FK9600:
RuO_2 resistor paste system for AlN

Fraunhofer IKTS

The RuO_2-based FK9600 resistor paste system, with sheet resistance values of 6 to 6,000 Ohm/sq, is compatible with the conductor pastes FK1205, FK1916 and FK1953, as well as with the encapsulation paste FK4027.

Other pastes can be used as conductor paste, but this may result in differing sheet resistance values or temperature coefficients.

The pastes of the FK9600 paste system as listed in the table below can be mixed with each other as needed. We do not recommend mixing with the resistor pastes of the FK9900M series.

Processing

Substrates
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 variations in 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.

Levelling
The screen printed film should level 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 films should be fired in air at a peak temperature of 850 °C, a dwell time of 10 minutes and a total cycle time of 60 minutes in a belt furnace.

Storage
The paste should be stored at 4 to 10 °C. This guarantees a high paste viscosity and prevents the solids from settling. The jar must remain tightly closed during storage. To prevent condensation of air humidity on the paste, the jar must not be opened until the contents have reached room temperature. Before using the paste, it must be sufficiently homogenized, for example by stirring it with a spatula.

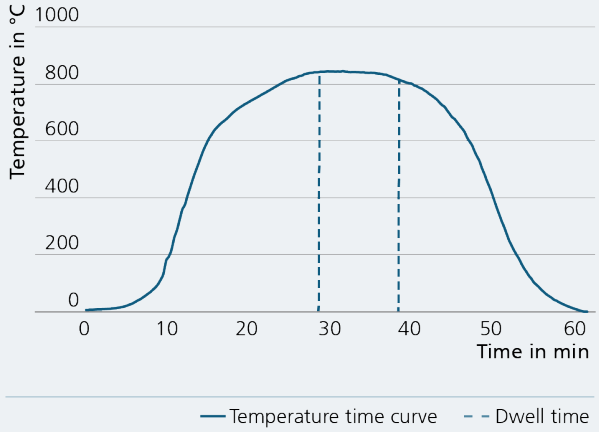
Safety notice
For safe handling of the pastes, please observe the notices in the safety data sheet accompanying each delivery.

Quality requirements
Each delivery will be supplied with Certificate of Analysis (CoA). The paste meets all requirements of RoHS III (regulation 2015/863/EC) and REACH (regulation (EC) 1907/2006).

Instead of an expiration date, after which an expired paste would have to be disposed of regardless of its condition, it is provided with a retest date. The certified values of the paste are valid for six months from the date of shipment of the unopened jars. Prolonged storage may result in segregation of the solids. Then the paste should be mixed thoroughly before further use. After the retest date the customer can decide whether the product needs to be retested to recheck the parameters for further application. The test conditions are given in point 2 to compare the results with CoA.

Miscellaneous
The current technical specifications are published on our website www.ikts.fraunhofer.de.

Firing profile



Firing profile: 60'cycle time, peak 850 °C, dwell time 10 min

For more information please turn the page.

Technical specifications

Parameter	Einheit	FK9606	FK9611	FK9615	FK9621	FK9631	FK9636
Viscosity[1]	Pa·s	220±30	220±30	220±30	220±30	220±30	220±30
Sheet resistance[2, 3]	Ohm/sq	6	10	50	100	1.000	6.000
Shipping specification	%	±10	±10	±10	±10	±10	±10
Hot TCR[2, 4]	ppm/K	0±200	0±100	0±100	0±100	0±100	0±300
Cold TCR[2, 4]	ppm/K	0±200	0±100	0±100	0±100	0±100	0±300
Dried film thickness	µm	22±2	22±2	22±2	22±2	22±2	22±2
Coverage[5]	cm²/g	105±5	105±5	105±5	110±5	110±5	110±5

[1] Brookfield viscometer HB with spindle/cup combination SC4-14/-6RP(Y) at n=10 rpm and 25±0.2 °C.
[2] Firing profile: total cycle time 60 min, 10 min at 850 °C.
[3] Calculated for resistors with the geometry 2x1 mm2 and a dried thickness of 22±2 µm.
[4] Hot temperature coefficient of resistance (TCR) between 25 °C and 150 °C, cold TCR between -55 °C and 25 °C.
[5] Calculated area that can be printed with one gram paste in the recommended thickness.

Richard Schmidt
Fraunhofer Institute for Ceramic Technologies and Systems IKTS
Winterbergstrasse 28, 01277 Dresden
Phone +49 351 2553-7916
service@ikts-tfc.de

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