

Description: Ferro Corporation offers a full range of thick film inks for contacting the back surface of silicon solar cells. The other classes of back surface metallizations offered are pure aluminum inks. These inks, which come in fritted and unfritted versions, are used to form a p+ back surface field layer. A variety of configurations and process sequences, including sequential or cofired processing methods, can be accommodated by combinations of our product offerings.

33-465 is part of a specially designed silver conductor system that does not require drying. By eliminating the drying processes of conventional pastes, Hot Melt compositions offer higher throughput rates, increased productivity and improved yields. Hot Melt pastes are solid at room temperature, but when resistively heated above their melting point, the ink will screen print similarly to a conventional thick film paste. Unlike conventional pastes, once the paste is transferred to the solar cell, the ink instantly resolidifies and is ready for the next printing sequence.

Processing Recommendations

Printing: 250 – 325 mesh screen with a 20 µm – 25 µm emulsion thickness is recommended. The screen and squeegee need be heated to temperatures of 60 – 65°C prior to printing. The temperature of the stage or nest used to carry the silicon wafer should also be controlled to achieve optimum results.

Drying: No drying is required, the paste instantly resolidifies after transfer to the solar cell.

Thinning: Thinning is not recommended, since the paste is a solid at room temperature. The viscosity of the ink may be adjusted by controlling the temperature of the screen.

Paste Storage & Shelf Life: The paste should be stored in tightly capped containers, in a cool, dry place away from direct sunlight. Properly stored material will have a shelf life in excess of 6 months.

Typical Properties	
	33-465
Viscosity (poise) ¹ :	285 – 450
Solids Content:	78.0 – 81.0 %
Fineness of Grind:	< 15 / 9 µm
A Printed Thickness:	20 – 30 µm
Fired Thickness:	12 – 16 µm
Resistivity ² (milliohms/square):	< 2.0
Drying Profile:	No Drying Required
Peak Firing Temp:	680 – 750°C
Time at Peak:	1 – 20 seconds

Notes:

¹Viscosity as measured on Brookfield model HBT cone/plate viscometer; 9.6 reciprocal seconds, 1.565" cone, 65°C.

²Milliohms/sq. at 25µm.

Rev: 09/05

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.