



## ESL ELECTROSCIENCE

CERAMIC TAPES &  
THICK-FILM MATERIALS

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## SOLAR CELL SILVER PASTE

# 9987

### Cadmium-Free, Low-Lead Photovoltaic Material

ESL 9987 is a cadmium-free, low-lead silver paste developed for use as a front-side metallization in photovoltaic applications. The 9987 provides high efficiency and high fill factor on single crystal and polycrystalline silicon solar cells. ESL 9987 can be processed on solar cells using a fire-through process with silicon nitride or titanium dioxide anti-reflection coating.

The recommended materials to be used in conjunction with the 9987 are 9920 Series back-surface silver and 2590 Series back-surface aluminum metallizations.

### PASTE DATA

<b>RHEOLOGY:</b>	Thixotropic, screen printable paste
<b>VISCOSITY:</b> (Brookfield HBT, CP-51 Spindle, Shear Rate 9.6 sec <sup>-1</sup> , 25.0±0.2°C)	120±30 Pa·s
<b>SHELF LIFE:</b> (25°C)	6 months

### PROCESSING

<b>SCREEN MESH/EMULSION:</b>	200-325/15-30 μm
<b>LEVELING TIME:</b> (25°C)	5-10 minutes
<b>DRYING AT 125°C:</b>	10-15 minutes
<b>FURNACE SET POINT:</b>	840-910°C
<b>TIME ABOVE 600°C:</b>	typically 5-8 seconds
<b>THINNER:</b>	ESL 401

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See Caution and Disclaimer on other side.

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**CAUTION:** Proper industrial safety precautions should be exercised in using these products. Use with adequate ventilation. Avoid prolonged contact with skin or inhalation of any vapors emitted during use or heating of these compositions. The use of safety eye goggles, gloves or hand protection creams is recommended. Wash hands or skin thoroughly with soap and water after using these products. Do not eat or smoke in areas where these materials are used. Refer to appropriate MSDS sheet.

**DISCLAIMER:** The product information and recommendations contained herein are based on data obtained by tests we believe to be accurate, but the accuracy and completeness thereof is not guaranteed. No warranty is expressed or implied regarding the accuracy of these data, the results obtained from the use hereof, or that any such use will not infringe any patent. Electro-Science assumes no liability for any injury, loss, or damage, direct or consequential arising out of its use by others. This information is furnished upon the condition that the person receiving it shall make their own tests to determine the suitability thereof for their particular use, before using it. User assumes all risk and liability whatsoever in connection with their intended use. Electro-Science's only obligation shall be to replace such quantity of the product proved defective.

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