In contrast to reclaimed Si dummy wafers, this engraving is not affected by the cleaning cycles and never needs to be redone throughout the lifetime of the wafer.

Cost of Ownership

A common belief in a wafer device company is that reclaimed silicon is cheap or free. However, this is not the case, as reclaimed Si wafers still originate from purchased Si wafers and the costs for cleaning, recovery and tracking can be very expensive.

Typical Material Properties

Properties	SUPERSiC-3C
Apparent density:	3.15 g/cm ³ (0.114 lb/in ³)
Bulk density:	2.55 g/cm ³ (0.092 lb/in ³)
Total porosity: ¹	20%
Open porosity: ²	0%
Total impurity level:	<10 ppm
Flexural strength:	155 MPa (22,400 psi)
Tensile strength:	129 MPa (18,700 psi)
Elastic modulus:	216 GPa (31 10 ⁶ psi)
Specific stiffness:	85 kN.m/g
Poisson's ratio:	0.17
Dynamic shear modulus:	96 GPa (14 10 ⁶ psi)
Hardness knoop:	1992 kg/mm ²
Thermal diffusivity:	100 mm ² /s
Thermal conductivity:	170 W/m.K (98 Btu/hr/ft ² °F)
Instantaneous CTE at RT:	2.4 10 ⁻⁶ /K (1.3 10 ⁻⁶ /°F)

¹Porosity is sealed under the dense coating; porosity is not exposed to the process

²Porosity sealed off by CVD SiC coating

For More Information

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