

Technical Data Sheet

THICK FILM MATERIALS

Product Type: Dielectrics

Product Name: IP 211 / IP 211 Clear



High Temperature Glaze for Platinum and Steel Insulation

Description

IP 211 is a high temperature overglaze for protection of platinum structures, e.g. sensor applications. It also can be used to cover Cr steel with an insulating layer.

The standard color is blue. A clear version, IP 211 Clear, is available on demand.

Key Benefits

- It fires to an extremely dense, hermetic film, allowing excellent electrical performance at fired film thicknesses of $\geq 50 \mu\text{m}$.
- A continuous operation temperature at up to $500 \text{ }^\circ\text{C}$ is possible.
- The following steel types may be used:

DIN-Standard No.	Steel Type
1.4016	X 6 Cr 17
1.4742	X 10 CrAl 18
1.4762	X 10 CrAl 24

- Free of cadmium, nickel and phthalate
- REACH³ and ROHS⁴ compliant

Processing

- Spatulate well prior to processing.

When stored in a refrigerator, the paste should have acquired room temperature before being opened, to avoid condensation.

- Print through 165 – 325 mesh stainless steel screen. A print-dry fire sequence is advised for each layer.
- Level at room temperature for 10 minutes.
- Dry at $150 \text{ }^\circ\text{C}$ for 10 – 20 minutes.
- Fire at $950 - 1350 \text{ }^\circ\text{C}$ (peak) for 8 – 12 minutes, and with a total firing cycle time ≥ 30 minutes.

Thinner

HVS 100

Typical Properties (Paste)

Form	Pseudoplastic paste
Viscosity	IP 211 (Blue): 15 – 30 Pas IP 211 (Clear): 25 – 45 Pas ($25 \text{ }^\circ\text{C}$, $D = 100/\text{s}$)
Coverage	c. $40 \text{ cm}^2/\text{g}$ (at $50 \mu\text{m}$ fired film thickness)
Shelf Life	3 months from date of shipment with correct storage (in a dry, cool ($5 - 25 \text{ }^\circ\text{C}$) and dark place with container tightly shut).

Typical Properties (Fired)¹

Dielectric Constant ²	7 – 10 ($25 \text{ }^\circ\text{C}$, 1 kHz)
Dissipation Factor ²	$< 0.5 \%$ ($25 \text{ }^\circ\text{C}$, 1 kHz)
Insulation Resistance ²	$> 10^{11} \Omega \times \text{cm}$ ($25 \text{ }^\circ\text{C}$)
Breakdown Voltage	$> 500 \text{ V DC}$ (3 separately fired layers with a total FFT of $50 \mu\text{m}$)
Colour	IP 211 : Blue IP 211 Clear: Colourless Transparent

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Legend:

1) Typical properties based on laboratory test methods. For optimum results all materials should be fired in a profiled furnace supplied with dried, hydrocarbon and other contaminant free air (PP-1).

2) Depending on conductor material, processing conditions and measurement methods

3) REACH compliant according to the latest ** Annex XIV to Regulation (EC) of the European Parliament and of the council on the Registration, Evaluation, Authorisation and Restriction of Chemicals ("REACH") by European Chemicals Agency and its subsequent amendments; the material does not contain any substance listed in Annex XIV.

4) RoHS compliant according to the latest ** Directives (European Union) of Restriction of Hazardous Substances ("RoHS") and its subsequent amendments (including the exceptions related to Pb)

* See the data sheet issue date (DD/MM/YY) as reference of validity of latest edition which is available on request

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