

FK1601: LEAD-FREE SOLDERABLE Ag CONDUCTOR PASTE FOR AlN

The Ag conductor paste FK1601 is intended to be applied to Aluminum Nitride substrates by a screen printing process and fired in a conveyor furnace in an air atmosphere, to form cost-effective, lead-free solderable thick film conductors with a very low sheet resistivity below 3.0 mOhm/Sq.

PROCESS CONDITIONS

Substrate

The paste is designed for use on AlN substrates (with lapped surfaces) from CoorsTek/ANCeram. Substrates with other surface qualities or from other manufacturers may lead to deviation of the results.

Screen printing

Use a stainless steel screen with 200 mesh and a wire diameter of 40 µm, as well as 25 µm emulsion thickness (10 to 12 µm EOM) to achieve the stated film thickness.

Leveling

The printed films should be leveled for 10±2 minutes at room temperature (22 to 25 °C).

Drying

The printed films should be dried for 15 minutes at 150 °C in a drying oven with an exhaust air system or in a continuous flow dryer.

Firing

The printed films should be fired under air atmosphere in a conveyor belt furnace at a peak temperature of 850 °C and with a dwell time of 10 minutes. Fraunhofer IKTS recommends a total cycle time of 30 minutes.

Storage

The pastes can be stored at any temperature between 4 and 10 °C. The lower the temperature, the better is the long-term stability. The jar must remain tightly sealed during storage. In order to prevent humidity from condensing on the paste, the jar may be opened only after the content has reached room temperature. The paste needs to be sufficiently homogenized before use, e.g. with a spatula.

Safety notice.

For safe handling of the pastes, please follow the instructions in the safety data sheet.

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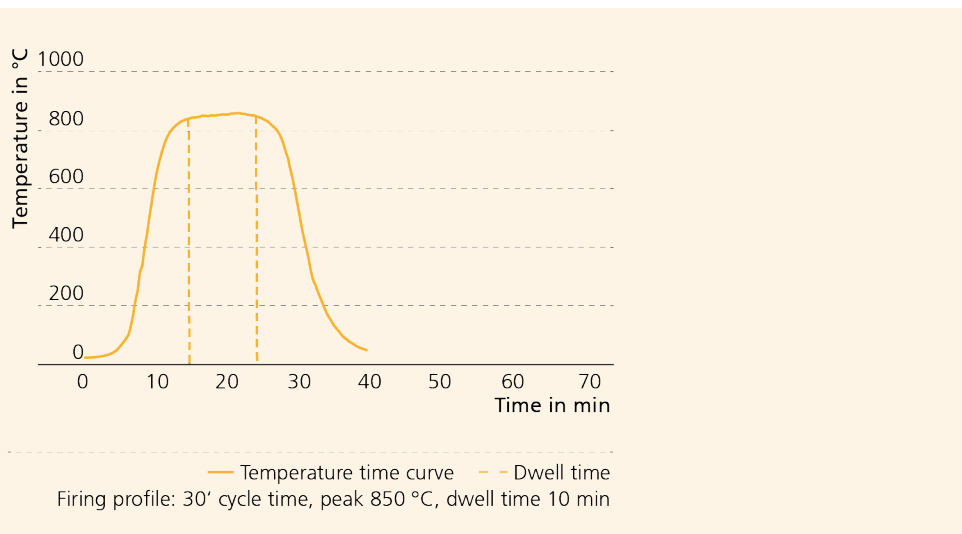
Management
System
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Quality requirements

An analysis certificate comes included with each delivery. The paste meets current legal requirements according to RoHS II (Directive 2011/65/EC) and REACH (Regulation (EC) No 1907/2006).

Instead of an expiration date, it states a date for retesting, which is six months after the date of delivery. During this period, IKTS warrants the values stated in the analysis certificate for unopened pastes. After the date for retesting has passed, it is the client's responsibility to test the paste quality under the conditions stated in the data sheet.

FIRING PROFILE



TECHNICAL SPECIFICATIONS

Characteristics	Unit	Value
Viscosity ¹	Pa·s	TBD
Sheet resistance ^{2, 6}	mOhm/Sq	≤ 3
Solderability ^{3, 6}	%	≥ 95
Leaching resistance ^{4, 6}	Dips/result	≥ 1
Adhesion ⁵ (number of firings)		
- Initial ⁶ (1x)	N/4 mm ²	≥ 20
- Aged ⁶ (1x)		≥ 20
Fired film thickness	µm	15±2
Coverage ⁷	cm ² /g	3.2

¹ Brookfield viscometer HB with spindle/cup combination SC4-14I-6RP(Y) at n=10 rpm and 25±0.2 °C.

² Sheet resistance, calculated for a fired thickness of 15±1 µm.

³ Solder Sn/Ag/Cu 96.5/3.0/0.5; flux: Alpha 611, soldering time: 5 s, soldering temperature: 245±2 °C.

⁴ Solder Sn/Ag/Cu 96.5/3.0/0.5; flux: Alpha 611, soldering time: 5 s, soldering temperature: 255±2 °C.

⁵ 90° wire peel test in accordance with DIN 41850-2, 2x2 mm² pad size, solder: Sn/Ag/Cu 96.5/3.0/0.5, artificial aging time 100 h at 150 °C.

⁶ Firing profile: total cycle time 30 min, 10 min at 850 °C.

⁷ Calculated area that can be printed with one gram paste in the recommended thickness.