



## Lustres for Brush Application and Spraying on Glass, Porcelain, Bone China, Earthenware and Tiles

### 1 General Information

Lustres are based on metallic compounds dissolved in organic solvents. After firing they form a very thin layer (less than 0.1  $\mu\text{m}$ ).

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.

Lustres are suitable for the decoration of glass, porcelain, bone china, earthenware and tiles.

### 2 Firing Range

480-630°C / 896-1166°F for glass and lead-crystal.

650-900°C / 1202-1652°F for porcelain, bone china, earthenware and tiles.

### 3 Precious Metal Content

Lustres contain less than 6 % precious metal or are precious metal free.

### 4 Properties

#### 4.1. Mechanical Resistance

The mechanical resistance of lustres does not achieve the same standard as most ceramic colours and precious metal preparations because the formed lustre film is very thin. Therefore, we recommend that customers test the decorations under their own conditions to achieve the required resistances.



#### 4.2. Storage

Lustres should be stored in a cool place or at room temperature (approx. 20°C / 68°F). We recommend that the preparations should be used within 6 months.

#### 4.3. Consumption

The material consumption depends on the layer thickness of the applied lustre. This is influenced by the viscosity, the amount of thinner added and by the application of the lustre.

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## 4.4 Colour Deviation

Substrate, kiln atmosphere, firing conditions and temperature, and the layer thickness are decisive for a good decoration. To receive good results it is recommended that a test decoration and subsequent firing be carried out.

## 5 Processing

### 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 affect the decoration during the firing process.
- Take care that the objects to be decorated are not taken from a cold store into a warm workshop. A fine condensation film may occur which is not visible to the naked eye. This results in faults (eg. pinholes) in the fired lustre decoration! Allow enough time for the material to adjust to the temperature of the workshop.

### 5.2 Application Information

#### 5.2.1 Brush Application

- For the application of lustres we recommend fine Casan or squirrel hair brushes. The lustre should not be brushed smooth, it should be left to „spread“ on the object to be decorated. Only then will the lustre achieve a very smooth and bright appearance after firing.
- Drying. The drying time depends on the surrounding atmosphere and the layer thickness of the lustre. Decorated objects should be protected from dust before firing. In general, it is recommended to fire the objects as soon as possible after they have dried.

#### 5.2.2 Spraying

- The jet size to be used depends on the size of the object to be decorated. The following can be taken as a general rule:

Object	Jet diameter	Pressure
Small object	0,2 – 0,4 mm	3,0 Bar / 43.5 psi
Large object	0,8 – 1,0 mm	3,5 Bar / 50.8 psi

- There is no clear recommendation for the correct distance between the object and the spray gun. It has to be determined through individual tests. It is important that a smooth layer is achieved on the object, while at the same time minimizing the loss from excessive spraying.
- When applying lustre pastes on ceramic tiles considerable changes in colour can occur, according to the glaze used. On principle, we recommend that printing and firing tests are made under the customer's own individual conditions.

### 5.3 Miscibility

- Lustres can be mixed with each other. However, unpredictable colour changes may occur, especially if lustres containing precious metals are mixed with lustres free of precious metals. We do not recommend mixing orange lustres with brown lustres, as this results in dirty colour shades.

### 5.3 Thinning

Particularly lustres that are to be sprayed have to be thinned.

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- As standard, we recommend the lustre thinner V 18.
- For sharp contours, such as with banding and lining, we recommend using the thinner V 35.
- Because of the releasing agents used in the machine production of glasses, problems may occur with the lustre's ability to wet the glass surface. The thinner V 36 has proved effective for this type of glass.
- To decrease the colour intensity of the lustres they can be mixed with the colourless lustre N 471. Normally there is no change in the colour tone, and quite often the adhesion is increased.
- The degree of thinning depends on the type of application method and can lie between 20 to 200 % (eg. for wafer-thin sprayed lustres). Generally, tests should be made under individual conditions, as the results can differ from luster to luster.

## 5.5 Firing

- During the first heating phase the organic components of the preparation burn off. This process is completed at approx. 400°C (750°F). The lustre film is formed. A constant, slow temperature increase, enough oxygen and sufficient ventilation are decisive for the quality of the fired lustre decoration.
- The firing profile considerably influences the mechanical and chemical properties of the fired decoration. Furthermore, the colour is strongly dependent on the temperature and the firing conditions.
- The rate of cooling has no major influence on the quality of the lustre 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 article too quickly can cause cracks in the glaze.

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## 6 Frequent Faults, Their Causes and Ways of Avoiding Them

Fault	Possible Cause	Remedy
Blurred contours, lustre runs.	Too much thinner was used.	Leave the bottle open for a while, so that some of the solvent can escape.
	The thinner was too fat or too slow drying.	Leave the bottle open for a while, so that some of the solvent can escape. Use quick drying thinner.
	Concentration of organic vapours in kiln too high.	Decrease kiln stacking and/or increase kiln ventilation.
Lustre is difficult to apply.	Viscosity is too high after long application or long storage	Thin lustre with V 35 or V 18.
Spots, firing faults.	Objects were soiled by dust, finger marks or water drops.	Clean the object before decorating.
	Problems in the kiln such as: <ul style="list-style-type: none"> <li>• reduction atmosphere in kiln</li> <li>• insufficient ventilation</li> <li>• heat increase is too fast during critical phase between 200-400°C (390-750°F)</li> <li>• too many objects in the kiln</li> </ul>	<ul style="list-style-type: none"> <li>• increase air addition</li> <li>• improve ventilation</li> <li>• reduce the heating speed</li> <li>• reduce the number of objects in the kiln</li> </ul>
Lustre flakes off after firing.	Applied layer is too thick.	Reduce the applied layer of the lustre.
	Applied layer is too thin.	Increase the applied layer of the lustre.
Low mechanical resistance of the lustre decoration	Firing temperature is too low.	Increase firing temperature.
Contour lines are blurred after lustre has been fired (decoration runs).	Too many objects in kiln.	Reduce the number of objects in the kiln.
Fine pinholes.	Pinholes can be caused by moisture on the surface of the objects to be decorated. For example, condensation occurs when the ware is brought from a cold store into the warmer workshop.	Give the ware enough time to adjust to the temperature of the workshop and so allow the possible condensation film to evaporate.

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## 7 Lustres for Brush Application and Spraying on Glass

Number of Colour	Name of colour	contains precious metal			Notes
			lead free	cadmium free	
N 631	White		●	●	-
N 472	Iris		●	●	-
LU 578	Iris (pearl effect)		●	●	-
LU 9301	Silvery Iris		●	●	-
LU 9304	Light Yellow			●	-
LU 512 A	Yellow	●	●	●	-
N 650/1	Orange		●	●	-
N 475/2	Orange		●	●	-
LU 7	Orange		●	●	-
N 497A	Reddish orange		●	●	-
LU 188	Aurora		●	●	-
LU 9703	Ruby	●	●	●	-
LU 109 A	Ruby	●	●	●	-
LU 647	Ruby (intense)	●	●	●	-
N 496	Raspberry	●	●	●	-
LU E 11 A	Lingonberry	●	●	●	-
LU E 517 GB	Pink	●	●	●	-
TLU0038A	Pink	●	●	●	-
LU 125 A	Violet	●	●	●	-
LU 9900	Violet	●	●	●	-
LU 9704	Violet	●	●	●	-
LU 9709	Dark Violet	●	●	●	-
LU E 146	Amethyst	●	●	●	-
LU 118 G	Blue	●	●	●	-
LU 200	Dark blue	●	●	●	-
LU 102	Light blue	●	●	●	-
LU 9103	Light blue	●	●	●	-
LU 542	Turquoise	●	●	●	-
N 338	Mossy green	●	●	●	-
LU 171	Green	●	●	●	-
LU 9405	Light green	●		●	-
LU 540	Dark green	●	●	●	-
N 493A	Beige		●	●	-
N 504	Brown		●	●	-
LU 580	Grey	●	●	●	-
LU 9800	Black	●	●	●	-

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## 8 Lustres for Brush Application and Spraying on Porcelain, Bone China and Tiles

Number of Colour	Name of colour	contains precious metal			Notes
			lead free	cadmium free	
N 631	White		●	●	-
N 472	Iris		●	●	-
LU 578	Iris (pearl effect)		●	●	-
LU 9301	Silvery Iris		●	●	-
LU 34	Silvery Iris		●	●	-
N 633	Yellow		●	●	-
N 650/1	Orange		●	●	-
N 475/2	Orange		●	●	-
LU 7	Orange		●	●	-
N 497 A	Reddish orange		●	●	-
LU 188	Aurora		●	●	-
LU 2 A	Ruby	●	●	●	-
N 495	Ruby	●	●	●	-
N 496	Raspberry	●	●	●	-
N 012/F	Pink	●	●	●	-
LU E 517 GB	Pink	●	●	●	-
TLU0038A	Pink	●	●	●	-
LU 125 A	Violet	●	●	●	-
N 499	Violet	●	●	●	-
LU 9901	Amethyst	●	●	●	-
LU 118	Blue	●	●	●	-
N 486/1	Dark blue	●	●	●	-
LU 102	Light blue	●	●	●	-
N 488	Light blue	●	●	●	-
LU 542	Turquoise	●	●	●	-
N 338	Mossy green	●	●	●	-
N 518	Green	●	●	●	-
LU 516	Light green		●	●	-
LU 540	Dark green	●	●	●	-
N 493A	Beige		●	●	-
N 504	Brown		●	●	-
LU 192 N	Brown		●	●	-
ST 26	Copper	●	●	●	-
LU 20 N	Copper	●	●	●	-
N 543	Light grey	●	●	●	-
LU 580	Grey	●	●	●	-
LU 234	Dark grey	●	●	●	-
N 605	Platinum	●	●	●	Platinum lustre
N 607	Platinum	●	●	●	Platinum lustre
N 608	Platinum	●	●	●	Platinum lustre
LU 9800	Black	●	●	●	-
N 508 D	Black	●	●	●	-

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Upon request the colours are available in different colour shades as well as for screen printing. If the user intends to use the lustres for the decoration of tiles, this must be checked under his own individual conditions due to different compositions of glaze.

Ruby lustres are prone to gel. Therefore, they should not be stored longer than 3 months.

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.

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