

## DB 99-001 Diffusion Barrier

**Description:** DB 99-001 is a screen printable diffusion barrier paste that is designed for use in the photovoltaic industry. The typical industrial solar cell consists of a front n+ junction that is diffused approximately 0.2–0.4 microns into the silicon wafer and is followed by a SiN<sub>x</sub> coating and Al back surface field (BSF). DB 99-001 is

designed to prevent phosphorus diffusion into silicon. The paste is suitable for the production of back contact solar cells and also provides edge isolation in conventional cells. A single print through a 200 mesh screen followed by rapid thermal processing through an infrared furnace will create a high quality diffusion barrier.

Typical Properties	
DB 99-001	
Viscosity (Pa.s) <sup>1</sup> :	50–70
Wet Deposit (mg/square cm):	1.8–2.4
Drying Profile <sup>2</sup> :	250–300°C, < 60 seconds
Peak Firing Temp <sup>2</sup> :	500–950°C
Time at Peak:	1–5 minutes
Recommended Thinner	0800

All properties are target values and are not meant to represent product specifications

**Notes:**

<sup>1</sup>Viscosity as measured on Brookfield model HBT cone/plate viscometer; 9.6 reciprocal seconds, 1.565° cone, 25°C.

<sup>2</sup>Recommended set points °C in infrared firing furnace

**Product Advantages:**

- RoHS compliant<sup>3</sup>
- Lead & Cadmium free<sup>4</sup>
- Single print/rapid IR thermal processing creates high quality diffusion barrier
- Suitable for back contact solar cells
- Provides edge isolation in conventional cells

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### Processing Recommendations

**Printing:** It is recommended that the paste temperature be between 20–25°C prior to printing, and it is advisable to control the ambient room temperature within  $\pm 2^\circ$  to insure consistent printing results. The printing area should be clean and well-ventilated.

**Screen:** 200–250 mesh screen with a 12–20  $\mu\text{m}$  emulsion thickness is recommended.

**Drying:** The ink can be dried in an Infrared or conventional dryer under a wide range of conditions. Inks are typically dried in an IR dryer with set points of 250–300°C in less than 60 seconds.

**Compatibility:** Ferro has tested this material according to the recommended processing conditions described here, however, it is imperative that customers evaluate the material in their manufacturing process and conditions to insure suitability for their intended use. Ferro technical personnel can help facilitate testing, and can assist with integration into customer manufacturing processes.

**Thinning:** Thinning is not recommended, since the paste is supplied at the correct viscosity for application. Contact your local Ferro Representative for appropriate solvent details, should thinning become necessary to replace solvent lost through evaporation.

**Paste Storage & Shelf Life:** The paste should be stored in tightly capped containers in a cool (5–30°C) dry place away from direct sunlight. When properly stored, unopened material will have a shelf life of up to 3 months.

Notes:

<sup>3</sup>Complies with EU Directives on Restriction of the use of Hazardous Substances (RoHS; 2002/95/EC) and Waste from Electrical and Electronic Equipment (WEEE; 2002/96/EC). Current exemptions allow lead contained in the glass system of thick film materials used in electronic components. In anticipation of future amendments and more stringent environmental regulations, Ferro continues to expand its range of Lead Free<sup>5</sup> materials.

<sup>4</sup>Initial product composition was certified by SGS laboratories to be below the detection level for lead and cadmium. This paste is not routinely analyzed for lead and cadmium content and is not the basis for product specification or warranty.

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