

## Dielectrics

### IP 211

#### 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. A clear version is available on demand. It also can be used to cover Cr-steel with an insulating layer. IP 211 / IP 211 clear displays the following advantages :

1. It fires to an extremely dense, hermetic film, allowing excellent electrical performance at fired thicknesses of  $\geq 50 \mu\text{m}$ .
2. A continuous operation temperature at up to  $500^\circ\text{C}$  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

Note: For steel pre-treatment, see separate info. sheet.

##### Processing:

1. Spatulate well prior to processing. When stored in a fridge, the paste should have acquired room temperature before being opened to avoid condensation.
2. Print through a 165 – 325 mesh screen. A print-dry-fire sequence is advised for each layer.
3. Level at room temperature for 10 minutes.
4. Dry at  $150^\circ\text{C}$  for 10 – 20 minutes.
5. Fire at  $950 - 1350^\circ\text{C}$  (peak) for 8 – 12 minutes, and with a total firing cycle time  $> 30$  minutes.

**Thinner :** HVS 100

##### Properties (Paste):

Form : Thixotropic paste

Viscosity : IP 211: 15 – 30 Pas  
IP 211 clear: 25 – 45 Pas  
( $25^\circ\text{C}$ ,  $D = 100 \text{ s}^{-1}$ )

Coverage: c.  $40 \text{ cm}^2 / \text{g}$  (FFT:  $50 \mu\text{m}$ )

Shelf Life : 3 months, with correct storage ( $5 - 25^\circ\text{C}$ , in a cool, dry, dark place, and with the container tightly shut)

##### Properties (Fired):<sup>1</sup>

Dielectric Constant <sup>2</sup>: 7 – 10 ( $25^\circ\text{C}$ , 1 kHz)

Dissipation Factor <sup>2</sup>:  $< 0.5 \%$  ( $25^\circ\text{C}$ , 1 kHz)

Insulation Resistance <sup>2</sup>:  $> 10^{11} \text{ Ohms x cm}$  ( $25^\circ\text{C}$ )

Breakdown Voltage :  $> 500 \text{ V DC}$   
( $50 \mu\text{m}$  FFT & 3 separately fired layers )

Color: IP 211: blue  
IP 211 clear: transparent

- 1 For optimum results all materials should be fired in a profiled furnace supplied with dried, hydrocarbon-free and other contaminant-free air (PP-1).
- 2 Depending on conductor material, processing conditions and measurement methods

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The descriptions and engineering data shown here have been compiled by Heraeus using commonly-accepted procedures, in conjunction with modern testing equipment, and have been compiled as according to the latest factual knowledge in our possession. The information was up-to date on the date this document was printed (latest versions can always be supplied upon request). Although the data is considered accurate, we cannot guarantee accuracy, the results obtained from its use, or any patent infringement resulting from its use (unless this is contractually and explicitly agreed in writing, in advance). The data is supplied on the condition that the user shall conduct tests to determine materials suitability for a particular application.

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