ESL ELECTROSCIENCE
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SOLAR CELL SILVER PASTE 9988

Cadmium-Free, Low-Lead Photovoltaic Material

ESL 9988 is a silver paste developed for use as a front-side metallization in photovoltaic applications. The 9988 provides high efficiency and high fill factor on single crystal and polycrystalline silicon solar cells. ESL 9988 can be processed on solar cells using a fire-through process with silicon nitride or titanium dioxide anti-reflection coating.

ESL 9925 Series silver and ESL 2591 Series aluminium back-surface metallisations are recommended for use with 9987.

PASTE DATA

Rheology:	Thixotropic screen-printable paste
Viscosity: (Brookfield HBT, Shear rate 9.6 sec^{-1}, CP-51 Spindle, 25.0 ± 0.2 °C)	80 ± 20 Pa.s
Shelf Life (20 - 25 °C):	6 months

PROCESSING

Screen Mesh, Emulsion:	200 - 325 S/S, 15 - 25 µm
Levelling Time (at 20 °C):	5 - 10 min
Drying Time (at 125 °C):	10 - 15 min
Furnace Set Point:	840 - 910 °C
Time above 600 °C:	typically 5 - 8 sec

(See typical firing profile on page 2 - spike profile, fast firing, IR furnace, 4.7 m/minute belt speed.)

Thinner:	ESL 452

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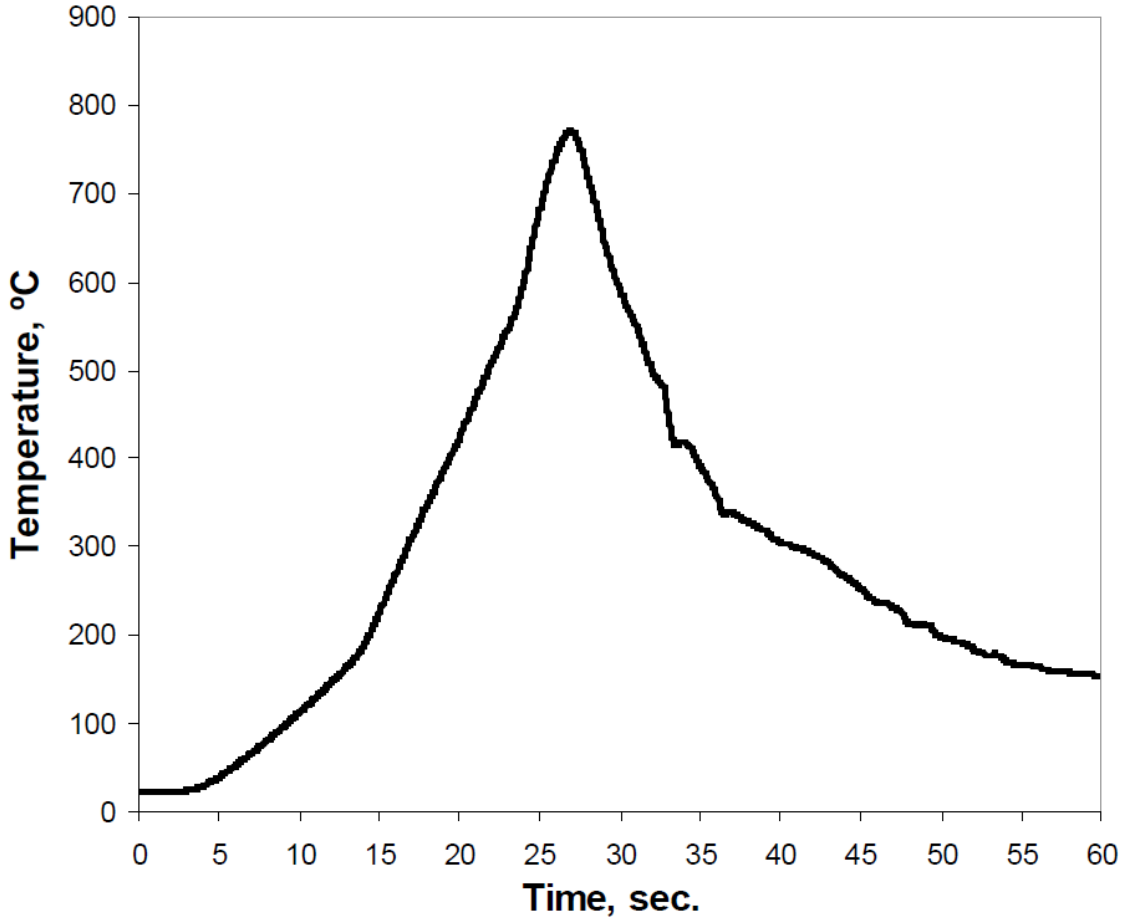
See Caution and Disclaimer on page 2.

TYPICAL FIRING PROFILE



Optimum firing conditions for the best performance must be established by the customer based on cell configuration, thickness and process conditions. For this reason, our recommended firing profile should be taken only as a starting point.

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 vapours 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.

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