



Thermoplastic Lustres

1 General Information

Thermoplastic lustres are metal compounds that are dissolved in organic waxes and resins. They solidify at room temperature and are lead free. After firing, thermoplastic lustres form a very thin film (less than 1 μm), therefore their mechanical resistance does not achieve the same standard as most ceramic colours and precious metal preparations.

Typical characteristics of lustres are their brilliance as well as their metallic iridescent brightness which occurs after firing on smooth substrates. The lustre loses its iridescent effect on matt surfaces and appears matt.

Thermoplastic lustres are suitable for the decoration of drinking glasses, bottles and flacons. The preparations can be used to print a closed surface as well as half-tone dot prints.

Thermoplastic decorating materials, precious metal preparations, colours and lustres are printed with heated screens. They solidify immediately after application. This characteristic enables the printing of a complete decoration within a few seconds. For this, several screen printing stations are arranged one after the other.

Depending on the decoration, lustres and precious metal preparations can be printed side by side but should not be printed on top of each other. However, overprinting is possible after an intermediate firing.

Another advantage of thermoplastic lustres is the possibility of printing all the way around cylindrical glass and ceramic articles.

Heraeus offers a colour range of 8 thermoplastic lustres.

2 Firing Range

480 – 630°C (900 – 1170°F) for glass

3 Precious metal content

Less than 6 % or precious metal free



The statements concerning our products correspond to our current knowledge and experience. It is the obligation of the purchaser to examine the usefulness of the products in its intended use in each individual case. In order to prevent production losses the user has to test the preparations in connection with every other material being involved in the production process and has to be satisfied that the intended result can be consistently produced.

W. C. Heraeus

Business Unit Ceramic Colours
Heraeusstraße 12-14
D-63450 Hanau
Telefon: +49 (0) 6181 35 4420
Telefax: +49 (0) 6181 35 9637
e-mail: ccd-m@heraeus.com
internet: www.heraeus-ccd.com / www.wc-heraeus.com

4 Properties

4.1. Mechanical Resistance

The chemical composition of glass, the resulting low firing range and the low thickness of metal film on the glass limits the mechanical resistance that can be obtained. Ideal firing conditions improve the resistance considerably.

4.2. Storage

Thermoplastic lustres should be stored at room temperature (approx. 20°C / 70°F). We recommend using the preparation within 6 months.

4.3. Consumption

The material consumption of thermoplastic lustres is approx. 0.2 – 0.3 g/100 cm² depending on the printing parameters (screen strength, squeegee position and squeegee pressure).

4.4. Deviations In Colour

The type of glass, the kiln atmosphere, firing conditions and temperatures are decisive for good firing results. These factors can cause deviations in the colour of the lustres after firing. To achieve good results it is advisable to carry out trial printing and firing.

5 Application Recommendations

5.1. Conditions Required For Good Results

- Make sure that the surface of the object to be decorated is clean and dry. Dust, fingerprints and water condensation can adversely affect the decoration during the firing.
- Take care that the objects are not decorated directly after they have been brought from a cold storage room into the warm decoration shop. A fine condensation film may occur that is not visible to the naked eye. This results in faults (eg. pinholes) in the fired precious metal decoration! Allow enough time for the material to adjust to the temperature in the decoration shop.

5.2. Influencing Factors

A number of parameters can influence the quality of the decoration and need to be considered when choosing the appropriate lustre preparation:

- Chemical composition of the glass.
- Glass coatings can impair the lustre decoration.
Inorganic and organic coatings are applied to glass objects in order to minimize damage to the glass surface caused by the objects rubbing against each other during transport. Moreover, coatings are often applied very unevenly. This can lead to a loss in quality with regard to brightness, colour shade and adhesion.
- Firing range.

The statements concerning our products correspond to our current knowledge and experience. It is the obligation of the purchaser to examine the usefulness of the products in its intended use in each individual case. In order to prevent production losses the user has to test the preparations in connection with every other material being involved in the production process and has to be satisfied that the intended result can be consistently produced.

W. C. Heraeus

Business Unit Ceramic Colours
Heraeusstraße 12-14
D-63450 Hanau
Telefon: +49 (0) 6181 35 4420
Telefax: +49 (0) 6181 35 9637
e-mail: ccd-m@heraeus.com
internet: www.heraeus-ccd.com / www.wc-heraeus.com

(see recommendation under item 2)

Generally we recommend testing the chosen lustre preparations in advance under realistic conditions. Please follow our instructions on individual lustre preparations.

5.3. Basic Information On Screen Heating, Screen Strength And Squeegees

5.3.1. Screen Heating

To print thermoplastic lustres the surface of the screen must be heated to a constant temperature of 65 to 75°C (150 to 170°F).

On no account should thermoplastic lustres be heated above 90°C (190°F) as this may lead to the decomposition of the preparation.

5.3.2. Screen Strength

We recommend the use of 425 – 500 mesh steel screens or the corresponding metallized polyester screen.

5.3.3. Squeegee

For a good printing result, it is important to have a well sharpened squeegee (hardness: 60-75° shore).

5.4. The Printing Process

- Apply the thermoplastic lustre preparation onto the heated screen.
- The thermoplastic lustre preparation can be applied as a granulate onto the heated screen (65 to 75°C / 150 to 170°F). Depending on the quantity applied the preparation melts within 5 to 10 minutes and becomes printable.
- Alternatively the lustre granulate can be heated up on a hot plate (65 to 75°C / 150 to 170°F) or in a drying cabinet and then applied to the screen in a molten condition. For quick replenishing of the paste during the printing process, it is recommended to pre-melt the preparation.
- Apply as much of the product as is needed to flood the screen with one motion of the squeegee. Generally a comparatively generous amount of the paste can be added to the screen. Due to the low solvent content a significant increase in the viscosity is not to be expected. Nevertheless, the amount of the product applied to the screen should not exceed the amount required for the complete process, as the preparation undergoes a certain amount of ageing during printing.
- Overlapping should be avoided if precious metal and colour layers are printed directly next to each other.

5.5. Miscibility

Thermoplastic lustres are not mixable with each other.

The statements concerning our products correspond to our current knowledge and experience. It is the obligation of the purchaser to examine the usefulness of the products in its intended use in each individual case. In order to prevent production losses the user has to test the preparations in connection with every other material being involved in the production process and has to be satisfied that the intended result can be consistently produced.

W. C. Heraeus

Business Unit Ceramic Colours
Heraeusstraße 12-14
D-63450 Hanau
Telefon: +49 (0) 6181 35 4420
Telefax: +49 (0) 6181 35 9637
e-mail: ccd-m@heraeus.com
internet: www.heraeus-ccd.com / www.wc-heraeus.com

5.6. Firing of the Decoration

- During the first heating phase the organic components of the preparation are burnt off. This process is completed at approx. 400°C (750°F). The colour tone is formed. A constant, slow increase in temperature, enough fresh air and the quick drawing-off of the fumes are decisive for the quality of the fired lustre decoration.
- The firing profile considerably influences the mechanical and chemical properties of the resulting decoration. Most lustres pale at temperatures above 600°C (1100°F).
- The rate of cooling has no major influence on the quality of the fired decoration, unlike the firing temperature and soak time. However, the firing process should not be stopped too abruptly after the soak time. Cooling down the decorated articles too quickly can damage the articles (cracks and broken glass).

5.7. Cleaning The Screen And Squeegee

Screens and squeegees have to be cleaned directly after printing. We recommend the use of our screen cleaner V 34. This special screen cleaner prevents the clogging of the fine screen structure and prolongs the lifespan of the screen. The screen should never be cleaned with toluene or similar solvents when it is still hot.

The statements concerning our products correspond to our current knowledge and experience. It is the obligation of the purchaser to examine the usefulness of the products in its intended use in each individual case. In order to prevent production losses the user has to test the preparations in connection with every other material being involved in the production process and has to be satisfied that the intended result can be consistently produced.

W. C. Heraeus

Business Unit Ceramic Colours
Heraeusstraße 12-14
D-63450 Hanau
Telefon: +49 (0) 6181 35 4420
Telefax: +49 (0) 6181 35 9637
e-mail: ccd-m@heraeus.com
internet: www.heraeus-ccd.com / www.wc-heraeus.com

6 Frequent Faults, Their Causes And Ways Of Avoiding Them

Fault	Possible Cause	Remedy
Streaks in the printed lustre film	the squeegee is possibly scratched	Exchange or sharpen squeegee
Squashed print	Check the screen movement to the substrate	Adjust the distance between screen and substrate to be decorated
Spots, firing disturbance	Objects were soiled by dust, finger marks or water drops before printing	clean the object before decorating
	problems in the kiln such as: <ul style="list-style-type: none"> Reduction of atmosphere in kiln insufficient ventilation heat increase is too fast during critical phase between 200-400°C (390-750°F) too many objects in the kiln 	<ul style="list-style-type: none"> increase air addition improvement ventilation reduce heating speed reduce the number of objects in the kiln
Fired result is blotchy or matt	Screen used is too coarse Printed layer is too thick	we recommend the use of a 425 up to 500 mesh steel screen for printing thermoplastic lustres
Blurred outline after lustre has been fired (spreading or running)	too many objects in kiln	reduce the number of objects in the kiln
Paste will not print properly	screen temperature was too high. Lustre preparation has decomposed or a chemical reaction has occurred.	Remove product from the screen (=> recycling). Clean the screen and print with fresh preparation. Be sure that screen temperature is 65-75°C (150-170°F).
Lustre flakes off during firing	Printed layer was too thick	Reduce thickness of applied film
Fine pinholes	moisture on the objects before decoration is applied and leads to firing faults (pinholes)	Give the ware enough time to adjust to the temperature of the decoration shop and so allow the possible condensation film to evaporate.
low mechanical resistance of the lustre	firing temperature was too low	increase firing temperature
	product layer was too thin	Use 425-500 mesh steel screen to print thermoplastic lustres
screen is clogged	Product is not sufficiently molten	Stop printing and allow the product to melt thoroughly. Check screen temperature. We recommend pre-melting thermoplastic lustres in a drying cabinet (80°C / 176°F).
	Localized cooling of the screen	Check the screen's heating system
Deviance in colour tone	The composition of the glass and the surface structure of the substrate can cause deviations in the colour.	Carry out test with the substrate to avoid firing faults.
	Kiln atmosphere	Keep strictly to the parameters

The statements concerning our products correspond to our current knowledge and experience. It is the obligation of the purchaser to examine the usefulness of the products in its intended use in each individual case. In order to prevent production losses the user has to test the preparations in connection with every other material being involved in the production process and has to be satisfied that the intended result can be consistently produced.

W. C. Heraeus

Business Unit Ceramic Colours
Heraeusstraße 12-14
D-63450 Hanau
Telefon: +49 (0) 6181 35 4420
Telefax: +49 (0) 6181 35 9637
e-mail: ccd-m@heraeus.com
internet: www.heraeus-ccd.com / www.wc-heraeus.com

7 Thermoplastic Lustres

	Number of Colour	Name of colour	precious metal content	lead free	cadmium free	Notes
	LUP 9317/TH	Iris		●	●	-
	LUP 9318/TH	Yellow		●	●	-
	LUP 9708/TH	Red	●	●	●	-
	LUP 9602/TH	Golden violet	●	●	●	-
	LUP 9104/TH	Blue	●	●	●	-
	LUP 9105/TH	Light blue	●	●	●	-
	LUP 9406/TH	Green	●	●	●	-
	LUP 9202/TH	Khaki	●	●	●	-

The colours are available in different colour shades.

Some lustre preparations can be dishwasher durable (depends on firing conditions, substrate etc.). This must, however, always be checked by the user under his own individual conditions.

The statements concerning our products correspond to our current knowledge and experience. It is the obligation of the purchaser to examine the usefulness of the products in its intended use in each individual case. In order to prevent production losses the user has to test the preparations in connection with every other material being involved in the production process and has to be satisfied that the intended result can be consistently produced.

W. C. Heraeus

Business Unit Ceramic Colours
 Heraeusstraße 12-14
 D-63450 Hanau
 Telefon: +49 (0) 6181 35 4420
 Telefax: +49 (0) 6181 35 9637
 e-mail: ccd-m@heraeus.com
 internet: www.heraeus-ccd.com / www.wc-heraeus.com