

Technical Information

DF76



FERRO/CABRO – Bright Precious Metal Preparations for Application on Porcelain, Ceramic and Glass

Bright precious metal preparations are varnish-like organic compounds containing precious metals, combined with flux components (based on organic metal compounds) as adhesion promoters. They further contain resin solutions as film formers. Applied and fired on a smooth ceramic surface, a highly glossy precious metal film forms. According to the colour shade of the fired product we distinguish:

- **Bright gold**, which develops a typical yellow gold shade after firing, and contains a small proportion of silver and lemon-yellow shade, achieved by formation of a gold/silver alloy.
- **Bright platinum**, which fire to a white-gold shade, achieved by formation of an Au/Pt or Au/Pd alloy.

Product Range

Ferro's **PMP** product range contains bright precious metal preparations for all common application methods in use in ceramic industries. Listed in the following tables are standard and special products arranged according to:

- **Type of preparation** (bright gold, bright platinum, semi matt gold, semi matt platinum, burnish gold, burnish platinum, lustre products, decoration auxiliaries)
- **Application** (brushing, lining, banding, stamping, indirect screen printing, direct screen printing).

The information given in the product TDS include colour shade, precious metal content, important product characteristics as well as the substrate for which each PM preparation is best suited. Please note the following abbreviations:

GLV	Gold Liquid Vitrum
GLC	Gold Liquid Ceramic
GSC	Gold Screen Ceramic
GSV	Gold Screen Vitrum
GSCM	Gold Screen Ceramic semi matt
GBMV	Gold Bending Machine Vitrum
GHFM	Gold High Fire Matt
BGLC	Burnish Gold Liquid Ceramic
BGLV	Burnish Gold Liquid Vitrum
PLV	Platinum Liquid Vitrum
PLC	Platinum Liquid Ceramic
PSC	Platinum Screen Ceramic
PSV	Platinum Screen Vitrum
PBMV	Platinum Bending Machine Vitrum
PHFM	Platinum High Fire Matt
TPG	ThermoPlastic Gold
TPP	ThermoPlastic Platinum
LLU	Lustre Liquid Universal (ceramic&vitrum)
LLC	Lustre Liquid Ceramic
LLV	Lustre Liquid Vitrum
LSC	Lustre Screen Ceramic
L	Thinner for liquids
X	Thinner for paste
PMP	Precious Metal Preparation
BC	Bone China
PZ	Porcelain
CE	Ceramic
GS	Glass

Precious Metal Content

FERRO bright gold preparations have a fine gold content till 38 %. Preparations with a fine gold content of less than 5 % are designated as lustres.

FERRO bright platinum preparations have a combined precious metal content (gold, platinum and/or palladium) till 26 %. The data given in the tables refer to the total content of Au-, Pt-, and/or Pd.

Consistency

Preparations to be applied by **brush, spraying or printing** are fluids with low viscosity (≤ 500 mPa-s), while those processed by **screen-printing** or other **mechanical application methods** are pastes with high viscosity (approx. 2,000 - 40,000 mPa-s).

FERRO bright PM preparations are generally supplied ready for use. If desired, suitable thinning oils are available to adjust viscosity to meet individual requirements.

Quality

In accordance with the quality management system of Ferro's Color and Glass Performance Materials Division, which is certified according to the **DIN EN ISO 9001, ISO 14001 and OHSAS 18001** certificates, precious metal preparations have to pass stringent quality control after production. Each production lot is carefully checked and compared with our production standard. Only those batches that meet Ferro's stringent standards are released for sale.

Dishwasher Resistance

FERRO bright PM preparations have been developed to deliver high value to the consumer. This includes mechanical resistance during daily use, as well as dishwasher durability.

Ferro classifies **ceramic decorations** (porcelain, bone china, etc.) as **dishwasher-resistant**, when they withstand more than 1000 washing cycles, and as **dishwasher-proof /-safe** when they withstand more than 500 washing cycles largely undamaged. Tests are conducted in a household dishwasher following the **EN test standard 50275, part 1**.

The data in the tables are based on dishwasher tests conducted in the R&D laboratories of Ferro GmbH.

Application

Before decoration, make sure that the substrate is clean and completely dry. Usually it is sufficient to rub the article with a water- or alcohol-dampened cloth or chamois leather and allow it to dry. In order to prevent moisture on the surface of the objects to be decorated caused by condensation (for example during transfer from a cool stockroom into a warm decoration room), we recommend allowing the ware to reach the temperature of the decoration room, and also give it time for evaporation of any condensation.

Different consistencies of PM products are required for different application techniques, as well as by the type of substrate to be decorated, in order to obtain optimum processing and firing results. If desired, suitable thinning oils are available to adjust the viscosity: e.g. **for spray application** or **for screen cleaning**, rapid evaporating oils and solvents are required, whereas for the application of **brush preparations**, semi-fat oils are needed, whilst for **printing application**, fat oils with low volatility are desired. The Decoration Auxiliaries mentioned in this brochure have especially been developed to perfectly suit **FERRO** PM preparations.

Printing of Bright Precious Metal Preparations

Work should always take place in well-ventilated workshops at room temperatures between 20-25 °C.

Squeegees should be made of a solvent-resistant material such as polyurethane (hardness 60-75 °Shore). For good results it is important to use squeegees with a clean, well sharpened edge.

Tab. 1: Recommended meshes for screen printing bright precious metal preparations

Preparation	Screen	
	Polyester [threads/cm]	Steel (VA 160-25) [mesh/inch]
Bright gold, bright platinum	140	400

Firing Process

The firing conditions depend on the type of substrate to be decorated and further individual processing parameters. Please bear in mind that precious metal preparations contain organic compounds that decompose during firing. It is therefore essential to assure sufficient kiln ventilation during the entire process, but especially during the heating up phase up to about 500 °C.

As the firing cycle has a strong influence on the quality of the final decoration, we recommend to determine the optimum conditions by pre-tests.

In contrast to normal firing, fast firing in continuous kilns allows faster firing cycles with a simultaneous increase in maximum temperature. Fast firing conditions impose special requirements on the preparations.

Tab. 2: Firing conditions common in the ceramic industry

Material	Temperature [°C]	Soaking Time [min]
Ceramic	700-780	10
Glass	550 -650°C	1-5
Porcelain		
Normal firing	780-850	10
Fast firing	860-900	-
Bone China	750-850	1 - 20

Storage

FERRO bright preparations should be stored in a cool and dry place (preferably in a refrigerator, at approx. 18 °C). Please note that bright gold and palladium/platinum preparations have a shelf-life of 6 months, whereas red lustre have a shelf life of 3 months.

Packing

FERRO preparations are supplied in the following packing sizes: 50 g, 100 g, 250 g, 500 g, 1 kg and 5 kg.

Containers are made of glass or plastic and bear a seal certifying their authenticity.

Safety Data Sheets

Data sheets providing health and safety information are available for all **FERRO** products.

Limitation of Warranty and Liability

Ferro believes that the information contained in this document is accurate at the time of its publication. Ferro makes no warranty with respect to the information contained in this document. The information in this document is not a product specification, either in whole or in part. Your use of the information contained in this document and your purchase and use of this Ferro product are at your sole discretion. Downstream users are responsible for determination of the suitability of this product and for testing in specific applications. Nothing in this document shall be construed as a license for use that infringes upon any property rights of any third party. Please refer to the Safety Data Sheet (SDS) for safe use, handling and disposal information. All sales by Ferro to you are subject to Ferro's Terms and Conditions of Sale, as amended from time to time and available at www.ferro.com. In the event this document conflicts with Ferro's Terms and Conditions of Sale, Ferro's Terms and Conditions of Sale shall control.