

DP 99-038 Phosphorus Diffusion Source

Description: DP 99-038 is a screen printable phosphorus diffusion source designed for use by the photovoltaic industry. The typical industrial solar cell consists of a front n-type junction diffused approximately 0.2–0.4 micron into the silicon wafer. DP 99-038 has been designed at a concentration whereby a single print through a

200 mesh screen followed by rapid thermal processing through an infrared furnace will create a high quality junction suitable for photovoltaic conversion. The sheet resistivity of 35 Ω /square to 100 Ω /square can be obtained by varying the firing profile.

Typical Properties	
DP 99-038	
Viscosity (Pa.s) ¹ :	2–3
Wet Deposit (mg/square cm):	1.8–2.4
Drying Profile ² :	250–300°C, < 60 seconds
Peak Firing Temp ² :	900–1000°C
Time at Peak:	5–10 minutes
Recommended Thinner	0800

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

Notes:

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

²Recommended set points °C in infrared firing furnace.

Product Advantages:

- Single print/rapid IR thermal processing creates high quality junction
- RoHS compliant³
- Lead & Cadmium free⁴

www.ferro.com

DISCLAIMER: Reasonable care has been taken in the preparation of this information, but FERRO EXTENDS NO WARRANTIES, MAKES NO REPRESENTATIONS AND ASSUMES NO RESPONSIBILITY AS TO ACCURACY OR SUITABILITY OF THIS INFORMATION OF THIS PRODUCT FOR ANY PURCHASER'S OR USER'S USE OR FOR ANY CONSEQUENCE OF ITS USE. FERRO DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR ANY PARTICULAR USE. All statements, technical information and recommendations contained herein are based on Seller's or Manufacturer's test and the test of others, and are believed to be accurate, but no guarantee of accuracy is made. Judgment as to the suitability of information herein or the user's purposes are necessarily the user's responsibility. Users shall determine the suitability of the products for their own intended application.

Users assume all risk of use or handling whether or not in accordance with any statements or recommendation of the seller or manufacturer. Liability, if any, is and shall be limited to the replacement of such quantity of material proved not to conform to specifications as set out in product specification. Statements concerning the possible use of these products are not intended as recommendation to use these products in infringement of any patent. No guarantee is made that any use of the products does not infringe third-party intellectual property or patent rights anywhere in the world.

DP 99-038 Phosphorus Diffusion Source

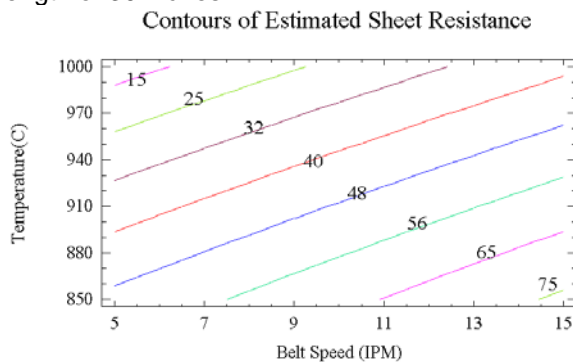
Processing Recommendations

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 μm 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.

Firing: Firing time and temperatures may be varied to obtain desired resistivity. The following contour diagram shows a typical resistivity obtained by firing DP99-038 through an IR furnace with the hot zone length of 30 inches.



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:

³Complies 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 Free⁵ materials.

⁴Initial 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.

Rev: 08/09

Vista, CA, USA
760-305-1000

Tsukuba, Japan
+81 29-889-2144

Suzhou, China
+86 512-62562258

Hanau, Germany
+49 61-81594739

www.ferro.com

DISCLAIMER: Reasonable care has been taken in the preparation of this information, but FERRO EXTENDS NO WARRANTIES, MAKES NO REPRESENTATIONS AND ASSUMES NO RESPONSIBILITY AS TO ACCURACY OR SUITABILITY OF THIS INFORMATION OF THIS PRODUCT FOR ANY PURCHASER'S OR USER'S USE OR FOR ANY CONSEQUENCE OF ITS USE. FERRO DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR ANY PARTICULAR USE. All statements, technical information and recommendations contained herein are based on Seller's or Manufacturer's test and the test of others, and are believed to be accurate, but no guarantee of accuracy is made. Judgment as to the suitability of information herein or the user's purposes are necessarily the user's responsibility. Users shall determine the suitability of the products for their own intended application.

Users assume all risk of use or handling whether or not in accordance with any statements or recommendation of the seller or manufacturer. Liability, if any, is and shall be limited to the replacement of such quantity of material proved not to conform to specifications as set out in product specification. Statements concerning the possible use of these products are not intended as recommendation to use these products in infringement of any patent. No guarantee is made that any use of the products does not infringe third-party intellectual property or patent rights anywhere in the world.