



ESL ELECTRO-SCIENCE

CERAMIC TAPES &
THICK-FILM MATERIALS

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SOLAR CELL BACK-SURFACE TABBING SILVER 9928-G

RoHS Compliant* Photovoltaic Conductor

APPLICATION

ESL 9928-G is a **silver-aluminum** paste intended for the back-surface solderable metallization of monocrystalline and polycrystalline silicon solar cells. The 9928-G paste contains a Pb-free, Cd-free glass developed to provide excellent ohmic contact, high adhesion, and excellent solderability with both leaded and lead-free solder compositions. This paste is specially formulated for applications requiring a silver-aluminum composition.

This material is designed to provide the highest coverage and excellent electrical performance over a wide range of processing conditions.

PRODUCT FEATURES

- Aluminium-doped silver
- Lead-free and cadmium-free
- Highest efficiency
- Highest coverage
- High adhesion
- Good solder wetting

PASTE PROPERTIES

Rheology:	Thixotropic, screen-printable paste
Viscosity ¹ (Brookfield RVT/ABZ, 10 rpm, 25.0°C – 26.0°C):	110 ± 30 Pa·s
Solids:	68.5 ± 1.5 %
Shelf life:	6 months
FOG:	< 10 µm

9928-G 1105-New

ESL Affiliates

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See Caution and Disclaimer on other side.

PROCESSING GUIDE

Screen mesh/emulsion:	180 - 325 mesh, 5 - 25 μm emulsion
Leveling time:	5 - 10 minutes
Drying time @ 125-150°C (box oven):	10 - 15 minutes
Drying time @ 220-300°C (IR furnace):	< 60 seconds
Dried thickness:	10 - 15 μm
Firing temperature (IR furnace set point):	840 - 910°C
Time above 600°C (IR furnace actual temperature):	typically 5-8 seconds
Fired thickness:	7 - 11 μm
Resistivity:	< 3 m Ω /square
Recommended thinners:	ESL 401, ESL 413

¹ The 9928-G paste is manufactured within a viscosity range compatible with most solar cell printing processes. If a different viscosity is desired, please contact ESL Technical Services for assistance.

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* Complies with RoHS ELV, WEEE, and CHP 3 EC directives.

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 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 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, but 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.
